CALENDAR FOR THE BOARD OF SUPERVISORS
CONTRA COSTA COUNTY
AND FOR SPECIAL DISTRICTS, AGENCIES, AND AUTHORITIES GOVERNED BY THE BOARD
BOARD CHAMBERS, ADMINISTRATION BUILDING, 1025 ESCOBAR STREET
MARTINEZ, CALIFORNIA 94553-1229

DIANE BURGIS, *CHAIR,* 3RD DISTRICT
FEDERAL D. GLOVER, *VICE CHAIR,* 5TH DISTRICT
JOHN GIOIA, 1ST DISTRICT
CANDACE ANDERSEN, 2ND DISTRICT
KAREN MITCHOFF, 4TH DISTRICT

MONICA NINO, CLERK OF THE BOARD AND COUNTY ADMINISTRATOR, (925) 655-2075

PERSONS WHO WISH TO ADDRESS THE BOARD DURING PUBLIC COMMENT OR WITH RESPECT TO AN ITEM THAT IS ON THE AGENDA, MAY BE LIMITED TO TWO (2) MINUTES.
A LUNCH BREAK MAY BE CALLED AT THE DISCRETION OF THE BOARD CHAIR.

To slow the spread of COVID-19, the Health Officer's Shelter Order of September 14, 2020, prevents public gatherings (Health Officer Order). In lieu of a public gathering, the Board of Supervisors meeting will be accessible via television and live-streaming to all members of the public as permitted by the Governor's Executive Order N29-20. Board meetings are televised live on Comcast Cable 27, ATT/U-Verse Channel 99, and WAVE Channel 32, and can be seen live online at www.contracosta.ca.gov.

PERSONS WHO WISH TO ADDRESS THE BOARD DURING PUBLIC COMMENT OR WITH RESPECT TO AN ITEM THAT IS ON THE AGENDA MAY CALL IN DURING THE MEETING BY DIALING **888-251-2949** FOLLOWED BY THE ACCESS CODE **1672589#.** To indicate you wish to speak on an agenda item, please push "#2" on your phone.

All telephone callers will be limited to two (2) minutes apiece. The Board Chair may reduce the amount of time allotted per telephone caller at the beginning of each item or public comment period depending on the number of calls and the business of the day. Your patience is appreciated.

A lunch break or closed session may be called at the discretion of the Board Chair.
Staff reports related to open session items on the agenda are also accessible on line at www.contracosta.ca.gov.

AGENDA
January 18, 2022

9:00 A.M. Convene, call to order and opening ceremonies.

Closed Session
A. CONFERENCE WITH LEGAL COUNSEL--EXISTING LITIGATION (Gov. Code § 54956.9(d)(1))

1. *Contra Costa County v. James T. Robson III, Trustee, et al.*; Contra Costa County Superior Court Case No. C20-00705
2. *Cynthia Slezak v. County of Contra Costa, et al.*; Contra Costa County Superior Court Case No. C17-02454
3. *Diane Wilson, et al. v. Town of Danville, et al.*; United States District Court, Northern District of California, Case No. 3:21-cv-02440 TSH
4. *Mary Elizabeth Knox, et al. v. Contra Costa County, et al.*; United States District Court, Northern District of California, Case No. 3:20-cv-01449-JCS
5. *Gustave Kramer v. Board of Supervisors of Contra Costa County and County of Contra Costa,* Contra Costa County Superior Court Case No. MSN18-2076

Inspirational Thought- *"Faith is taking the first step even when you don't see the whole staircase."* ~Dr. Martin Luther King Jr.

Present: John Gioia, District I Supervisor; Candace Andersen, District II Supervisor; Diane Burgis, District III Supervisor; Karen Mitchoff, District IV Supervisor; Federal D. Glover, District V Supervisor

Staff Present: Monica Nino, County Administrator
Mary Ann McNett Mason, County Counsel

Supervisor Andersen recused herself from consideration on the case of Contra Costa County Superior Court Case No. C20-00705 Cynthia Slezak v. County of Contra Costa, et al. There were no announcements from Closed Session.

CONSIDER CONSENT ITEMS (Items listed as C.1 through C.83 on the following agenda) – Items are subject to removal from Consent Calendar by request of any Supervisor or on request for discussion by a member of the public. **Items removed from the Consent Calendar will be considered with the Discussion Items.**

PRESENTATIONS (5 Minutes Each)

PRESENTATION recognizing January 2022 as Positive Parenting Awareness Month. (Supervisor Mitchoff)

PRESENTATION recognizing January 2022 as Human Trafficking Awareness Month. (Supervisor Mitchoff)

PRESENTATION by the Assistance League Of Diablo Valley on their 50th Anniversary of the TeleCare Program. (Supervisor Mitchoff)

DISCUSSION ITEMS

D.1 HEARING to consider adoption of Ordinance No. 2022-06, which would extend Urgency Ordinance No. 2021-43 (approved by the Board of Supervisors on December 20, 2021) imposing a moratorium on the establishment or expansion of fulfillment centers, parcel hubs, and parcel sorting facilities in the North Richmond area. (Francisco Avila, Department of Conservation and Development)

The following people spoke in favor of the ordinance: Jan; Floy Andrews, Kathy.

D.2 HEARING to consider adopting Ordinance No. 2022-02, adopting and amending the 2019 California Energy Code to require all newly constructed residential buildings, hotels, offices, and retail buildings be constructed as all-electric buildings. (Demian Hardman, Department of Conservation and Development)

Speakers: Doug Chan, Builders; Rob, Danville; Denise, 1000 Grandmothers for Future Generations; Lisa Jackson, 350 Contra Costa; Juan Pablo Galvàn, Save Mt. Diablo; Carol, Rossmoor Community; Floy Andrews; Fred; No name given, Vote for Change; Mariella, Community Development Director, MCE; Jackie Garcia Mann, Climate Reality and Interfaith Climate Action Network; Ryan, Sustainable Contra Costa; Melissa Yu, Sierra Club; Casimir Karbo.

The following people provided written commentary (attached): Gary Farber, 350 Contra Costa; Adrian Byram, Sustainable Rossmoor; Andy Ferguson; Sue Bock, San Ramon Valley Climate coalition; Zoe Siegel, Greenbelt Alliance; Lisa Chang, Alamo; Ryan Buckley, Sustainable Contra Costa; Sheila Tarbet, Elders Climate Action; Laura Feinstein, PhD; Amanda Millstein, MD; Jan Warren, Interfaith Climate Action Network of CCC; Marcia Liberson, Walnut Creek; Cynthia Mahoney, Contra Costa Citizens Climate Lobby; Denice A. Dennis, 1000 Grandmothers for Future Generations; Ogie Strogatz, 350 Contra Costa; Marti Roach, 350 Contra Costa; Karen Leung, Contra Costa; Brenden Millstein; Maria Gastelumendi, Environmental Task Force of City of Lafayette; Nancy Hu, Climate Reality Project, Environmental Task Force of Lafayette.

AYE: District I Supervisor John Gioia, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

NO: District II Supervisor Candace Andersen

D.3 ACCEPT update on COVID-19; and PROVIDE direction to staff. (Anna Roth, Health Services Director)

Speakers: No name given; Casimir Karbo; Debbie Toth, Choice in Aging; Natalie.

ACCEPTED the oral report.

D.4 CONSIDER adopting the Proposed 2022 State and Federal Legislative Programs for Contra Costa County. (Lara DeLaney, County Administrator's Office)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

D.5 INTRODUCE Ordinance No. 2022-04, amending the Election Campaign Ordinance to revise the limits on individual campaign contributions to supervisorial and non-supervisorial candidates; WAIVE reading; FIX February 1, 2022, for adoption. (Supervisor Karen Mitchoff, Chair)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

D. 6 CONSIDER Consent Items previously removed.

There were no items removed from consent for discussion.

D. 7 PUBLIC COMMENT (2 Minutes/Speaker)

Marianna Moore, congratulated Supervisor Mitchoff and thanked Supervisor Burgis for her thoughtful comments, and notes she will work this year on improving communication with the Board;

Debbie Toth, Choice in Aging, is very pleased by the master plan for aging locally as well as to increase the safety net for our elders and also for all the benefits that will come from Measure X funding.

D. 8 CONSIDER reports of Board members.

There were no items reported today.

11:00 A.M.

Contra Costa County 44th Annual Dr. Martin Luther King Jr. Commemoration and Humanitarian of the Year Awards Virtual Ceremony

ADJOURN in memory
Clifford Dochterman
Moraga resident, past President of the International Rotary
and
Donald Huntington
Brentwood resident

CONSENT ITEMS

Road and Transportation

C. 1 ADOPT Traffic Resolution No. 2022/4514 to prohibit stopping, standing, or parking at all times except for those vehicles of individuals with disabilities (blue curb) on a portion of Winslow Street (Road No. 2295AD), as recommended by the Public Works Director, Crockett area. (No fiscal impact)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 2 AWARD and AUTHORIZE the Public Works Director, or designee, to execute a construction contract with Coral Construction Company in the amount of $1,117,777 for the Crockett Area Guardrail Upgrades Project, Crockett area. (52% Federal Highway Safety Improvement Program, 48% Local Road Funds)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Engineering Services

C. 3 ADOPT Resolution No. 2022/19 approving the seventh extension of the Subdivision Agreement for subdivision SD91-07553, for a project being developed by Alamo Land Investors, LLC and Alamo 37, LLC, as recommended by the Public Works Director, Alamo area. (No fiscal impact)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Special Districts & County Airports

C. 4 APPROVE and AUTHORIZE the Director of Airports, or designee, to execute an Exclusive Negotiating Agreement with Urban Mobility, LLC, a Delaware limited liability company, for the negotiation of a long-term lease of approximately 0.86-acre of land on the northwest side and approximately 11-acres of land on the northeast side of the Buchanan Field Airport. (100% Airport Enterprise Fund)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Claims, Collections & Litigation

C. 5 DENY claims filed by CA Insurance Co., as subrogee of Aaron Smith, DeMaria Gipson, Mercury Insurance, as subrogee of Peter Fogarty, Dustin Rober Scudder, Aaron and Holli Smith, State Farm, a subrogee of Rodolfo L. Angelito, Subro Claims Insurance Obo Geico Insurance, a subrogee of Christina Given, and Scott Talley.

AYE: District I Supervisor John Gioia, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Other: District II Supervisor Candace Andersen (RECUSE)

C. 6 APPROVE clarification of Board action of November 2, 2021 regarding claimant Arnulfo Ramirez to reflect the correct name of the property owner/payee as Paper Tree Garden LLC and AUTHORIZE payment to Paper Tree Garden LLC from the Liability Internal Service Fund in an amount not to exceed One Hundred Thousand Dollars ($100,000) for resolution of a claim of property damage. (100% Liability Internal Service Fund)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Statutory Actions

C. 7 ACCEPT Board members meeting reports for December 2021.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Honors & Proclamations

C. 8 ADOPT Resolution No. 2022/27 recognizing Assistance League of Diablo Valley's TeleCare Program and its 50 years of service to our community, as recommended by Supervisor Mitchoff.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 9 ADOPT Resolution No. 2022/28 proclaiming January 2022 as Human Trafficking Awareness Month in Contra Costa County, as recommended by Supervisor Mitchoff.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 10 ADOPT Resolution No. 2022/30 proclaiming January 2022 as Positive Parenting Month, as recommended by Supervisor Mitchoff.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Ordinances

C. 11 INTRODUCE Ordinance No. 2022-05 amending the County Ordinance Code to exclude from the merit system the new classification of Chief of Administrative Services - Exempt, update section heading, and reorganize existing section, WAIVE READING and FIX February 1, 2022, for adoption, as recommended by the Human Resources Director.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Appointments & Resignations

C. 12 APPOINT Michael Bruno as the Sterling Aviation representative on the Aviation Advisory Committee for a term ending February 28, 2022, as recommended by the Contra Costa County Airports Business Association.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 13 ACCEPT the resignation of Richard Bell, DECLARE a vacancy in the District 1 seat on the Family & Children's Trust Committee for a term ending September 30, 2023, and DIRECT the Clerk of the Board to post the vacancy.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 14 ACCEPT the resignation of Silvia Ledezma, DECLARE a vacancy in the District 1 seat on the Arts & Culture Commission for a term ending June 30, 2025, and DIRECT the Clerk of the Board to post the vacancy.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 15 APPOINT in lieu of election Coleman Foley and Thomas E. Baldocchi, Jr. to the Board of Trustees of Reclamation District 2065 for terms of four years, as recommended by the County Administrator.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 16 ACCEPT the resignation of Joan D'Onofrio, DECLARE a vacancy in the At-Large 3 seat on the Arts & Culture Commission for a term ending June 30, 2025, and DIRECT the Clerk of the Board to post the vacancy, as recommended by the County Administrator.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Appropriation Adjustments

C. 17 Employment and Human Services Department, Community Services Bureau (0589): APPROVE Appropriations and Revenue Adjustment No. 5025 authorizing additional revenue from the California Department of Social Services in the amount of $3,475,050 in the Employment and Human Services Department, Community Services Bureau (0589) for an increase in the Maximum Reimbursable Amounts in FY 21-22 for the California Alternative Payment Program and the California Alternative Payment Program Stage II. (100% State)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 18 Employment and Human Services Department, Community Services Bureau (0589): APPROVE Appropriations and Revenue Adjustment No. 5026 authorizing additional revenue from the California Department of Social Services in the amount of $182,566 in the Employment and Human Services Department, Community Services Bureau (0589) for an increase in the Maximum Reimbursable Amount to the Child Care and Development Program. (100% State)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 19 County Counsel (0030): APPROVE Appropriation Adjustment No.05027 transferring $154,693.00 in revenues to the County Counsel's Office (0030), for fiscal year 2021-22 specialized legal services for Health Services.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Personnel Actions

C. 20 ADOPT Position Adjustment Resolution No. 25872 to add one Deputy County Counsel - Advanced - Exempt (unrepresented) position in the Office of the County Counsel. (100% Health Services Department)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 21 ADOPT Position Adjustment Resolution No. 25877 to reallocate the salary of the Director of Airports (unrepresented) classification in the Public Works Department – Airports Division. (100% Airport Enterprise Fund)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 22 ADOPT Position Adjustment Resolution No. 25870 to add one Assistant Chief Information Officer-Exempt position and appoint the incumbent in position no. 17614 to this position; cancel one Chief Information Security Officer-Exempt position and abolish the class; and reallocate the salary of the Assistant Chief Information Officer-Exempt on the salary schedule in the Department of Information Technology. (100% User Departments)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 23 ADOPT Position Adjustment Resolution No. 25871 to add one Chief of Administrative Services - Exempt position and cancel one Administrative Services Officer (unpresented) position in the Department of Information Technology. (100% User Departments)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 24 ADOPT Position Adjustment Resolution No. 25879 to add 73 represented positions to permanently staff the Inpatient Psychiatric Services unit at the Contra Costa Regional Medical Center in the Health Services Department. (Cost neutral)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Grants & Contracts

APPROVE and AUTHORIZE execution of agreements between the County and the following agencies for receipt of fund and/or services:

C. 25 ADOPT Resolution Nos. 2022/11 and 2022/34, approving and authorizing the Health Services Director, or designee, to apply for and accept two loans, in an amount not to exceed $20,000,000 for each loan, from the State of California's No Place Like Home Program as a joint applicant with development sponsors to fund a portion of two affordable permanent supportive housing projects for persons with mental illness or who are homeless. (No County match)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 26 APPROVE and AUTHORIZE the Employment and Human Services Director, or designee, to execute the Continued Funding Application with the California Department of Social Services for General Child Care and Development Program, CalWORKs Stage 2, and California Alternative Payment Program for Fiscal Year 2022-23. (100% State)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 27 APPROVE and AUTHORIZE the Chief Information Officer, or designee, to execute a contract with Delta Diablo to pay the County an amount not to exceed $140,000 to provide information technology services for the period of November 17, 2021 through June 30, 2022. (100% Delta Diablo Sanitation District)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 28 APPROVE and AUTHORIZE the County Librarian, or designee, to apply for and accept California State Library grant funding in the amount not to exceed $20,000 to meet the operational and services expenses required by Project Second Chance, the Contra Costa County Library adult literacy program, to provide English as a Second Language services for the period January 1 to June 30, 2022. (63% County match, Library Fund)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 29 APPROVE and AUTHORIZE the Sheriff-Coroner, or designee, to execute a contract with the City and County of San Francisco, in an amount not to exceed $634,686 as part of the 2021 U.S. Department of Homeland Security, Urban Area Security Initiative Grant for homeland security related projects for the period November 1, 2021 through the end of the grant funding. (100% Federal)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

APPROVE and AUTHORIZE execution of agreement between the County and the following parties as noted for the purchase of equipment and/or services:

C. 30 AUTHORIZE the Public Works Director, or designee, to advertise for bids for the 2022 Uninterrupted Power Supply (UPS) Services Contract(s) for maintenance and emergency repairs to County UPS units at various County facilities, Countywide. (100% General Fund)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 31 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Wellsky Corporation in an amount not to exceed $1,815,883 to provide a hosted software system for Wellsky's blood bank and care management systems for the period January 18, 2022 through January 10, 2027. (100% COVID-19 Enhancing Learning Capacity Supplemental)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 32 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a novation contract with A Better Way, Inc., in an amount not to exceed $700,000 to provide mental health services to children ages birth to twenty-one and their families in Contra Costa County for the period July 1, 2021 through June 30, 2022, including a six-month automatic extension in an amount not to exceed $350,000 through December 31, 2022 . (50% Federal Medi-Cal, 50% Employment and Human Services Department)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 33 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a novation contract with Desarrollo Familiar, Inc. (dba Familias Unidas), in an amount not to exceed $431,158 to provide community based mental health services for children and their families in West Contra Costa County for the period July 1, 2021 through June 30, 2022, including a six-month automatic extension through December 31, 2022 in an amount not to exceed $215,579. (50% Federal Medi-Cal, 50% Mental Health Realignment)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 34 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a novation contract with Fred Finch Youth Center, in an amount not to exceed $1,439,194 to provide school and community-based mental health and therapeutic behaviroal services to adolescent children for the period July 1, 2021 through June 30, 2022, including a six-month automatic extension through December 31, 2022 in an amount not to exceed $709,597. (49% Federal Medi-Cal, 49% Mental Health Realignment, 2% Mt. Diablo Unified School District)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 35 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Lincoln, in an amount not to exceed $1,612,202 to provide mental health services and multi-dimensional family therapy for seriously emotionally disturbed adolescents and their families for the period July 1, 2021 through June 30, 2022, including a six-month automatic extension through December 31, 2022, in an amount not to exceed $806,101. (34% Federal Medi-Cal, 32% Mental Health Services Act Uninsured, 26% Mental Health Services Act, 8% Mental Health Realignment)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 36 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Mountain Valley Child and Family Services, Inc., in an amount not to exceed $1,852,100 to provide mental health services, case management and Therapeutic Behavioral Services for Seriously Emotionally Disturbed youth and dependents for the period July 1, 2021 through June 30, 2022, including a six-month automatic extension through December 31, 2022 in an amount not to exceed $926,050. (50% Mental Health Realignment, 50% Federal Medi-Cal)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 37 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Contra Costa Youth Services Bureau, in an amount not to exceed $3,846,000 to provide mental health services, wraparound services, and outpatient treatment to children in West County for the period from July 1, 2021 through June 30, 2022, including a six-month automatic extension through December 31, 2022 in an amount not to exceed $1,923,000. (50% Federal Medi-Cal, 50% Mental Health Realignment)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 38 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a novation contract with La Clinica de La Raza, Inc., in an amount not to exceed $297,644 to provide Mental Health Services Act Prevention and Early Intervention program services for the period July 1, 2021 through June 30, 2022, including a six-month automatic extension through December 31, 2022 in an amount not to exceed $148,822. (100% Mental Health Services Act)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 39 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Covelo Group, Inc., in an amount not to exceed $450,000 to provide temporary medical staffing and recruitment services for Contra Costa Regional Medical Center and Health Centers for the period January 1, 2022 through December 31, 2022. (100% Hospital Enterprise Fund I)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 40 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with The Sun Healthcare and Surgery Group, Inc., in an amount not to exceed $538,000 to provide podiatry services to Contra Costa Regional Medical Center and Health Center patients for the period October 1, 2021 through September 30, 2023. (100% Hospital Enterprise Fund I)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 41 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract amendment with American Medical Response West, effective October 1, 2021, to decrease the payment limit by $116,231 to a new payment limit of $117,585 and extend the termination date from August 31, 2022 to September 30, 2022 for the Choosing Change Program, an overdose prevention program, which allows emergency responders to provide opioid overdose medication and education services to patients and bystanders. (100% State)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 42 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Wanyi He, LAC, in an amount not to exceed $300,000 to provide acupuncture services to Contra Costa Health Plan members and County recipients for the period February 1, 2022 through January 31, 2025. (100% Contra Costa Health Plan Enterprise Fund II)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 43 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with DJR Healthcare Consulting, Inc., in an amount not to exceed $307,464 to provide consultation and technical assistance to the Contra Costa Regional Medical Center and Health Centers for the period January 1, 2022 through December 31, 2022. (100% Hospital Enterprise Fund I)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 44 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Center for Behavioral Solutions, in an amount not to exceed $675,000 to provide applied behavioral analysis services to Contra Costa Health Plan members for the period January 1, 2022 through December 31, 2024. (100% Contra Costa Health Plan Enterprise Fund II)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 45 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Crestwood Behavioral Health, Inc., in an amount not to exceed $95,000 to provide adult residential care and mental health services for the period January 1, 2022 through December 31, 2022. (100% Mental Health Realignment)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 46 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract amendment with Hobbs Investments, Inc. (dba Am-Tran), effective October 1, 2021, to increase the payment limit by $85,000 to a new payment limit of $460,000 to provide additional courier services at Contra Costa Regional Medical Center and Health Centers, with no change to the term February 1, 2021 through January 31, 2022. (100% Hospital Enterprise Fund I)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 47 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Animate Consulting LLC (dba Animate Behavior, LLC), in an amount not to exceed $900,000, to provide applied behavior analysis services to Contra Costa Health Plan members for the period December 1, 2021 through November 30, 2024. (100% Contra Costa Health Plan Enterprise Fund II)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 48 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Traditions Psychology Group, Inc (dba Traditions Behavioral Health), in an amount not to exceed $18,000,000 to provide physician management and psychiatric staffing for the Inpatient Psychiatric Crisis Stabilization Unit at Contra Costa Regional Medical Center, the County's Main Detention Facility and mental health clinics for the period December 1, 2021 through November 30, 2022. (100% Hospital Enterprise Fund I)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 49 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract amendment with Specialty Laboratories, Inc. (dba Quest Diagnostic Nichols Institute), to include additional outside laboratory testing services with no change to the payment limit of $7,000,000 or term January 1, 2021 through December 31, 2022. (No fiscal impact)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 50 APPROVE and AUTHORIZE the Public Works Director, or designee, to execute a contract with Bay City Boiler and Engineering Company Incorporated, in an amount not to exceed $750,000 to provide on-call boiler maintenance and repair services at various County buildings, for the period February 1, 2022 through January 31, 2025, Countywide. (100% General Fund)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 51 APPROVE and AUTHORIZE the Public Works Director, or designee, to execute a contract amendment with Fehr & Peers to extend the term from February 28, 2022 through June 30, 2022, for continued transportation planning services in preparation of the County's first Active Transportation Plan, with no change to the payment limit of $300,000, Countywide. (No fiscal impact)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 52 APPROVE and AUTHORIZE the Public Works Director, or designee, to execute a contract with Charles Kopp Inc. (dba Continental Electric), in an amount not to exceed $2,250,000 to provide on-call electrical maintenance and repair services at various County sites and facilities, for the period February 1, 2022 through January 31, 2025, Countywide. (100% General Fund)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 53 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Serramonte Pulmonary Asthma Sleep Clinic, Inc., in an amount not to exceed $1,200,000 to provide pulmonary and sleep study services to Contra Costa Health Plan members for the period December 1, 2021 through November 30, 2024. (100% Contra Costa Health Plan Enterprise Fund II)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 54 APPROVE and AUTHORIZE the Public Works Director, or designee, to execute a contract with Bear Electrical Solutions, Inc., in an amount not to exceed $500,000 to provide on-call electrical maintenance and repair services at various County sites and facilities, for the period February 1, 2022 through January 31, 2025, Countywide. (100% General Fund)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 55 APPROVE and AUTHORIZE the Public Works Director, or designee, to execute a contract with St Francis Electric, LLC, in an amount not to exceed $2,250,000 to provide on-call electrical maintenance and repair services at various County sites and facilities, for the period February 1, 2022 through January 31, 2025, Countywide. (100% General Fund)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 56 APPROVE and AUTHORIZE the Employment and Human Services Director, or designee, to execute a contract amendment with Social Service Staffing & Recruiting, Inc., effective February 1, 2022 to increase the payment limit by $100,000 to a new payment limit of $500,000 to provide additional qualified temporary social worker services for clients of Children and Family Services, with no change to term July 1, 2021 through June 30, 2022. (60% Federal, 34% State, and 6% County)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 57 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Bay Medic Transportation Inc., in an amount not to exceed $375,000 for non-emergency medical transportation services for Contra Costa Health Plan Medi-Cal members for the period January 1, 2022 through December 31, 2024. (100% Contra Costa Health Plan Enterprise Fund II)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 58 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Vickie Lee Scharr, in an amount not to exceed $260,000 to provide consultation, technical support and planning services to the West Contra Costa Health Care District for the period January 1, 2022 through December 31, 2022. (100% West Contra Costa Healthcare District)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 59 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a novation contract with Well Health, Inc., in an amount not to exceed $578,094 for patient engagement software license for the period May 1, 2021 through May 19, 2022. (100% Hospital Enterprise Fund I)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 60 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Semon Bader, M.D., in an amount not to exceed $300,000 to provide orthopedic services at Contra Costa Regional Medical Center and Contra Costa Health Centers for the period January 1, 2022 through December 31, 2022. (100% Hospital Enterprise Fund I)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 61 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Randell Lee Wilferd Jr. (dba Randy's Mobile Mechanical Service), in an amount not to exceed $310,000 to provide consultation, vehicle inspections, repairs and maintenance to the Public Health Division's Mobile Satellite Health Center vehicles for the period January 1, 2022 through December 31, 2022. (100% Hospital Enterprise Fund I)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 62 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Signature Parking, LLC, in an amount not to exceed $420,849 to provide parking management services for Contra Costa Regional Medical Center for the period January 1, 2022 through December 31, 2022. (100% Hospital Enterprise Fund I)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 63 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Vasanta Venkat Giri, M.D., in an amount not to exceed $376,320 to provide telepsychiatry services to children for the period January 1, 2022 through December 31, 2022. (50% Federal Medi-Cal, 50% Mental Health Realignment)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 64 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with InfoImage of California, Inc., in an amount not to exceed $330,000 to provide patient billing services at Contra Costa Regional Medical Center and Health Centers for the period January 1, 2022 through December 31, 2023. (100% Hospital Enterprise Fund I)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 65 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Jiva Health, Inc., in an amount not to exceed $2,000,000 to provide endocrine, diabetes, and allergy specialty services to Contra Costa Health Plan members for the period January 1, 2022 through December 31, 2022. (100% Contra Costa Health Plan Enterprise Fund II)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 66 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Youth Homes Incorporated, in an amount not to exceed $2,205,290 to provide residential treatment and therapeutic behavioral services for emotionally disturbed children for the period January 1, 2022 through June 30, 2022, including a six-month automatic extension through December 31, 2022 in an amount not to exceed $2,205,290. (50% Federal Medi-Cal, 50% Mental Health Realignment)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 67 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Kunwardeep Sohal, M.D., in an amount not to exceed $1,800,000 to provide gastroenterology services at Contra Costa Regional Medical Center and Contra Costa Health Centers for the period January 1, 2022 through December 31, 2024. (100% Hospital Enterprise Fund I)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 68 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract amendment with America West Transportation, Inc., to increase the payment limit by $150,000 to a new payment limit of $675,000 for additional non-emergency medical transportation services for CCHP Medi-Cal members requiring additional physical assistance in accordance with the California Advancing and Innovating Medi-Cal initiative with no change in the term April 1, 2021 through March 31, 2024. (100% Contra Costa Health Plan Enterprise Fund II)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 69 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Native American Health Center, Inc., in an amount not to exceed $257,753 to provide Mental Health Services Act Prevention and Early Intervention program services for the period July 1, 2021 through June 30, 2022, including a six-month automatic extension through December 31, 2022 in an amount not to exceed $128,876. (100% Mental Health Services Act)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 70 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with People Who Care Children Association, in an amount not to exceed $236,689 to provide Mental Health Services Act Prevention and Early Intervention services for the period July 1, 2021 through June 30, 2022, including a six-month automatic extension through December 31, 2022 in an amount not to exceed $118,344. (100% Mental Health Services Act)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 71 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract with Contra Costa Interfaith Transitional Housing, Inc. (dba Hope Solutions), in an amount not to exceed $397,041 to provide an on-site, on-demand and culturally appropriate Prevention and Early Intervention program to help formerly homeless families for the period July 1, 2021 through June 30, 2022, including a six-month automatic extension through December 31, 2022 in an amount not to exceed $198,520. (100% Mental Health Services Act)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 72 APPROVE and AUTHORIZE the Health Services Director, or designee, to execute a contract amendment with Kaiser Foundation Health Plan, Inc., to include State data exchange requirements and revise the Delegation Agreement and reporting requirements for Contra Costa Health Plan Medi-Cal members, with no change in the payment limit of $600,000,000 or the automatic biennial renewal term. (100% Contra Costa Health Plan Enterprise Fund II)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 73 APPROVE and AUTHORIZE the Public Works Director, or designee, to execute a contract with Silicon Valley Fire, Inc., in an amount not to exceed $600,000 to provide fire suppression certification and repair services at various County facilities, for the period February 1, 2022 through January 31, 2025, Countywide. (100% General Fund)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 74 APPROVE and AUTHORIZE the Public Works Director, or designee, to execute a contract with Diablo Boiler & Steam Inc., in an amount not to exceed $750,000 to provide on-call boiler maintenance and repair services at various County buildings, for the period February 1, 2022 through January 31, 2025, Countywide. (100% General Fund)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Other Actions

C. 75 ACCEPT the canvass of votes for the December 14, 2021 Elections for County Service Areas P-6, Zone 3008 (San Pablo unincorporated area) and Zone 3114 (El Sobrante unincorporated area), as recommended by the Clerk-Recorder. (Tax proceeds accrue to County Service Areas)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 76 AUTHORIZE relief of cash shortage in the Health Services Department - Alcohol & Other Drug Services Division in the amount of $362.90, as recommended by the County Administrator. (100% General Fund)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 77 DECLARE as surplus and AUTHORIZE the Purchasing Agent, or designee, to dispose of fully depreciated vehicles and equipment no longer needed for public use, as recommended by the Public Works Director, Countywide. (No fiscal impact)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 78 AUTHORIZE initiation of a General Plan Amendment process to consider changing the General Plan land use designation from Agricultural Lands to Single-Family Residential Low-Density for a portion of a 23.9-acre parcel located at the intersection of Camino Pablo and Sanders Ranch Road in the Moraga area, Assessor's Parcel No. 258-290-029, as recommended by the Conservation and Development Director. (County File #GP21-0004) (100% Applicant fees)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 79 APPROVE and AUTHORIZE the Auditor-Controller, to pay up to $113,868 to Tri Delta Transit for emergency transportation services provided to Contra Costa Regional Medical Center for the period June 14, 2020 through July 3, 2021. (100% American Rescue Plan Act)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 80 APPROVE and AUTHORIZE the Purchasing Agent to execute, on behalf of the Health Services Director, a purchase order amendment with Metropolitan Van & Storage Inc., to increase the payment limit by $425,000 to a new payment limit of $624,000 for additional staging, storage, and delivery of emergency medical supplies and setup and demobilization services for community COVID-19 vaccination and testing sites for the period August 1, 2021 through July 31, 2023. (100% American Rescue Plan Act)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 81 ACCEPT Office of the Sheriff report, in accordance with Penal Code Section 4025(e), on accounting of all Inmate Welfare Fund receipts and disbursements for Fiscal Year 2020/2021, as recommended by the Sheriff-Coroner. (No fiscal impact)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

C. 82 ADOPT the FY 2022/23 Recommended Budget development schedule, as recommended by the County Administrator.

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

Successor Agency to the Contra Costa County Redevelopment Agency

C. 83 ADOPT Resolution No. 2022/24 approving the Recognized Obligation Payment Schedule for the Successor (to the Contra Costa Redevelopment) Agency for the period July 1, 2022 through June 30, 2023, as recommended by the Conservation and Development Director. (100% Redevelopment Property Tax Trust Fund)

AYE: District I Supervisor John Gioia, District II Supervisor Candace Andersen, District III Supervisor Diane Burgis, District IV Supervisor Karen Mitchoff, District V Supervisor Federal D. Glover

GENERAL INFORMATION

The Board meets in all its capacities pursuant to Ordinance Code Section 24-2.402, including as the Housing Authority and the Successor Agency to the Redevelopment Agency. Persons who wish to address the Board should complete the form provided for that purpose and furnish a copy of any written statement to the Clerk.

Any disclosable public records related to an open session item on a regular meeting agenda and distributed by the Clerk of the Board to a majority of the members of the Board of Supervisors less than 96 hours prior to that meeting are available for public inspection at 1025 Escobar Street, First Floor, Martinez, CA 94553, during normal business hours.

All matters listed under CONSENT ITEMS are considered by the Board to be routine and will be enacted by one motion. There will be no separate discussion of these items unless requested by a member of the Board or a member of the public prior to the time the Board votes on the motion to adopt.

Persons who wish to speak on matters set for PUBLIC HEARINGS will be heard when the Chair calls for comments from those persons who are in support thereof or in opposition thereto. After persons have spoken, the hearing is closed and the matter is subject to discussion and action by the Board. Comments on matters listed on the agenda or otherwise within the purview of the Board of Supervisors can be submitted to the office of the Clerk of the Board via mail: Board of Supervisors, 1025 Escobar Street, First Floor, Martinez, CA 94553 or to clerkoftheboard@cob.cccounty.us.

The County will provide reasonable accommodations for persons with disabilities planning to attend Board meetings who contact the Clerk of the Board at least 24 hours before the meeting, at (925) 655-2000. An assistive listening device is available from the Clerk, First Floor.

Copies of recordings of all or portions of a Board meeting may be purchased from the Clerk of the Board. Please telephone the Office of the Clerk of the Board, (925) 655-2000, to make the necessary arrangements.

Forms are available to anyone desiring to submit an inspirational thought nomination for inclusion on the Board Agenda. Forms may be obtained at the Office of the County Administrator or Office of the Clerk of the Board, 1025 Escobar Street, Martinez, California.

Subscribe to receive to the weekly Board Agenda by calling the Office of the Clerk of the Board, (925) 655-2000 or using the County's on line subscription feature at the County's Internet Web Page, where agendas and supporting information may also be viewed:

www.contracosta.ca.gov

STANDING COMMITTEES

The **Airport Committee** (Supervisors Karen Mitchoff and Diane Burgis) meets quarterly on the second Wednesday of the month at 11:00 a.m. at the Director of Airports Office, 550 Sally Ride Drive, Concord.

The **Family and Human Services Committee** (Supervisors John Gioia and Candace Andersen) meets on the fourth Monday of the month at 9:00 a.m. in Room 110, County Administration Building, 1025 Escobar Street, Martinez.

The **Finance Committee** (Supervisors John Gioia and Karen Mitchoff) meets on the first Monday of the month at 9:00 a.m. in Room 110, County Administration Building, 1025 Escobar Street, Martinez.

The **Hiring Outreach Oversight Committee** (Supervisors Federal D. Glover and John Gioia) meets quarterly on the first Monday of the month at 10:30 a.m.. in Room 110, County Administration Building, 1025 Escobar Street, Martinez.

The **Internal Operations Committee** (Supervisors Candace Andersen and Diane Burgis) meets on the second Monday of the month at 10:30 a.m. in Room 110, County Administration Building, 1025 Escobar Street, Martinez.

The **Legislation Committee** (Supervisors Karen Mitchoff and Diane Burgis) meets on the second Monday of the month at 1:00 p.m. in Room 110, County Administration Building, 1025 Street, Martinez.

The **Public Protection Committee** (Supervisors Andersen and Federal D. Glover) meets on the fourth Monday of the month at 10:30 a.m. in Room 110, County Administration Building, 1025 Escobar Street, Martinez.

The **Sustainability Committee** (Supervisors Federal D. Glover and John Gioia) meets on the fourth Monday of every other month at 1:00 p.m. in Room 110, County Administration Building, 1025 Escobar Street, Martinez.

The **Transportation, Water & Infrastructure Committee** (Supervisors Candace Andersen and Karen Mitchoff) meets on the second Monday of the month at 9:00 a.m. in Room 110, County Administration Building, 1025 Escobar Street, Martinez.

Airports Committee	March 9, 2022	11:00 a.m.	See above
Family & Human Services Committee	February 28, 2022	9:00 a.m.	See above
Finance Committee	February 7, 2022	9:00 a.m.	See above
Hiring Outreach Oversight Committee	TBD	TBD	See above
Internal Operations Committee	February 14, 2022	10:30 a.m.	See above
Legislation Committee	February 14, 2022	1:00 p.m.	See above
Public Protection Committee	January 24, 2022	10:30 a.m.	See above
Sustainability Committee	March 28, 2022	1:00 p.m.	See above
Transportation, Water & Infrastructure Committee	February 14, 2022	9:00 a.m.	See above

AGENDA DEADLINE: Thursday, 12 noon, 12 days before the Tuesday Board meetings.

Glossary of Acronyms, Abbreviations, and other Terms (in alphabetical order):

Contra Costa County has a policy of making limited use of acronyms, abbreviations, and industry-specific language in its Board of Supervisors meetings and written materials. Following is a list of commonly used language that may appear in oral presentations and written materials associated with Board meetings:

AB Assembly Bill
ABAG Association of Bay Area Governments
ACA Assembly Constitutional Amendment
ADA Americans with Disabilities Act of 1990
AFSCME American Federation of State County and Municipal Employees
AICP American Institute of Certified Planners
AIDS Acquired Immunodeficiency Syndrome
ALUC Airport Land Use Commission
AOD Alcohol and Other Drugs
ARRA American Recovery & Reinvestment Act of 2009
BAAQMD Bay Area Air Quality Management District
BART Bay Area Rapid Transit District
BayRICS Bay Area Regional Interoperable Communications System
BCDC Bay Conservation & Development Commission
BGO Better Government Ordinance
BOS Board of Supervisors
CALTRANS California Department of Transportation
CalWIN California Works Information Network
CalWORKS California Work Opportunity and Responsibility to Kids
CAER Community Awareness Emergency Response
CAO County Administrative Officer or Office
CCCPFD (ConFire) Contra Costa County Fire Protection District
CCHP Contra Costa Health Plan
CCTA Contra Costa Transportation Authority
CCRMC Contra Costa Regional Medical Center
CCWD Contra Costa Water District
CDBG Community Development Block Grant
CFDA Catalog of Federal Domestic Assistance
CEQA California Environmental Quality Act
CIO Chief Information Officer
COLA Cost of living adjustment
ConFire (CCCFPD) Contra Costa County Fire Protection District
CPA Certified Public Accountant
CPI Consumer Price Index
CSA County Service Area
CSAC California State Association of Counties
CTC California Transportation Commission
dba doing business as
DSRIP Delivery System Reform Incentive Program
EBMUD East Bay Municipal Utility District
ECCFPD East Contra Costa Fire Protection District
EIR Environmental Impact Report
EIS Environmental Impact Statement
EMCC Emergency Medical Care Committee
EMS Emergency Medical Services
EPSDT Early State Periodic Screening, Diagnosis and Treatment Program (Mental Health)
et al. et alii (and others)
FAA Federal Aviation Administration
FEMA Federal Emergency Management Agency
F&HS Family and Human Services Committee
First 5 First Five Children and Families Commission (Proposition 10)

FTE Full Time Equivalent
FY Fiscal Year
GHAD Geologic Hazard Abatement District
GIS Geographic Information System
HCD (State Dept of) Housing & Community Development
HHS (State Dept of) Health and Human Services
HIPAA Health Insurance Portability and Accountability Act
HIV Human Immunodeficiency Syndrome
HOV High Occupancy Vehicle
HR Human Resources
HUD United States Department of Housing and Urban Development
IHSS In-Home Supportive Services
Inc. Incorporated
IOC Internal Operations Committee
ISO Industrial Safety Ordinance
JPA Joint (exercise of) Powers Authority or Agreement
Lamorinda Lafayette-Moraga-Orinda Area
LAFCo Local Agency Formation Commission
LLC Limited Liability Company
LLP Limited Liability Partnership
Local 1 Public Employees Union Local 1
LVN Licensed Vocational Nurse
MAC Municipal Advisory Council
MBE Minority Business Enterprise
M.D. Medical Doctor
M.F.T. Marriage and Family Therapist
MIS Management Information System
MOE Maintenance of Effort
MOU Memorandum of Understanding
MTC Metropolitan Transportation Commission
NACo National Association of Counties
NEPA National Environmental Policy Act
OB-GYN Obstetrics and Gynecology
O.D. Doctor of Optometry
OES-EOC Office of Emergency Services-Emergency Operations Center
OPEB Other Post Employment Benefits
OSHA Occupational Safety and Health Administration
PARS Public Agencies Retirement Services
PEPRA Public Employees Pension Reform Act
Psy.D. Doctor of Psychology
RDA Redevelopment Agency
RFI Request For Information
RFP Request For Proposal
RFQ Request For Qualifications
RN Registered Nurse
SB Senate Bill
SBE Small Business Enterprise
SEIU Service Employees International Union
SUASI Super Urban Area Security Initiative
SWAT Southwest Area Transportation Committee
TRANSPAC Transportation Partnership & Cooperation (Central)
TRANSPLAN Transportation Planning Committee (East County)
TRE or **TTE** Trustee
TWIC Transportation, Water and Infrastructure Committee
UASI Urban Area Security Initiative
VA Department of Veterans Affairs
vs. versus (against)
WAN Wide Area Network
WBE Women Business Enterprise
WCCTAC West Contra Costa Transportation Advisory Committee

Contra Costa County

To: Board of Supervisors

From: John Kopchik, Director, Conservation & Development Department

Date: January 18, 2022

Subject: Consider Urgency Ordinance No. 2022-06

RECOMMENDATION(S):

1. OPEN the public hearing on Ordinance No. 2022-06, RECEIVE testimony, and CLOSE the public hearing.

2. ADOPT Ordinance No. 2022-06, an urgency interim ordinance extending, through December 3, 2022, a moratorium on establishment or expansion of fulfillment centers, parcel hubs, and parcel sorting facilities in the North Richmond area.

3. DETERMINE that adoption of Ordinance No. 2022-06 is exempt from the California Environmental Quality Act (CEQA) under CEQA Guidelines Section 15061(b)(3).

4. DIRECT staff to file a CEQA Notice of Exemption with the County Clerk-Recorder.

FISCAL IMPACT:

None.

BACKGROUND:

On December 14, 2021, the Board of Supervisors adopted Ordinance No. 2021-43, an urgency interim ordinance that established a moratorium on the establishment or expansion of fulfillment centers, parcel hubs and parcel sorting facilities (collectively and individually, "Heavy Distribution") in the unincorporated North Richmond area. This urgency ordinance, Ordinance No. 2022-06, extends the temporary moratorium on Heavy Distribution uses to December 3, 2022, while the County continues developing reasonable regulations to mitigate the impacts for such uses.

This issue stems from rapid expansion of e-commerce in recent years and need for local fulfillment centers and operations. The North Richmond area particularly has seen a proliferation of these types of uses. As a result, the North Richmond area faces increased truck traffic and the following related adverse impacts: increased safety risk to smaller vehicles, pedestrians, and bicyclists; increased damage to streets; traffic congestion and reduced levels of service on streets and at intersections; and increased emissions and air quality impacts.

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☐ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

Contact: Francisco Avila, (925) 655-2866

By: , Deputy

cc:

BACKGROUND: (CONT'D)

Staff has identified additional concerns that the cumulative impacts caused by the increase in Heavy Distribution in the North Richmond Area have not been sufficiently considered and analyzed given that Heavy Distribution often operates on a 24-hour basis and may cause deteriorating air quality, health, noise, vibration, and other disruptions to peace and quiet that may impact surrounding sensitive uses, such as schools and residences. The North Richmond community has been designated by the California Air Resources Board and the Bay Area Air Quality Management District as one of only 15 communities in California to be part of State Assembly Bill (AB) 617's Community Air Protection Program. Under current County regulations, Heavy Distribution is consistent with the existing General Plan industrial land use designations in the North Richmond Area, and is permitted within the North Richmond P-1 district. DCD staff is considering a zoning text amendment to the North Richmond P-1 district to address the individual and cumulative impacts of Heavy Distribution through appropriate locational criteria and traffic and air quality impact mitigation requirements.

Extending this temporary moratorium on Heavy Distribution uses will allow staff an opportunity to consider a zoning text amendment to the North Richmond P-1 District that takes into account these issues. A threat to the public health, safety, and welfare would result if Heavy Distribution type land-use entitlements or building permits are accepted and approved under the existing North Richmond P-1 District. The failure to extend this temporary moratorium may result in significant irreversible impacts to businesses, residents, and other sensitive uses in the North Richmond Area that may not be adequately analyzed or mitigated.

CEQA COMPLIANCE

Adoption of the proposed urgency interim ordinance is exempt from CEQA because it can be seen with certainty that adoption of the ordinance will not have a significant effect on the environment. The proposed ordinance would extend a temporary moratorium on the establishment or expansion of a land use activity that might otherwise affect the environment. See CEQA Guidelines, Section 15061(b)(3).

CONSEQUENCE OF NEGATIVE ACTION:

The failure to extend the moratorium may result in significant irreversible impacts to businesses, residents, and other sensitive uses in the North Richmond Area from new or expanded Heavy Distribution land uses.

CLERK'S ADDENDUM

The following people spoke in favor of the ordinance: Jan; Floy Andrews, Kathy.

AGENDA ATTACHMENTS

Ordinance No. 2022-06

Report to Board

Exhibit A- Map

MINUTES ATTACHMENTS

Signed Ordinance No. 2022-06

ORDINANCE NO. 2022-06

URGENCY INTERIM ORDINANCE EXTENDING A MORATORIUM ON HEAVY DISTRIBUTION LAND USE DEVELOPMENT IN THE NORTH RICHMOND AREA

The Contra Costa County Board of Supervisors ordains as follows:

SECTION I. FINDINGS AND PURPOSE.

A. The purpose of this urgency ordinance is to extend a temporary moratorium on the establishment or expansion of fulfillment centers, parcel hubs, and parcel sorting facilities in the North Richmond Area while the County considers developing reasonable regulations to address the individual and cumulative impacts caused by those uses.

B. The area of North Richmond is the area located within the boundaries of the North Richmond P-1 (Planned Unit) District adopted by the Board of Supervisors on December 12, 1994 (the "North Richmond Area"). The North Richmond P-1 District encompasses the entire North Richmond community.

C. The North Richmond Area is designated in the County General Plan primarily for heavy industrial and light industrial land uses, but also includes areas designated for residential and public space land uses. Existing industrial land uses in the North Richmond Area consist of floricultural growing operations, distribution operations, recycling and auto dismantling operations, a resource recovery facility, and a water reclamation facility.

D. The North Richmond Area also includes an elementary school, single- and multi-family dwellings, parks and recreation, open space, and an urban farm outdoor education center for at-risk youth. Many of these uses are adjacent to or located near the industrial land uses in the North Richmond Area.

E. Due to the recent and rapid expansion of e-commerce in recent years and need for local fulfillment centers and operations, the North Richmond Area has seen a significant increase in fulfillment centers, parcel hubs, and parcel sorting facilities (collectively and individually, "Heavy Distribution"). A "fulfillment center" is a facility where the primary purpose is storage and distribution of e-commerce products to consumers or end-users, either directly or through a parcel hub. A "parcel hub" is a last mile facility or similar facility where the primary purpose is the processing or redistribution of parcels or products, primarily by moving a shipment from one mode of transport to a vehicle with a rated capacity of less than 10,000 pounds, for delivery directly to consumers or end-users. A "parcel sorting facility" is a facility where the primary purpose is the sorting or redistribution of parcels or products from a fulfillment center to a parcel hub.

F. With this increase in Heavy Distribution, residents and businesses within the North Richmond Area face increased truck traffic and the following related adverse impacts: increased safety risk to smaller vehicles, pedestrians, and bicyclists; increased damage to streets; traffic congestion and reduced levels of service on streets and at intersections; and increased emissions and air quality impacts.

G. The Board of Supervisors has additional concerns that the cumulative impacts caused by the increase in Heavy Distribution in the North Richmond Area have not been sufficiently considered and analyzed given that Heavy Distribution often operates on a 24-hour basis and may cause deteriorating air quality, health, noise, vibration, and other disruptions to peace and quiet that may impact surrounding sensitive uses, such as schools and residences. As with current industrial uses located in the North Richmond Area, new or expanded Heavy Distribution uses may be located adjacent to or near sensitive uses, such as schools and residences.

H. The North Richmond community has been designated by the California Air Resources Board and the Bay Area Air Quality Management District as one of only 15 communities in California to be part of State Assembly Bill (AB) 617's Community Air Protection Program. The purpose of this program is to reduce emissions exposure in California's communities that are most impacted by air pollution. A community steering committee has been established to guide the development of a Community Emissions Reduction Program to improve air quality in North Richmond, Richmond, and San Pablo. The current proliferation of Heavy Distribution uses in the North Richmond Area without appropriate evaluation is inconsistent with AB617's goal of reducing harmful particulate matter emissions in the State's most heavily impacted communities.

I. The Board of Supervisors has determined that Heavy Distribution has potentially detrimental impacts upon the North Richmond community that are not addressed by the County's current General Plan and zoning regulations. Under these current regulations, Heavy Distribution is consistent with the existing General Plan industrial land use designations in the North Richmond Area and is permitted within the North Richmond P-1 District. There is a need to study and develop policies to address various individual and cumulative impacts associated with Heavy Distribution. Specifically, there is a need for additional locational criteria and traffic and air quality impact mitigation requirements to protect businesses, residents, and other sensitive uses in the North Richmond Area.

J. The Department of Conservation and Development is considering a zoning text amendment to the North Richmond P-1 District to address the individual and cumulative impacts of Heavy Distribution.

K. On December 14, 2021, the Board of Supervisors adopted Ordinance No. 2021-43, an urgency interim ordinance that established a moratorium on Heavy Distribution land use development in the North Richmond Area.

L. This ordinance, extending the moratorium, is necessary to proceed with an orderly planning process that takes into account consideration of the zoning text amendment for the North Richmond P-1 District. A threat to the public health, safety, and welfare would result if Heavy Distribution land use entitlements or building permits are accepted and approved under the existing North Richmond P-1 District. If Heavy Distribution land uses are allowed in the North Richmond Area under the existing North Richmond P-1 District, they could conflict with and defeat the purpose of the contemplated zoning text amendment. The failure to extend the moratorium during the stated period may result in significant irreversible impacts to businesses, residents, and other sensitive uses in the North Richmond Area that would not be adequately analyzed or mitigated.

SECTION II. EXTENSION. The existing moratorium established by Ordinance No. 2021-43 is extended for 10 months and 15 days, through December 3, 2022.

SECTION III. PROHIBITION. The existing moratorium on certain development in the North Richmond Area is extended as follows:

(a) While this interim ordinance is in effect, no new Heavy Distribution land use shall be established and no existing Heavy Distribution land use shall be expanded within the North Richmond Area, except as otherwise provided in Section IV. No applications for a land use entitlement or building permit for Heavy Distribution shall be accepted or processed, and no land use entitlement or building permit for Heavy Distribution shall be approved or issued, for any parcel or portion of a parcel located within the North Richmond Area.

(b) This moratorium applies to the North Richmond Area, which is the area located within the boundaries of the North Richmond P-1 District, as shown on Exhibit A, which is attached and incorporated by reference.

SECTION IV. EXEMPTIONS. The prohibition set forth in Section III does not apply to any application for a land use entitlement or building permit for Heavy Distribution that has been deemed complete by the Department of Conservation and Development as of December 14, 2021.

SECTION V. REPORTS. In accordance with subdivision (d) of Government Code section 65858, ten days before the expiration of this ordinance and any extension of it, the Department of Conservation and Development shall file with the Clerk of this Board a written report describing the measures taken to alleviate the conditions that led to the adoption of this urgency interim ordinance.

SECTION VI. SEVERABILITY. If any provision or clause of this ordinance or the application thereof to any person or circumstances is held to be unconstitutional or to be otherwise invalid by any court of competent jurisdiction, such invalidity shall not affect other ordinance provisions or clauses or applications thereof that can be implemented without the invalid provision or clause or application, and to this end the provisions and clauses of this ordinance are declared to be severable.

SECTION VII. DECLARATION OF URGENCY. This interim ordinance is hereby declared to be an urgency ordinance for the immediate preservation of the public safety, health, and welfare of the County, and it shall take effect immediately upon its adoption. The facts constituting the urgency of this interim ordinance's adoption are set forth in Section I.

SECTION VIII. EFFECTIVE PERIOD. This ordinance becomes effective immediately upon passage by four-fifths vote of the Board of Supervisors and shall continue in effect for a period of 10 months and 15 days, through December 3, 2022, pursuant to Government Code section 65858.

SECTION IX. PUBLICATION. Within 15 days of passage, this ordinance shall be published once with the names of the supervisors voting for and against it in the East Bay Times, a newspaper published in this County.

PASSED ON _____ by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

ATTEST: MONICA NINO
Clerk of the Board of Supervisors
and County Administrator

_____
Board Chair

By: _____
Deputy

[SEAL]

KCK:
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ORDINANCE NO. 2022-06

URGENCY INTERIM ORDINANCE EXTENDING A MORATORIUM ON HEAVY DISTRIBUTION LAND USE DEVELOPMENT IN THE NORTH RICHMOND AREA

The Contra Costa County Board of Supervisors ordains as follows:

SECTION I. FINDINGS AND PURPOSE.

A. The purpose of this urgency ordinance is to extend a temporary moratorium on the establishment or expansion of fulfillment centers, parcel hubs, and parcel sorting facilities in the North Richmond Area while the County considers developing reasonable regulations to address the individual and cumulative impacts caused by those uses.

B. The area of North Richmond is the area located within the boundaries of the North Richmond P-1 (Planned Unit) District adopted by the Board of Supervisors on December 12, 1994 (the "North Richmond Area"). The North Richmond P-1 District encompasses the entire North Richmond community.

C. The North Richmond Area is designated in the County General Plan primarily for heavy industrial and light industrial land uses, but also includes areas designated for residential and public space land uses. Existing industrial land uses in the North Richmond Area consist of floricultural growing operations, distribution operations, recycling and auto dismantling operations, a resource recovery facility, and a water reclamation facility.

D. The North Richmond Area also includes an elementary school, single- and multi-family dwellings, parks and recreation, open space, and an urban farm outdoor education center for at-risk youth. Many of these uses are adjacent to or located near the industrial land uses in the North Richmond Area.

E. Due to the recent and rapid expansion of e-commerce in recent years and need for local fulfillment centers and operations, the North Richmond Area has seen a significant increase in fulfillment centers, parcel hubs, and parcel sorting facilities (collectively and individually, "Heavy Distribution"). A "fulfillment center" is a facility where the primary purpose is storage and distribution of e-commerce products to consumers or end-users, either directly or through a parcel hub. A "parcel hub" is a last mile facility or similar facility where the primary purpose is the processing or redistribution of parcels or products, primarily by moving a shipment from one mode of transport to a vehicle with a rated capacity of less than 10,000 pounds, for delivery directly to consumers or end-users. A "parcel sorting facility" is a facility where the primary purpose is the sorting or redistribution of parcels or products from a fulfillment center to a parcel hub.

F. With this increase in Heavy Distribution, residents and businesses within the North Richmond Area face increased truck traffic and the following related adverse impacts: increased safety risk to smaller vehicles, pedestrians, and bicyclists; increased damage to streets; traffic congestion and reduced levels of service on streets and at intersections; and increased emissions and air quality impacts.

G. The Board of Supervisors has additional concerns that the cumulative impacts caused by the increase in Heavy Distribution in the North Richmond Area have not been sufficiently considered and analyzed given that Heavy Distribution often operates on a 24-hour basis and may cause deteriorating air quality, health, noise, vibration, and other disruptions to peace and quiet that may impact surrounding sensitive uses, such as schools and residences. As with current industrial uses located in the North Richmond Area, new or expanded Heavy Distribution uses may be located adjacent to or near sensitive uses, such as schools and residences.

H. The North Richmond community has been designated by the California Air Resources Board and the Bay Area Air Quality Management District as one of only 15 communities in California to be part of State Assembly Bill (AB) 617's Community Air Protection Program. The purpose of this program is to reduce emissions exposure in California's communities that are most impacted by air pollution. A community steering committee has been established to guide the development of a Community Emissions Reduction Program to improve air quality in North Richmond, Richmond, and San Pablo. The current proliferation of Heavy Distribution uses in the North Richmond Area without appropriate evaluation is inconsistent with AB617's goal of reducing harmful particulate matter emissions in the State's most heavily impacted communities.

I. The Board of Supervisors has determined that Heavy Distribution has potentially detrimental impacts upon the North Richmond community that are not addressed by the County's current General Plan and zoning regulations. Under these current regulations, Heavy Distribution is consistent with the existing General Plan industrial land use designations in the North Richmond Area and is permitted within the North Richmond P-1 District. There is a need to study and develop policies to address various individual and cumulative impacts associated with Heavy Distribution. Specifically, there is a need for additional locational criteria and traffic and air quality impact mitigation requirements to protect businesses, residents, and other sensitive uses in the North Richmond Area.

J. The Department of Conservation and Development is considering a zoning text amendment to the North Richmond P-1 District to address the individual and cumulative impacts of Heavy Distribution.

K. On December 14, 2021, the Board of Supervisors adopted Ordinance No. 2021-43, an urgency interim ordinance that established a moratorium on Heavy Distribution land use development in the North Richmond Area.

L. This ordinance, extending the moratorium, is necessary to proceed with an orderly planning process that takes into account consideration of the zoning text amendment for the North Richmond P-1 District. A threat to the public health, safety, and welfare would result if Heavy Distribution land use entitlements or building permits are accepted and approved under the existing North Richmond P-1 District. If Heavy Distribution land uses are allowed in the North Richmond Area under the existing North Richmond P-1 District, they could conflict with and defeat the purpose of the contemplated zoning text amendment. The failure to extend the moratorium during the stated period may result in significant irreversible impacts to businesses, residents, and other sensitive uses in the North Richmond Area that would not be adequately analyzed or mitigated.

SECTION II. EXTENSION. The existing moratorium established by Ordinance No. 2021-43 is extended for 10 months and 15 days, through December 3, 2022.

SECTION III. PROHIBITION. The existing moratorium on certain development in the North Richmond Area is extended as follows:

(a) While this interim ordinance is in effect, no new Heavy Distribution land use shall be established and no existing Heavy Distribution land use shall be expanded within the North Richmond Area, except as otherwise provided in Section IV. No applications for a land use entitlement or building permit for Heavy Distribution shall be accepted or processed, and no land use entitlement or building permit for Heavy Distribution shall be approved or issued, for any parcel or portion of a parcel located within the North Richmond Area.

(b) This moratorium applies to the North Richmond Area, which is the area located within the boundaries of the North Richmond P-1 District, as shown on Exhibit A, which is attached and incorporated by reference.

SECTION IV. EXEMPTIONS. The prohibition set forth in Section III does not apply to any application for a land use entitlement or building permit for Heavy Distribution that has been deemed complete by the Department of Conservation and Development as of December 14, 2021.

SECTION V. REPORTS. In accordance with subdivision (d) of Government Code section 65858, ten days before the expiration of this ordinance and any extension of it, the Department of Conservation and Development shall file with the Clerk of this Board a written report describing the measures taken to alleviate the conditions that led to the adoption of this urgency interim ordinance.

SECTION VI. SEVERABILITY. If any provision or clause of this ordinance or the application thereof to any person or circumstances is held to be unconstitutional or to be otherwise invalid by any court of competent jurisdiction, such invalidity shall not affect other ordinance provisions or clauses or applications thereof that can be implemented without the invalid provision or clause or application, and to this end the provisions and clauses of this ordinance are declared to be severable.

SECTION VII. DECLARATION OF URGENCY. This interim ordinance is hereby declared to be an urgency ordinance for the immediate preservation of the public safety, health, and welfare of the County, and it shall take effect immediately upon its adoption. The facts constituting the urgency of this interim ordinance's adoption are set forth in Section I.

SECTION VIII. EFFECTIVE PERIOD. This ordinance becomes effective immediately upon passage by four-fifths vote of the Board of Supervisors and shall continue in effect for a period of 10 months and 15 days, through December 3, 2022, pursuant to Government Code section 65858.

SECTION IX. PUBLICATION. Within 15 days of passage, this ordinance shall be published once with the names of the supervisors voting for and against it in the East Bay Times, a newspaper published in this County.

PASSED ON January 18 2022 by the following vote:

AYES: John Gioia, Candace Andersen, Diane Burgis, Karen Mitchoff, Federal Glover
NOES: None
ABSENT: None
ABSTAIN: None

ATTEST: MONICA NINO
Clerk of the Board of Supervisors
and County Administrator

By: _____
Deputy Clerk June McHuen

Board Chair Karen Mitchoff

[SEAL]

KCK:
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REPORT ON URGENCY INTERIM ORDINANCE NO. 2022-06 PROHIBITING ESTABLISHMENT OR EXPANSION OF FULFILLMENT CENTERS, PARCEL HUBS AND SORTING FACILITIES IN NORTH RICHMOND

January 10, 2022

Pursuant to Government Code, §65858 (d), the following report describes the measures taken to alleviate the condition that led to the adoption of an urgency interim ordinance (Ordinance No. 2021-43) prohibiting the establishment or expansion of fulfillment centers, parcel hubs and parcel sorting facilities in the unincorporated North Richmond area of Contra Costa County.

On December 14, 2021, the Board of Supervisors adopted Urgency Interim Ordinance No. 2021-43 prohibiting the establishment or expansion of fulfillment centers, parcel hubs and parcel sorting facilities in unincorporated North Richmond area of Contra Costa County, in order to prevent impacts to public health, safety and welfare that may have resulted from the proliferation of such uses. Unless the Board of Supervisors authorizes an extension, the interim ordinance is set to expire on February 3, 2022.

Additional time is needed for the Department of Conservation and Development and other County agencies, to research, analyze and prepare a permanent ordinance addressing the individual and cumulative impacts associated with Heavy Distribution facilities in the unincorporated North Richmond area of the County. At this point, the additional measures taken to alleviate the conditions that led the Board to adopt the Urgency Interim Ordinance No. 2021-43 include:

- **Coordination of an inter-departmental staff meeting identifying and discussing potential issues and concerns relating to the prohibition of Heavy Distribution uses in the unincorporated North Richmond area if the County;**

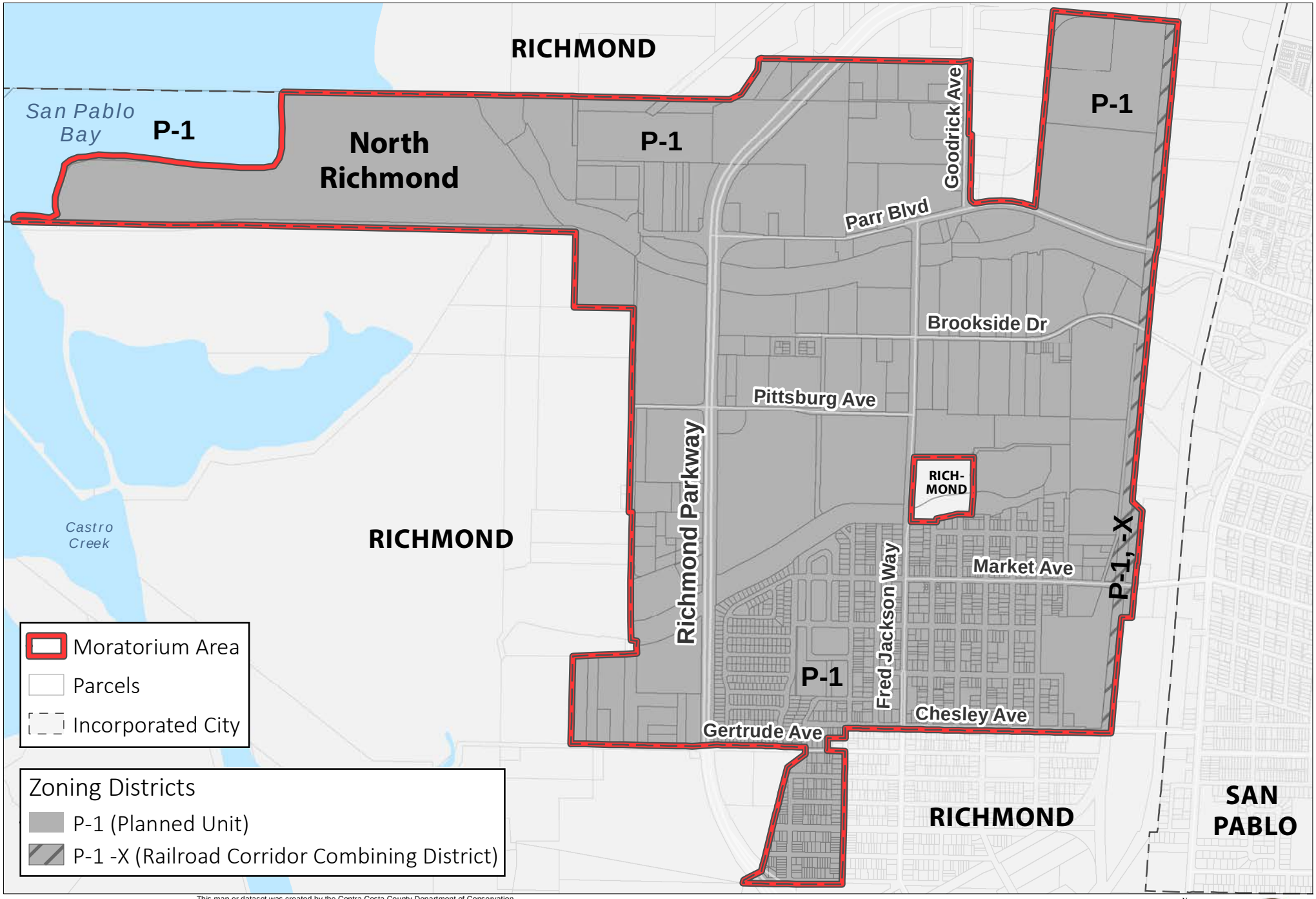
- **Coordination of meetings with property owners to discuss which type of uses would be appropriate in place of Heavy Distribution uses;**

- **Prepared for adoption by the Contra Costa County Board of Supervisors an extension of the urgency interim ordinance extending Ordinance No. 2021-43 an additional ten months and 15 days to December 3, 2022, for adoption by the Board on January 18, 2022.**

Francisco Avila, January 10, 2022

Francisco Avila, Principal Planner
Contra Costa County, Department of Conservation and Development

Exhibit A Ordinance No. 2021-43, North Richmond Area



Map created 12/8/2021
by Contra Costa County Department of Conservation and Development, GIS Group
30 Muir Road, Martinez, CA 94553
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Contra Costa County

To: Board of Supervisors

From: John Kopchik, Director, Conservation & Development Department

Date: January 18, 2022

Subject: HEARING to Consider Adopting Ordinance No. 2022-02 Pertaining to All-Electric Buildings

RECOMMENDATION(S):

1. OPEN the public hearing on Ordinance No. 2022-02, RECEIVE testimony, and CLOSE the public hearing.

2. ADOPT Ordinance No. 2022-02, adopting and amending the 2019 California Energy Code with changes, additions, and deletions, requiring that all newly constructed residential buildings, hotels, offices, and retail buildings be constructed as all-electric buildings without natural gas infrastructure.

3. ADOPT the attached findings and cost effectiveness studies in support of the County's changes, additions and deletions to the 2019 California Energy Code.

4. DIRECT the Department of Conservation and Development, to submit a certified copy of Ordinance No. 2022-02, and adopted findings and cost effectiveness studies and this Board Order to the California Energy Commission, the California Department of Housing and Community Development, and the California Building Standards Commission.

5. FIND that adoptions of the ordinance is exempt from the California Environmental Quality Act (CEQA) pursuant to CEQA Guidelines Sections 15061(b)(3) and 15308.

6. DIRECT staff to file a Notice of Exemption with the County Clerk and pay any required fee for the filing.

FISCAL IMPACT:

None.

BACKGROUND:

On August 3, 2021, the Board of Supervisors directed staff to develop an ordinance amending the County building code to require all newly constructed residential buildings, hotels, offices, and retail buildings to be constructed as all-electric buildings without natural gas infrastructure.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

NO: Candace Andersen, District II Supervisor

Contact: Demian Hardman-Saldana, 925-655-2816

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc:

BACKGROUND: (CONT'D)

On December 14, 2021, the Board of Supervisors (BOS) introduced Ordinance No. 2022-02, waived its reading, and fixed a hearing date of January 18, 2022, to consider adopting and amending the 2019 California Energy Code to require that all newly constructed residential buildings, hotels, offices, and retail buildings be constructed as all-electric buildings without natural gas infrastructure.

Health and Safety Code sections 17958.5 and 18941.5 authorize a local agency to modify the 2019 California Energy Code and establish more restrictive building standards if the local agency finds that the changes and modifications are reasonably necessary because of local climatic, geological, topographical, or environmental conditions. California Public Resources Code section 25402.1(h)(2) further authorizes a local agency to modify the California Energy Code if the local agency finds that the proposed standards are cost-effective and the California Energy Commission (CEC) determines that the proposed standards will require the diminution of energy consumption levels permitted by the 2019 California Energy Code.

The proposed Ordinance No. 2022-02 would amend the 2019 California Energy Code due to local climatic, geographical, topographical, and environmental conditions. The attached findings describe the local conditions that make the more restrictive standards reasonably necessary. The attached findings also include the required findings related to energy savings and cost-effectiveness based on several cost-effectiveness studies prepared as part of the Statewide Reach Codes Program. The referenced cost-effectiveness studies are also attached. The proposed substantive changes to the 2019 California Energy Code are described below:

Modifications to the 2019 California Energy Code

Requires a newly constructed building that is any of the following building types to be an all-electric building:
-Residential (including single-family and multi-family buildings);
-Detached Accessory Dwelling Unit;
-Hotel;
-Office;
-Retail.

An all-electric building is defined to mean a building that has no natural gas or propane plumbing installed within the building, and that uses electricity as the sole source of energy for its space heating (including heating of all indoor and outdoor spaces of the building), water heating (including heating of indoor and outdoor pools and spas), cooking appliances, and clothes drying appliances. An all-electric building may utilize solar thermal pool heating.

The proposed ordinance would exempt development projects from the all-electric building requirement if the development project has obtained an approved vesting tentative map, development agreement, or other vested right pursuant to applicable law, prior to the operative date of the ordinance. The exemption recognizes existing projects that have obtained vested rights based on entitlements issued before the all-electric building requirements become operative.

The proposed ordinance would not prohibit the use of emergency backup power sources, such as generators, that may be fossil-fuel operated. The ordinance would also not preclude anyone from installing natural gas for any existing buildings, including other allowed ancillary uses to existing buildings, such as pools, spas, or other similar outdoor equipment.

California Energy Commission

Modification to the California Energy Code, and the associated findings, must be submitted to the California Energy Commission (CEC) for review and approval before the modifications take effect. If adopted by the Board, staff will transmit the adopted ordinance and findings to the CEC. Staff is informed that the CEC review and approval process may take approximately 30-60 days.

Ordinance Effective and Operative Dates

If adopted by the Board, the ordinance will be effective upon approval by the California Energy Commission or 30 days after adoption, whichever is later. Staff recommends that the Board adopt the ordinance with an operative date of June 1, 2022, to provide the building industry and other stakeholders additional notice and lead time prior to enforcement of the new all-electric building requirements. That is, staff recommends that a building permit issued before June 1, 2022, for a newly constructed residential building, hotel, office, or retail building would not require the building to be an all-electric building. Additionally, a building permit issued after June 1, 2022 would not require a newly constructed residential building, hotel, office, or retail building to be all-electric if the building is part of a development project that has obtained an approved vesting tentative map, development agreement, or other vested right pursuant to applicable law, prior to June 1, 2022.

Outreach Efforts and Public Input

Public outreach related to development of this ordinance occurred through the Board of Supervisors Sustainability Committee. The Sustainability Commission also advised the Board to include building electrification commitments in the County's Climate Emergency Resolution adopted by the Board on September 22, 2020. The building electrification ordinance issue was first discussed at the Sustainability Committee meeting on September 23, 2019, and at subsequent meetings on February 3, 2020, and May 24, 2021. The Sustainability Committee recommended that the Board of Supervisors authorize staff to develop an ordinance amending the County building code to prohibit the use of natural gas and use electricity as the sole source of power for all newly constructed residential buildings, hotels, offices, and retail buildings. On August 3, 2021, the Board of Supervisors approved the Sustainability Committee recommendation and directed staff to prepare the proposed ordinance.

The public has had the opportunity to provide input at each of these meetings. Most public comments have indicated overall support for a building electrification ordinance. At the direction of the Sustainability Committee, County staff also met with staff from the Building Industry Association (BIA) and East Bay Leadership Council (EBLC) to solicit feedback on the Committee's recommendation to the Board. The main concern raised by the BIA was to ensure that the building industry be given sufficient time to adapt to the building code changes

so new projects in the pipeline would not require a redesign. The BIA also previously submitted a letter to the Board, which included, among other things, concerns of grid reliability, refuting whether all-electric homes are truly cost-effective, and a request that there not be localized codes. The BIA letter and the issues raised therein were discussed at the Board meeting on August 3, 2021.

On December 13, 2021, the California Pool and Spa Association (CPSA) submitted a letter to the BOS requesting an exemption from the proposed ordinance for swimming pools, spas, and other ancillary equipment for outdoor use, such as fire pits, fireplaces, decorative fire features, pizza ovens, barbecues, outdoor ranges, and outdoor space heating. The CPSA letter stated, among other things, that other alternatives that are not natural gas are either not practically available or severely disappointing in quality. Their major point being that a natural gas pool heating system can heat a pool or spa much faster to their optimal temperature, as compared to an electric heat pump system. The CPSA letter also states that the electric pool heating systems may be more costly for homeowners because of the potential need to increase the size of a building's electrical service when adding an electric pool heating system. The letter also raises the concern that eliminating or phasing out the use of natural gas would undermine the swimming pool and hot tub business and have an economic impact on the State. Other concerns raised include not being able to use natural gas for other outdoor features, such as fire pits, fireplaces, decorative fire features, pizza ovens, barbeques, outdoor ranges, and outdoor space heating. The letter received by the CPSA was discussed at the BOS meeting when the proposed ordinance was introduced on December 14, 2021.

Staff has reviewed the concerns raised by the CPSA. Electric and solar thermal alternatives to the appliances mentioned in the letter do exist and in fact electric heating is the most common approach for standalone hot tubs. However, as staff stated at the prior hearing, eliminating the use of natural gas would require other equipment that would take substantially longer than a gas system to heat cold water in a pool or inground spa. Regarding CPSA's argument that an electric pool heating system may increase cost to homeowners by requiring an increase in the size of the home's electrical service, this may apply when adding a pool with an electric heating system to an existing home if it requires the homeowner to upsize the electrical service for the home. However, the proposed ordinance only applies to pools installed for new homes. The added cost of designing the electrical system of a new home to accommodate the needs of a pool heating system is not significant as the added electrical load resulting from a pool heating system will not result in a substantial increase in the cost of the overall electrical system for the home.

A more comprehensive method for comparing the costs of various pool heating systems is to compare the life-cycle cost of these systems, which includes both the initial cost of installation and the ongoing operating cost of such systems over their useful life. Staff is not aware of any such studies that have examined this issue. The closest approximation staff has found is a cost effectiveness study done on behalf of the City of Santa Monica that found, generally, electric pool heating systems have a marginally higher initial cost of installation, but a marginally lower cost of ongoing operation. Overall, the analysis was inconclusive as to which type of system has a lower overall cost to homeowners.

On January 6, 2022, 350 Contra Costa submitted a letter with a comment wanting to ensure enforcement of the ordinance for the applicable commercial uses and requested that the last sentence in the definition of an all-electric building in the proposed ordinance be modified. The letter from 350 Contra Costa with their comments and suggested ordinance language changes are attached.

Clean Energy Policy and Electricity Reliability

The proposed ordinance would require all new residential buildings and many new commercial buildings within the County's jurisdictions to be constructed with electricity as the sole source of power. As such, it is important to consider whether the supply of electricity within the County is stable and reliable, and whether it will be adequate to serve the needs of all-electric buildings.

To address climate change, State policy is shifting away from fossil fuels as a source of power and towards greater use of renewable energy. As this transition proceeds, it raises questions as to whether there is enough electricity generated from renewable sources to meet the needs of Californians. In addition to the question of electricity supply, there is also the related question of whether the State's electrical grid infrastructure is adequate to distribute electricity to where it is needed across the State.

While County staff are not involved in managing the State's energy supply or grid infrastructure, staff has researched these areas and found that multiple State agencies are deeply involved in planning for the State's future energy needs. While County staff cannot assure these efforts will be successful, staff have confirmed that tremendous resources and attention are being applied at the State level to address these concerns.

Electricity procurement and management of the electrical grid are administered by utility companies and other energy providers, such as community choice energy programs. These processes are heavily regulated by State agencies, which are in turn guided by State law. County staff have examined these regulatory processes and concluded that State agencies have robust planning processes in place to forecast energy demand and to ensure that utilities procure sufficient electricity to meet the energy needs of Californians. This planning process includes a gradual transition to 100 percent renewable energy over the next 25 years. The planning efforts conducted by State agencies also include forecasting the infrastructure investments that will be needed to ensure the reliability of the electricity grid.

State legislation enacted the 100 Percent Clean Energy Act of 2018, Senate Bill 100 (SB 100), which establishes a target for renewable and zero-carbon resources to supply 100 percent of retail sales and electricity procured to serve all State agencies by 2045. The bill also increases the State's Renewables Portfolio Standard (RPS) to 60 percent of retail sales by the end of 2030 and requires all State agencies to incorporate these targets into their relevant planning.

SB 100 calls upon the California Public Utilities Commission (CPUC), California Energy Commission (CEC), and California Air Resources Board (CARB) to use programs under existing statues to achieve this policy and issue a joint policy report to the Legislature by January 1, 2021, and every four years thereafter. The first joint policy report was released in March 2021 with the intent of being the first step in an iterative and ongoing effort to assess barriers and opportunities to implementing the 100 percent clean electricity policy.

To address system reliability of the grid, the joint agencies plan to evaluate resource portfolios that were developed as part of the joint policy report issued in March 2021. The first step outlined in the report specific to system reliability includes an evaluation of the resource

portfolios in all hours of the year and to highlight potential supply shortfalls in meeting the projected energy demand. The second step included in their analysis will be to evaluate the revised resource portfolio with a set of probabilistic production cost model runs. This model will analyze reliability over a wide range of conditions to explore probabilistic variables, such as loads, renewable energy and hydro availability, and power plant outages to determine the likelihood of power outages due to insufficient capacity from the energy resource mix. The report further specifies that a loss of load probability that exceeds, or is significantly under, an acceptable limit will result in additional resource portfolio adjustments that would restart the process to the initial first step included in the analysis. The report states that this reliability analysis could be completed as part of the 2025 SB 100 Report or possibly through existing State efforts.

In addition to the requirements of SB 100, there is a very rigorous longstanding process for resource planning that involves multiple state agencies to forecast and procure enough renewable and carbon free electricity to meet the State's energy needs. This includes the California Independent System Operator (CAISO), CEC, and CPUC.

CAISO was created by the California Legislature and is responsible for managing the flow of electricity throughout the State. CAISO has an annual long-term Transmission Planning Process completed every 15 months that uses other tools to ensure the grid has adequate supply, or in rare cases a strategy for working through undersupply situations.

The CEC adopts an Integrated Energy Policy Report (IEPR) every two years that includes an assessment of major energy trends and issues facing California's electricity, natural gas, and transportation fuel sectors, including energy reliability. The IEPR provides policy recommendations on these issues. The CEC's 2019 IEPR included an analysis of building electrification and grid reliability. The CEC leads the State's research on all-electric buildings, in collaboration with the CAISO, CARB, and the CPUC. The 2019 IEPR identifies numerous reports produced over several years on the importance of adding firm electricity capacity and long duration energy storage.

The CPUC has a biennial process through the Integrated Resource Plan (IRP) Proceeding that requires load-serving entities (LSEs) such as MCE (the County's Community Choice Aggregator) and investor-owned utilities such as Pacific Gas and Electric (PG&E) to detail the procured and planned resources in their portfolio to ensure that the State has a safe, reliable, and cost-effective electricity supply. The CPUC's IRP Proceeding(s) also serve as the umbrella venue for considering comprehensive issues in the portion of the California electricity sector under the purview of the Commission (the CPUC does not regulate municipal utilities). The IRP proceeding was the successor to multiple long-term procurement planning (LTPP) proceedings, and continues to require investor-owned utilities (IOUs) such as PG&E and community choice aggregators such as MCE to submit procurement plans to project their resource needs for their bundled customers, and their action plans for meeting those needs over a ten-year horizon. This process requires PG&E and MCE to include contingency planning regarding resource planning and load forecasting, including a secured energy capacity equal to 115% of its expected peak load for each month of the year. As specified in MCE's 2022 Operation Integrated Resource Plan (OIRP), MCE must also demonstrate that it has procured capacity in specific transmission-constrained areas equal to its assigned share of CAISO's need for each month of the year In addition, MCE and PG&E is required to address short-term system reliability beyond the existing baseline resources required by the CPUC. Furthermore, PG&E and MCE are required to procure even more incremental capacity to meet mid-term reliability procurement requirements.

In September 2021, the CEC also released its Midterm Reliability Analysis report, which provides an analysis conducted by CEC staff to inform decisions about the future resource procurement to support energy reliability for calendar years 2023 – 2026. The report was prepared for the CPUC to consider as part of the IRP as the CPUC decides whether to adopt the next plan. The report finds that the ordered resource procurement for 2023 through 2026 appears to be sufficient, indicating system reliability. The report also concludes that the reliance on zero-emitting resources does not appear to diminish reliability compared to procuring thermal resources. The report acknowledges that the CEC demand forecast is being further enhanced to capture the frequency and dispersion of extreme climate impacts. Additionally, the study acknowledges that it did not include resource retirements beyond those assumed in the CPUC's mid-term reliability decision and that additional retirements would increase the likelihood of system reliability challenges.

Another issue of concern related to grid reliability is the occurrence of Public Safety Power Shutoff (PSPS) events. The State continues to work with utilities to reduce the need for PSPS events. However, such events will likely occur again in the future, subject to weather conditions. Property owners can mitigate their risk of losing power during PSPS events by installing a source of backup power, such as a generator or battery storage.

In summary, California's energy system is in the middle of a major transition away from fossil fuels and towards sources of renewable energy. This transition raises valid questions and concerns about the stability of electricity supply for County residents. While the proposed ordinance will not significantly change the overall demand for electricity within the State, requiring newly constructed buildings be all-electric will increase the dependency of these buildings – and their occupants – on the State's system for procuring and distributing electricity. Staff have researched this topic and concluded that multiple State agencies are engaged in a comprehensive planning process to implement this transition over the next 25 years. While the outcome of the process cannot be known at this time, considerable State resources are being applied to make it successful. This will be an ongoing challenge of statewide concern for decades to come.

MCE's Planning to Support Greater Building Electrification

Staff have also analyzed issues of electricity supply and stability at the local level. Most residents of the unincorporated area and most residents of nearly all of the cities within the County receive their electricity from MCE. MCE is California's first community choice energy provider and currently serves 36 local jurisdictions across the counties of Contra Costa, Marin, Napa and Solano. The County joined MCE in 2017 with the goal of increasing the amount of energy provided within the County that comes from renewable sources. MCE was established over 10 years ago and has been able to consistently procure electricity from renewable sources to a degree that exceeds State policy requirements while maintaining stable prices for consumers relative to other Bay Area utilities and energy providers. MCE is also taking steps locally to address conditions that impact grid reliability.

On December 22, 2021, MCE submitted a letter that summarizes its 2022 Operational Integrated Resource Plan (OIRP). The OIRP included, among other things, electrification trends, grid reliability needs, and capacity requirements. MCE's OIRP also stated that MCE met the State's 60% renewables goal back in 2017 and is expected to reach 85% renewable energy by 2029. Additionally, to mitigate the

impact of electricity outages, PSPS events, and improve grid reliability MCE allocated $6 million in 2019 for a resiliency fund that prioritizes customers and populations that are disproportionately affected by grid outages.

MCE's letter also outlines ten key procurement process activities which incorporate factors such as electrification trends and load forecasts. The referenced letter from MCE is attached with web links to MCE's 2022 OIRP and the State's IEPR.

In conclusion, staff does not perceive any near-term threats to the ability of County residents to obtain electricity from local energy providers. The State faces longer term challenges as it attempts to manage the transition to 100 percent renewable electricity by 2045. More investment in renewable energy generation and distribution infrastructure will be needed. The proposed ordinance will have negligible impact on this process. All County residents will be dependent on State agencies to successfully navigate this transition and ensure a stable energy system for California, but this dependency will be particularly acute for those who occupy all-electric buildings.

In addition to efforts by State agencies, the County's local electricity provider, MCE supports building electrification and is taking steps to improve energy reliability. County residents and building owners can mitigate energy reliability risk by installing battery storage or other sources of back-up electrical power.

California Environmental Quality Act (CEQA)

For the purposes of compliance with CEQA, adoption of the ordinance is the project. Based on the record before the County, staff has determined that this project is categorically exempt from environmental review under CEQA Guidelines Sections 15061(b)(3) and 15308 (Actions by Regulatory Agencies for Protection of the Environment). Section 15308 covers Class 8 categorical exemptions, which consist of actions taken by regulatory agencies, as authorized by state or local ordinance, to assure the maintenance, restoration, enhancement, or protection of the environment where the regulatory process involves procedures for protection of the environment. For the purpose of protecting the environment, the proposed ordinance eliminates the construction of natural gas infrastructure for all newly constructed residential buildings, hotels, offices. The regulatory standards contained in the proposed ordinance are more stringent than those set forth in the State Building Standards Code, and as a result there are no reasonably foreseeable adverse impacts or possibility that the activity in question may have a significant effect on the environment.

CONSEQUENCE OF NEGATIVE ACTION:

If the proposed ordinance is not approved, the County would not implement one of the actions specified in its Climate Emergency Resolution adopted by the Board of Supervisors on September 22, 2020.

CLERK'S ADDENDUM

Speakers: Doug Chan, Builders; Rob, Danville; Denise, 1000 Grandmothers for Future Generations; Lisa Jackson, 350 Contra Costa; Juan Pablo Galvàn, Save Mt. Diablo; Carol, Rossmoor Community; Floy Andrews; Fred; No name given, Vote for Change; Mariella, Community Development Director, MCE; Jackie Garcia Mann, Climate Reality and Interfaith Climate Action Network; Ryan, Sustainable Contra Costa; Melissa Yu, Sierra Club; Casimir Karbo.

The following people provided written commentary (attached): Gary Farber, 350 Contra Costa; Adrian Byram, Sustainable Rossmoor; Andy Ferguson; Sue Bock, San Ramon Valley Climate coalition; Zoe Siegel, Greenbelt Alliance; Lisa Chang, Alamo; Ryan Buckley, Sustainable Contra Costa; Sheila Tarbet, Elders Climate Action; Laura Feinstein, PhD; Amanda Millstein, MD; Jan Warren, Interfaith Climate Action Network of CCC; Marcia Liberson, Walnut Creek; Cynthia Mahoney, Contra Costa Citizens Climate Lobby; Denice A. Dennis, 1000 Grandmothers for Future Generations; Ogie Strogatz, 350 Contra Costa; Marti Roach, 350 Contra Costa; Karen Leung, Contra Costa; Brenden Millstein; Maria Gastelumendi, Environmental Task Force of City of Lafayette; Nancy Hu, Climate Reality Project, Environmental Task Force of Lafayette.

AGENDA ATTACHMENTS

Ordinance No. 2022-02

Findings Energy Reach Code Adoption

Cost Effectiveness Studies

MCE Letter

350 Contra Costa Letter

MINUTES ATTACHMENTS

Signed Ordinance No. 2022-02

Correspondence Received

ORDINANCE NO. 2022-02

ADOPTION AND AMENDMENT OF THE 2019 CALIFORNIA ENERGY CODE TO REQUIRE CERTAIN NEWLY CONSTRUCTED BUILDINGS TO BE ALL-ELECTRIC BUILDINGS

The Contra Costa County Board of Supervisors ordains as follows (omitting the parenthetical footnotes from the official text of the enacted or amended provisions of the County Ordinance Code):

SECTION I. SUMMARY. This ordinance adopts and amends the 2019 California Energy Code to require all newly constructed residential buildings, hotels, offices, and retail buildings to be constructed as all-electric buildings without natural gas infrastructure. This ordinance is adopted pursuant to Health and Safety Code sections 17922, 17958, 17958.5, 17958.7, and 18941.5, Public Resources Code section 25402.1(h)(2), and Government Code sections 50020 through 50022.10.

SECTION II. Section 74-2.002 (Adoption) of Division 74 (Building Code) of the County Ordinance Code is amended to read:

74-2.002 Adoption.

(a) The building code of this county is the 2019 California Building Code (California Code of Regulations, Title 24, Part 2, Volumes 1 and 2), the 2019 California Residential Code (California Code of Regulations, Title 24, Part 2.5), the 2019 California Green Building Standards Code (California Code of Regulations, Title 24, Part 11), the 2019 California Existing Building Code (California Code of Regulations, Title 24, Part 10), and the 2019 Energy Code (California Code of Regulations, Title 24, Part 6), as amended by the changes, additions, and deletions set forth in this division and Division 72.

(b) The 2019 California Building Code, with the changes, additions, and deletions set forth in Chapter 74-4 and Division 72, is adopted by this reference as though fully set forth in this division.

(c) The 2019 California Residential Code, with the changes, additions, and deletions set forth in Chapter 74-4 and Division 72, is adopted by this reference as though fully set forth in this division.

(d) The 2019 California Green Building Standards Code, with the changes, additions, and deletions set forth in Chapter 74-4 and Division 72, is adopted by this reference as though fully set forth in this division.

(e) The 2019 California Existing Building Code, with the changes, additions, and deletions set forth in Chapter 74-4 and Division 72, is adopted by this reference as though fully set forth in this division.

(f) The 2019 California Energy Code, with the changes, additions, and deletions set forth in Chapter 74-4 and Division 72, is adopted by this reference as though fully set forth in this division.

(g) At least one copy of this building code is now on file with the building inspection division, and the other requirements of Government Code section 50022.6 have been and shall be complied with.

(h) As of the effective date of the ordinance from which this division is derived, the provisions of the building code are controlling and enforceable within the county. (Ords. 2022-02 § 2, 2019-31 § 2, 2016-22 § 2, 2013-24 § 2, 2011-03 § 2, 2007-54 §3, 2002-31 § 3, 99-17 § 5, 99-1, 90-100 § 5, 87-55 § 4, 80-14 § 5, 74-30.)

SECTION III. Section 74.4.010 (Amendments to CEnC) is added to Chapter 74-4 (Modifications) of Division 74 (Building Code) of the County Ordinance Code, to read:

74-4.010 Amendments to CEnC. The 2019 California Energy Code ("CEnC") is amended by the changes, additions, and deletions set forth in this chapter and Division 72. Section numbers used below are those of the 2019 California Energy Code.

(a) Section 100.0(e)(2)(A) of CEnC Subchapter 1 (All Occupancies - General Provisions) is amended to read:

A. **All newly constructed buildings.**

i. Sections 110.0 through 110.12 apply to all newly constructed buildings within the scope of Section 100.0(a). In addition, newly constructed buildings shall meet the requirements of Subsection B, C, D, or E, as applicable.

ii. A newly constructed building that is any of the following building types shall be an all-electric building:

a. Residential.

b. Detached accessory dwelling unit.

c. Hotel.

d. Office.

e. Retail.

Exception to Section 100.0(e)(2)(A)(ii): Development projects that have obtained vested rights before the effective date of this subsection (ii) or June 1, 2022, whichever is later, pursuant to a development agreement in accordance with Government Code section 65866, a vesting tentative map in accordance with Government Code section 66998.1, or other applicable law, are exempt for the requirements of Section 100.0(e)(2)(A)(ii).

(b) Section 100.1(b) (Definitions) of CEnC Subchapter 1 (All Occupancies - General Provisions) is amended by adding the following definition:

ALL-ELECTRIC BUILDING means a building that has no natural gas or propane plumbing installed within the building, and that uses electricity as the sole source of energy for its space heating (including heating of all indoor and outdoor spaces of the building), water heating (including heating of indoor and outdoor pools and spas), cooking appliances, and clothes drying appliances. An all-electric building may utilize solar thermal pool heating.

(Ord. 2022-02 § 3.)

SECTION IV. VALIDITY. The Contra Costa County Board of Supervisors declares that if any section, paragraph, sentence, or word of this ordinance or of the 2019 California Energy Code as adopted and amended herein is declared for any reason to be invalid, it is the intent of the Contra Costa County Board of Supervisors that it would have passed all other portions or provisions of this ordinance independent of the elimination herefrom any portion or provision as may be declared invalid.

SECTION V. EFFECTIVE AND OPERATIVE DATE. This ordinance becomes effective, but not operative, upon approval by the California Energy Commission or 30 days after passage, whichever is later. This ordinance will become operative on the effective date of this ordinance or June 1, 2022, whichever is later. Within 15 days of passage, this ordinance shall be published once in the East Bay Times, a newspaper published in this County.

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PASSED on _____, by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

ATTEST: MONICA NINO,
Clerk of the Board of Supervisors
and County Administrator

_____
Board Chair

By: _____
Deputy

[SEAL]

KCK:
H:\Client Matters\2021\DCD\Ordinance No. 2022-02 All-Electric Buildings.wpd

CONTRA COSTA COUNTY
FINDINGS IN SUPPORT OF CHANGES, ADDITIONS, AND DELETIONS TO CALIFORNIA ENERGY CODE TO REQUIRE CERTAIN NEWLY CONSTRUCTED BUILDINGS TO BE ALL-ELECTRIC BUILDINGS

The California Building Standards Commission has adopted and published the 2019 Building Standards Code, which became effective on January 1, 2020. The 2019 Building Standards Code is composed of the 2019 California Building, Residential, Green Building Standards, Energy, Electrical, Plumbing, Mechanical, and Existing Building Codes. These codes are enforced in Contra Costa County by the Building Inspection Division of the Department of Conservation and Development.

Although these codes apply statewide, Health and Safety Code sections 17958.5 and 18941.5 authorize a local jurisdiction to modify or change these codes to establish more restrictive building standards if the jurisdiction finds that the modifications and changes are reasonably necessary because of local climatic, geological, or topographical conditions. Additionally, Public Resources Code section 25402.1(h)(2) authorizes a local jurisdiction to modify or change the California Energy Code to establish more restrictive building standards if the jurisdiction determines that the standards are cost-effective and the State Energy Resources Conservation and Development Commission finds that the standards will require the diminution of energy consumption levels.

Ordinance No. 2022-02 adopts the 2019 California Energy Code and amends it to address local conditions by requiring that all newly constructed residential buildings, hotels, offices, and retail buildings be constructed as all-electric buildings without natural gas infrastructure.

Pursuant to Health and Safety Code section 17958.7, the Contra Costa County Board of Supervisors finds that the more restrictive standards contained in Ordinance No. 2022-02 are reasonably necessary because of the local climatic, geological, and topographic conditions that are described below.

I. Local Conditions

A. Climatic

The burning of fossil fuels to heat structures and water, for use in cooking and clothes drying appliances, and for other uses is a significant contributor to greenhouse gas emissions and consequently climate change. "Combustion of natural gas and petroleum products for heating and cooking needs emits carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O). Emissions from natural gas consumption represent 80 percent of direct fossil fuel CO2 emissions from the residential and commercial sectors in 2019."[1] "Scientists attribute the global warming trend observed since the mid-20th century to the human expansion of the 'greenhouse effect' warming that results

[1] United States Environmental Protection Agency, Source of Greenhouse Gas Emissions, as of November 18, 2021, https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions#commercial-and-residential.

when the atmosphere traps heat radiating from Earth toward space."[2] Nitrous oxide, carbon dioxide, and methane are gases that contribute to the greenhouse effect.[3] The County's Climate Action Plan (2015) states that the County is likely to experience more extreme heat events, reduced air quality, changes in sea level, less predictable water supply, and increases in storm severity and frequency of flood events. Requiring all-electric construction without gas infrastructure will reduce the amount of greenhouse gas produced in Contra Costa County and will contribute to reducing the overall and local impact of climate change and associated risks.

B. Geological

Contra Costa County is located in Seismic Design Categories D and E, which designates the County at very high risk for earthquakes. Buildings and other structures in these zones can experience major seismic damage. Contra Costa County is near numerous earthquake faults including the San Andreas Fault, and all or portions of the Hayward, Calaveras, Concord, Antioch, Mt. Diablo, and other lesser faults. A 4.1 earthquake with its epicenter in Concord occurred in 1958, and a 5.4 earthquake with its epicenter also in Concord occurred in 1955. The Concord and Antioch faults have a potential for a Richter 6 earthquake and the Hayward and Calaveras faults have the potential for a Richter 7 earthquake. Minor tremblers from seismic activity are not uncommon in the area. A study released in 2015 by the Working Group of California Earthquake Probabilities predicts that for the San Francisco region, the 30-year likelihood of one or more earthquake of 6.7 or larger magnitude is 72%. The purpose of this Working Group is to develop statewide, time-dependent Earthquake Rupture Forecasts for California that use best available science, and are endorsed by the United States Geological Survey, the Southern California Earthquake Center, and the California Geological Survey. Scientists, therefore, believe that an earthquake of a magnitude 6.7 or larger is now slightly more than twice as likely to occur as to not occur in, approximately, the next 30 years. The elimination of natural gas infrastructure in new buildings would reduce the hazards associated with gas leaks during seismic events.

C. Topographic

Highly combustible dry grass, weeds, and brush are common in the hilly and open space areas in the County for 6 to 8 months of each year. Many of these areas are adjacent to developed locations. And many of these areas frequently experience wildland fires, which threaten nearby buildings, particularly those with wood roofs, or sidings. This condition can be found throughout Contra Costa County, especially in those developed and developing areas of the County. Earthquake gas fires due to gas line ruptures can ignite grasslands and stress resources to combat fires. The elimination of natural gas infrastructure in new buildings would reduce fire hazards of buildings constructed near highly combustible dry land areas.

[2] NASA, Causes of Climate Change, as of November 18, 2021, https://climate.nasa.gov/causes/.
[3] Id.

II. Necessity of More Restrictive Standards

Because of the conditions described above, the Contra Costa County Board of Supervisors finds that there are local climatic, geological, and topographical conditions unique to Contra Costa County that require imposing all-electric building requirements for newly constructed residential buildings, detached accessory dwelling units, hotels, offices, and retail buildings as set forth in Ordinance No. 2022-02.

III. California Energy Code

Pursuant to California Public Resources Code section 25402.1(h)(2), the Contra Costa County Board of Supervisors finds that the modifications made to the California Energy Code in this ordinance are cost-effective for newly constructed residential buildings, including detached accessory dwelling units, and newly constructed hotels, offices and retail buildings. This finding of cost-effectiveness is based on the following cost-effectiveness studies prepared as part of the Statewide Reach Codes Program:

- Cost-effectiveness Study: Low-Rise Residential New Construction
  Last modified August 1, 2019
- 2019 Mid-Rise New Construction Reach Code Cost-Effectiveness Study
  Last modified June 22, 2020
- 2019 Cost-Effectiveness Study: 2020 Analysis of High-Rise Residential New Construction
  Last modified February 22, 2021
- 2020 Reach Code Cost-Effectiveness Analysis: Detached Accessory Dwelling Units
  Last modified March 12, 2021
- 2019 Nonresidential New Construction Reach Code Cost Effectiveness Study
  Last modified July 25, 2019
- 2020 Reach Code Cost-Effectiveness Analysis Large Office
  Last modified October 13, 2021

Contra Costa County is located in climate zones 3 and 12. The cost-effectiveness studies conclude that specific modifications to the 2019 California Energy Code—including all-electric building requirements for newly constructed residential buildings, detached accessory dwelling units, hotels, offices, and retail buildings— are cost-effective for climate zones 3 and 12. The Board of Supervisors also finds, pursuant to California Public Resources Code section 25402.1(h)(2), that the modifications made to the California Energy Code in this ordinance will require diminution of energy consumption levels compared to those permitted by the 2019 California Energy Code. These findings of cost-effectiveness and energy savings will be filed with the California Energy Commission before Ordinance No. 2022-02 takes effect.

CALIFORNIA ENERGY CODES & STANDARDS

A STATEWIDE UTILITY PROGRAM

Title 24, Parts 6 and 11
Local Energy Efficiency Ordinances

2019 Cost-effectiveness Study: Low-Rise Residential New Construction

Prepared for:
Kelly Cunningham
Codes and Standards Program
Pacific Gas and Electric Company

Prepared by:
Frontier Energy, Inc.
Misti Bruceri & Associates, LLC

Last Modified: August 01, 2019

LEGAL NOTICE

This report was prepared by Pacific Gas and Electric Company and funded by the California utility customers under the auspices of the California Public Utilities Commission.

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Acronyms

2020 PV$	Present value costs in 2020
ACH50	Air Changes per Hour at 50 pascals pressure differential
ACM	Alternative Calculation Method
AFUE	Annual Fuel Utilization Efficiency
B/C	Lifecycle Benefit-to-Cost Ratio
BEopt	Building Energy Optimization Tool
BSC	Building Standards Commission
CAHP	California Advanced Homes Program
CBECC-Res	Computer program developed by the California Energy Commission for use in demonstrating compliance with the California Residential Building Energy Efficiency Standards
CFI	California Flexible Installation
CFM	Cubic Feet per Minute
CMFNH	California Multifamily New Homes
CO_2	Carbon Dioxide
CPC	California Plumbing Code
CZ	California Climate Zone
DHW	Domestic Hot Water
DOE	Department of Energy
DWHR	Drain Water Heat Recovery
EDR	Energy Design Rating
EER	Energy Efficiency Ratio
EF	Energy Factor
GHG	Greenhouse Gas
HERS Rater	Home Energy Rating System Rater
HPA	High Performance Attic
HPWH	Heat Pump Water Heater
HSPF	Heating Seasonal Performance Factor
HVAC	Heating, Ventilation, and Air Conditioning
IECC	International Energy Conservation Code
IOU	Investor Owned Utility
kBtu	kilo-British thermal unit
kWh	Kilowatt Hour
LBNL	Lawrence Berkeley National Laboratory

LCC	Lifecycle Cost
LLAHU	Low Leakage Air Handler Unit
VLLDCS	Verified Low Leakage Ducts in Conditioned Space
MF	Multifamily
NAECA	National Appliance Energy Conservation Act
NEEA	Northwest Energy Efficiency Alliance
NEM	Net Energy Metering
NPV	Net Present Value
NREL	National Renewable Energy Laboratory
PG&E	Pacific Gas and Electric Company
PV	Photovoltaic
SCE	Southern California Edison
SDG&E	San Diego Gas and Electric
SEER	Seasonal Energy Efficiency Ratio
SF	Single Family
CASE	Codes and Standards Enhancement
TDV	Time Dependent Valuation
Therm	Unit for quantity of heat that equals 100,000 British thermal units
Title 24	Title 24, Part 6
TOU	Time-Of-Use
UEF	Uniform Energy Factor
ZNE	Zero-net Energy

1 Introduction

The California Building Energy Efficiency Standards Title 24, Part 6 (Title 24) (Energy Commission, 2018b) is maintained and updated every three years by two state agencies, the California Energy Commission (Energy Commission) and the Building Standards Commission (BSC). In addition to enforcing the code, local jurisdictions have the authority to adopt local energy efficiency ordinances, or reach codes, that exceed the minimum standards defined by Title 24 (as established by Public Resources Code Section 25402.1(h)2 and Section 10-106 of the Building Energy Efficiency Standards). Local jurisdictions must demonstrate that the requirements of the proposed ordinance are cost-effective and do not result in buildings consuming more energy than is permitted by Title 24. In addition, the jurisdiction must obtain approval from the Energy Commission and file the ordinance with the BSC for the ordinance to be legally enforceable.

This report documents cost-effective combinations of measures that exceed the minimum state requirements, the 2019 Building Energy Efficiency Standards, effective January 1, 2020, for new single family and low-rise (one- to three-story) multifamily residential construction. The analysis includes evaluation of both mixed fuel and all-electric homes, documenting that the performance requirements can be met by either type of building design. Compliance package options and cost-effectiveness analysis in all sixteen California climate zones (CZs) are presented (see Appendix A – California Climate Zone Map for a graphical depiction of Climate Zone locations). All proposed package options include a combination of efficiency measures and on-site renewable energy.

2 Methodology and Assumptions

This analysis uses two different metrics to assess cost-effectiveness. Both methodologies require estimating and quantifying the incremental costs and energy savings associated with energy efficiency measures. The main difference between the methodologies is the manner in which they value energy and thus the cost savings of reduced or avoided energy use.

- **Utility Bill Impacts (On-Bill)**: Customer-based Lifecycle Cost (LCC) approach that values energy based upon estimated site energy usage and customer on-bill savings using electricity and natural gas utility rate schedules over a 30-year duration accounting for discount rate and energy cost inflation.
- **Time Dependent Valuation (TDV)**: Energy Commission LCC methodology, which is intended to capture the "societal value or cost" of energy use including long-term projected costs such as the cost of providing energy during peak periods of demand and other societal costs such as projected costs for carbon emissions, as well as grid transmission and distribution impacts. This metric values energy use differently depending on the fuel source (gas, electricity, and propane), time of day, and season. Electricity used (or saved) during peak periods has a much higher value than electricity used (or saved) during off-peak periods (Horii et al., 2014). This is the methodology used by the Energy Commission in evaluating cost-effectiveness for efficiency measures in Title 24, Part 6.

2.1 Building Prototypes

The Energy Commission defines building prototypes which it uses to evaluate the cost-effectiveness of proposed changes to Title 24 requirements. At the time that this report was written, there are two single family prototypes and one low-rise multifamily prototype. All three are used in this analysis in development of the above-code packages. Table 1 describes the basic characteristics of each prototype. Additional details on the prototypes can be found in the Alternative Calculation Method (ACM) Approval Manual (Energy Commission, 2018a). The prototypes have equal geometry on all walls, windows and roof to be orientation neutral.

Table 1: Prototype Characteristics

Characteristic	Single Family One-Story	Single Family Two-Story	Multifamily
Conditioned Floor Area	2,100 ft^2	2,700 ft^2	6,960 ft^2: (4) 780 ft^2 & (4) 960 ft^2 units
Num. of Stories	1	2	2
Num. of Bedrooms	3	3	(4) 1-bed & (4) 2-bed units
Window-to-Floor Area Ratio	20%	20%	15%

Source: 2019 Alternative Calculation Method Approval Manual (California Energy Commission, 2018a).

The Energy Commission's protocol for single family prototypes is to weight the simulated energy impacts by a factor that represents the distribution of single-story and two-story homes being built statewide, assuming 45 percent single-story and 55 percent two-story. Simulation results in this study are characterized according to this ratio, which is approximately equivalent to a 2,430-square foot (ft^2) house.[1]

The methodology used in the analyses for each of the prototypical building types begins with a design that precisely meets the minimum 2019 prescriptive requirements (zero compliance margin). Table 150.1-A in the 2019 Standards (Energy Commission, 2018b) lists the prescriptive measures that determine the baseline design in each climate zone. Other features are consistent with the Standard Design in the ACM Reference Manual (Energy Commission, 2019), and are designed to meet, but not exceed, the minimum requirements. Each prototype building has the following features:

- Slab-on-grade foundation.
- Vented attic.
- High performance attic in climate zones where prescriptively required (CZ 4, 8-16) with insulation installed at the ceiling and below the roof deck per Option B. (Refer to Table 150.1-A in the 2019 Standards.)
- Ductwork located in the attic for single family and within conditioned space for multifamily.

Both mixed fuel and all-electric prototypes are evaluated in this study. While in past code cycles an all-electric home was compared to a home with gas for certain end-uses, the 2019 code includes separate prescriptive and performance paths for mixed-fuel and all-electric homes. The fuel specific characteristics of the mixed fuel and all-electric prototypes are defined according to the 2019 ACM Reference Manual and described in Table 2.[2]

[1] 2,430 ft^2 = (45% x 2,100 ft^2) + (55% x 2,700 ft^2)

[2] Standards Section 150.1(c)8.A.iv.a specifies that compact hot water distribution design and a drain water heat recovery system or extra PV capacity are required when a heat pump water heater is installed prescriptively. The efficiency of the distribution and the drain water heat recovery systems as well as the location of the water heater applied in this analysis are based on the Standard Design assumptions in CBECC-Res which result in a zero-compliance margin for the 2019 basecase model.

Table 2: Characteristics of the Mixed Fuel vs All-Electric Prototype

Characteristic	Mixed Fuel	All-Electric
Space Heating/Cooling[1]	Gas furnace 80 AFUE Split A/C 14 SEER, 11.7 EER	Split heat pump 8.2 HSPF, 14 SEER, 11.7 EER
Water Heater[1,2, 3, 4]	Gas tankless UEF = 0.81	50gal HPWH UEF = 2.0 SF: located in the garage MF CZ 2,4,6-16: located in living space MF CZ 1,3,5: located in exterior closet
Hot Water Distribution	Code minimum. All hot water lines insulated	Basic compact distribution credit, (CZ 6-8,15) Expanded compact distribution credit, compactness factor = 0.6 (CZ 1-5,9-14,16)
Drain Water Heat Recovery Efficiency	None	CZ 1: unequal flow to shower = 42% CZ 16: equal flow to shower & water heater = 65% None in other CZs
Cooking	Gas	Electric
Clothes Drying	Gas	Electric

[1]Equipment efficiencies are equal to minimum federal appliance efficiency standards.
[2]The multifamily prototype is evaluated with individual water heaters. HPWHs located in the living space do not have ducting for either inlet or exhaust air; CBECC-Res does not have the capability to model ducted HPWHs.
[3]UEF = uniform energy factor. HPWH = heat pump water heater. SF = single family. MF = multifamily.
[4]CBECC-Res applies a 50gal water heater when specifying a storage water heater. Hot water draws differ between the prototypes based on number of bedrooms.

2.2 Measure Analysis

The California Building Energy Code Compliance simulation tool, CBECC-RES 2019.1.0, was used to evaluate energy impacts using the 2019 Title 24 prescriptive standards as the benchmark, and the 2019 TDV values. TDV is the energy metric used by the Energy Commission since the 2005 Title 24 energy code to evaluate compliance with the Title 24 standards.

Using the 2019 baseline as the starting point, prospective energy efficiency measures were identified and modeled in each of the prototypes to determine the projected energy (Therm and kWh) and compliance impacts. A large set of parametric runs were conducted to evaluate various options and develop packages of measures that exceed minimum code performance. The analysis utilizes a parametric tool based on Micropas[3] to automate and manage the generation of CBECC-Res input files. This allows for quick evaluation of various efficiency measures across multiple climate zones and prototypes and improves quality control. The batch process functionality of CBECC-Res is utilized to simulate large groups of input files at once. Annual utility costs were calculated using hourly data output from CBECC-Res and electricity and natural gas tariffs for each of the investor owned utilities (IOUs).

[3] Developed by Ken Nittler of Enercomp, Inc.

The Reach Codes Team selected packages and measures based on cost-effectiveness as well as decades of experience with residential architects, builders, and engineers along with general knowledge of the relative acceptance of many measures.

2.2.1 Federal Preemption

The Department of Energy (DOE) sets minimum efficiency standards for equipment and appliances that are federally regulated under the National Appliance Energy Conservation Act (NAECA), including heating, cooling, and water heating equipment. Since state and local governments are prohibited from adopting policies that mandate higher minimum efficiencies than the federal standards require, the focus of this study is to identify and evaluate cost-effective packages that do not include high efficiency equipment. While this study is limited by federal preemption, in practice builders may use any package of compliant measures to achieve the performance goals, including high efficiency appliances. Often, these measures are the simplest and most affordable measures to increase energy performance.

2.2.2 Energy Design Rating

The 2019 Title 24 code introduces California's Energy Design Rating (EDR) as the primary metric to demonstrate compliance with the energy code. EDR is still based on TDV but it uses a building that is compliant with the 2006 International Energy Conservation Code (IECC) as the reference building. The reference building has an EDR score of 100 while a zero-net energy (ZNE) home has an EDR score of zero (Energy Commission, 2018d). See Figure 1 for a graphical representation of this. While the Reference Building is used to determine the rating, the Proposed Design is still compared to the Standard Design based on the prescriptive baseline assumptions to determine compliance.

The EDR is calculated by CBECC-Res and has two components:

1. An "Efficiency EDR" which represents the building's energy use without solar generation.[4]
2. A "Total EDR" that represents the final energy use of the building based on the combined impact of efficiency measures, PV generation and demand flexibility.

For a building to comply, two criteria are required:

(1) the proposed Efficiency EDR must be equal to or less than the Efficiency EDR of the Standard Design, and
(2) the proposed Total EDR must be equal to or less than the Total EDR of the Standard Design.

Single family prototypes used in this analysis that are minimally compliant with the 2019 Title 24 code achieve a Total EDR between 20 and 35 in most climates.

This concept, consistent with California's "loading order" which prioritizes energy efficiency ahead of renewable generation, requires projects meet a minimum Efficiency EDR before PV is credited but allows for PV to be traded off with additional efficiency when meeting the Total EDR. A project may improve on building efficiency beyond the minimum required and subsequently reduce the PV generation capacity required to achieve the required Total EDR but may not increase the size of the PV system and trade this off with a reduction of efficiency measures. Figure 1 graphically summarizes how both Efficiency EDR and PV / demand flexibility EDR are used to calculate the Total EDR used in the 2019 code and in this analysis.

[4] While there is no compliance credit for solar PV as there is under the 2016 Standards, the credit for installing electric storage battery systems that meet minimum qualifications can be applied to the Efficiency EDR.

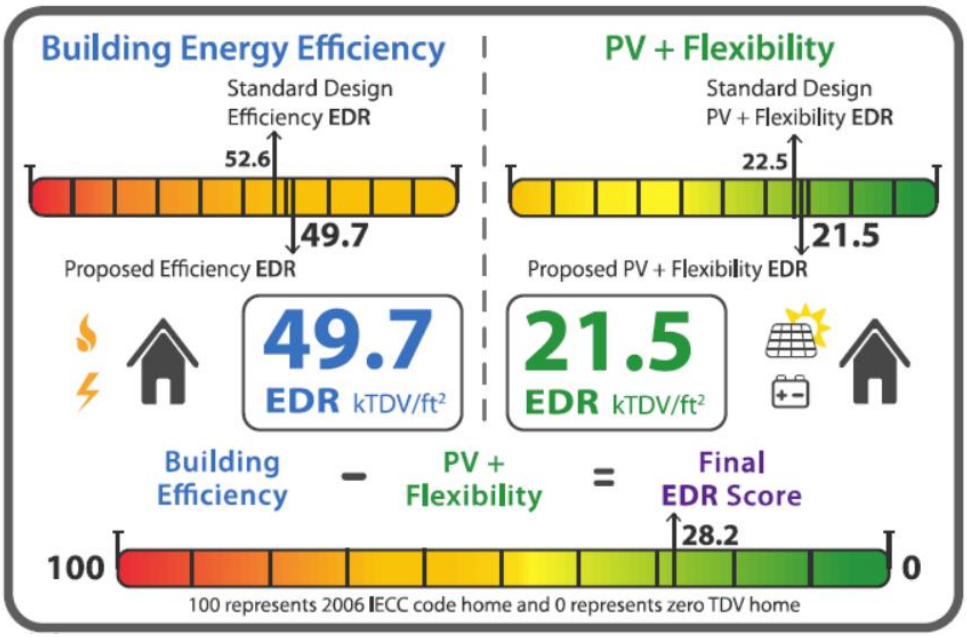

Figure 1: Graphical description of EDR scores (courtesy of Energy Code Ace[5])

Results from this analysis are presented as EDR Margin, a reduction in the EDR score relative to the Standard Design. EDR Margin is a better metric to use than absolute EDR in the context of a reach code because absolute values vary, based on the home design and characteristics such as size and orientation. This approach aligns with how compliance is determined for the 2019 Title 24 code, as well as utility incentive programs, such as the California Advanced Homes Program (CAHP) & California Multifamily New Homes (CMFNH), which require minimum performance criteria based on an EDR Margin for low-rise residential projects. The EDR Margin is calculated according to Equation 1 for the two efficiency packages and Equation 2 for the Efficiency & PV and Efficiency & PV/Battery packages (see Section 2.3).

Equation 1

$$EDR\ Margin_{\boldsymbol{efficiency}} = Standard\ Design\ \boldsymbol{Efficiency}\ EDR - Proposed\ Design\ \boldsymbol{Efficiency}\ EDR$$

Equation 2

$$EDR\ Margin_{\boldsymbol{efficiency\ \&\ PV}} = Standard\ Design\ \boldsymbol{Total}\ EDR - Proposed\ Design\ \boldsymbol{Total}\ EDR$$

2.2.3 Energy Efficiency Measures

Following are descriptions of each of the efficiency measures evaluated under this analysis. Because not all of the measures described below were found to be cost-effective and cost-effectiveness varied by climate zone, not all measures are included in all packages and some of the measures listed are not included in any final package. For a list of measures included in each efficiency package by climate zone, see Appendix D – Single Family Measure Summary and Appendix F – Multifamily Measure Summary.

Reduced Infiltration (ACH50): Reduce infiltration in single family homes from the default infiltration assumption of five (5) air changes per hour at 50 Pascals (ACH50)[6] by 40 to 60 percent to either 3 ACH50 or 2 ACH50. HERS

[5] https://energycodeace.com/

[6] Whole house leakage tested at a pressure difference of 50 Pascals between indoors and outdoors.

rater field verification and diagnostic testing of building air leakage according to the procedures outlined in the 2019 Reference Appendices RA3.8 (Energy Commission, 2018c). This measure was not applied to multifamily homes because CBECC-Res does not allow reduced infiltration credit for multifamily buildings.

Improved Fenestration: Reduce window U-factor to 0.24. The prescriptive U-factor is 0.30 in all climates. In climate zones 1, 3, 5, and 16 where heating loads dominate, an increase in solar heat gain coefficient (SHGC) from the default assumption of 0.35 to 0.50 was evaluated in addition to the reduction in U-factor.

Cool Roof: Install a roofing product that's rated by the Cool Roof Rating Council to have an aged solar reflectance (ASR) equal to or greater than 0.25. Steep-sloped roofs were assumed in all cases. Title 24 specifies a prescriptive ASR of 0.20 for Climate Zones 10 through 15 and assumes 0.10 in other climate zones.

Exterior Wall Insulation: Decrease wall U-factor in 2x6 walls to 0.043 from the prescriptive requirement of 0.048 by increasing exterior insulation from one-inch R-5 to 1-1/2 inch R-7.5. This was evaluated for single family buildings only in all climate zones except 6 and 7 where the prescriptive requirement is higher (U-factor of 0.065) and improving beyond the prescriptive value has little impact.

High Performance Attics (HPA): HPA with R-38 ceiling insulation and R-30 insulation under the roof deck. In climates where HPA is already required prescriptively this measure requires an incremental increase in roof insulation from R-19 or R-13 to R-30. In climates where HPA is not currently required (Climate Zones 1 through 3, and 5 through 7), this measure adds roof insulation to an uninsulated roof as well as increasing ceiling insulation from R-30 to R-38 in Climate Zones 3, 5, 6 and 7.

Slab Insulation: Install R-10 perimeter slab insulation at a depth of 16-inches. For climate zone 16, where slab insulation is required, prescriptively this measure increases that insulation from R-7 to R-10.

Duct Location (Ducts in Conditioned Space): Move the ductwork and equipment from the attic to inside the conditioned space in one of the three following ways.

1. Locate ductwork in conditioned space. The air handler may remain in the attic provided that 12 linear feet or less of duct is located outside the conditioned space including the air handler and plenum. Meet the requirements of 2019 Reference Appendices RA3.1.4.1.2. (Energy Commission, 2018c)
2. All ductwork and equipment located entirely in conditioned space meeting the requirements of 2019 Reference Appendices RA3.1.4.1.3. (Energy Commission, 2018c)
3. All ductwork and equipment located entirely in conditioned space with ducts tested to have less than or equal to 25 cfm leakage to outside. Meet the requirements of Verified Low Leakage Ducts in Conditioned Space (VLLDCS) in the 2019 Reference Appendices RA3.1.4.3.8. (Energy Commission, 2018c)

Option 1 and 2 above apply to single family only since the basecase for multifamily assumes ducts are within conditioned space. Option 3 applies to both single family and multifamily cases.

Reduced Distribution System (Duct) Leakage: Reduce duct leakage from 5% to 2% and install a low leakage air handler unit (LLAHU). This is only applicable to single family homes since the basecase for multifamily assumes ducts are within conditioned space and additional duct leakage credit is not available.

Low Pressure Drop Ducts: Upgrade the duct distribution system to reduce external static pressure and meet a maximum fan efficacy of 0.35 Watts per cfm for gas furnaces and 0.45 Watts per cfm for heat pumps operating at full speed. This may involve upsizing ductwork, reducing the total effective length of ducts, and/or selecting low pressure drop components such as filters. Fan watt draw must be verified by a HERS rater according to the procedures outlined in the 2019 Reference Appendices RA3.3 (Energy Commission, 2018c). New federal regulations that went into effect July 3, 2019 require higher fan efficiency for gas furnaces than for heat pumps and air handlers, which is why the recommended specification is different for mixed fuel and all-electric homes.

HERS Verification of Hot Water Pipe Insulation: The California Plumbing Code (CPC) requires pipe insulation on all hot water lines. This measure provides credit for HERS rater verification of pipe insulation requirements according to the procedures outlined in the 2019 Reference Appendices RA3.6.3. (Energy Commission, 2018c)

Compact Hot Water Distribution: Two credits for compact hot water distribution were evaluated.

1. Basic Credit: Design the hot water distribution system to meet minimum requirements for the basic compact hot water distribution credit according to the procedures outlined in the 2019 Reference Appendices RA4.4.6 (Energy Commission, 2018c). In many single family homes this may require moving the water heater from an exterior to an interior garage wall. Multifamily homes with individual water heaters are expected to easily meet this credit with little or no alteration to plumbing design. CBECC-Res software assumes a 30% reduction in distribution losses for the basic credit.
2. Expanded Credit: Design the hot water distribution system to meet minimum requirements for the expanded compact hot water distribution credit according to the procedures outlined in the 2019 Reference Appendices RA3.6.5 (Energy Commission, 2018c). In addition to requiring HERS verification that the minimum requirements for the basic compact distribution credit are met, this credit also imposes limitations on pipe location, maximum pipe diameter, and recirculation system controls allowed.

Drain Water Heat Recovery (DWHR): For multifamily buildings add DWHR that serves the showers in an unequal flow configuration (pre-heated water is piped directly to the shower) with 50% efficiency. This upgrade assumes all apartments are served by a DWHR with one unit serving each apartment individually. For a slab-on-grade building this requires a horizontal unit for the first-floor apartments.

Federally Preempted Measures:

The following additional measures were evaluated. Because these measures require upgrading appliances that are federally regulated to high efficiency models, they cannot be used to show cost-effectiveness in a local ordinance. The measures and packages are presented here to show that there are several options for builders to meet the performance targets. Heating and cooling capacities are autosized by CBECC-Res in all cases.

High Efficiency Furnace: For the mixed-fuel prototypes, upgrade natural gas furnace to one of two condensing furnace options with an efficiency of 92% or 96% AFUE.

High Efficiency Air Conditioner: For the mixed-fuel prototypes, upgrade the air conditioner to either single-stage SEER 16 / EER 13 or two-stage SEER 18 / EER 14 equipment.

High Efficiency Heat Pump: For the all-electric prototypes, upgrade the heat pump to either single-stage SEER 16 / EER 13 / HSPF 9 or two-stage SEER 18 / EER 14 / HSPF 10 equipment.

High Efficiency Tankless Water Heater: For the mixed-fuel prototype, upgrade tankless water heater to a condensing unit with a rated Uniform Energy Factor (UEF) of 0.96.

High Efficiency Heat Pump Water Heater (HPWH): For the all-electric prototypes, upgrade the federal minimum heat pump water heater to a HPWH that meets the Northwest Energy Efficiency Alliance (NEEA)[7] Tier 3 rating. The evaluated NEEA water heater is an 80gal unit and is applied to all three building prototypes. Using the same

[7] Based on operational challenges experienced in the past, NEEA established rating test criteria to ensure newly installed HPWHs perform adequately, especially in colder climates. The NEEA rating requires an Energy Factor equal to the ENERGY STAR performance level and includes requirements regarding noise and prioritizing heat pump use over supplemental electric resistance heating.

water heater provides consistency in performance across all the equipment upgrade cases, even though hot water draws differ across the prototypes.

2.3 Package Development

Three to four packages were evaluated for each prototype and climate zone, as described below.

1) **Efficiency – Non-Preempted**: This package uses only efficiency measures that don't trigger federal preemption issues including envelope, and water heating and duct distribution efficiency measures.
2) **Efficiency – Equipment, Preempted**: This package shows an alternative design that applies HVAC and water heating equipment that are more efficient than federal standards. The Reach Code Team considers this more reflective of how builders meet above code requirements in practice.
3) **Efficiency & PV**: Using the Efficiency – Non-Preempted Package as a starting point[8], PV capacity is added to offset most of the estimated electricity use. This only applies to the all-electric case, since for the mixed fuel cases, 100% of the projected electricity use is already being offset as required by 2019 Title 24, Part 6.
4) **Efficiency & PV/Battery**: Using the Efficiency & PV Package as a starting point, PV capacity is added as well as a battery system.

2.3.1 Solar Photovoltaics (PV)

Installation of on-site PV is required in the 2019 residential code. The PV sizing methodology in each package was developed to offset annual building electricity use and avoid oversizing which would violate net energy metering (NEM) rules.[9] In all cases, PV is evaluated in CBECC-Res according to the California Flexible Installation (CFI) assumptions.

The Reach Code Team used two options within the CBECC-Res software for sizing the PV system, described below. Analysis was conducted to determine the most appropriate sizing method for each package which is described in the results.

- Standard Design PV – the same PV capacity as is required for the Standard Design case[10]
- Specify PV System Scaling – a PV system sized to offset a specified percentage of the estimated electricity use of the Proposed Design case

2.3.2 Energy Storage (Batteries)

A battery system was evaluated in CBECC-Res with control type set to "Time of Use" and with default efficiencies of 95% for both charging and discharging. The "Time of Use" option assumes batteries are charged anytime PV generation is greater than the house load but controls when the battery storage system discharges. During the summer months (July – September) the battery begins to discharge at the beginning of the peak period at a maximum rate until fully discharged. During discharge the battery first serves the house load but will

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[8] In cases where there was no cost-effective Efficiency – Non-Preempted Package, the most cost-effective efficiency measures for that climate zone were also included in the Efficiency & PV Package in order to provide a combination of both efficiency and PV beyond code minimum.

[9] NEM rules apply to the IOU territories only.

[10] The Standard Design PV system is sized to offset the electricity use of the building loads which are typically electric in a mixed fuel home, which includes all loads except space heating, water heating, clothes drying, and cooking.

discharge to the electric grid if there is excess energy available. During other months the battery discharges whenever the PV system does not cover the entire house load and does not discharge to the electric grid. This control option is considered to be most reflective of the current products on the market. This control option requires an input for the "First Hour of the Summer Peak" and the Statewide CASE Team applied the default hour in CBECC-Res which differs by climate zone (either a 6pm or 7pm start). The Self Utilization Credit was taken when the battery system was modeled.

2.4 Incremental Costs

Table 4 below summarizes the incremental cost assumptions for measures evaluated in this study. Incremental costs represent the equipment, installation, replacement, and maintenance costs of the proposed measures relative to the base case.[11] Replacement costs are applied to HVAC and DHW equipment, PV inverters, and battery systems over the 30-year evaluation period. There is no assumed maintenance on the envelope, HVAC, or DHW measures since there should not be any additional maintenance cost for a more efficient version of the same system type as the baseline. Costs were estimated to reflect costs to the building owner. When costs were obtained from a source that didn't already include builder overhead and profit, a markup of ten percent was added. All costs are provided as present value in 2020 (2020 PV$). Costs due to variations in furnace, air conditioner, and heat pump capacity by climate zone were not accounted for in the analysis.

Equipment lifetimes applied in this analysis for the water heating and space conditioning measures are summarized in Table 3.

Table 3: Lifetime of Water Heating & Space Conditioning Equipment Measures

Measure	Lifetime
Gas Furnace	20
Air Conditioner	20
Heat Pump	15
Gas Tankless Water Heater	20
Heat Pump Water Heater	15

Source: City of Palo Alto 2019 Title 24 Energy Reach Code Cost-effectiveness Analysis Draft (TRC, 2018) which is based on the Database of Energy Efficiency Resources (DEER).[12]

[11] Interest costs due to financing are not included in the incremental costs presented in the Table 4 but are accounted for in the lifetime cost analysis. All first costs are assumed to be financed in a mortgage, see Section 2.5 for details.

[12] http://www.deeresources.com

Table 4: Incremental Cost Assumptions

Measure	Performance Level	Incremental Cost (2020 PV$) Single Family	Incremental Cost (2020 PV$) Multifamily (Per Dwelling Unit)	Source & Notes
Non-Preempted Measures				
Reduced Infiltration	3.0 vs 5.0 ACH50	$391	n/a	NREL's BEopt cost database ($0.115/ft^2 for 3 ACH50 & $0.207/ft^2 for 2 ACH50) + $100 HERS rater verification.
	2.0 vs 5.0 ACH50	$613	n/a	
Window U-factor	0.24 vs 0.30	$2,261	$607	$4.23/ft^2 window area based on analysis conducted for the 2019 and 2022 Title 24 cycles (Statewide CASE Team, 2018).
Window SHGC	0.50 vs 0.35	$0	$0	Data from CASE Report along with direct feedback from Statewide CASE Team that higher SHGC does not necessarily have any incremental cost (Statewide CASE Team, 2017d). Applies to CZ 1,3,5,16.
Cool Roof - Aged Solar Reflectance	0.25 vs 0.20	$237	$58	Costs based on 2016 Cost-effectiveness Study for Cool Roofs reach code analysis for 0.28 solar reflectance product. (Statewide Reach Codes Team, 2017b).
	0.20 vs 0.10	$0	$0	
Exterior Wall Insulation	R-7.5 vs R-5	$818	n/a	Based on increasing exterior insulation from 1" R-5 to 1.5" R-7.5 in a 2x6 wall (Statewide CASE Team, 2017c). Applies to single family only in all climates except CZ 6, 7.
Under-Deck Roof Insulation (HPA)	R-13 vs R-0	$1,338	$334	Costs for R-13 ($0.64/ft^2), R-19 ($0.78/ft^2) and R-30 ($1.61/ft^2) based on data presented in the 2019 HPA CASE Report (Statewide CASE Team, 2017b) along with data collected directly from builders during the 2019 CASE process. The R-30 costs include additional labor costs for cabling. Costs for R-38 from NREL's BEopt cost database.
	R-19 vs R-13	$282	$70	
	R-30 vs R-19	$1,831	$457	
	R-38 vs R-30	$585	$146	
Attic Floor Insulation	R-38 vs R-30	$584	$146	NREL's BEopt cost database: $0.34/ft^2 ceiling area
Slab Edge Insulation	R-10 vs R-0	$553	$121	$4/linear foot of slab perimeter based on internet research. Assumes 16in depth.
	R-10 vs R-7	$157	$21	$1.58/linear foot of slab perimeter based on NREL's BEopt cost database. This applies to CZ 16 only where R-7 slab edge insulation is required prescriptively. Assumes 16in depth.
Duct Location	<12 feet in attic	$358	n/a	Costs based on a 2015 report on the Evaluation of Ducts in Conditioned Space for New California Homes (Davis Energy Group, 2015). HERS verification cost of $100 for the Verified Low Leakage Ducts in Conditioned Space credit.
	Ducts in Conditioned Space	$658	n/a	
	Verified Low Leakage Ducts in Conditioned Space	$768	$110	

Table 4: Incremental Cost Assumptions

Measure	Performance Level	Incremental Cost (2020 PV$)		Source & Notes
		Single Family	Multifamily (Per Dwelling Unit)	
Distribution System Leakage	2% vs 5%	$96	n/a	1-hour labor. Labor rate of $96 per hour is from 2019 RSMeans for sheet metal workers and includes an average City Cost Index for labor for California cities & 10% for overhead and profit. Applies to single family only since ducts are assumed to be in conditioned space for multifamily
	Low Leakage Air Handler	$0	n/a	Negligible cost based on review of available products. There are more than 6,000 Energy Commission certified units and the list includes many furnace and heat pump air handler product lines from the major manufacturers, including minimum efficiency, low cost product lines.
Low Pressure Drop Ducts (Fan W/cfm)	0.35 vs 0.45	$96	$48	Costs assume one-hour labor for single family and half-hour per multifamily apartment. Labor rate of $96 per hour is from 2019 RSMeans for sheet metal workers and includes an average City Cost Index for labor for California cities.
	0.45 vs 0.58	$96	$48	
Hot Water Pipe Insulation	HERS verified	$110	$83	Cost for HERS verification only, based on feedback from HERS raters. $100 per single family home and $75 per multifamily unit before markup.
Compact Hot Water Distribution	Basic credit	$150	$0	For single family add 20-feet venting at $12/ft to locate water heater on interior garage wall, less 20-feet savings for less PEX and pipe insulation at $4.88/ft. Costs from online retailers. Many multifamily buildings are expected to meet this credit without any changes to distribution design.
	Expanded credit	n/a	$83	Cost for HERS verification only. $75 per multifamily unit before markup. This was only evaluated for multifamily buildings.
Drain Water Heat Recovery	50% efficiency	n/a	$690	Cost from the 2019 DWHR CASE Report assuming a 2-inch DWHR unit. The CASE Report multifamily costs were based on one unit serving 4 dwelling units with a central water heater. Since individual water heaters serve each dwelling unit in this analysis, the Reach Code Team used single family costs from the CASE Report. Costs in the CASE Report were based on a 46.1% efficient unit, a DWHR device that meets the 50% efficiency assumed in this analysis may cost a little more. (Statewide CASE Team, 2017a).
Federally Pre-empted Measures				
Furnace AFUE	92% vs 80%	$139	$139	Equipment costs from online retailers for 40-kBtu/h unit. Cost saving for 6-feet of venting at $26/foot due to lower cost venting requirements for condensing (PVC) vs non-condensing (stainless) furnaces. Replacement at year 20 assumes a 50% reduction in first cost. Value at year 30 based on remaining useful life is included.
	96% vs 80%	$244	$244	
Air Conditioner SEER/EER	16/13 vs 14/11.7	$111	$111	Costs from online retailers for 2-ton unit. Replacement at year 20 assumes a 50% reduction in first cost. Value at year 30 based on remaining useful life is included.
	18/14 vs 14/11.7	$1,148	$1,148	

Table 4: Incremental Cost Assumptions

Measure	Performance Level	Incremental Cost (2020 PV$)		Source & Notes
		Single Family	Multifamily (Per Dwelling Unit)	
Heat Pump SEER/EER /HSPF	16/13/9 vs 14/11.7/8.2	$411	$411	Costs from online retailers for 2-ton unit. Replacement at year 15 assumes a 50% reduction in first cost.
	18/14/10 vs 14/11.7/8.2	$1,511	$1,511	
Tankless Water Heater Energy Factor	0.96 vs 0.81	$203	$203	Equipment costs from online retailers for 40-kBtu/h unit. Cost saving for 6-feet of venting at $26/foot due to lower cost venting requirements for condensing (PVC) vs non-condensing (stainless) furnaces. Replacement at year 15 assumes a 50% reduction in first cost.
HPWH	NEEA Tier 3 vs 2.0 EF	$294	$294	Equipment costs from online retailers. Replacement at year 15 assumes a 50% reduction in first cost.
PV + Battery				
PV System	System size varies	$3.72/W-DC	$3.17/W-DC	First costs are from LBNL's Tracking the Sun 2018 costs (Barbose et al., 2018) and represent costs for the first half of 2018 of $3.50/W-DC for residential system and $2.90/W-DC for non-residential system ≤500 kW-DC. These costs were reduced by 16% for the solar investment tax credit, which is the average credit over years 2020-2022. Inverter replacement cost of $0.14/W-DC present value includes replacements at year 11 at $0.15/W-DC (nominal) and at year 21 at $0.12/W-DC (nominal) per the 2019 PV CASE Report (California Energy Commission, 2017). System maintenance costs of $0.31/W-DC present value assume $0.02/W-DC (nominal) annually per the 2019 PV CASE Report (California Energy Commission, 2017). 10% overhead and profit added to all costs
Battery	System size varies by building type	$656/kWh	$656/kWh	$633/kWh first cost based on the PV Plus Battery Study report (Statewide Reach Codes Team, 2018) as the average cost of the three systems that were analyzed. This cost was reduced by 16% for the solar investment tax credit, which is the average credit over years 2020-2022. Replacement cost at year 15 of $100/kWh based on target price reductions (Penn, 2018).

2.5 Cost-effectiveness

Cost-effectiveness was evaluated for all sixteen climate zones and is presented based on both TDV energy, using the Energy Commission's LCC methodology, and an On-Bill approach using residential customer utility rates. Both methodologies require estimating and quantifying the value of the energy impact associated with energy efficiency measures over the life of the measures (30 years) as compared to the prescriptive Title 24 requirements.

Results are presented as a lifecycle benefit-to-cost (B/C) ratio, a net present value (NPV) metric which represents the cost-effectiveness of a measure over a 30-year lifetime taking into account discounting of future savings and costs and financing of incremental first costs. A value of one indicates the NPV of the savings over the life of the measure is equivalent to the NPV of the lifetime incremental cost of that measure. A value greater than one represents a positive return on investment. The B/C ratio is calculated according to Equation 3.

Equation 3

$$Benefit - to - Cost\ Ratio = \frac{NPV\ of\ lifetime\ benefit}{NPV\ of\ lifetime\ cost}$$

In most cases the benefit is represented by annual utility savings or TDV savings and the cost by incremental first cost and replacement costs. However, in some cases a measure may have incremental cost savings but with increased energy related costs. In this case, the benefit is the lower first cost and the cost is the increase in utility bills. The lifetime costs or benefits are calculated according to Equation 4.

Equation 4

$$\boldsymbol{NPV\ of\ lifetime\ cost/benefit = \sum_{t=1}^{n} Annual\ cost/benefit_t * (1+r)^t}$$

Where:

- *n* = analysis term
- *r* = discount rate

The following summarizes the assumptions applied in this analysis to both methodologies.

- Analysis term of 30-years
- Real discount rate of 3 percent
- Inflation rate of 2 percent
- First incremental costs are financed into a 30-year mortgage
- Mortgage interest rate of 4.5 percent
- Average tax rate of 20 percent (to account for tax savings due to loan interest deductions)

2.5.1 ***On-Bill Customer Lifecycle Cost***

Residential utility rates were used to calculate utility costs for all cases and determine On-Bill customer cost-effectiveness for the proposed packages. The Reach Codes Team obtained the recommended utility rates from each IOU based on the assumption that the reach codes go into effect January of 2020. Annual utility costs were calculated using hourly electricity and gas output from CBECC-Res and applying the utility tariffs summarized in Table 5. Appendix B – Utility Tariff Details includes the utility rate schedules used for this study. The applicable residential time-of-use (TOU) rate was applied to all cases.[13] Annual electricity production in excess of annual electricity consumption is credited to the utility account at the applicable wholesale rate based on the approved

[13] Under NEM rulings by the CPUC (D-16-01-144, 1/28/16), all new PV customers shall be in an approved TOU rate structure. https://www.cpuc.ca.gov/General.aspx?id=3800

NEM2 tariffs for that utility. Minimum daily use billing and mandatory non-bypassable charges have been applied. Future change to the NEM tariffs are likely; however, there is a lot of uncertainty about what those changes will be and if they will become effective during the 2019 code cycle (2020-2022).
The net surplus compensation rates for each utility are as follows:[14]

- PG&E: $0.0287 / kWh
- SCE: $0.0301 / kWh
- SDG&E: $0.0355 / kWh

Utility rates were applied to each climate zone based on the predominant IOU serving the population of each zone according to Two SCE tariff options were evaluated: TOU-D-4-9 and TOU-D-PRIME. The TOU-D-PRIME rate is only available to customers with heat pumps for either space or water heating, a battery storage system, or an electric vehicle and therefore was only evaluated for the all-electric cases and the Efficiency & PV/Battery packages. The rate which resulted in the lowest annual cost to the customer was used for this analysis, which was TOU-D-4-9 in all cases with the exception of the single family all-electric cases in Climate Zone 14.

Table 5. Climate Zones 10 and 14 are evaluated with both SCE/SoCalGas and SDG&E tariffs since each utility has customers within these climate zones. Climate Zone 5 is evaluated under both PG&E and SoCalGas natural gas rates.

Two SCE tariff options were evaluated: TOU-D-4-9 and TOU-D-PRIME. The TOU-D-PRIME rate is only available to customers with heat pumps for either space or water heating, a battery storage system, or an electric vehicle and therefore was only evaluated for the all-electric cases and the Efficiency & PV/Battery packages. The rate which resulted in the lowest annual cost to the customer was used for this analysis, which was TOU-D-4-9 in all cases with the exception of the single family all-electric cases in Climate Zone 14.

Table 5: IOU Utility Tariffs Applied Based on Climate Zone

Climate Zones	Electric / Gas Utility	Electricity (Time-of-use)	Natural Gas
1-5, 11-13, 16	PG&E	E-TOU, Option B	G1
5	PG&E / SoCalGas	E-TOU, Option B	GR
6, 8-10, 14, 15	SCE / SoCal Gas	TOU-D-4-9 or TOU-D-PRIME	GR
7, 10, 14	SDG&E	TOU-DR1	GR

Source: Utility websites, See Appendix B – Utility Tariff Details for details on the tariffs applied.

Utility rates are assumed to escalate over time, using assumptions from research conducted by Energy and Environmental Economics (E3) in the 2019 study Residential Building Electrification in California study (Energy & Environmental Economics, 2019). Escalation of natural gas rates between 2019 and 2022 is based on the currently filed General Rate Cases (GRCs) for PG&E, SoCalGas and SDG&E. From 2023 through 2025, gas rates are assumed to escalate at 4% per year above inflation, which reflects historical rate increases between 2013 and 2018. Escalation of electricity rates from 2019 through 2025 is assumed to be 2% per year above inflation, based on electric utility estimates. After 2025, escalation rates for both natural gas and electric rates are assumed to drop to a more conservative 1% escalation per year above inflation for long-term rate trajectories beginning in 2026 through 2050. See Appendix B – Utility Tariff Details for additional details.

[14] Net surplus compensation rates based on 1-year average February 2018 – January 2019.

2.5.2 TDV Lifecycle Cost

Cost-effectiveness was also assessed using the Energy Commission's TDV LCC methodology. TDV is a normalized monetary format developed and used by the Energy Commission for comparing electricity and natural gas savings, and it considers the cost of electricity and natural gas consumed during different times of the day and year. The 2019 TDV values are based on long term discounted costs of 30 years for all residential measures. The CBECC-Res simulation software outputs are in terms of TDV kBTUs. The present value of the energy cost savings in dollars is calculated by multiplying the TDV kBTU savings by a net present value (NPV) factor, also developed by the Energy Commission. The NPV factor is $0.173/TDV kBtu for residential buildings.

Like the customer B/C ratio, a TDV B/C ratio value of one indicates the savings over the life of the measure are equivalent to the incremental cost of that measure. A value greater than one represents a positive return on investment. The ratio is calculated according to Equation 5.

Equation 5

$$TDV\ Benefit - to - Cost\ Ratio = \frac{TDV\ energy\ savings\ *\ NPV\ factor}{NPV\ of\ lifetime\ incremental\ cost}$$

2.6 Electrification Evaluation

In addition to evaluating upgrades to mixed fuel and all-electric buildings independently that do not result in fuel switching, the Reach Code Team also analyzed the impact on construction costs, utility costs, and TDV when a builder specifies and installs electric appliances instead of the gas appliances typically found in a mixed fuel building. This analysis compared the code compliant mixed fuel prototype, which uses gas for space heating, water heating, cooking, and clothes drying, with the code compliant all-electric prototype. It also compared the all-electric Efficiency & PV Package with the code compliance mixed fuel prototype. In these cases, the relative costs between natural gas and electric appliances, differences between in-house electricity and gas infrastructure and the associated infrastructure costs for providing gas to the building were also included.

A variety of sources were reviewed when determining incremental costs. The sources are listed below.

- SMUD All-Electric Homes Electrification Case Study (EPRI, 2016)
- City of Palo Alto 2019 Title 24 Energy Reach Code Cost-effectiveness Analysis (TRC, 2018)
- Building Electrification Market Assessment (E3, 2019)
- Decarbonization of Heating Energy Use in California Buildings (Hopkins et al., 2018)
- Analysis of the Role of Gas for a Low-Carbon California Future (Navigant, 2008)
- Rulemaking No. 15-03-010 An Order Instituting Rulemaking to Identify Disadvantaged Communities in the San Joaquin Valley and Analyze Economically Feasible Options to Increase Access to Affordable Energy in Those Disadvantages Communities (California Public Utilities Commission, 2016)
- 2010-2012 WO017 Ex Ante Measure Cost Study: Final Report (Itron, 2014)
- Natural gas infrastructure costs provided by utility staff through the Reach Code subprogram
- Costs obtained from builders, contractors and developers

Incremental costs are presented in Table 6. Values in parentheses represent a lower cost or cost reduction in the electric option relative to mixed fuel. The costs from the available sources varied widely, making it difficult to develop narrow cost estimates for each component. For certain components data is provided with a low to high range as well as what were determined to be typical costs and ultimately applied in this analysis. Two sets of typical costs are presented, one which is applied in the On-Bill cost effectiveness methodology and another applied in the TDV methodology. Details of these differences are explained in the discussion of site gas infrastructure costs in the following pages.

Table 6: Incremental Costs – All-Electric Code Compliant Home Compared to a Mixed Fuel Code Compliant Home

Measure	Incremental Cost (2020 PV$) Single Family[1]				Incremental Cost (2020 PV$) Multifamily[1] (Per Dwelling Unit)			
	Low	High	Typical (On-Bill)	Typical (TDV)	Low	High	Typical (On-Bill)	Typical (TDV)
Heat Pump vs Gas Furnace/Split AC	($2,770)	$620	($221)		Same as Single Family			
Heat Pump Water Heater vs Gas Tankless	($1,120)	$1,120	$0					
Electric vs Gas Clothes Dryer[2]	($428)	$820	$0					
Electric vs Gas Cooking[2]	$0	$1,800	$0					
Electric Service Upgrade	$200	$800	$600		$150	$600	$600	
In-House Gas Infrastructure	($1,670)	($550)	($800)		($600)	($150)	($600)	
Site Gas Infrastructure	($25,000)	($900)	($5,750)	($11,836)	($16,250)	($310)	($3,140)	($6,463)
Total First Cost	***($30,788)***	***$3,710***	***($6,171)***	***($12,257)***	***($20,918)***	***$4,500***	***($3,361)***	***($6,684)***
Present Value of Equipment Replacement Cost			***$1,266***				***$1,266***	
Lifetime Cost Including Replacement & Financing of First Cost			***($5,349)***	***($11,872)***			***($2,337)***	***($5,899)***

[1]Low and high costs represent the potential range of costs and typical represents the costs used in this analysis and determined to be most representative of the conditions described in this report. Two sets of typical costs are presented, one which is applied in the On-Bill cost effectiveness methodology and another applied in the TDV methodology.
[2]Typical costs assume electric resistance technology. The high range represents higher end induction cooktops and heat pump clothes dryers. Lower cost induction cooktops are available.

Typical incremental costs for switching from a mixed fuel design to an all-electric design are based on the following assumptions:

Appliances: The Reach Code Team determined that the typical first installed cost for electric appliances is very similar to that for natural gas appliances. This was based on information provided by HVAC contractors, plumbers and builders as well as a review of other studies. After review of various sources, the Reach Code Team concluded that the cost difference between gas and electric resistance options for clothes dryers and stoves is negligible and that the lifetimes of the two technologies are also similar.

HVAC: Typical HVAC incremental costs were based on the City of Palo Alto 2019 Title 24 Energy Reach Code Cost-effectiveness Analysis (TRC, 2018) which assumes approximately $200 first cost savings for the heat pump relative to the gas furnace and air conditioner. Table 6 also includes the present value of the incremental replacement costs for the heat pump based on a 15-year lifetime and a 20-year lifetime for the gas furnace in the mixed fuel home.

DHW: Typical costs for the water heating system were based on equivalent installed first costs for the HPWH and tankless gas water heater. This accounts for slightly higher equipment cost but lower installation labor due to the elimination of the gas flue. Incremental replacement costs for the HPWH are based on a 15-year lifetime and a 20-year lifetime for the tankless water heater.

For multifamily, less data was available and therefore a range of low and high costs is not provided. The typical first cost for multifamily similarly is expected to be close to the same for the mixed fuel and all-electric designs. However, there are additional considerations with multifamily such as greater complexity for venting of natural gas appliances as well as for locating the HPWH within the conditioned space (all climates except Climate Zones 1, 3, and 5, see Table 2) that may impact the total costs.

Electric service upgrade: The study assumes an incremental cost to run 220V service to each appliance of $200 per appliance for single family homes and $150 per appliance per multifamily apartment based on cost estimates from builders and contractors. The Reach Code Team reviewed production builder utility plans for

mixed-fuel homes and consulted with contractors to estimate which electricity and/or natural gas services are usually provided to the dryer and oven. Typical practice varied, with some builders providing both gas and electric service to both appliances, others providing both services to only one of the appliances, and some only providing gas. For this study, the Reach Code Team determined that for single family homes the typical cost is best qualified by the practice of providing 220V service and gas to either the dryer and the oven and only gas service to the other. For multifamily buildings it's assumed that only gas is provided to the dryer and oven in the mixed fuel home.

It is assumed that no upgrades to the electrical panel are required and that a 200 Amp panel is typically installed for both mixed fuel and all-electric new construction homes. There are no incremental electrical site infrastructure requirements.

In-house gas infrastructure (from meter to appliances): Installation cost to run a gas line from the meter to the appliance location is $200 per appliance for single family and $150 per appliance per multifamily apartment based on cost estimates from builders and contractors. The cost estimate includes providing gas to the water heater, furnace, dryer and cooktop.

Site gas infrastructure: The cost-effective analysis components with the highest degree of variability are the costs for on-site gas infrastructure. These costs can be project dependent and may be significantly impacted by such factors as utility territory, site characteristics, distance to the nearest gas main and main location, joint trenching, whether work is conducted by the utility or a private contractor, and number of dwelling units per development. All gas utilities participating in this study were solicited for cost information. The typical infrastructure costs for single family homes presented in Table 6 are based on cost data provided by PG&E and reflect those for a new subdivision in an undeveloped area requiring the installation of natural gas infrastructure, including a main line. Infrastructure costs for infill development can also be highly variable and may be higher than in an undeveloped area. The additional costs associated with disruption of existing roads, sidewalks, and other structures can be significant. Total typical costs in Table 6 assume $10,000 for extension of a gas main, $1,686 for a service lateral, and $150 for the meter.

Utility Gas Main Extensions rules[15] specify that the developer has the option to only pay 50% of the total cost for a main extension after subtraction of allowances for installation of gas appliances. This 50% refund and the appliance allowance deductions are accounted for in the site gas infrastructure costs under the On-Bill cost-effectiveness methodology. The net costs to the utility after partial reimbursement from the developer are included in utility ratebase and recovered via rates to all customers. The total cost of $5,750 presented in Table 6 reflects a 50% refund on the $10,000 extension and appliance deductions of $1,086 for a furnace, water heater, cooktop, and dryer. Under the On-Bill methodology this analysis assumes this developer option will remain available through 2022 and that the cost savings are passed along to the customer.

The 50% refund and appliance deductions were not applied to the site gas infrastructure costs under the TDV cost-effectiveness methodology based on input received from the Energy Commission and agreement from the Reach Code technical advisory team that the approach is appropriate. TDV cost savings impacts extend beyond the customer and account for societal impacts of energy use. Accounting for the full cost of the infrastructure upgrades was determined to be justified when evaluating under the TDV methodology.

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[15] PG&E Rule 15: https://www.pge.com/tariffs/tm2/pdf/GAS_RULES_15.pdf

SoCalGas Rule 20: https://www.socalgas.com/regulatory/tariffs/tm2/pdf/20.pdf

SDG&E Rule 15: http://regarchive.sdge.com/tm2/pdf/GAS_GAS-RULES_GRULE15.pdf

Less information was available for the costs associated with gas infrastructure for low-rise multifamily development. The typical cost in Table 6 for the On-Bill methodology is based on TRC's City of Palo Alto 2019 Title 24 Energy Reach Code Cost-effectiveness Analysis (TRC, 2018). These costs, provided by the City of Palo Alto, are approximately $25,100 for an 8-unit new construction building and reflect connection to an existing main for infill development. Specific costs include plan review, connection charges, meter and manifold, plumbing distribution, and street cut fees. While these costs are specifically based on infill development and from one municipal utility, the estimates are less than those provided by PG&E reflecting the average cost differences charged to the developer between single family and multifamily in an undeveloped area (after accounting for deductions per the Gas Main Extensions rule). To convert costs charged to the developer to account for the full infrastructure upgrade cost (costs applied in the TDV methodology analysis), a factor of 2.06[16] was calculated based on the single family analysis. This same factor was applied to the multifamily cost of $3,140 to arrive at $6,463 (see Table 6).

2.7 Greenhouse Gas Emissions

Equivalent CO_2 emission savings were calculated based on outputs from the CBECC-Res simulation software. Electricity emissions vary by region and by hour of the year. CBECC-Res applies two distinct hourly profiles, one for Climate Zones 1 through 5 and 11 through 13 and another for Climate Zones 6 through 10 and 14 through 16. For natural gas a fixed factor of 0.005307 metric tons/therm is used. To compare the mixed fuel and all-electric cases side-by-side, greenhouse gas (GHG) emissions are presented as CO_2-equivalent emissions per square foot of conditioned floor area.

3 Results

The primary objective of the evaluation is to identify cost-effective, non-preempted performance targets for both single family and low-rise multifamily prototypes, under both mixed fuel and all-electric cases, to support the design of local ordinances requiring new low-rise residential buildings to exceed the minimum state requirements. The packages presented are representative examples of designs and measures that can be used to meet the requirements. In practice, a builder can use any combination of non-preempted or preempted compliant measures to meet the requirements.

This analysis covered all sixteen climate zones and evaluated two efficiency packages, including a non-preempted package and a preempted package that includes upgrades to federally regulated equipment, an Efficiency & PV Package for the all-electric scenario only, and an Efficiency & PV/Battery Package. For the efficiency-only packages, measures were refined to ensure that the non-preempted package was cost-effective based on one of the two metrics applied in this study, TDV or On-Bill. The preempted equipment package, which the Reach Code Team considers to be a package of upgrades most reflective of what builders commonly apply to exceed code requirements, was designed to be cost-effective based on the On-Bill cost-effectiveness approach.

Results are presented as EDR Margin instead of compliance margin. EDR is the metric used to determine code compliance in the 2019 cycle. Target EDR Margin is based on taking the calculated EDR Margin for the case and rounding down to the next half of a whole number. Target EDR Margin for the Efficiency Package are defined based on the lower of the EDR Margin of the non-preempted package and the equipment, preempted package. For example, if for a particular case the cost-effective non-preempted package has an EDR Margin of 3 and the preempted package an EDR Margin of 4, the Target EDR Margin is set at 3.

[16] This factor includes the elimination of the 50% refund for the main extension and adding back in the appliance allowance deductions.

For a package to qualify, a minimum EDR Margin of 0.5 was required. This is to say that a package that only achieved an EDR Margin of 0.4, for example, was not considered. An EDR Margin less than 0.5 generally corresponds to a compliance margin lower than 5% and was considered too small to ensure repeatable results. In certain cases, the Reach Code Team did not identify a cost-effective package that achieved the minimum EDR Margin of 0.5.

Although some of the efficiency measures evaluated were not cost-effective and were eliminated, the following measures are included in at least one package:

- Reduced infiltration
- Improved fenestration
- Improved cool roofs
- High performance attics
- Slab insulation
- Reduced duct leakage
- Verified low leakage ducts in conditioned space
- Low pressure-drop distribution system
- Compact hot water distribution system, basic and expanded
- High efficiency furnace, air conditioner & heat pump (*preempted*)
- High efficiency tankless water heater & heat pump water heater (*preempted*)

3.1 PV and Battery System Sizing

The approach to determining the size of the PV and battery systems varied based on each package and the source fuel. Table 7 describes the PV and battery sizing approaches applied to each of the four packages. For the **Efficiency Non-preempted and Efficiency – Equipment, Preempted packages** a different method was applied to each the two fuel scenarios. In all **mixed fuel cases**, the PV was sized to offset 100% of the estimated electrical load and any electricity savings from efficiency measures were traded off with a smaller PV system. Not downsizing the PV system after adding efficiency measures runs the risk of producing more electricity than is consumed, reducing cost-effectiveness and violating NEM rules. While the impact of this in most cases is minor, analysis confirmed that cost-effectiveness improved when reducing the system size to offset 100% of the electricity usage as opposed to keeping the PV system the same size as the Standard Design.

In the **all-electric Efficiency cases**, the PV system size was left to match the Standard Design (Std Design PV), and the inclusion of energy efficiency measures was not traded off with a reduced capacity PV system. Because the PV system is sized to meet the electricity load of a mixed fuel home, it is cost-effective to keep the PV system the same size and offset a greater percentage of the electrical load.

For the **Efficiency & PV case on the all-electric home**, the Reach Code Team evaluated PV system sizing to offset 100%, 90% and 80% of the total calculated electricity use. Of these three, sizing to 90% proved to be the most cost-effective based on customer utility bills. This is a result of the impact of the annual minimum bill which is around $120 across all the utilities. The “sweet spot” is a PV system that reduces electricity bills just enough to match the annual minimum bill; increasing the PV size beyond this adds first cost but does not result in utility bill savings.

Table 7: PV & Battery Sizing Details by Package Type

Package	Mixed Fuel	All-Electric
Efficiency (Envelope & Equipment)	PV Scaled @ 100% electricity	Std Design PV
Efficiency & PV	n/a	PV Scaled @ 90%
Efficiency & PV/Battery	PV Scaled @ 100% electricity 5kWh / SF home 2.75kWh/ MF apt	PV Scaled @ 100% 5kWh / SF home 2.75kWh/ MF apt

A sensitivity analysis was conducted to determine the appropriate battery and PV capacity for the Efficiency & PV/Battery Packages using the 1-story 2,100 square foot prototype in Climate Zone 12. Results are shown in Figure 2. The current version of CBECC-Res requires a minimum battery size of 5 kWh to qualify for the self-utilization credit. CBECC-Res allows for PV oversizing up to 160% of the building's estimated electricity load when battery storage systems are installed; however, the Reach Code Team considered this high, potentially problematic from a grid perspective, and likely not acceptable to the utilities or customers. The Reach Code Team compared cost-effectiveness of 5kWh and 7.5kWh battery systems as well as of PV systems sized to offset 90%, 100%, or 120% of the estimated electrical load.

Results show that from an on-bill perspective a smaller battery size is more cost-effective. The sensitivity analysis also showed that increasing the PV capacity from 90% to 120% of the electricity use reduced cost-effectiveness. From the TDV perspective there was little difference in results across all the scenarios, with the larger battery size being marginally more cost-effective. Based on these results, the Reach Code Team applied to the Efficiency & PV/Battery Package a 5kWh battery system for single family homes with PV sized to offset 100% of the electricity load. Even though PV scaled to 90% was the most cost-effective, sizing was increased to 100% to evaluate greater generation beyond the Efficiency & PV Package and to achieve zero net electricity. These results also show that in isolation, the inclusion of a battery system reduces cost-effectiveness compared to the same size PV system without batteries.

For multifamily buildings the battery capacity was scaled to reflect the average ratio of battery size to PV system capacity (kWh/kW) for the single family Efficiency & PV Package. This resulted in a 22kWh battery for the multifamily building, or 2.75kWh per apartment.

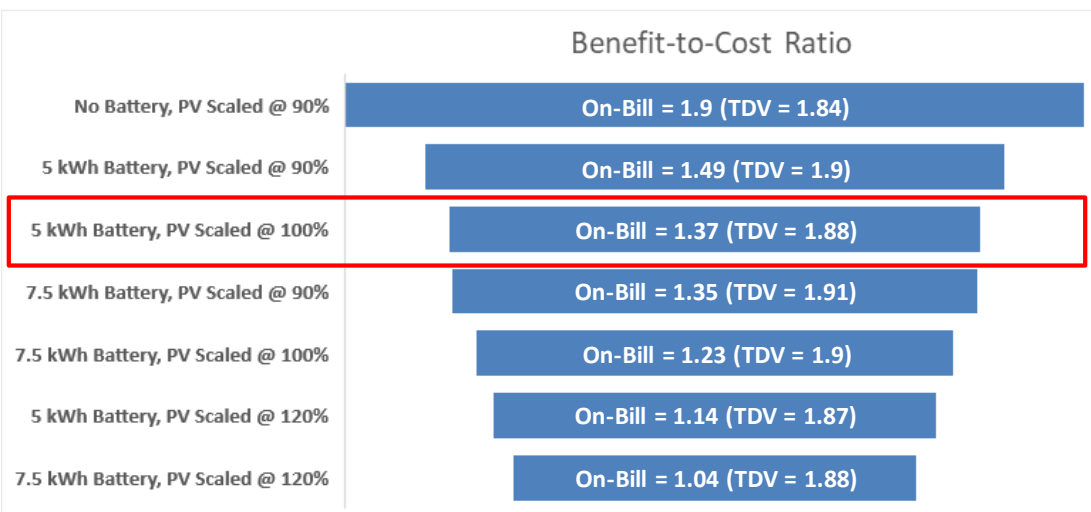

Figure 2: B/C ratio comparison for PV and battery sizing

3.2 Single Family Results

Table 8 through Table 10 contain cost effectiveness findings for the single family packages. Table 8 summarizes the package costs for all of the mixed fuel and all-electric efficiency, PV and battery packages. The mixed fuel results are evaluated and presented relative to a mixed fuel code compliant basecase while the all-electric results are relative to an all-electric code compliant basecase.

Table 9 and Table 10 present the B/C ratios for all the single family packages according to both the On-Bill and TDV methodologies for the mixed fuel and the all-electric cases, respectively. Results are cost-effective based on TDV for all cases except for Climate Zone 7 where no cost-effective combination of non-preempted efficiency measures was found that met the minimum 0.5 EDR Margin threshold. Cases where the B/C ratio is indicated as ">1" refer to instances where there are incremental cost savings in addition to annual utility bill savings. In these cases, there is no cost associated with the upgrade and benefits are realized immediately.

Figure 3 presents a comparison of Total EDRs for single family buildings and Figure 4 presents the EDR Margin results. Each graph compares the mixed fuel and all-electric cases as well as the various packages. The EDR Margin for the **Efficiency Package** for most climates is between 1.0 and 5.5 for mixed fuel cases and slightly higher, between 1.5 and 6.5, for the all-electric design. No cost-effective **mixed fuel or all-electric non-preempted Efficiency package** was found Climate Zone 7.

For the **mixed fuel case, the Efficiency & PV/Battery** Package increased the EDR Margin to values between 7.0 and 10.5. Because of the limitations on oversizing PV systems to offset natural gas use it is not feasible to achieve higher EDR Margins by increasing PV system capacity.

For the **all-electric case, the Efficiency & PV** Package resulted in EDR Margins of 11.0 to 19.0 for most climates; adding a battery system increased the EDR Margin by an additional 7 to 13 points. Climate zones 1 and 16, which have high heating loads, have much higher EDR Margins for the Efficiency & PV package (26.5-31.0). The Standard Design PV, which is what is applied in the all-electric Efficiency Package, is not sized to offset any of the heating load. When the PV system is sized to offset 90% of the total electricity use, the increase is substantial as a result. In contrast, in Climate Zone 15 the Standard Design PV system is already sized to cover the cooling electricity load, which represents 40% of whole building electricity use. Therefore, increasing the PV size to offset 90% of the electric load in this climate only results in adding approximately 120 Watts of PV capacity and subsequently a negligible impact on the EDR.

Additional results details can be found in Appendix C – Single Family Detailed Results with summaries of measures included in each of the packages in Appendix D – Single Family Measure Summary. A summary of results by climate zone is presented in Appendix G – Results by Climate Zone.

Table 8: Single Family Package Lifetime Incremental Costs

Climate Zone	Mixed Fuel			All-Electric			
	Non-Preempted	Equipment - Preempted	Efficiency & PV/Battery	Non-Preempted	Equipment - Preempted	Efficiency & PV	Efficiency & PV/Battery
CZ01	+$1,355	+$1,280	+$5,311	+$7,642	+$2,108	+$18,192	+$24,770
CZ02	+$1,504	+$724	+$5,393	+$3,943	+$2,108	+$12,106	+$18,132
CZ03	+$1,552	+$1,448	+$5,438	+$1,519	+$2,108	+$8,517	+$14,380
CZ04	+$1,556	+$758	+$5,434	+$1,519	+$2,108	+$8,786	+$14,664
CZ05	+$1,571	+$772	+$5,433	+$1,519	+$2,108	+$8,307	+$14,047
CZ06	+$1,003	+$581	+$4,889	+$926	+$846	+$6,341	+$12,036
CZ07	n/a	+$606	+$4,028	n/a	+$846	+$4,436	+$9,936
CZ08	+$581	+$586	+$4,466	+$926	+$412	+$5,373	+$11,016
CZ09	+$912	+$574	+$4,785	+$1,180	+$846	+$5,778	+$11,454
CZ10	+$1,648	+$593	+$5,522	+$1,773	+$949	+$6,405	+$12,129
CZ11	+$3,143	+$1,222	+$7,026	+$3,735	+$2,108	+$10,827	+$17,077
CZ12	+$1,679	+$654	+$5,568	+$3,735	+$2,108	+$11,520	+$17,586
CZ13	+$3,060	+$611	+$6,954	+$4,154	+$2,108	+$10,532	+$16,806
CZ14	+$1,662	+$799	+$5,526	+$4,154	+$2,108	+$10,459	+$16,394
CZ15	+$2,179	-($936)	+$6,043	+$4,612	+$2,108	+$5,085	+$11,382
CZ16	+$3,542	+$2,441	+$7,399	+$5,731	+$2,108	+$16,582	+$22,838

Table 9: Single Family Package Cost-Effectiveness Results for the Mixed Fuel Case [1,2]

		Efficiency							Efficiency & PV/Battery			
		Non-Preempted			Equipment - Preempted			Target				Target
CZ	Utility	Efficiency EDR Margin	On-Bill B/C Ratio	TDV B/C Ratio	Efficiency EDR Margin	On-Bill B/C Ratio	TDV B/C Ratio	Efficiency EDR Margin	Total EDR Margin	On-Bill B/C Ratio	TDV B/C Ratio	Total EDR Margin
01	PG&E	5.3	3.4	2.8	6.9	4.9	4.1	5.0	10.6	0.9	1.6	10.5
02	PG&E	3.3	1.6	1.7	3.3	3.8	3.6	3.0	10.1	0.5	1.6	10.0
03	PG&E	3.0	1.3	1.3	4.1	1.9	2.0	2.5	10.0	0.4	1.4	10.0
04	PG&E	2.5	0.9	1.2	2.7	2.4	2.7	2.5	10.1	0.3	1.5	10.0
05	PG&E	2.7	1.1	1.2	2.6	2.3	2.5	2.5	9.4	0.4	1.3	9.0
05	PG&E/SoCalGas	2.7	0.9	1.2	2.6	2.0	2.5	2.5	9.4	0.3	1.3	9.0
06	SCE/SoCalGas	2.0	0.7	1.2	2.0	1.6	2.0	1.5	9.8	0.8	1.3	9.5
07	SDG&E	0.0	-	-	1.5	1.5	1.4	0.0	9.2	0.1	1.3	9.0
08	SCE/SoCalGas	1.3	0.6	1.4	1.6	1.3	1.8	1.0	8.4	0.9	1.3	8.0
09	SCE/SoCalGas	2.6	0.7	2.0	2.9	1.8	3.7	2.5	8.8	1.0	1.5	8.5
10	SCE/SoCalGas	3.2	0.6	1.3	3.2	2.0	3.8	3.0	9.6	1.0	1.5	9.5
10	SDG&E	3.2	0.8	1.3	3.2	2.6	3.8	3.0	9.6	0.6	1.5	9.5
11	PG&E	4.3	0.8	1.2	5.1	2.5	3.7	4.0	9.2	0.4	1.5	9.0
12	PG&E	3.5	1.2	1.8	3.4	3.3	4.6	3.0	9.6	0.4	1.7	9.5
13	PG&E	4.6	0.8	1.3	5.8	5.3	8.4	4.5	9.7	0.4	1.6	9.5
14	SCE/SoCalGas	5.0	1.6	2.5	5.8	4.0	6.1	4.5	9.0	1.3	1.7	9.0
14	SDG&E	5.0	1.9	2.5	5.8	4.9	6.1	4.5	9.0	1.2	1.7	9.0
15	SCE/SoCalGas	4.8	1.0	1.6	5.0	>1	>1	4.5	7.1	1.1	1.5	7.0
16	PG&E	5.4	1.6	1.5	6.2	2.2	2.2	5.0	10.5	0.9	1.4	10.5

[1]">1" indicates cases where there are both first cost savings and annual utility bill savings.

[2]Information about the measures included for each climate zone are described in Appendix D – Single Family Measure Summary.

Table 10: Single Family Package Cost-Effectiveness Results for the All-Electric Case[1,2]

		Efficiency							Efficiency & PV				Efficiency & PV/Battery			
		Non-Preempted			Equipment - Preempted			Target				Target				Target
CZ	Utility	Efficiency EDR Margin	On-Bill B/C Ratio	TDV B/C Ratio	Efficiency EDR Margin	On-Bill B/C Ratio	TDV B/C Ratio	Efficiency EDR Margin	Total EDR Margin	On-Bill B/C Ratio	TDV B/C Ratio	Total EDR Margin	Total EDR Margin	On-Bill B/C Ratio	TDV B/C Ratio	Total EDR Margin
01	PG&E	15.2	1.8	1.7	6.9	2.9	2.7	6.5	31.4	1.8	1.5	31.0	41.2	1.4	1.4	41.0
02	PG&E	4.9	1.2	1.1	5.1	2.3	2.1	4.5	19.4	1.8	1.4	19.0	30.1	1.4	1.4	30.0
03	PG&E	4.7	2.6	2.4	4.4	1.8	1.6	4.0	18.5	2.2	1.7	18.0	29.3	1.5	1.6	29.0
04	PG&E	3.4	1.9	1.8	3.9	1.5	1.5	3.0	17.2	2.1	1.6	17.0	28.6	1.5	1.6	28.5
05	PG&E	4.4	2.6	2.3	4.4	1.9	1.7	4.0	18.2	2.3	1.8	18.0	28.7	1.6	1.6	28.5
05	PG&E/SoCalGas	4.4	2.6	2.3	4.4	1.9	1.7	4.0	18.2	2.3	1.8	18.0	28.7	1.6	1.6	28.5
06	SCE/SoCalGas	2.0	1.3	1.4	2.9	2.2	2.3	2.0	14.3	1.2	1.5	14.0	26.1	1.2	1.4	26.0
07	SDG&E	0.0	-	-	2.2	1.6	1.7	0.0	11.3	1.9	1.5	11.0	24.2	1.3	1.5	24.0
08	SCE/SoCalGas	1.6	0.6	1.2	1.8	2.8	3.0	1.5	10.9	1.0	1.5	10.5	21.6	1.1	1.4	21.5
09	SCE/SoCalGas	2.8	0.8	2.0	3.3	2.1	3.2	2.5	11.5	1.1	1.6	11.5	21.3	1.1	1.5	21.0
10	SCE/SoCalGas	3.1	0.9	1.5	3.4	2.3	3.2	3.0	11.1	1.1	1.5	11.0	21.2	1.1	1.5	21.0
10	SDG&E	3.1	1.1	1.5	3.4	2.6	3.2	3.0	11.1	1.7	1.5	11.0	21.2	1.4	1.5	21.0
11	PG&E	4.6	1.2	1.5	5.9	3.0	3.3	4.5	14.2	1.8	1.6	14.0	23.2	1.5	1.6	23.0
12	PG&E	3.8	0.8	1.1	5.1	2.0	2.5	3.5	15.7	1.7	1.4	15.5	25.4	1.3	1.5	25.0
13	PG&E	5.1	1.1	1.4	6.0	2.9	3.3	5.0	13.4	1.7	1.5	13.0	22.5	1.4	1.5	22.0
14	SCE/SoCalGas	5.6	1.0	1.5	6.0	2.3	3.1	5.5	15.5	1.2	1.6	15.5	23.9	1.4	1.6	23.5
14	SDG&E	5.6	1.3	1.5	6.0	2.9	3.1	5.5	15.5	1.8	1.6	15.5	23.9	1.7	1.6	23.5
15	SCE/SoCalGas	5.6	1.1	1.6	7.3	3.3	4.5	5.5	6.2	1.1	1.6	6.0	13.5	1.2	1.5	13.0
16	PG&E	9.7	1.7	1.7	4.9	2.4	2.3	4.5	27.0	2.1	1.6	26.5	35.4	1.7	1.5	35.0

[1]">1" indicates cases where there are both first cost savings and annual utility bill savings.

[2]Information about the measures included for each climate zone are described in Appendix D – Single Family Measure Summary

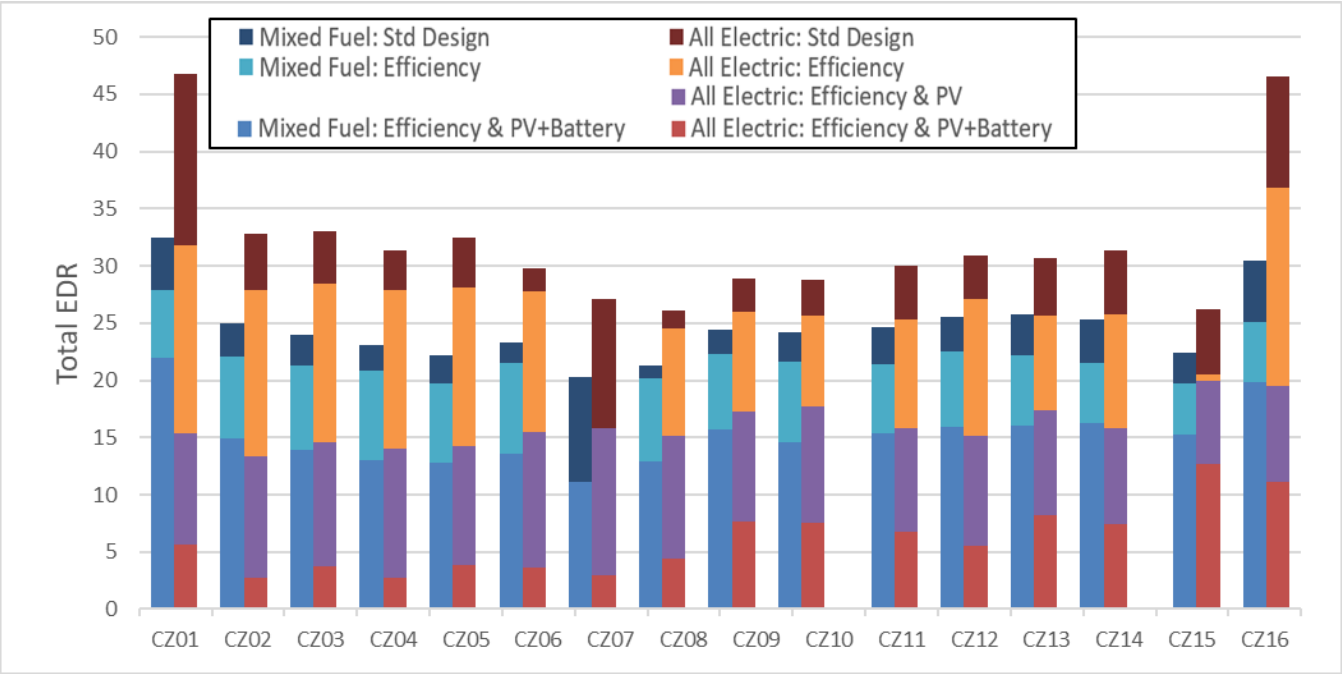

Figure 3: Single family Total EDR comparison

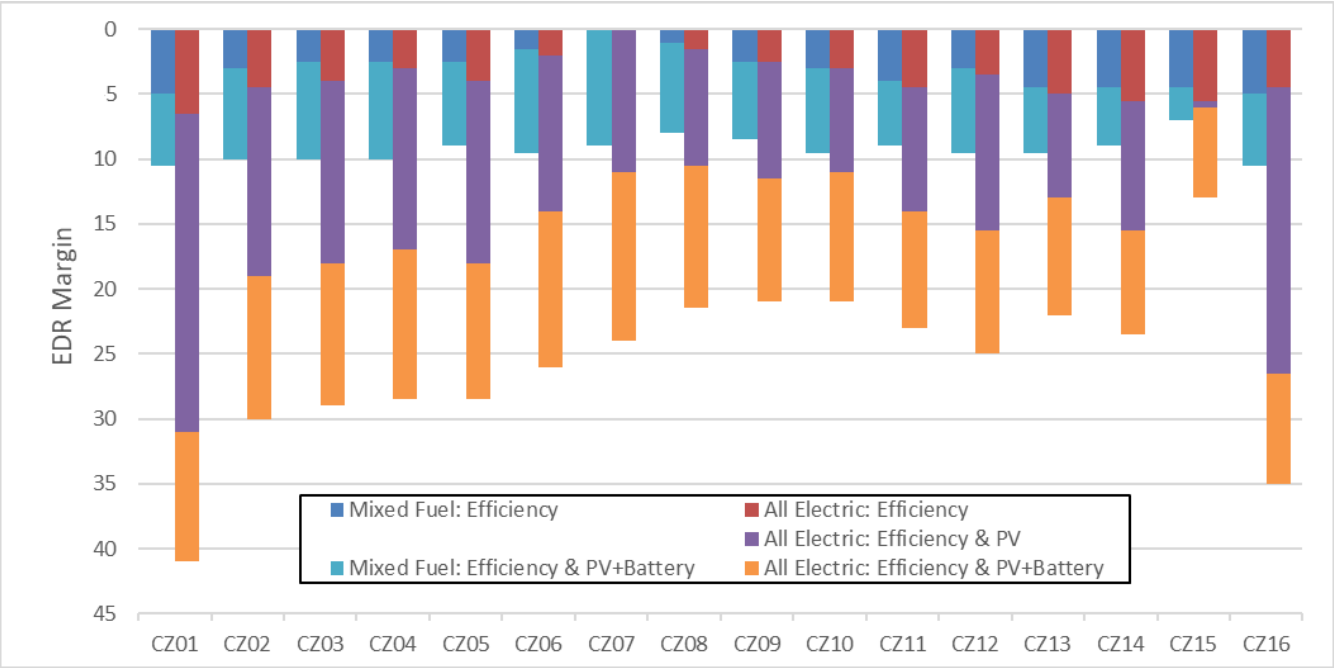

Figure 4: Single family EDR Margin comparison (based on Efficiency EDR Margin for the Efficiency packages and the Total EDR Margin for the Efficiency & PV and Efficiency & PV/Battery packages)

3.2.1 GHG Emission Reductions

Figure 5 compares annual GHG emissions for both mixed fuel and all-electric single family 2019 code compliant cases with Efficiency, Efficiency & PV and Efficiency & PV/Battery packages. GHG emissions vary by climate but are consistently higher in mixed fuel cases than all-electric. Standard Design mixed fuel emissions range from 1.3 (CZ 7) to 3.3 (CZ 16) lbs CO2e/square foot of floor area, where all-electric Standard Design emissions range from 0.7 to 1.7 lbs CO2e/ ft^2. Adding efficiency, PV and batteries to the mixed fuel code compliant prototype reduces GHG emissions by 20% on average to between 1.0 and 1.8 lbs CO2e/ft^2, with the exception of Climate Zones 1 and 16. Adding efficiency, PV and batteries to the all-electric code compliant prototype reduces annual GHG emissions by 65% on average to 0.8 lbs CO2e/ft^2 or less. None of the cases completely eliminate GHG emissions. Because of the time value of emissions calculation for electricity in CBECC-Res, there is always some amount of GHG impacts with using electricity from the grid.

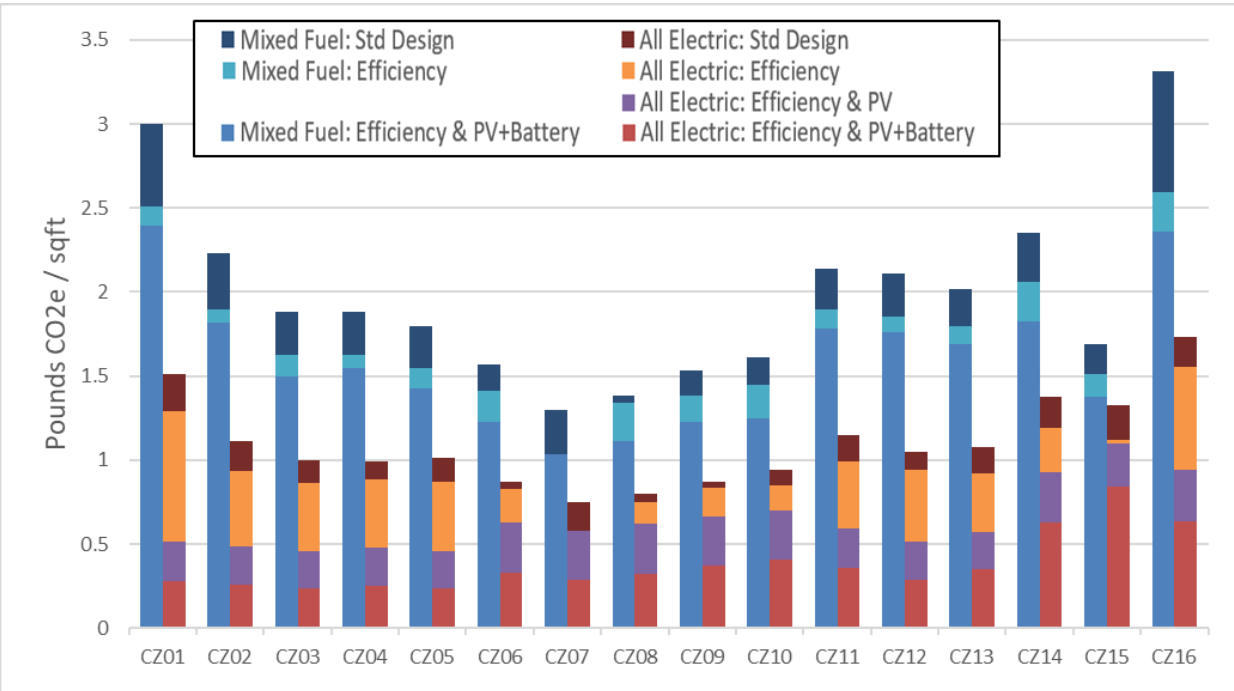

Figure 5: Single family greenhouse gas emissions comparison

3.3 Multifamily Results

Table 11 through Table 13 contain cost effectiveness findings for the multifamily packages. Table 11 summarizes the package costs for all the mixed fuel and all-electric efficiency, PV and battery packages.

Table 12 and Table 13 present the B/C ratios for all the packages according to both the On-Bill and TDV methodologies for the mixed fuel and the all-electric cases, respectively. All the packages are cost-effective based on TDV except Climate Zone 3 for the all-electric cases where no cost-effective combination of non-preempted efficiency measures was found that met the minimum 0.5 EDR Margin threshold. Cases where the B/C ratio is indicated as “>1” refer to instances where there are incremental cost savings in addition to annual utility bill savings. In these cases, there is no cost associated with this upgrade and benefits are realized immediately.

It is generally more challenging to achieve equivalent savings targets cost-effectively for the multifamily cases than for the single family cases. With less exterior surface area per floor area the impact of envelope measures

is diminished in multifamily buildings. Ducts are already assumed to be within conditioned space and therefore only one of the duct measures found to be cost-effective in single family homes can be applied.

Figure 6 presents a comparison of Total EDRs for the multifamily cases and Figure 7 presents the EDR Margin results. Each graph compares the mixed fuel and all-electric cases as well as the various packages. Cost-effective efficiency packages were found for all **mixed fuel cases**. The Target EDR Margins for the **mixed fuel Efficiency Package** are 0.5 for Climate Zones 3, 5 and 7, between 1.0 and 2.5 for Climate Zones 1, 2, 4, 6, 8 through 12 and 16, and between 3.0 and 4.0 in Climate Zones 13 through 15. For the **all-electric case, no cost-effective non-preempted efficiency packages** were found in Climate Zone 3. The Target EDR Margins are between 0.5 and 2.5 for Climate Zones 2, 4 through 10 and 12, and between 3.0 and 4.0 in Climate Zones 1, 11, and 13 through 16.

For the **mixed fuel case, the Efficiency & PV/Battery Package** results in an EDR Margin of between 8.5 and 11.5 across all climate zones. Most of these packages were not found to be cost-effective based on utility bill savings alone, but they all are cost-effective based on TDV energy savings. For the **all-electric case, the Efficiency & PV Package** resulted in EDR Margins of 10.5 to 17.5 for most climates; adding a battery system increased the EDR Margin by an additional 10 to 15 points. Climate zones 1 and 16, which have high heating loads, have much higher EDR Margins for the **Efficiency & PV package** (19.5-22.5). The Standard Design PV, which is what is applied in the **Efficiency Package**, is not sized to offset any of the heating load. When the PV system is sized to offset 90% of the total electricity use, the increase is substantial as a result. In Climate Zone 15 the Standard Design PV system is already sized to cover the cooling electricity load, which represents 30% of whole building electricity use. Therefore, increasing the PV size to offset 90% of the electric load in this climate only results in adding approximately 240 Watts of PV capacity per apartment and subsequently a much smaller impact on the EDR than in other climate zones. Because of the limitations on oversizing PV systems to offset natural gas use it is not feasible to achieve comparable EDR Margins for the mixed fuel case as in the all-electric case.

Additional results details can be found in Appendix E – Multifamily Detailed Results with summaries of measures included in each of the packages in Appendix F – Multifamily Measure Summary. A summary of results by climate zone is presented in Appendix G – Results by Climate Zone.

Table 11: Multifamily Package Incremental Costs per Dwelling Unit

Climate Zone	Mixed Fuel			All-Electric			
	Non-Preempted	Equipment - Preempted	Efficiency & PV/Battery	Non-Preempted	Equipment - Preempted	Efficiency & PV	Efficiency & PV/Battery
CZ01	+$960	+$507	+$3,094	+$949	+$795	+$5,538	+$8,919
CZ02	+$309	+$497	+$2,413	+$361	+$795	+$3,711	+$6,833
CZ03	+$175	+$403	+$2,279	n/a	+$795	+$3,272	+$6,344
CZ04	+$329	+$351	+$2,429	+$361	+$795	+$3,158	+$6,201
CZ05	+$180	+$358	+$2,273	+$247	+$795	+$3,293	+$6,314
CZ06	+$190	+$213	+$2,294	+$231	+$361	+$2,580	+$5,590
CZ07	+$90	+$366	+$2,188	+$202	+$361	+$2,261	+$5,203
CZ08	+$250	+$213	+$2,353	+$231	+$361	+$2,240	+$5,249
CZ09	+$136	+$274	+$2,234	+$231	+$361	+$2,232	+$5,236
CZ10	+$278	+$250	+$2,376	+$361	+$361	+$2,371	+$5,395
CZ11	+$850	+$317	+$2,950	+$1,011	+$795	+$3,601	+$6,759
CZ12	+$291	+$434	+$2,394	+$1,011	+$795	+$3,835	+$6,943
CZ13	+$831	+$290	+$2,936	+$1,011	+$795	+$3,462	+$6,650
CZ14	+$874	+$347	+$2,957	+$1,011	+$795	+$3,356	+$6,380
CZ15	+$510	-($157)	+$2,604	+$1,011	+$1,954	+$1,826	+$5,020
CZ16	+$937	+$453	+$3,028	+$843	+$795	+$4,423	+$7,533

Table 12: Multifamily Package Cost-Effectiveness Results for the Mixed Fuel Case[1,2]

		Efficiency							Efficiency & PV/Battery			
		Non-Preempted			Equipment - Preempted			Target				Target
CZ	Utility	Efficiency EDR Margin	On-Bill B/C Ratio	TDV B/C Ratio	Efficiency EDR Margin	On-Bill B/C Ratio	TDV B/C Ratio	Efficiency EDR Margin	Total EDR Margin	On-Bill B/C Ratio	TDV B/C Ratio	Total EDR Margin
01	PG&E	3.4	1.1	1.2	2.3	1.3	1.4	2.0	11.5	0.4	1.2	11.5
02	PG&E	1.8	1.0	1.7	2.3	1.1	1.5	1.5	10.9	0.2	1.6	10.5
03	PG&E	0.6	1.0	1.1	1.6	1.1	1.2	0.5	10.3	0.1	1.4	10.0
04	PG&E	1.3	0.8	1.2	1.9	1.1	1.7	1.0	11.2	0.2	1.6	11.0
05	PG&E	0.5	1.0	1.0	1.5	1.2	1.3	0.5	9.9	0.2	1.4	9.5
05	PG&E/SoCalGas	0.5	0.8	1.0	1.5	1.1	1.3	0.5	9.9	0.1	1.4	9.5
06	SCE/SoCalGas	1.3	0.6	1.5	1.3	1.4	1.7	1.0	10.7	0.6	1.4	10.5
07	SDG&E	0.9	0.7	2.2	2.0	1.1	1.4	0.5	11.0	0.0	1.4	11.0
08	SCE/SoCalGas	1.5	0.7	1.4	1.1	1.4	1.7	1.0	9.9	0.7	1.3	9.5
09	SCE/SoCalGas	1.8	1.5	3.3	2.8	1.7	2.9	1.5	9.7	0.9	1.5	9.5
10	SCE/SoCalGas	1.7	0.8	1.7	2.9	2.0	3.3	1.5	10.4	1.0	1.6	10.0
10	SDG&E	1.7	1.1	1.7	2.9	2.6	3.3	1.5	10.4	0.2	1.6	10.0
11	PG&E	2.9	0.7	1.2	3.2	1.8	3.3	2.5	10.5	0.4	1.6	10.5
12	PG&E	1.9	1.1	2.2	2.8	1.2	2.2	1.5	10.3	0.3	1.7	10.0
13	PG&E	3.1	0.6	1.3	3.4	2.0	3.8	3.0	10.7	0.4	1.6	10.5
14	SCE/SoCalGas	3.1	0.7	1.2	3.3	2.0	3.0	3.0	9.6	1.1	1.4	9.5
14	SDG&E	3.1	0.9	1.2	3.3	2.5	3.0	3.0	9.6	0.5	1.4	9.5
15	SCE/SoCalGas	4.2	1.4	2.3	4.4	>1	>1	4.0	8.8	1.3	1.7	8.5
16	PG&E	2.4	1.1	1.2	2.9	1.8	2.1	2.0	9.9	0.5	1.3	9.5

[1]">1" indicates cases where there are both first cost savings and annual utility bill savings.

[2]Information about the measures included for each climate zone are described in Appendix F – Multifamily Measure Summary.

Table 13: Multifamily Package Cost-effectiveness Results for the All-Electric Case[1,2]

		Efficiency							Efficiency & PV				Efficiency & PV/Battery			
		Non-Preempted			Equipment - Preempted											
CZ	Utility	Efficiency EDR Margin	On-Bill B/C Ratio	TDV B/C Ratio	Efficiency EDR Margin	On-Bill B/C Ratio	TDV B/C Ratio	Target Efficiency EDR Margin	Total EDR Margin	On-Bill B/C Ratio	TDV B/C Ratio	Target Total EDR Margin	Total EDR Margin	On-Bill B/C Ratio	TDV B/C Ratio	Target Total EDR Margin
01	PG&E	3.6	1.6	1.4	3.3	2.4	2.3	3.0	22.5	2.0	1.5	22.5	34.5	1.3	1.4	34.5
02	PG&E	1.9	1.7	2.1	3.2	1.6	1.6	1.5	17.5	2.4	1.8	17.5	30.9	1.4	1.7	30.5
03	PG&E	0.0	-	-	2.7	1.7	1.6	0.0	16.1	2.4	1.7	16.0	29.5	1.3	1.6	29.5
04	PG&E	1.4	1.4	1.5	2.2	1.2	1.1	1.0	15.0	2.4	1.8	15.0	28.9	1.3	1.8	28.5
05	PG&E	0.6	1.1	0.9	3.6	2.1	2.0	0.5	17.1	2.5	1.8	17.0	30.3	1.4	1.7	30.0
05	PG&E/SoCalGas	0.6	1.1	0.9	3.6	2.1	2.0	0.5	17.1	2.5	1.8	17.0	30.3	1.4	1.7	30.0
06	SCE/SoCalGas	1.0	0.7	1.3	2.2	1.6	1.9	1.0	13.8	1.2	1.7	13.5	27.5	1.2	1.6	27.5
07	SDG&E	0.6	0.6	1.0	1.9	1.6	1.7	0.5	12.8	2.1	1.8	12.5	27.1	1.2	1.6	27.0
08	SCE/SoCalGas	1.2	0.9	1.7	1.9	1.6	1.8	1.0	11.6	1.3	1.8	11.5	24.2	1.2	1.6	24.0
09	SCE/SoCalGas	1.6	1.3	2.7	1.5	1.6	1.6	1.5	11.3	1.3	1.9	11.0	23.3	1.3	1.7	23.0
10	SCE/SoCalGas	1.8	1.2	2.0	1.8	1.7	2.0	1.5	10.8	1.3	1.8	10.5	23.3	1.3	1.7	23.0
10	SDG&E	1.8	1.5	2.0	1.8	2.0	2.0	1.5	10.8	2.1	1.8	10.5	23.3	1.4	1.7	23.0
11	PG&E	3.5	1.4	1.6	3.9	2.0	2.3	3.5	13.4	2.2	1.8	13.0	25.3	1.4	1.8	25.0
12	PG&E	2.6	0.9	1.1	2.9	1.6	1.6	2.5	14.4	2.1	1.6	14.0	26.6	1.3	1.7	26.5
13	PG&E	3.3	1.3	1.6	3.8	2.0	2.3	3.0	12.2	2.1	1.7	12.0	23.9	1.4	1.7	23.5
14	SCE/SoCalGas	3.7	1.2	1.6	3.8	1.6	2.2	3.5	14.0	1.4	1.9	14.0	24.8	1.4	1.8	24.5
14	SDG&E	3.7	1.5	1.6	3.8	2.0	2.2	3.5	14.0	2.2	1.9	14.0	24.8	1.7	1.8	24.5
15	SCE/SoCalGas	4.4	1.5	2.3	6.4	1.2	1.7	4.0	7.1	1.4	2.1	7.0	16.9	1.3	1.8	16.5
16	PG&E	4.1	2.1	2.1	3.2	1.6	1.7	3.0	19.6	2.6	1.9	19.5	29.9	1.6	1.7	29.5

[1]">1" indicates cases where there are both first cost savings and annual utility bill savings.

[2]Information about the measures included for each climate zone are described in Appendix F – Multifamily Measure Summary.

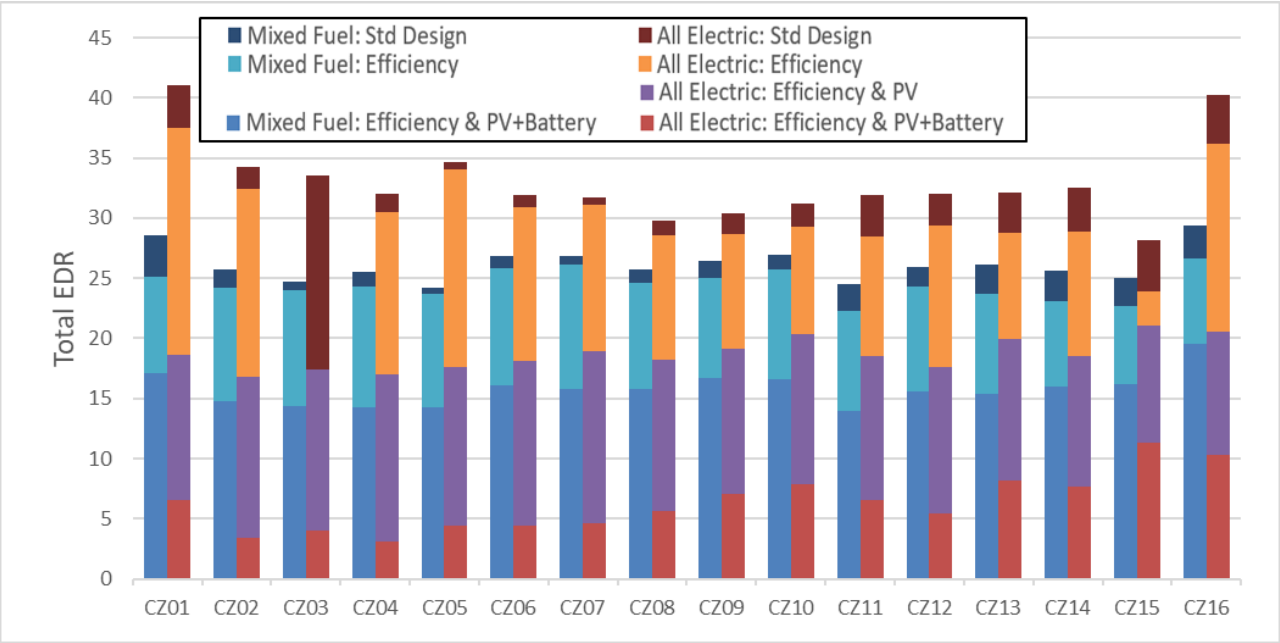

Figure 6: Multifamily Total EDR comparison

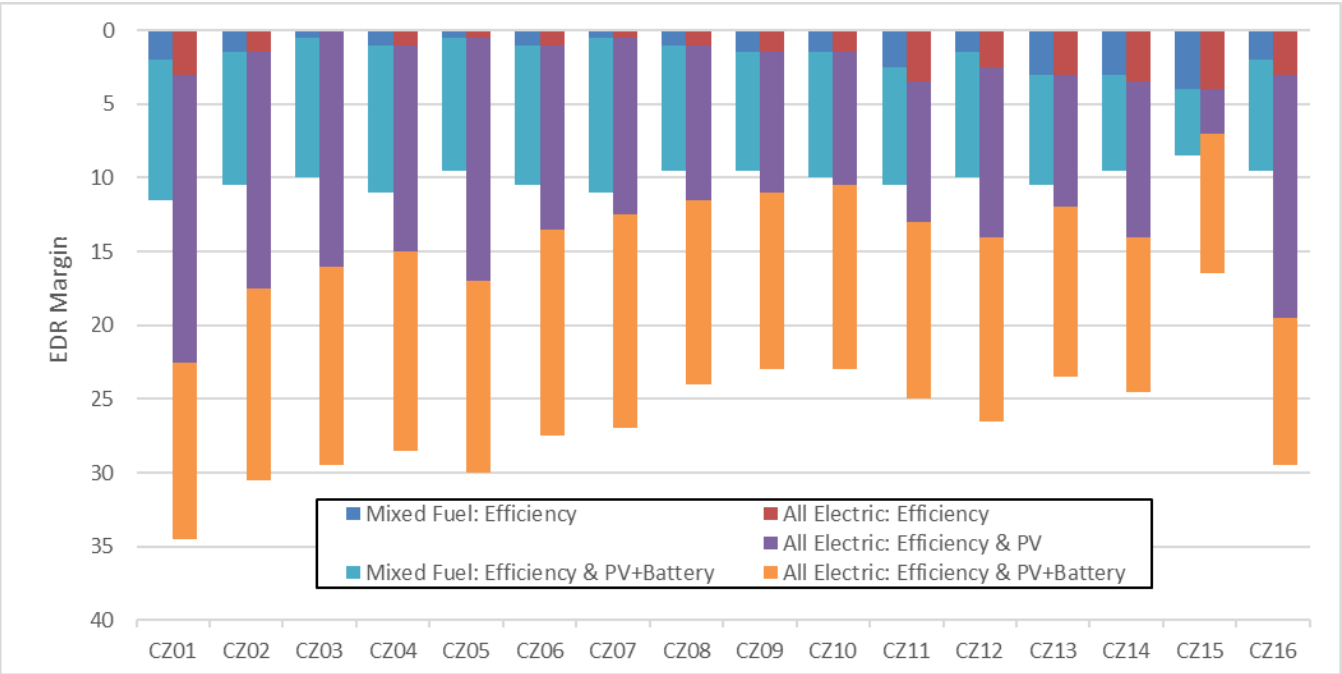

Figure 7: Multifamily EDR Margin comparison (based on Efficiency EDR Margin for the Efficiency packages and the Total EDR Margin for the Efficiency & PV and Efficiency & PV/Battery packages)

3.3.1 GHG Emission Reductions

Figure 8 compares annual GHG emissions for both mixed fuel and all-electric multifamily 2019 code compliant cases with Efficiency, Efficiency & PV and Efficiency & PV/Battery packages. GHG emissions vary by climate but are consistently higher in mixed fuel cases than all-electric. Standard design mixed fuel emissions range from 2.0 to 3.0 lbs CO2e/square foot of floor area, where all-electric standard design emissions range from 1.2 to 1.7 lbs CO2e/ ft^2. Adding PV, batteries and efficiency to the mixed fuel code compliant prototype reduces annual GHG emissions by 17% on average to between 1.7 and 2.2 lbs CO2e/ft^2, except Climate Zone 16. Adding PV, batteries and efficiency to the all-electric code compliant prototype reduces annual GHG emissions by 64% on average to 0.6 lbs CO2e/ft^2 or less with the exception of Climate Zones 14, 15 and 16. As in the single family case, none of the cases completely eliminate GHG emissions because of the time value of emissions calculation for electricity in CBECC-Res.

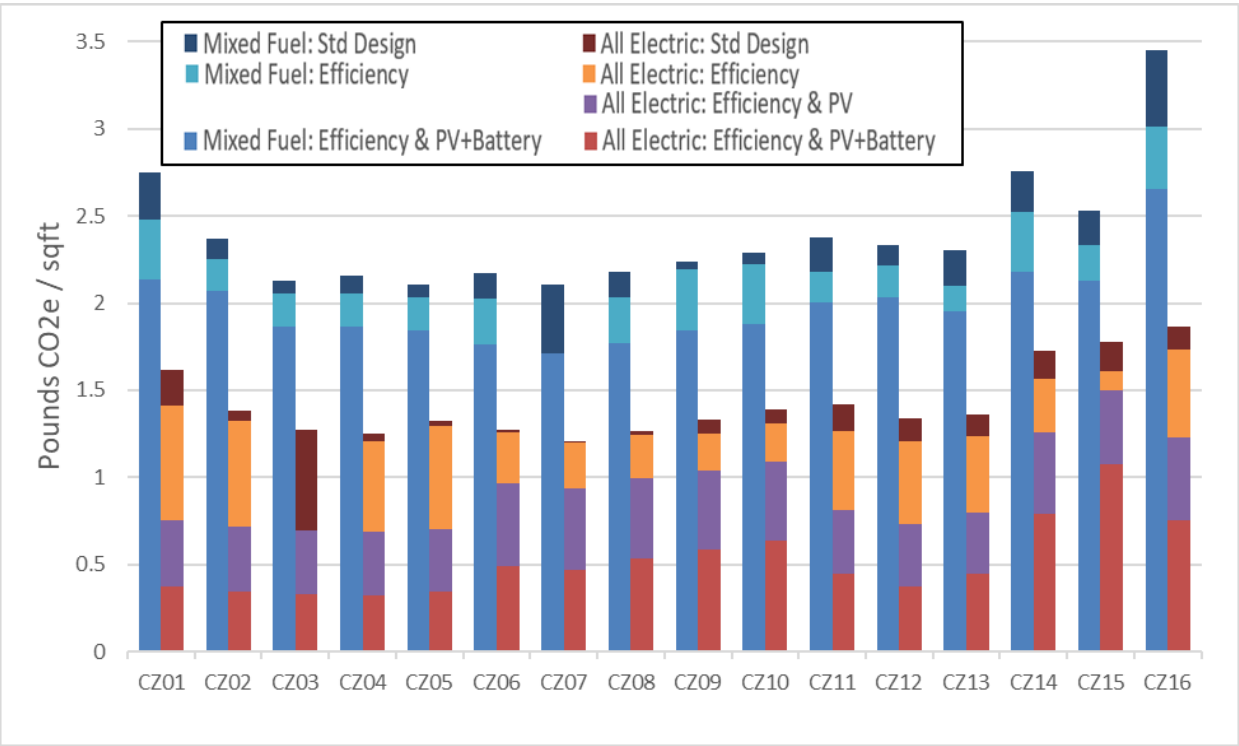

Figure 8: Multifamily greenhouse gas emissions comparison

3.4 Electrification Results

Cost-effectiveness results comparing mixed fuel and all-electric cases are summarized below. The tables show average annual utility bill impacts and lifetime utility bill impacts, which account for fuel escalation for electricity and natural gas (see Section 2.5), lifetime equipment cost savings, and both On-Bill and TDV cost-effectiveness (B/C ratio). Positive utility bill values indicate lower utility costs for the all-electric home relative to the mixed fuel case while negative values in red and parenthesis indicate higher utility costs for the all-electric case. Lifetime equipment cost savings include savings due to eliminating natural gas infrastructure and replacement costs for appliances based on equipment life. Positive values for the lifetime equipment cost savings indicate lower installed costs for the all-electric and negative values indicate higher costs. B/C ratios 1.0 or greater indicate positive cost-effectiveness. Cases where the B/C ratio is indicated as “>1” refer to instances where there was incremental cost savings in addition to annual utility bill savings. In these cases, there is no cost associated with this upgrade and benefits are realized immediately.

Three scenarios were evaluated:

1. 2019 Code Compliant: Compares a 2019 code compliant all-electric home with a 2019 code compliant mixed fuel home.
2. Efficiency & PV Package: Compares an all-electric home with efficiency and PV sized to 90% of the annual electricity use to a 2019 code compliant mixed fuel home. The first cost savings in the code compliant all-electric house is invested in above code efficiency and PV reflective of the Efficiency & PV packages described above.
3. Neutral Cost Package: Compares an all-electric home with PV beyond code minimum with a 2019 code compliant mixed fuel home. The PV system for the all-electric case is sized to result in a zero lifetime incremental cost relative to a mixed fuel home.

3.4.1 Single Family

Table 14, Table 15, Figure 9, Figure 10, and Figure 11 present results of cost-effectiveness analysis for electrification of single family buildings, according to both the On-Bill and TDV methodologies. Based on typical cost assumptions arrived at for this analysis, the lifetime equipment costs for the single family code compliant all-electric option are approximately $5,350 less than the mixed fuel code compliant option. Cost savings are entirely due to the elimination of gas infrastructure, which was assumed to be a savings of $5,750. When evaluating cost-effectiveness based on TDV, the Utility Gas Main Extensions rules 50% refund and appliance allowance deduction are not applied and therefore the cost savings are twice as much.

Under the Efficiency & PV Package and the On-Bill analysis, the incremental cost of the efficiency and PV is typically more than the cost savings seen in the code compliant case, which results in a net cost increase in most climate zones for the all-electric case. In climates with small heating loads (7 and 15) there continues to be an incremental cost savings for the all-electric home. With the TDV analysis, there is still an incremental cost savings in all climates except 1 and 16 for single family.

Utility impacts differ by climate zone and utility, but utility costs for the code compliant all-electric option are typically higher than for the compliant mixed fuel design. There are utility cost savings across all climates zones and building types for the all-electric Efficiency & PV Package, resulting in a more cost-effective option.

The all-electric code compliant option is cost-effective based on the On-Bill approach for single family homes in Climate Zones 6 through 9, 10 (SCE/SoCalGas territory only), and 15. The code compliant option is cost-effective based on the TDV methodology in all climate zones except 1 and 16. If the same costs used for the On-Bill approach are also used for the TDV approach (incorporating the Utility Gas Main Extensions rules 50% refund and appliance allowance deduction), the all-electric code compliant option is cost-effective in Climate Zones 6 through 10. The Efficiency & PV all-electric option is cost-effective in all climate zones based on both the On-Bill and TDV methodologies. In many cases it is cost-effective immediately with lower equipment and utility costs.

The last set of results in Table 14 shows the neutral cost case where the cost savings for the all-electric code compliant home is invested in a larger PV system, resulting in a lifetime incremental cost of zero based on the On-Bill approach. This package results in utility cost savings in all cases except Climate Zones 1, 14 (SCE/SoCalGas territory only), and 16. For these three cases the Reach Code Team evaluated how much additional PV would be required to result in a cost-effective package. These results are presented in Table 15 and show that an additional 1.6kW in Climate Zone 1 results in a B/C ratio of 1.1. For Climate Zone 14 and 16 adding 0.25kW and 1.2kW, respectively, results in a B/C ratio of 1.2. Neutral cost cases are cost-effective based on the TDV methodology in all climate zones except 16.

3.4.2 Multifamily

Multifamily results are found in Table 16, Table 17, Figure 12, Figure 13, and Figure 14. Lifetime costs for the multifamily code compliant all-electric option are approximately $2,300 less than the mixed fuel code compliant option, entirely due to the elimination of gas infrastructure. When evaluating cost-effectiveness based on TDV,

the Utility Gas Main Extensions rules 50% refund and appliance allowance deduction are not applied and therefore the cost savings are approximately 2.5 times higher.

With the Efficiency & PV Package and the On-Bill analysis, due to the added cost of the efficiency and PV there is a net cost increase for the all-electric case in all climate zones for except 7, 8, 9, and 15. With the TDV analysis, there is still an incremental cost savings in all climates. Like the single family results, utility costs are typically higher for the code compliant all-electric option but lower than the code compliant mixed fuel option with the Efficiency & PV Package.

The all-electric code compliant option is cost-effective based on the On-Bill approach for multifamily in Climate Zones 6 through 9, 10 and 14 (SCE/SoCalGas territory only), and 15. Based on the TDV methodology, the code compliant option for multifamily is cost-effective for all climate zones. If the same costs used for the On-Bill approach are also used for the TDV approach (incorporating the Utility Gas Main Extensions rules 50% refund and appliance allowance deduction), the all-electric code compliant option is cost-effective in Climate Zones 8 and 9. Like the single family cases, the Efficiency & PV all-electric option is cost-effective in all climate zones based on both the On-Bill and TDV methodologies.

The last set of results in Table 16 show the neutral cost case where the cost savings for the all-electric code compliant home is invested in a larger PV system, resulting in a lifetime incremental cost of zero based on the On-Bill approach. This package results in utility cost savings in all cases except Climate Zone 1. For this case the Reach Code Team evaluated how much additional PV would be required to result in a cost-effective package. These results are presented in Table 17 and show that an additional 0.3kW per apartment results in a B/C ratio of 1.1. Neutral cost cases are cost-effective based on the TDV methodology in all climate zones except 16.

Table 14: Single Family Electrification Results

		On-Bill Cost-effectiveness[1]						TDV Cost-effectiveness		
		Average Annual Utility Bill Savings			Lifetime NPV			Lifetime NPV		
CZ	Utility	Electricity	Natural Gas	Net Utility Savings	Utility Bill Savings	Equipment Cost Savings	On-Bill B/C Ratio[2]	TDV Cost Savings	Equipment Cost Savings	TDV B/C Ratio
	2019 Code Compliant Home									
01	PG&E	-($1,194)	+$712	-($482)	-($14,464)	+$5,349	0.4	-($13,081)	+$11,872	0.9
02	PG&E	-($825)	+$486	-($340)	-($10,194)	+$5,349	0.5	-($7,456)	+$11,872	1.6
03	PG&E	-($717)	+$391	-($326)	-($9,779)	+$5,349	0.5	-($7,766)	+$11,872	1.5
04	PG&E	-($710)	+$387	-($322)	-($9,671)	+$5,349	0.6	-($7,447)	+$11,872	1.6
05	PG&E	-($738)	+$367	-($371)	-($11,128)	+$5,349	0.5	-($8,969)	+$11,872	1.3
05	PG&E/SoCalGas	-($738)	+$370	-($368)	-($11,034)	+$5,349	0.5	-($8,969)	+$11,872	1.3
06	SCE/SoCalGas	-($439)	+$289	-($149)	-($4,476)	+$5,349	1.2	-($4,826)	+$11,872	2.5
07	SDG&E	-($414)	+$243	-($171)	-($5,134)	+$5,349	1.0	-($4,678)	+$11,872	2.5
08	SCE/SoCalGas	-($347)	+$249	-($97)	-($2,921)	+$5,349	1.8	-($3,971)	+$11,872	3.0
09	SCE/SoCalGas	-($377)	+$271	-($107)	-($3,199)	+$5,349	1.7	-($4,089)	+$11,872	2.9
10	SCE/SoCalGas	-($403)	+$280	-($123)	-($3,684)	+$5,349	1.5	-($4,458)	+$11,872	2.7
10	SDG&E	-($496)	+$297	-($198)	-($5,950)	+$5,349	0.9	-($4,458)	+$11,872	2.7
11	PG&E	-($810)	+$447	-($364)	-($10,917)	+$5,349	0.5	-($7,024)	+$11,872	1.7
12	PG&E	-($740)	+$456	-($284)	-($8,533)	+$5,349	0.6	-($6,281)	+$11,872	1.9
13	PG&E	-($742)	+$413	-($329)	-($9,870)	+$5,349	0.5	-($6,480)	+$11,872	1.8
14	SCE/SoCalGas	-($661)	+$413	-($248)	-($7,454)	+$5,349	0.7	-($7,126)	+$11,872	1.7
14	SDG&E	-($765)	+$469	-($296)	-($8,868)	+$5,349	0.6	-($7,126)	+$11,872	1.7
15	SCE/SoCalGas	-($297)	+$194	-($103)	-($3,090)	+$5,349	1.7	-($5,364)	+$11,872	2.2
16	PG&E	-($1,287)	+$712	-($575)	-($17,250)	+$5,349	0.3	-($17,391)	+$11,872	0.7

		On-Bill Cost-effectiveness[1]						TDV Cost-effectiveness		
		Average Annual Utility Bill Savings			Lifetime NPV			Lifetime NPV		
CZ	Utility	Electricity	Natural Gas	Net Utility Savings	Utility Bill Savings	Equipment Cost Savings	On-Bill B/C Ratio[2]	TDV Cost Savings	Equipment Cost Savings	TDV B/C Ratio
	Efficiency & PV Package									
01	PG&E	-($99)	+$712	+$613	+$18,398	-($12,844)	1.4	+$13,364	-($6,321)	2.1
02	PG&E	-($89)	+$486	+$397	+$11,910	-($6,758)	1.8	+$9,307	-($234)	39.7
03	PG&E	-($87)	+$391	+$304	+$9,119	-($3,169)	2.9	+$6,516	+$3,355	>1
04	PG&E	-($85)	+$387	+$302	+$9,074	-($3,438)	2.6	+$6,804	+$3,086	>1
05	PG&E	-($98)	+$367	+$268	+$8,054	-($2,959)	2.7	+$5,625	+$3,564	>1
05	PG&E/SoCalGas	-($98)	+$370	+$272	+$8,148	-($2,959)	2.8	+$5,625	+$3,564	>1
06	SCE/SoCalGas	-($188)	+$289	+$102	+$3,049	-($992)	3.1	+$4,585	+$5,531	>1
07	SDG&E	-($137)	+$243	+$106	+$3,174	+$912	>1	+$2,176	+$7,436	>1
08	SCE/SoCalGas	-($160)	+$249	+$89	+$2,664	-($25)	107.9	+$3,965	+$6,499	>1
09	SCE/SoCalGas	-($169)	+$271	+$102	+$3,067	-($429)	7.1	+$5,368	+$6,094	>1
10	SCE/SoCalGas	-($173)	+$280	+$107	+$3,216	-($1,057)	3.0	+$5,165	+$5,466	>1
10	SDG&E	-($137)	+$297	+$160	+$4,805	-($1,057)	4.5	+$5,165	+$5,466	>1
11	PG&E	-($147)	+$447	+$300	+$8,988	-($5,478)	1.6	+$9,776	+$1,045	>1
12	PG&E	-($92)	+$456	+$364	+$10,918	-($6,172)	1.8	+$9,913	+$352	>1
13	PG&E	-($144)	+$413	+$269	+$8,077	-($5,184)	1.6	+$8,960	+$1,339	>1
14	SCE/SoCalGas	-($241)	+$413	+$172	+$5,164	-($5,111)	1.0	+$9,850	+$1,412	>1
14	SDG&E	-($139)	+$469	+$330	+$9,910	-($5,111)	1.9	+$9,850	+$1,412	>1
15	SCE/SoCalGas	-($107)	+$194	+$87	+$2,603	+$264	>1	+$2,598	+$6,787	>1
16	PG&E	-($130)	+$712	+$582	+$17,457	-($11,234)	1.6	+$9,536	-($4,710)	2.0
	Neutral Cost Package									
01	PG&E	-($869)	+$712	-($157)	-($4,704)	+$0	0	-($6,033)	+$6,549	1.1
02	PG&E	-($445)	+$486	+$40	+$1,213	+$0	>1	+$868	+$6,505	>1
03	PG&E	-($335)	+$391	+$56	+$1,671	+$0	>1	+$483	+$6,520	>1
04	PG&E	-($321)	+$387	+$66	+$1,984	+$0	>1	+$1,062	+$6,521	>1
05	PG&E	-($335)	+$367	+$31	+$938	+$0	>1	-($163)	+$6,519	40.1
05	PG&E/SoCalGas	-($335)	+$370	+$34	+$1,031	+$0	>1	-($163)	+$6,519	40.1
06	SCE/SoCalGas	-($227)	+$289	+$63	+$1,886	+$0	>1	+$3,258	+$6,499	>1
07	SDG&E	-($72)	+$243	+$171	+$5,132	+$0	>1	+$3,741	+$6,519	>1
08	SCE/SoCalGas	-($144)	+$249	+$105	+$3,162	+$0	>1	+$4,252	+$6,515	>1
09	SCE/SoCalGas	-($170)	+$271	+$100	+$3,014	+$0	>1	+$4,271	+$6,513	>1
10	SCE/SoCalGas	-($199)	+$280	+$81	+$2,440	+$0	>1	+$3,629	+$6,494	>1
10	SDG&E	-($155)	+$297	+$143	+$4,287	+$0	>1	+$3,629	+$6,494	>1
11	PG&E	-($426)	+$447	+$21	+$630	+$0	>1	+$1,623	+$6,504	>1
12	PG&E	-($362)	+$456	+$94	+$2,828	+$0	>1	+$2,196	+$6,525	>1
13	PG&E	-($370)	+$413	+$43	+$1,280	+$0	>1	+$1,677	+$6,509	>1
14	SCE/SoCalGas	-($416)	+$413	-($4)	-($107)	+$0	0	+$2,198	+$6,520	>1
14	SDG&E	-($391)	+$469	+$79	+$2,356	+$0	>1	+$2,198	+$6,520	>1
15	SCE/SoCalGas	-($98)	+$194	+$97	+$2,900	+$0	>1	+$2,456	+$6,483	>1
16	PG&E	-($878)	+$712	-($166)	-($4,969)	+$0	0	-($8,805)	+$6,529	0.7

[1]Red values in parentheses indicate an increase in utility bill costs or an incremental first cost for the all-electric home.
[2]">1" indicates cases where there are both first cost savings and annual utility bill savings.

Table 15: Comparison of Single Family On-Bill Cost Effectiveness Results with Additional PV

		Neutral Cost				Min. Cost Effectiveness			
CZ	Utility	PV Capacity (kW)	Utility Bill Savings	Equipment Cost Savings	On-Bill B/C Ratio	PV Capacity (kW)	Utility Bill Savings	Equipment Cost Savings	On-Bill B/C Ratio
01	PG&E	4.7	-($4,704)	+$0	0	6.3	+$6,898	-($6,372)	1.1
14	SCE/SoCalGas	4.5	-($107)	+$0	0	4.8	+$1,238	-($1,000)	1.2
16	PG&E	4.1	-($4,969)	+$0	0	5.3	+$5,883	-($4,753)	1.2

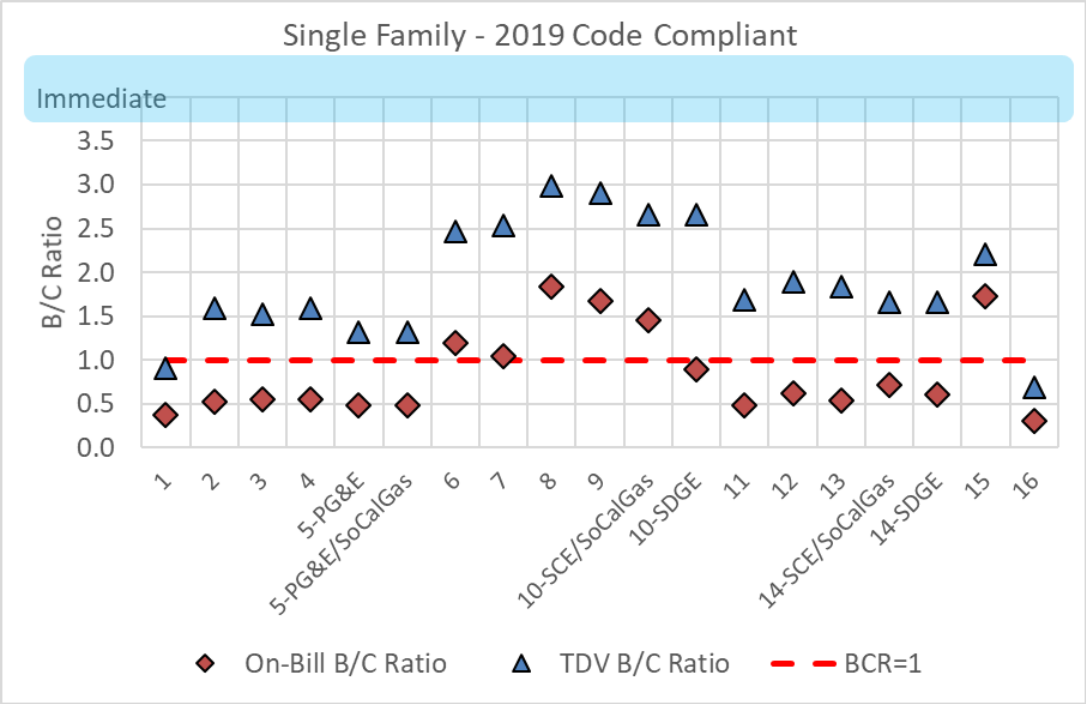

Figure 9: B/C ratio results for a single family all-electric code compliant home versus a mixed fuel code compliant home

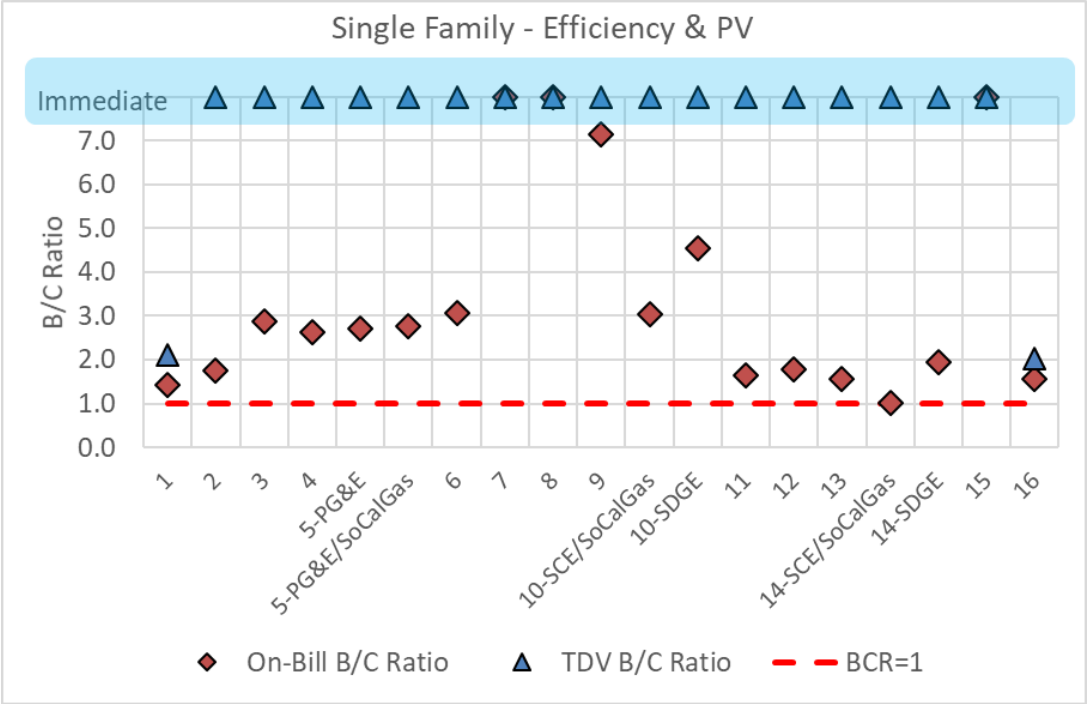

Figure 10: B/C ratio results for the single family Efficiency & PV all-electric home versus a mixed fuel code compliant home

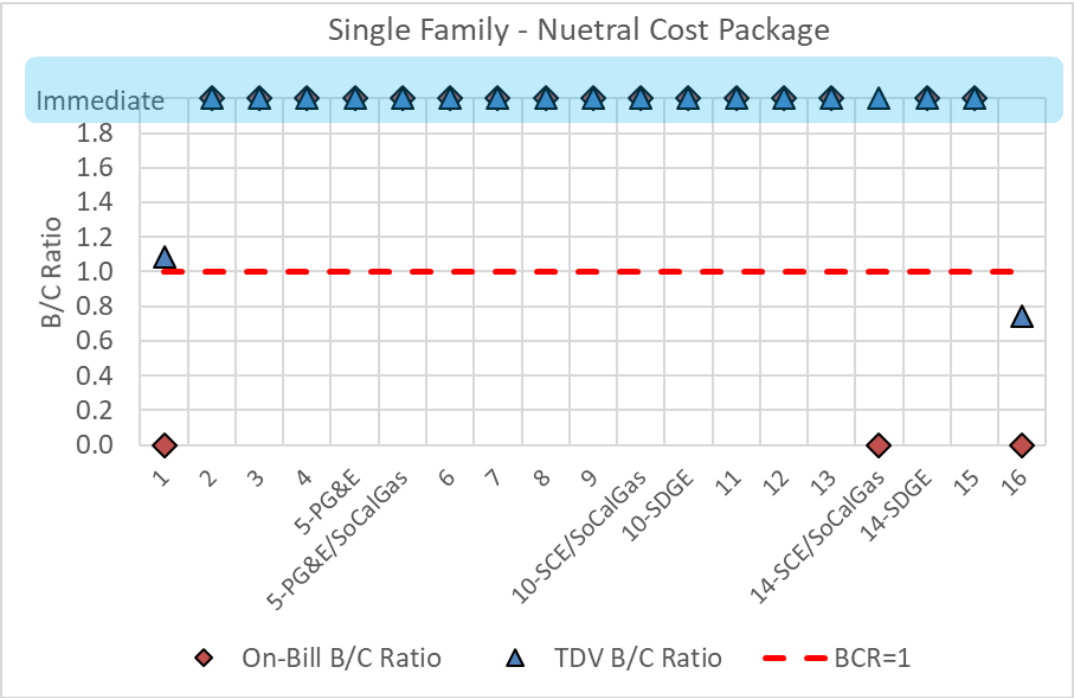

Figure 11: B/C ratio results for the single family neutral cost package all-electric home versus a mixed fuel code compliant home

Table 16: Multifamily Electrification Results (Per Dwelling Unit)

		On-Bill Cost-effectiveness[1]						TDV Cost-effectiveness		
		Average Annual Utility Bill Savings			Lifetime NPV			Lifetime NPV		
CZ	Utility	Electricity	Natural Gas	Net Utility Savings	Utility Bill Savings	Equipment Cost Savings	On-Bill B/C Ratio[2]	TDV Cost Savings	Equipment Cost Savings	TDV B/C Ratio
	2019 Code Compliant Home									
01	PG&E	-($396)	+$193	-($203)	-($6,079)	+$2,337	0.4	-($5,838)	+$5,899	1.0
02	PG&E	-($310)	+$162	-($148)	-($4,450)	+$2,337	0.5	-($4,144)	+$5,899	1.4
03	PG&E	-($277)	+$142	-($135)	-($4,041)	+$2,337	0.6	-($4,035)	+$5,899	1.5
04	PG&E	-($264)	+$144	-($120)	-($3,595)	+$2,337	0.6	-($3,329)	+$5,899	1.8
05	PG&E	-($297)	+$140	-($157)	-($4,703)	+$2,337	0.5	-($4,604)	+$5,899	1.3
05	PG&E/SoCalGas	-($297)	+$178	-($119)	-($3,573)	+$2,337	0.7	-($4,604)	+$5,899	1.3
06	SCE/SoCalGas	-($191)	+$161	-($30)	-($902)	+$2,337	2.6	-($2,477)	+$5,899	2.4
07	SDG&E	-($206)	+$136	-($70)	-($2,094)	+$2,337	1.1	-($2,390)	+$5,899	2.5
08	SCE/SoCalGas	-($169)	+$157	-($12)	-($349)	+$2,337	6.7	-($2,211)	+$5,899	2.7
09	SCE/SoCalGas	-($177)	+$159	-($18)	-($533)	+$2,337	4.4	-($2,315)	+$5,899	2.5
10	SCE/SoCalGas	-($183)	+$159	-($23)	-($697)	+$2,337	3.4	-($2,495)	+$5,899	2.4
10	SDG&E	-($245)	+$139	-($106)	-($3,192)	+$2,337	0.7	-($2,495)	+$5,899	2.4
11	PG&E	-($291)	+$153	-($138)	-($4,149)	+$2,337	0.6	-($4,420)	+$5,899	1.3
12	PG&E	-($277)	+$155	-($122)	-($3,665)	+$2,337	0.6	-($3,557)	+$5,899	1.7
13	PG&E	-($270)	+$146	-($124)	-($3,707)	+$2,337	0.6	-($3,821)	+$5,899	1.5
14	SCE/SoCalGas	-($255)	+$187	-($69)	-($2,062)	+$2,337	1.1	-($3,976)	+$5,899	1.5
14	SDG&E	-($328)	+$175	-($154)	-($4,607)	+$2,337	0.5	-($3,976)	+$5,899	1.5
15	SCE/SoCalGas	-($154)	+$142	-($12)	-($367)	+$2,337	6.4	-($2,509)	+$5,899	2.4
16	PG&E	-($404)	+$224	-($180)	-($5,411)	+$2,337	0.4	-($5,719)	+$5,899	1.0
	Efficiency & PV Package									
01	PG&E	-($19)	+$193	+$174	+$5,230	-($3,202)	1.6	+$2,467	+$361	>1
02	PG&E	-($10)	+$162	+$152	+$4,549	-($1,375)	3.3	+$2,605	+$2,187	>1
03	PG&E	-($12)	+$142	+$130	+$3,910	-($936)	4.2	+$1,632	+$2,626	>1
04	PG&E	-($8)	+$144	+$136	+$4,080	-($822)	5.0	+$2,381	+$2,740	>1
05	PG&E	-($19)	+$140	+$121	+$3,635	-($956)	3.8	+$1,403	+$2,606	>1
05	PG&E/SoCalGas	-($19)	+$178	+$159	+$4,765	-($956)	5.0	+$1,403	+$2,606	>1
06	SCE/SoCalGas	-($84)	+$161	+$77	+$2,309	-($243)	9.5	+$1,940	+$3,319	>1
07	SDG&E	-($49)	+$136	+$87	+$2,611	+$75	>1	+$1,583	+$3,638	>1
08	SCE/SoCalGas	-($74)	+$157	+$83	+$2,480	+$96	>1	+$1,772	+$3,658	>1
09	SCE/SoCalGas	-($76)	+$159	+$82	+$2,469	+$104	>1	+$1,939	+$3,667	>1
10	SCE/SoCalGas	-($79)	+$159	+$80	+$2,411	-($34)	70.9	+$1,737	+$3,528	>1
10	SDG&E	-($77)	+$139	+$61	+$1,842	-($34)	54.2	+$1,737	+$3,528	>1
11	PG&E	-($25)	+$153	+$128	+$3,834	-($1,264)	3.0	+$2,080	+$2,298	>1
12	PG&E	-($11)	+$155	+$144	+$4,316	-($1,498)	2.9	+$2,759	+$2,064	>1
13	PG&E	-($26)	+$146	+$121	+$3,625	-($1,125)	3.2	+$2,083	+$2,437	>1
14	SCE/SoCalGas	-($99)	+$187	+$87	+$2,616	-($1,019)	2.6	+$2,422	+$2,543	>1
14	SDG&E	-($86)	+$175	+$88	+$2,647	-($1,019)	2.6	+$2,422	+$2,543	>1
15	SCE/SoCalGas	-($67)	+$142	+$75	+$2,247	+$511	>1	+$1,276	+$4,073	>1
16	PG&E	-($24)	+$224	+$200	+$5,992	-($2,087)	2.9	+$2,629	+$1,476	>1

		On-Bill Cost-effectiveness[1]						TDV Cost-effectiveness		
		Average Annual Utility Bill Savings			Lifetime NPV			Lifetime NPV		
CZ	Utility	Electricity	Natural Gas	Net Utility Savings	Utility Bill Savings	Equipment Cost Savings	On-Bill B/C Ratio[2]	TDV Cost Savings	Equipment Cost Savings	TDV B/C Ratio
	Neutral Cost Package									
01	PG&E	-($228)	+$193	-($35)	-($1,057)	+$0	0	-($2,267)	+$3,564	1.6
02	PG&E	-($115)	+$162	+$47	+$1,399	+$0	>1	+$59	+$3,563	>1
03	PG&E	-($81)	+$142	+$61	+$1,843	+$0	>1	+$138	+$3,562	>1
04	PG&E	-($64)	+$144	+$80	+$2,402	+$0	>1	+$983	+$3,563	>1
05	PG&E	-($90)	+$140	+$50	+$1,490	+$0	>1	-($152)	+$3,564	23.4
05	PG&E/SoCalGas	-($90)	+$178	+$87	+$2,620	+$0	>1	-($152)	+$3,564	23.4
06	SCE/SoCalGas	-($90)	+$161	+$71	+$2,144	+$0	>1	+$1,612	+$3,562	>1
07	SDG&E	-($32)	+$136	+$105	+$3,135	+$0	>1	+$1,886	+$3,560	>1
08	SCE/SoCalGas	-($67)	+$157	+$90	+$2,705	+$0	>1	+$1,955	+$3,564	>1
09	SCE/SoCalGas	-($71)	+$159	+$87	+$2,623	+$0	>1	+$1,924	+$3,561	>1
10	SCE/SoCalGas	-($78)	+$159	+$81	+$2,431	+$0	>1	+$1,588	+$3,561	>1
10	SDG&E	-($71)	+$139	+$68	+$2,033	+$0	>1	+$1,588	+$3,561	>1
11	PG&E	-($93)	+$153	+$59	+$1,783	+$0	>1	-($48)	+$3,562	74.0
12	PG&E	-($82)	+$155	+$73	+$2,184	+$0	>1	+$739	+$3,564	>1
13	PG&E	-($79)	+$146	+$68	+$2,034	+$0	>1	+$310	+$3,560	>1
14	SCE/SoCalGas	-($141)	+$187	+$45	+$1,359	+$0	>1	+$747	+$3,562	>1
14	SDG&E	-($137)	+$175	+$38	+$1,131	+$0	>1	+$747	+$3,562	>1
15	SCE/SoCalGas	-($50)	+$142	+$92	+$2,771	+$0	>1	+$1,738	+$3,560	>1
16	PG&E	-($194)	+$224	+$30	+$900	+$0	>1	-($1,382)	+$3,564	2.6

[1]Red values in parentheses indicate an increase in utility bill costs or an incremental first cost for the all-electric home.
[2]">1" indicates cases where there are both first cost savings and annual utility bill savings.

Table 17: Comparison of Multifamily On-Bill Cost Effectiveness Results with Additional PV (Per Dwelling Unit)

		Neutral Cost				Min. Cost Effectiveness			
CZ	Utility	PV Capacity (kW)	Utility Bill Savings	Equipment Cost Savings	On-Bill B/C Ratio	PV Capacity (kW)	Utility Bill Savings	Equipment Cost Savings	On-Bill B/C Ratio
01	PG&E	2.7	-($1,057)	+$0	0	3.0	+$1,198	-($1,052)	1.1

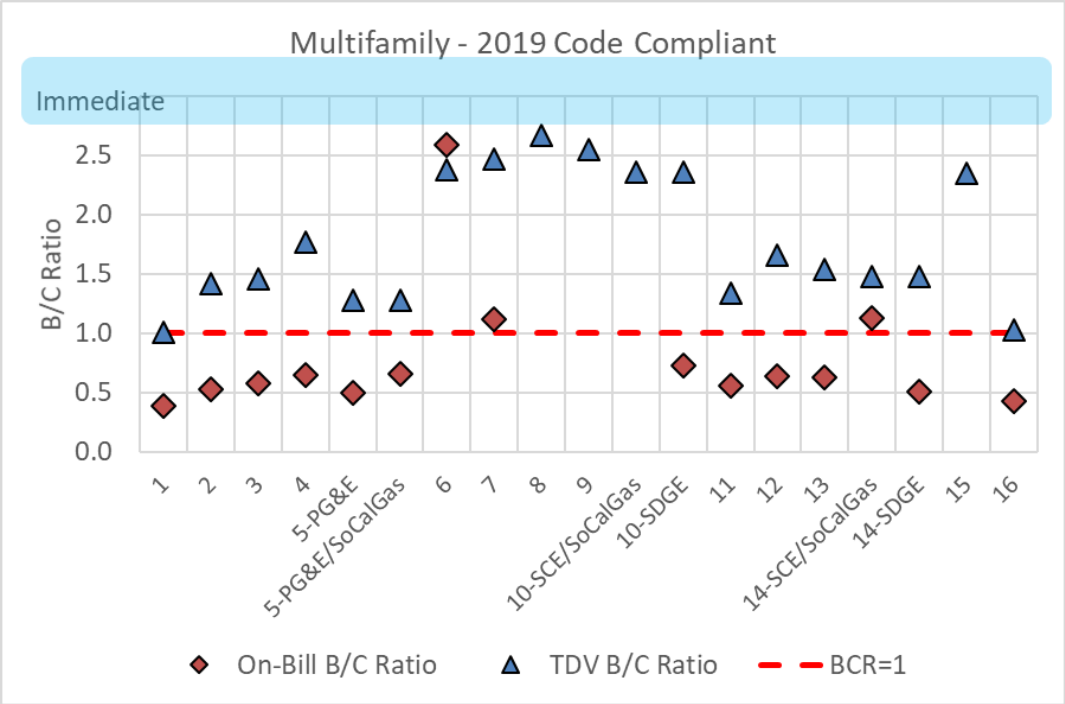

Figure 12: B/C ratio results for a multifamily all-electric code compliant home versus a mixed fuel code compliant home

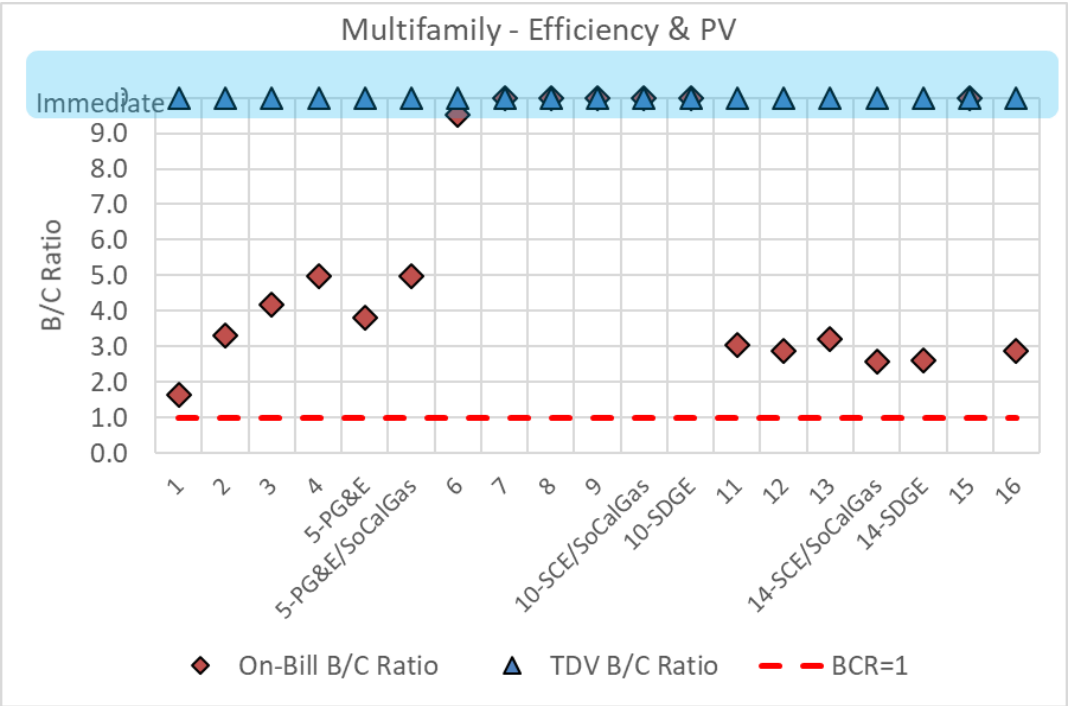

Figure 13: B/C ratio results for the multifamily Efficiency & PV all-electric home versus a mixed fuel code compliant home

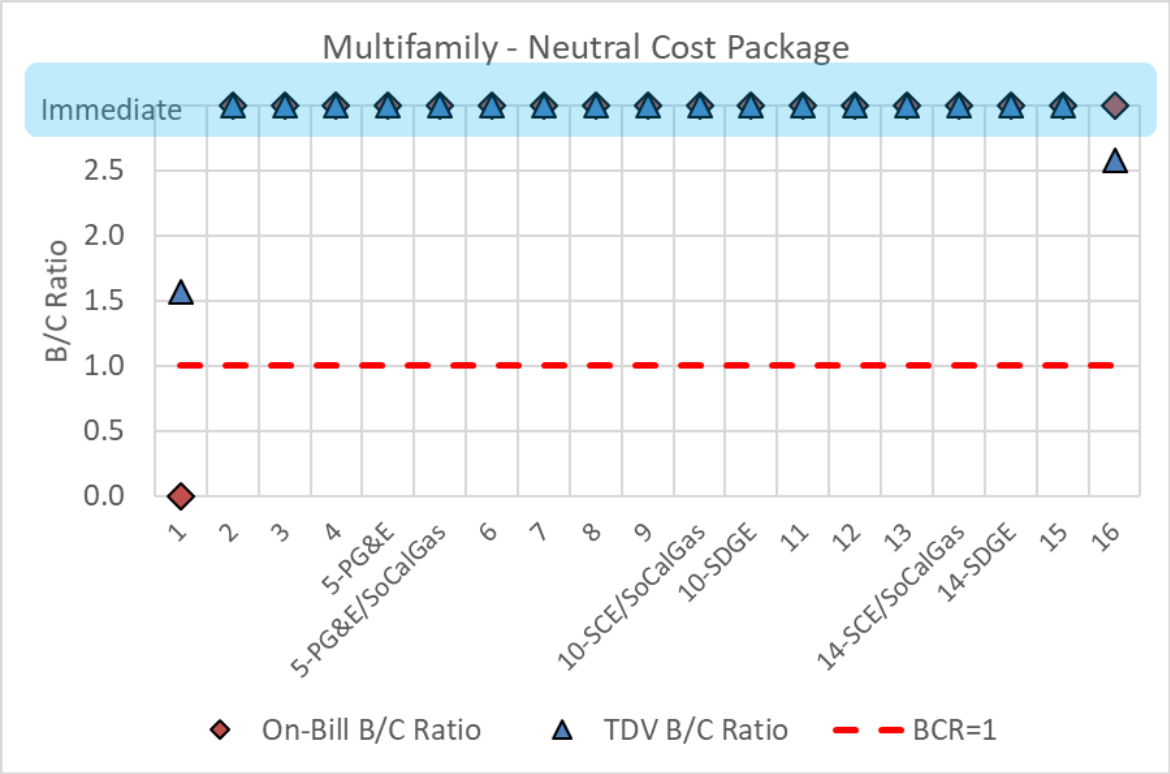

Figure 14: B/C ratio results for the multifamily neutral cost package all-electric home versus a mixed fuel code compliant home

4 Conclusions & Summary

This report evaluated the feasibility and cost-effectiveness of "above code" performance specifications through the application of efficiency measures, PV, and electric battery storage in all 16 California climate zones. The analysis found cost-effective packages across the state for both single family and low-rise multifamily buildings. For the building types and climate zones where cost-effective packages were identified, the results of this analysis can be used by local jurisdictions to support the adoption of reach codes. Cost-effectiveness was evaluated according to two metrics: On-Bill customer lifecycle benefit-to-cost and TDV lifecycle benefit-to-cost. While all the above code targets presented are based on packages that are cost-effective under at least one of these metrics, they are not all cost-effective under both metrics. Generally, the test for being cost-effective under the TDV methodology is less challenging than under the On-Bill methodology. Therefore, all packages presented are cost-effective based on TDV, and may or may not be cost-effective based on the On-Bill method. It is up to each jurisdiction to determine what metric is most appropriate for their application. A summary of results by climate zone are presented in Appendix G – Results by Climate Zone.

Above code targets are presented as Target EDR Margin, which have been defined for each scenario where a cost-effective package was identified. Target EDR Margins represent the maximum "reach" values that meet the requirements. Jurisdictions may adopt less stringent requirements. For the Efficiency Package the Target EDR Margin was defined based on the lower EDR Margin of the Efficiency – Non-Preempted Package and the Efficiency – Equipment, Preempted Package. For example, if the cost-effective Non-Preempted package has an EDR Margin of 3 and the Preempted package an EDR Margin of 4, the Target EDR Margin is set at 3.

The average incremental cost for the single family Efficiency packages is ~$1,750. The Efficiency & PV Package average incremental cost is $9,180 and for the Efficiency & PV/Battery Package it is approximately $5,600 for the

mixed fuel cases and $15,100 for the all-electric cases. The incremental costs for each multifamily apartment are approximately 30-40% lower. See Table 8 and Table 11 for a summary of package costs by case.

Table 18 and Table 19 summarize the maximum Target EDR Margins determined to be cost effective for each package for single family and multifamily, respectively. Cases labeled as "n/a" in the tables indicate where no cost-effective package was identified under either On-Bill or TDV methodology.

This analysis also looked at the GHG emissions impacts of the various packages. An all-electric design reduces GHG emissions 40-50% in most cases relative to a comparable mixed fuel design.

There is significant interest throughout California on electrification of new buildings. The Reach Code Team assembled data on the cost differences between a code compliant mixed fuel building and a code compliant all-electric building. Based on lifetime equipment cost savings (the difference in first cost for equipment and infrastructure combined with incremental replacement costs) of $5,349 for an all-electric single family home this analysis found that from a customer on-bill perspective, the all-electric code compliant option is cost-effective in Climates Zones 6 through 9, 10 (SCE/SoCalGas territory only), and 15, and cost-effective in all climate zones except 1 and 16 based on TDV. For multifamily buildings, based on a cost savings of $2,337 per apartment, the code compliant option is cost-effective in Climates Zones 6 through 9, 10 & 14 (SCE/SoCalGas territory only), and 15, and cost-effective based on TDV.

Adding efficiency and PV to the code compliant all-electric buildings increases the cost-effectiveness in all climate zones. The Efficiency & PV Package is cost-effective when compared to a mixed fuel code compliant building in all climate zones for both single family and multifamily buildings based on both the On-Bill and TDV methodologies. The Efficiency & PV package adds PV to offset 90% of the electricity use of the home. While this results in higher installed costs, the reduced lifetime utility costs are larger ($0 to $6,000 lifetime incremental equipment costs in many climates for single family homes and an associated $4,500 to $13,500 lifetime utility cost savings across the same cases), resulting in positive B/C ratios for all cases.

The Reach Code Team also evaluated a neutral cost electrification scenario where the cost savings for the all-electric code compliant home is invested in a larger PV system, resulting in a lifetime incremental cost of zero based on the On-Bill approach. This package results in utility cost savings and positive on-bill B/C ratio in all cases except Climate Zones 1 and 16 for single family, and Climate Zone 1 for low-rise multifamily. Increasing the PV sizes in those climates by approximately 30% resulted in positive on-bill B/C ratios, while still not resulting in oversizing of PV systems.

Other studies have shown that cost-effectiveness of electrification increases with high efficiency space conditioning and water heating equipment in the all-electric home. This was not directly evaluated in this analysis but based on the favorable cost-effectiveness results of the Equipment, Preempted package for the individual mixed fuel and all-electric upgrades it's expected that applying similar packages to the electrification analysis would result in increased cost-effectiveness.

The Reach Code Team found there can be substantial variability in first costs, particularly related to natural gas infrastructure. Costs are project-dependent and will be impacted by such factors as site characteristics, distance to the nearest gas main, joint trenching, whether work is conducted by the utility or a private contractor, and number of homes per development among other things. While the best cost data available to the Reach Code Team was applied in this analysis, individual projects may experience different costs, either higher or lower than the estimates presented here.

Table 18: Summary of Single Family Target EDR Margins

Climate Zone	Mixed Fuel		All-Electric		
	Efficiency	Efficiency & PV/Battery	Efficiency	Efficiency & PV	Efficiency & PV/Battery
01	5.0	10.5	6.5	31.0	41.0
02	3.0	10.0	4.5	19.0	30.0
03	2.5	10.0	4.0	18.0	29.0
04	2.5	10.0	3.0	17.0	28.5
05	2.5	9.0	4.0	18.0	28.5
06	1.5	9.5	2.0	14.0	26.0
07	n/a	9.0	n/a	11.0	24.0
08	1.0	8.0	1.5	10.5	21.5
09	2.5	8.5	2.5	11.5	21.0
10	3.0	9.5	3.0	11.0	21.0
11	4.0	9.0	4.5	14.0	23.0
12	3.0	9.5	3.5	15.5	25.0
13	4.5	9.5	5.0	13.0	22.0
14	4.5	9.0	5.5	15.5	23.5
15	4.5	7.0	5.5	6.0	13.0
16	5.0	10.5	4.5	26.5	35.0

Table 19: Summary of Multifamily Target EDR Margins

Climate Zone	Mixed Fuel		All-Electric		
	Efficiency	Efficiency & PV/Battery	Efficiency	Efficiency & PV	Efficiency & PV/Battery
01	2.0	11.5	3.0	22.5	34.5
02	1.5	10.5	1.5	17.5	30.5
03	0.5	10.0	n/a	16.0	29.5
04	1.0	11.0	1.0	15.0	28.5
05	0.5	9.5	0.5	17.0	30.0
06	1.0	10.5	1.0	13.5	27.5
07	0.5	11.0	0.5	12.5	27.0
08	1.0	9.5	1.0	11.5	24.0
09	1.5	9.5	1.5	11.0	23.0
10	1.5	10.0	1.5	10.5	23.0
11	2.5	10.5	3.5	13.0	25.0
12	1.5	10.0	2.5	14.0	26.5
13	3.0	10.5	3.0	12.0	23.5
14	3.0	9.5	3.5	14.0	24.5
15	4.0	8.5	4.0	7.0	16.5
16	2.0	9.5	3.0	19.5	29.5

5 References

California Energy Commission. 2017. Rooftop Solar PV System. Measure number: 2019-Res-PV-D Prepared by Energy and Environmental Economics, Inc. https://efiling.energy.ca.gov/getdocument.aspx?tn=221366

California Energy Commission. 2018a. 2019 Alternative Calculation Method Approval Manual. CEC-400-2018-023-CMF. December 2018. California Energy Commission. https://www.energy.ca.gov/2018publications/CEC-400-2018-023/CEC-400-2018-023-CMF.pdf

California Energy Commission. 2018b. 2019 Building Energy Efficiency Standards for Residential and Nonresidential Buildings. CEC-400-2018-020-CMF. December 2018. California Energy Commission. https://www.energy.ca.gov/2018publications/CEC-400-2018-020/CEC-400-2018-020-CMF.pdf

California Energy Commission. 2018c. 2019 Reference Appendices. CEC-400-2018-021-CMF. December 2018. California Energy Commission. https://www.energy.ca.gov/2018publications/CEC-400-2018-021/CEC-400-2018-021-CMF.pdf

California Energy Commission. 2018d. 2019 Residential Compliance Manual. CEC-400-2018-017-CMF. December 2018. California Energy Commission. https://www.energy.ca.gov/2018publications/CEC-400-2018-017/CEC-400-2018-017-CMF.pdf

California Energy Commission. 2019. 2019 Residential Alternative Calculation Method Reference Manual. CEC-400-2019-005-CMF. May 2019. California Energy Commission. https://www.energy.ca.gov/2019publications/CEC-400-2019-005/CEC-400-2019-005-CMF.pdf

California Public Utilities Commission. 2016. Rulemaking No. 15-03-010 An Order Instituting Rulemaking to Identify Disadvantaged Communities in the San Joaquin Valley and Analyze Economically Feasible Options to Increase Access to Affordable Energy in Those Disadvantages Communities. Proposed Decision of Commissioner Guzman Aceves. April 07, 2017. http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M183/K389/183389022.PDF

Davis Energy Group. 2015. Evaluation of Ducts in Conditioned Space for New California Homes. Prepared for Pacific Gas and Electric Company. March 2015. https://www.etcc-ca.com/reports/evaluation-ducts-conditioned-space-new-california-homes

Energy & Environmental Economics. 2019. Residential Building Electrification in California. April 2019. https://www.ethree.com/wp-content/uploads/2019/04/E3_Residential_Building_Electrification_in_California_April_2019.pdf

EPRI. 2016. SMUD All-Electric Homes Electrification Case Study: Summary for the Three-Prong Test Discussion. Electric Power Research Institute, Inc. September. 2016. Presentation to Sacramento Municipal Utility District.

Horii, B., E. Cutter, N. Kapur, J. Arent, and D. Conotyannis. 2014. "Time Dependent Valuation of Energy for Developing Building Energy Efficiency Standards." http://www.energy.ca.gov/title24/2016standards/prerulemaking/documents/2014-07-09_workshop/2017_TDV_Documents/

Itron. 2014. 2010-2012 WO017 Ex Ante Measure Cost Study: Final Report. Itron. May 2014. Presented to California Public Utilities Commission.

Barbose, Galen and Darghouth, Naim. 2018. Tracking the Sun. Installed Price Trends for Distributed Photovoltaic Systems in the United States – 2018 Edition. Lawrence Berkeley National Laboratory. September 2018. https://emp.lbl.gov/sites/default/files/tracking_the_sun_2018_edition_final_0.pdf

Navigant. 2018. Analysis of the Role of Gas for a Low-Carbon California Future. July 24, 2018. Prepared for Southern California Gas Company. https://www.socalgas.com/1443741887279/SoCalGas_Renewable_Gas_Final-Report.pdf

Penn, Ivan. 2018. Cheaper Battery Is Unveiled as a Step to a Carbon-Free Grid. The New York Times. September 2018. https://www.nytimes.com/2018/09/26/business/energy-environment/zinc-battery-solar-power.html. Accessed January 29, 2019.

Statewide CASE Team. 2017a. Codes and Standards Enhancement (CASE) Initiative Drain Water Heat Recovery – Final Report. July 2017. http://title24stakeholders.com/wp-content/uploads/2017/09/2019-T24-CASE-Report_DWHR_Final_September-2017.pdf

Statewide CASE Team. 2017b. Codes and Standards Enhancement (CASE) Initiative High Performance Attics – Final Report. September 2017. http://title24stakeholders.com/wp-content/uploads/2017/09/2019-T24-CASE-Report_HPA_Final_September-2017.pdf

Statewide CASE Team. 2017c. Codes and Standards Enhancement (CASE) Initiative High Performance Walls – Final Report. September 2017. http://title24stakeholders.com/wp-content/uploads/2017/09/2019-T24-CASE-Report_HPW_Final_September-2017.pdf

Statewide CASE Team. 2017d. Codes and Standards Enhancement (CASE) Initiative Residential High Performance Windows & Doors – Final Report. August 2017. http://title24stakeholders.com/wp-content/uploads/2017/09/2019-T24-CASE-Report_Res-Windows-and-Doors_Final_September-2017.pdf

Statewide CASE Team. 2018. Energy Savings Potential and Cost-Effectiveness Analysis of High Efficiency Windows in California. Prepared by Frontier Energy. May 2018. https://www.etcc-ca.com/reports/energy-savings-potential-and-cost-effectiveness-analysis-high-efficiency-windows-california

Statewide Reach Codes Team. 2016. CALGreen Cost-Effectiveness Study. Prepared for Pacific Gas and Electric Company. Prepared by Davis Energy Group. November 2016. http://localenergycodes.com/download/50/file_path/fieldList/2016%20RNC%20Tiers%201-2%20Cost-Eff%20Report

Statewide Reach Codes Team. 2017a. CALGreen All-Electric Cost-Effectiveness Study. Prepared for Pacific Gas and Electric Company. Prepared by Davis Energy Group. October 2017. http://localenergycodes.com/download/276/file_path/fieldList/2016%20RNC%20All-Electric%20Cost-Eff%20Report

Statewide Reach Codes Team. 2017b. 2016 Title 24 Residential Reach Code Recommendations: Cost-effectiveness Analysis for All California Climate Zones. Prepared for Southern California Edison. Prepared by TRC Energy Services. August 2017. http://localenergycodes.com/download/283/file_path/fieldList/2016%20RNC%20Reach%20Code%20Tier%203%20Cost-Eff%20Report

Statewide Reach Codes Team. 2018. PV + Battery Storage Study. Prepared for Pacific Gas and Electric Company. Prepared by EnergySoft. July, 2018. http://localenergycodes.com/download/430/file_path/fieldList/PV%20Plus%20Battery%20Storage%20Report

Hopkins, Asa, Takahashi, Kenji, Glick, Devi, Whited, Melissa. 2018. Decarbonization of Heating Energy Use in California Buildings. Synapse Energy Economics, Inc. October 2018. http://www.synapse-energy.com/sites/default/files/Decarbonization-Heating-CA-Buildings-17-092-1.pdf

TRC. 2018. City of Palo Alto 2019 Title 24 Energy Reach Code Cost-effectiveness Analysis Draft. September 2018. https://cityofpaloalto.org/civicax/filebank/documents/66742

Appendix A – California Climate Zone Map

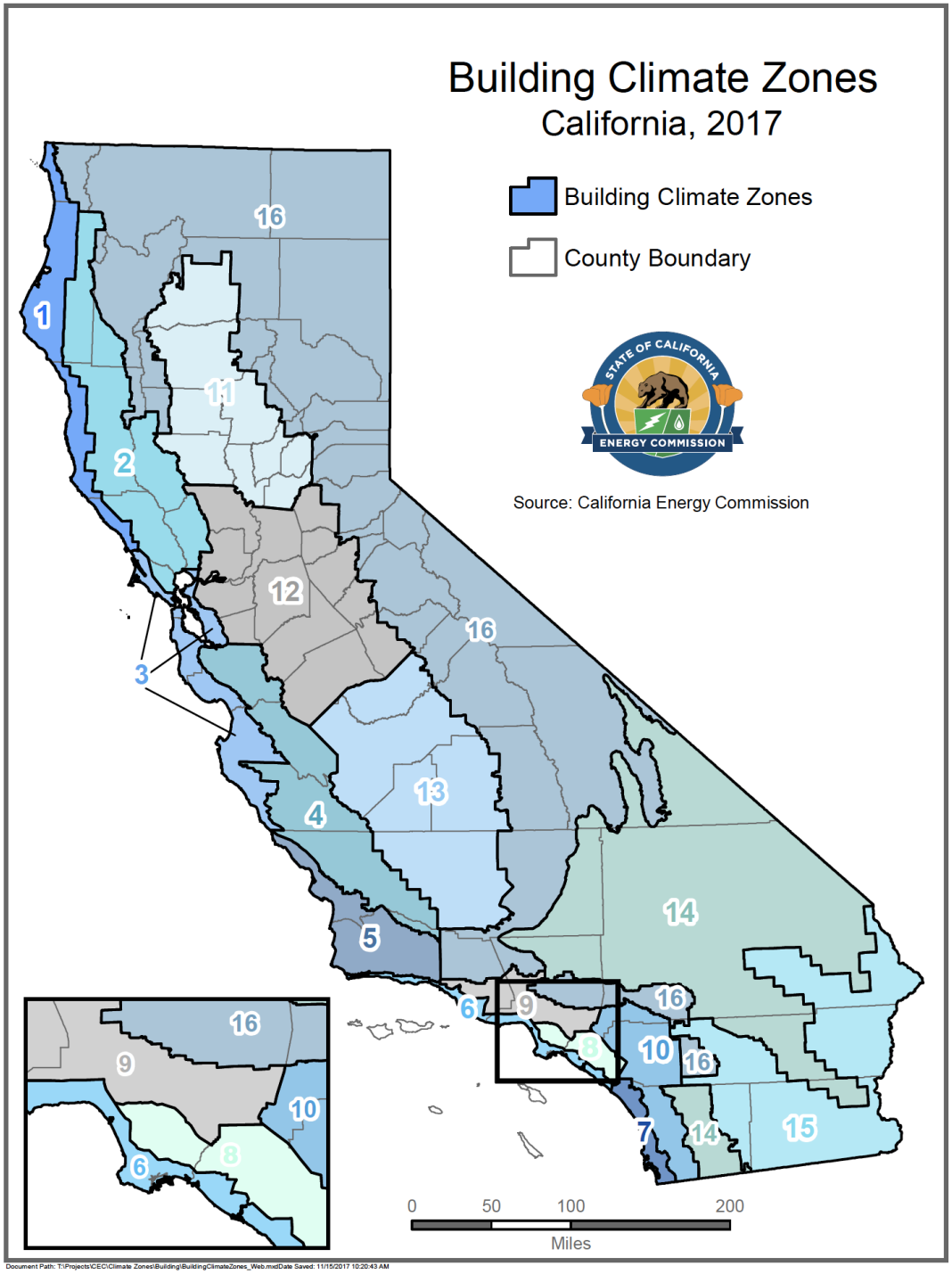

Figure 15: Map of California Climate Zones (courtesy of the California Energy Commission[17])

[17] https://ww2.energy.ca.gov/maps/renewable/building_climate_zones.html

Appendix B – Utility Tariff Details

PG&E

The following pages provide details on the PG&E electricity and natural gas tariffs applied in this study. Table 20 describes the baseline territories that were assumed for each climate zone.

Table 20: PG&E Baseline Territory by Climate Zone

	Baseline Territory
CZ01	V
CZ02	X
CZ03	T
CZ04	X
CZ05	T
CZ11	R
CZ12	S
CZ13	R
CZ16	Y

The PG&E monthly gas rate in $/therm was applied on a monthly basis for the 12-month period ending January 2019 according to the rates shown below.

Pacific Gas and Electric Company

Residential Non-CARE and CARE Gas Tariff Rates
January 1, 2018, to Present
($/therm)[1/]

Effective Date	Advice Letter Number	Minimum Transportation Charge[2/] (per day)	Procurement Charge	Transportation Charge[2/]		TOTAL Residential Non-CARE Schedules Charge[3/] (Non-CARE)	
				Baseline	Excess	Baseline	Excess
01/01/18	3918-G	$0.09863	$0.37310	$0.91828	$1.46925	$1.29138	$1.84235
02/01/18	3931-G	$0.09863	$0.40635	$0.91828	$1.46925	$1.32463	$1.87560
03/01/18	3941-G	$0.09863	$0.32103	$0.91828	$1.46925	$1.23931	$1.79028
04/01/18	3959-G	$0.09863	$0.34783	$0.91828	$1.46925	$1.26611	$1.81708
05/01/18	3969-G	$0.09863	$0.26995	$0.91828	$1.46925	$1.18823	$1.73920
06/01/18	3980-G	$0.09863	$0.21571	$0.91828	$1.46925	$1.13399	$1.68496
07/01/18	3984-G	$0.09863	$0.22488	$0.93438	$1.49502	$1.15926	$1.71990
08/01/18	3995-G	$0.09863	$0.28814	$0.93438	$1.49502	$1.22252	$1.78316
09/01/18	4008-G	$0.09863	$0.25597	$0.93438	$1.49502	$1.19035	$1.75099
10/01/18	4018-G	$0.09863	$0.27383	$0.93438	$1.49502	$1.20821	$1.76885
11/01/18	4034-G	$0.09863	$0.35368	$0.93438	$1.49502	$1.28806	$1.84870
12/01/18	4046-G	$0.09863	$0.42932	$0.93438	$1.49502	$1.36370	$1.92434
01/01/19	4052-G	$0.09863	$0.43394[7/]	$0.99414	$1.59063	$1.42808	$2.02457

[1/] Unless otherwise noted
[2/] Effective July 1, 2005, the Transportation Charge will be no less than the Minimum Transportation Charge of $0.09863 (per day). Applicable to Rate Schedule G-1 only and does not apply to submetered tenants of master-metered customers served under gas Rate Schedule GS and GT.
[3/] Schedule G-PPPS (Public Purpose Program Surcharge) needs to be added to the TOTAL Non-CARE Charge and TOTAL CARE Charge for bill calculation. See Schedule G-PPPS for details and exempt customers.
[4/] CARE Schedules include California Solar Initiative (CSI) Exemption in accordance with Advice Letter 3257-G-A.
[5/] Per dwelling unit per day (Multifamily Service)
[6/] Per installed space per day (Mobilehome Park Service)
[7/] This procurement rate includes a charge of $0.03686 per therm to reflect account balance amortizations in accordance with Advice Letter 3157-G.
[8/] **Residential bill credit of ($29.85) per household, annual bill credit occurring in the October 2018 bill cycle, thereafter in the April bill cycle.**
Seasons: **Winter** = Nov-Mar **Summer** = April-Oct

Pacific Gas and Electric Company
U 39 San Francisco, California

	Revised	*Cal. P.U.C. Sheet No.*	43533-E
Cancelling	Revised	*Cal. P.U.C. Sheet No.*	42728-E

ELECTRIC SCHEDULE E-TOU
RESIDENTIAL TIME-OF-USE SERVICE

Sheet 4

RATES:
(Cont'd.)

OPTION B TOTAL RATES

Total Energy Rates ($ per kWh)	PEAK		OFF-PEAK	
Summer (all usage)	$0.37188	(R)	$0.26882	(R)
Winter (all usage)	$0.23441	(R)	$0.21561	(R)

Delivery Minimum Bill Amount ($ per meter per day) $0.32854

California Climate Credit (per household, per semi-annual payment occurring in the April and October bill cycles) ($39.42)

Total bundled service charges shown on customer's bills are unbundled according to the component rates shown below. Where the delivery minimum bill amount applies, the customer's bill will equal the sum of (1) the delivery minimum bill amount plus (2) for bundled service, the generation rate times the number of kWh used. For revenue accounting purposes, the revenues from the delivery minimum bill amount will be assigned to the Transmission, Transmission Rate Adjustments, Reliability Services, Public Purpose Programs, Nuclear Decommissioning, Competition Transition Charges, Energy Cost Recovery Amount, DWR Bond, and New System Generation Charges based on kWh usage times the corresponding unbundled rate component per kWh, with any residual revenue assigned to Distribution.***

UNBUNDLING OF OPTION B TOTAL RATES

Generation	PEAK		OFF-PEAK	
Summer (all usage)	$0.21238		$0.10932	
Winter (all usage)	$0.10554		$0.08674	
Distribution**				
Summer (all usage)	$0.10716	(R)	$0.10716	(R)
Winter (all usage)	$0.07653	(R)	$0.07653	(R)

Transmission* (all usage)	$0.02469	(R)
Transmission Rate Adjustments* (all usage)	$0.00214	
Reliability Services* (all usage)	$0.00260	
Public Purpose Programs (all usage)	$0.01413	
Nuclear Decommissioning (all usage)	$0.00020	
Competition Transition Charges (all usage)	$0.00132	
Energy Cost Recovery Amount (all usage)	($0.00005)	
DWR Bond (all usage)	$0.00503	(R)
New System Generation Charge (all usage)**	$0.00228	

* Transmission, Transmission Rate Adjustments and Reliability Service charges are combined for presentation on customer bills.
** Distribution and New System Generation Charges are combined for presentation on customer bills.
*** This same assignment of revenues applies to direct access and community choice aggregation customers.

(Continued)

Advice	5444-E	*Issued by*	*Submitted*	December 18, 2018
Decision	18-08-013	***Robert S. Kenney***	*Effective*	January 1, 2019
		Vice President, Regulatory Affairs	*Resolution*	

Pacific Gas and Electric Company®
U 39 San Francisco, California

Revised Cal. P.U.C. Sheet No. 34735-G
Cancelling Revised Cal. P.U.C. Sheet No. 34691-G

GAS SCHEDULE G-1
RESIDENTIAL SERVICE

Sheet 1

APPLICABILITY: This rate schedule[1] applies to natural gas service to Core End-Use Customers on PG&E's Transmission and/or Distribution Systems. To qualify, service must be to individually-metered single family premises for residential use, including those in a multifamily complex, and to separately-metered common areas in a multifamily complex where Schedules GM, GS, or GT are not applicable. Common area accounts that are separately metered by PG&E have an option of switching to a core commercial rate schedule. Common area accounts are those accounts that provide gas service to common use areas as defined in Rule 1.

Per D.15-10-032 and D.18-03-017, transportation rates include GHG Compliance Cost for non-covered entities. Customers who are directly billed by the Air Resources Board (ARB), i.e., covered entities, are exempt from paying AB 32 GHG Compliance Costs through PG&E's rates.[2] A "Cap-and-Trade Cost Exemption" credit for these costs will be shown as a line item on exempt customers' bills.[3, 4]

TERRITORY: Schedule G-1 applies everywhere within PG&E's natural gas Service Territory.

RATES: Customers on this schedule pay a Procurement Charge and a Transportation Charge, per meter, as shown below. The Transportation Charge will be no less than the Minimum Transportation Charge, as follows:

	Per Day			
Minimum Transportation Charge:[5]	$0.09863			
	Per Therm			
	Baseline		Excess	
Procurement:	$0.43394	(I)	$0.43394	(I)
Transportation Charge:	$0.99414	(I)	$1.59063	(I)
Total:	$1.42808	(I)	$2.02457	(I)
California Natural Gas Climate Credit (per Household, annual payment occurring in October 2018 bill cycle, and thereafter in the April bill cycle)	($25.45)	(I)		

Public Purpose Program Surcharge:

Customers served under this schedule are subject to a gas Public Purpose Program (PPP) Surcharge under Schedule G-PPPS.

See Preliminary Statement, Part B for the Default Tariff Rate Components.

The Procurement Charge on this schedule is equivalent to the rate shown on informational Schedule G-CP—Gas Procurement Service to Core End-Use Customers.

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1 PG&E's gas tariffs are available online at www.pge.com.
2 Covered entities are not exempt from paying costs associated with LUAF Gas and Gas used by Company Facilities.
3 The exemption credit will be equal to the effective non-exempt AB 32 GHG Compliance Cost Rate ($ per therm) included in Preliminary Statement – Part B, multiplied by the customer's billed volumes (therms) for each billing period.
4 PG&E will update its billing system annually to reflect newly exempt or newly excluded customers to conform with lists of Directly Billed Customers provided annually by the ARB.
5 The Minimum Transportation charge does not apply to submetered tenants of master-metered customers served under gas rate Schedules GS and GT.

(Continued)

Advice	4052-G	Issued by	Submitted	December 21, 2018
Decision	97-10-065 & 98-07-025	**Robert S. Kenney** Vice President, Regulatory Affairs	Effective	January 1, 2019
			Resolution	

SCE

The following pages provide details on are the SCE electricity tariffs applied in this study. Table 21 describes the baseline territories that were assumed for each climate zone.

Table 21: SCE Baseline Territory by Climate Zone

	Baseline Territory
CZ06	6
CZ08	8
CZ09	9
CZ10	10
CZ14	14
CZ15	15

	Delivery	Generation	Total Rate
TOU-Default-Rate-1 (On-Peak 4:00 pm - 9:00 pm)			
Energy Charge - $/kWh			
Summer Season - On-Peak	0.19880	0.20072	0.39952
Mid-Peak	0.19880	0.05948	0.25828
Off-Peak	0.15574	0.06023	0.21597
Winter Season - Mid-Peak	0.19880	0.08308	0.28188
Off-Peak	0.15574	0.11309	0.26883
Super-Off-Peak	0.15062	0.01344	0.16406
Basic Charge - $/day			
Single-Family Residence	0.031	0.000	0.031
Multi-Family Residence	0.024	0.000	0.024
Minimum Charge - $/day			
Single Family Residence	0.338	0.000	0.338
Multi-Family Residence	0.338	0.000	0.338
Baseline Credit - $/kWh	(0.06512)	0.00000	(0.06512)

	Delivery	Generation	Total Rate
TOU-D-Rate PRIME			
Energy Charge - $/kWh			
Summer Season - On-Peak	0.15926	0.19811	0.35737
Mid-Peak	0.15926	0.10092	0.26018
Off-Peak	0.08308	0.04687	0.12995
Winter Season - Mid-Peak	0.16268	0.16761	0.33029
Off-Peak	0.08081	0.04331	0.12412
Super-Off-Peak	0.08081	0.04331	0.12412
Customer Charge - $/day	0.395	0.000	0.395

TOU Period	Weekdays		Weekends and Holidays	
	Summer	Winter	Summer	Winter
On-Peak	4 p.m. - 9 p.m.			
Mid-Peak		4 p.m. - 9 p.m.	4 p.m. - 9 p.m.	4 p.m. - 9 p.m.
Off-Peak	All other hours	9 p.m. - 8 a.m.	All other hours	9 p.m. - 8 a.m.
Super-Off-Peak		8 a.m. - 4 p.m.		8 a.m. - 4 p.m.

PROPOSED
(7 Year Average 2010-2016)

Summer kWh per Day			Winter kWh per Day		
Baseline Region	Basic	All Electric	Baseline Region	Basic	All Electric
05	17.2	17.9	05	18.7	29.1
06	11.4	8.8	06	11.3	13.0
08	12.6	9.8	08	10.6	12.7
09	16.5	12.4	09	12.3	14.3
10	18.9	15.8	10	12.5	17.0
13	22.0	24.6	13	12.6	24.3
14	18.7	18.3	14	12.0	21.3
15	46.4	24.1	15	9.9	18.2
16	14.4	13.5	16	12.6	23.1

SoCalGas

Following are the SoCalGas natural gas tariffs applied in this study. Table 22 describes the baseline territories that were assumed for each climate zone.

Table 22: SoCalGas Baseline Territory by Climate Zone

	Baseline Territory
CZ05	2
CZ06	1
CZ08	1
CZ09	1
CZ10	1
CZ14	2
CZ15	1

SOUTHERN CALIFORNIA GAS COMPANY Revised CAL. P.U.C. SHEET NO. 55854-G
LOS ANGELES, CALIFORNIA CANCELING Revised CAL. P.U.C. SHEET NO. 55828-G

Schedule No. GR Sheet 1
RESIDENTIAL SERVICE
(Includes GR, GR-C and GT-R Rates)

APPLICABILITY

The GR rate is applicable to natural gas procurement service to individually metered residential customers.

The GR-C, cross-over rate, is a core procurement option for individually metered residential core transportation customers with annual consumption over 50,000 therms, as set forth in Special Condition 10.

The GT-R rate is applicable to Core Aggregation Transportation (CAT) service to individually metered residential customers, as set forth in Special Condition 11.

The California Alternate Rates for Energy (CARE) discount of 20%, reflected as a separate line item on the bill, is applicable to income-qualified households that meet the requirements for the CARE program as set forth in Schedule No. G-CARE.

TERRITORY

Applicable throughout the service territory.

RATES	GR	GR-C	GT-R	
Customer Charge, per meter per day:	16.438¢	16.438¢	16.438¢	
For "Space Heating Only" customers, a daily Customer Charge applies during the winter period from November 1 through April 30[1/]:	33.149¢	33.149¢	33.149¢	
Baseline Rate, per therm (baseline usage defined in Special Conditions 3 and 4):				
Procurement Charge: [2/]	41.589¢	42.676¢	N/A	R
Transmission Charge:	63.566¢	63.566¢	63.566¢	
Total Baseline Charge:	105.155¢	106.242¢	63.566¢	R
Non-Baseline Rate, per therm (usage in excess of baseline usage):				
Procurement Charge: [2/]	41.589¢	42.676¢	N/A	R
Transmission Charge:	96.806¢	96.806¢	96.806¢	
Total Non-Baseline Charge:	138.395¢	139.482¢	96.806¢	R

[1/] For the summer period beginning May 1 through October 31, with some exceptions, usage will be accumulated to at least 20 Ccf (100 cubic feet) before billing.

(Footnotes continue next page.)

(Continued)

(TO BE INSERTED BY UTILITY)
ADVICE LETTER NO. 5410
DECISION NO.
1C5

ISSUED BY
Dan Skopec
Vice President
Regulatory Affairs

(TO BE INSERTED BY CAL. PUC)
SUBMITTED Jan 7, 2019
EFFECTIVE Jan 10, 2019
RESOLUTION NO. G-3351

SDG&E

Following are the SDG&E electricity and natural gas tariffs applied in this study. Table 23 describes the baseline territories that were assumed for each climate zone.

Table 23: SDG&E Baseline Territory by Climate Zone

	Baseline Territory
CZ07	Coastal
CZ10	Inland
CZ14	Mountain

SDGE

San Diego Gas & Electric Company
San Diego, California

Revised Cal. P.U.C. Sheet No. 31320-E
Canceling Revised Cal. P.U.C. Sheet No. 31103-E

SCHEDULE TOU-DR1
RESIDENTIAL TIME-OF-USE

Sheet 2

RATES

Total Rates:

Description – TOU DR1	UDC Total Rate		DWR-BC Rate		EECC Rate + DWR Credit		Total Rate	
Summer:								
On-Peak	0.29562	R	0.00503	R	0.35013	R	0.65078	R
Off-Peak	0.29562	R	0.00503	R	0.11235	R	0.41300	R
Super Off-Peak	0.29562	R	0.00503	R	0.05739	R	0.35804	R
Winter:								
On-Peak	0.32037	R	0.00503	R	0.07618	R	0.40158	R
Off-Peak	0.32037	R	0.00503	R	0.06762	R	0.39302	R
Super Off-Peak	0.32037	R	0.00503	R	0.05812	R	0.38352	R
Summer Baseline Adjustment Credit up to 130% of Baseline	(0.19921)	I					(0.19921)	I
Winter Baseline Adjustment Credit up to 130% of Baseline	(0.16853)	I					(0.16853)	I
Minimum Bill ($/day)	0.329						0.329	

Description – TOU DR1	UDC Total Rate		DWR-BC Rate		EECC Rate + DWR Credit		Total Rate		Total Effective Care Rate	
Summer – CARE Rates:										
On-Peak	0.29494	R	0.00000		0.35013	R	0.64507	R	0.41628	R
Off-Peak	0.29494	R	0.00000		0.11235	R	0.40729	R	0.26077	R
Super Off-Peak	0.29494	R	0.00000		0.05739	R	0.35233	R	0.22483	R
Winter – CARE Rates:										
On-Peak	0.31969	R	0.00000		0.07618	R	0.39587	R	0.25330	R
Off-Peak	0.31969	R	0.00000		0.06762	R	0.38731	R	0.24770	R
Super Off-Peak	0.31969	R	0.00000		0.05812	R	0.37781	R	0.24149	R
Summer Baseline Adjustment Credit up to 130% of Baseline	(0.19921)	I					(0.19921)	I	(0.13028)	I
Winter Baseline Adjustment Credit up to 130% of Baseline	(0.16853)	I					(0.16853)	I	(0.11022)	I
Minimum Bill ($/day)	0.164						0.164		0.164	

Note:
(1) Total Rates consist of UDC, Schedule DWR-BC (Department of Water Resources Bond Charge), and Schedule EECC (Electric Energy Commodity Cost) rates, with the EECC rates reflecting a DWR Credit.
(2) Total Rates presented are for customers that receive commodity supply and delivery service from Utility.
(3) DWR-BC charges do not apply to CARE customers.
(4) As identified in the rates tables, customer bills will also include line-item summer and winter credits for usage up to 130% of baseline to provide the rate capping benefits adopted by Assembly Bill 1X and Senate Bill 695.

(Continued)

2C11
Advice Ltr. No. 3326-E
Decision No.

Issued by
Dan Skopec
Vice President
Regulatory Affairs

Submitted Dec 28, 2018
Effective Jan 1, 2019
Resolution No.

San Diego Gas & Electric Company
San Diego, California

Revised Cal. P.U.C. Sheet No. 23614-G
Canceling Revised Cal. P.U.C. Sheet No. 23601-G

Sheet 1

SCHEDULE GR

RESIDENTIAL NATURAL GAS SERVICE
(Includes Rates for GR, GR-C, GTC/GTCA)

APPLICABILITY

The GR rate is applicable to natural gas procurement service for individually metered residential customers.

The GR-C, cross-over rate, is a core procurement option for individually metered residential core transportation customers with annual consumption over 50,000 therms, as set forth in Special Condition 10.

The GTC/GTCA rate is applicable to intrastate gas transportation-only services to individually metered residential customers, as set forth in Special Condition 11.

Customers taking service under this schedule may be eligible for a 20% California Alternate Rate for Energy (CARE) program discount, reflected as a separate line item on the bill, if they qualify to receive service under the terms and conditions of Schedule G-CARE.

TERRITORY

Within the entire territory served natural gas by the utility.

RATES

	GR	GR-C		GTC/GTCA[1/]
Baseline Rate, per therm (baseline usage defined in Special Conditions 3 and 4):				
Procurement Charge:[2/]	$0.41614	$0.41614	R	N/A
Transmission Charge:	$1.01230	$1.01230		$1.01230
Total Baseline Charge:	$1.42844	$1.42844	R	$1.01230
Non-Baseline Rate, per therm (usage in excess of baseline usage):				
Procurement Charge:[2/]	$0.41614	$0.41614	R	N/A
Transmission Charge:	$1.19980	$1.19980		$1.19980
Total Non-Baseline Charge:	$1.61594	$1.61594	R	$1.19980
Minimum Bill, per day:[3/]				
Non-CARE customers:	$0.09863	$0.09863		$0.09863
CARE customers:	$0.07890	$0.07890		$0.07890

1/ The rates for core transportation-only customers, with the exception of customers taking service under Schedule GT-NGV, include any FERC Settlement Proceeds Memorandum Account (FSPMA) credit adjustments.
2/ This charge is applicable to Utility Procurement Customers and includes the GPC and GPC-A Procurement Charges shown in Schedule GPC which are subject to change monthly as set forth in Special Condition 7.
3/ Effective starting May 1, 2017, the minimum bill is calculated as the minimum bill charge of $0.09863 per day times the number of days in the billing cycle (approximately $3 per month) with a 20% discount applied for CARE customer resulting in a minimum bill charge of $0.07890 per day (approximately $2.40 per month).

(Continued)

1C5
Advice Ltr. No. 2735-G
Decision No.

Issued by
Dan Skopec
Vice President
Regulatory Affairs

Submitted Jan 7, 2019
Effective Jan 10, 2019
Resolution No.

Escalation Assumptions

The average annual escalation rates in the following table were used in this study and are from E3's 2019 study Residential Building Electrification in California (Energy & Environmental Economics, 2019). These rates are applied to the 2019 rate schedules over a thirty-year period beginning in 2020. SDG&E was not covered in the E3 study. The Reach Code Team reviewed SDG&E's GRC filing and applied the same approach that E3 applied for PG&E and SoCalGas to arrive at average escalation rates between 2020 and 2022.

Table 24: Real Utility Rate Escalation Rate Assumptions

	Statewide Electric Residential Average Rate (%/year, real)	Natural Gas Residential Core Rate (%/yr escalation, real)		
		PG&E	SoCalGas	SDG&E
2020	2.0%	1.48%	6.37%	5.00%
2021	2.0%	5.69%	4.12%	3.14%
2022	2.0%	1.11%	4.12%	2.94%
2023	2.0%	4.0%	4.0%	4.0%
2024	2.0%	4.0%	4.0%	4.0%
2025	2.0%	4.0%	4.0%	4.0%
2026	1.0%	1.0%	1.0%	1.0%
2027	1.0%	1.0%	1.0%	1.0%
2028	1.0%	1.0%	1.0%	1.0%
2029	1.0%	1.0%	1.0%	1.0%
2030	1.0%	1.0%	1.0%	1.0%
2031	1.0%	1.0%	1.0%	1.0%
2032	1.0%	1.0%	1.0%	1.0%
2033	1.0%	1.0%	1.0%	1.0%
2034	1.0%	1.0%	1.0%	1.0%
2035	1.0%	1.0%	1.0%	1.0%
2036	1.0%	1.0%	1.0%	1.0%
2037	1.0%	1.0%	1.0%	1.0%
2038	1.0%	1.0%	1.0%	1.0%
2039	1.0%	1.0%	1.0%	1.0%
2040	1.0%	1.0%	1.0%	1.0%
2041	1.0%	1.0%	1.0%	1.0%
2042	1.0%	1.0%	1.0%	1.0%
2043	1.0%	1.0%	1.0%	1.0%
2044	1.0%	1.0%	1.0%	1.0%
2045	1.0%	1.0%	1.0%	1.0%
2046	1.0%	1.0%	1.0%	1.0%
2047	1.0%	1.0%	1.0%	1.0%
2048	1.0%	1.0%	1.0%	1.0%
2049	1.0%	1.0%	1.0%	1.0%

Appendix C – Single Family Detailed Results

Table 25: Single Family Mixed Fuel Efficiency Package Cost-Effectiveness Results

		BASECASE					Non-Preempted								Equipment - Preempted							
CZ	Utility	Total EDR	Efficiency EDR	CALGreen Tier 1 EDR Target	lbs CO2 per sqft	PV kW	Total EDR	Efficiency EDR	Efficiency EDR Margin	% Comp Margin	lbs CO2 per sqft	PV kW	On-Bill B/C Ratio	TDV B/C Ratio	Total EDR	Efficiency EDR	Efficiency EDR Margin	% Comp Margin	lbs CO2 per sqft	PV kW	On-Bill B/C Ratio	TDV B/C Ratio
1	PG&E	32.5	54.2	23	3.0	3.3	27.9	49.0	5.3	18.8%	2.5	3.2	3.4	2.8	26.0	47.3	6.9	25.1%	2.3	3.2	4.9	4.1
2	PG&E	25.0	46.0	12	2.2	2.8	22.0	42.7	3.3	16.3%	1.9	2.8	1.6	1.7	21.8	42.6	3.3	16.4%	1.9	2.8	3.8	3.6
3	PG&E	23.9	46.9	10	1.9	2.7	21.3	43.9	3.0	16.7%	1.6	2.7	1.3	1.3	20.1	42.8	4.1	22.8%	1.5	2.7	1.9	2.0
4	PG&E	23.1	44.9	8	1.9	2.7	20.8	42.4	2.5	13.9%	1.7	2.7	0.9	1.2	20.5	42.2	2.7	14.9%	1.6	2.7	2.4	2.7
5	PG&E	22.2	44.4	10	1.8	2.6	19.7	41.7	2.7	16.7%	1.6	2.5	1.1	1.2	19.7	41.7	2.6	16.2%	1.5	2.5	2.3	2.5
5	PG&E/SoCalGas	22.2	44.4	10	1.8	2.6	19.7	41.7	2.7	16.7%	1.6	2.5	0.9	1.2	19.7	41.7	2.6	16.2%	1.5	2.5	2.0	2.5
6	SCE/SoCalGas	23.3	49.9	10	1.6	2.7	21.5	47.8	2.0	12.1%	1.5	2.7	0.7	1.2	21.5	47.9	2.0	11.8%	1.4	2.7	1.6	2.0
7	SDG&E	20.3	49.1	5	1.3	2.6	20.3	49.1	0.0	0.0%	1.3	2.6	-	-	18.8	47.6	1.5	12.4%	1.2	2.6	1.5	1.4
8	SCE/SoCalGas	21.3	46.9	10	1.4	2.9	20.1	45.6	1.3	7.7%	1.3	2.9	0.6	1.4	19.7	45.3	1.6	9.4%	1.3	2.9	1.3	1.8
9	SCE/SoCalGas	24.5	47.7	13	1.5	2.9	22.3	45.1	2.6	11.7%	1.5	2.9	0.7	2.0	21.9	44.8	2.9	13.4%	1.4	2.9	1.8	3.7
10	SCE/SoCalGas	24.2	46.3	10	1.6	3.0	21.7	43.1	3.2	14.3%	1.5	3.0	0.6	1.3	21.5	43.1	3.2	14.6%	1.4	3.0	2.0	3.8
10	SDG&E	24.2	46.3	10	1.6	3.0	21.7	43.1	3.2	14.3%	1.5	3.0	0.8	1.3	21.5	43.1	3.2	14.6%	1.4	3.0	2.6	3.8
11	PG&E	24.6	44.9	11	2.1	3.6	21.3	40.6	4.3	16.4%	1.9	3.4	0.8	1.2	20.7	39.9	5.1	19.2%	1.8	3.4	2.5	3.7
12	PG&E	25.5	44.8	12	2.1	3.0	22.5	41.3	3.5	14.9%	1.9	2.9	1.2	1.8	22.5	41.4	3.4	14.4%	1.9	3.0	3.3	4.6
13	PG&E	25.7	46.5	11	2.0	3.8	22.2	41.9	4.6	16.9%	1.8	3.6	0.8	1.3	21.2	40.7	5.8	21.4%	1.7	3.6	5.3	8.4
14	SCE/SoCalGas	25.3	46.3	15	2.3	3.2	21.5	41.3	5.0	18.5%	2.1	3.0	1.6	2.5	20.8	40.4	5.8	21.7%	2.0	3.0	4.0	6.1
14	SDG&E	25.3	46.3	15	2.3	3.2	21.5	41.3	5.0	18.5%	2.1	3.0	1.9	2.5	20.8	40.4	5.8	21.7%	2.0	3.0	4.9	6.1
15	SCE/SoCalGas	22.4	49.1	11	1.7	5.4	19.7	44.3	4.8	14.8%	1.6	5.0	1.0	1.6	19.5	44.1	5.0	15.4%	1.5	5.0	>1	>1
16	PG&E	30.4	48.9	22	3.3	2.7	25.0	43.5	5.4	20.6%	2.6	2.7	1.6	1.5	24.8	42.7	6.2	23.5%	2.7	2.6	2.2	2.2

">1" = indicates cases where there is both first cost savings and annual utility bill savings.

Table 26: Single Family Mixed Fuel Efficiency & PV/Battery Package Cost-Effectiveness Results

		BASECASE				Efficiency & PV/Battery						
CZ	Utility	Total EDR	CALGreen Tier 1 EDR Target	lbs CO2 per sqft	PV kW	Total EDR	Total EDR Margin	% Comp Margin	lbs CO2 per sqft	PV kW	On-Bill B/C Ratio	TDV B/C Ratio
1	PG&E	32.5	23	3.0	3.3	21.9	10.6	31.8%	2.4	3.3	0.9	1.6
2	PG&E	25.0	12	2.2	2.8	14.9	10.1	27.3%	1.8	2.9	0.5	1.6
3	PG&E	23.9	10	1.9	2.7	13.9	10.0	27.7%	1.5	2.8	0.4	1.4
4	PG&E	23.1	8	1.9	2.7	13.0	10.1	24.9%	1.5	2.8	0.3	1.5
5	PG&E	22.2	10	1.8	2.6	12.8	9.4	29.7%	1.4	2.6	0.4	1.3
5	PG&E/SoCalGas	22.2	10	1.8	2.6	12.8	9.4	29.7%	1.4	2.6	0.3	1.3
6	SCE/SoCalGas	23.3	10	1.6	2.7	13.6	9.8	20.1%	1.2	2.8	0.8	1.3
7	SDG&E	20.3	5	1.3	2.6	11.1	9.2	9.0%	1.0	2.7	0.1	1.3
8	SCE/SoCalGas	21.3	10	1.4	2.9	12.9	8.4	23.7%	1.1	3.0	0.9	1.3
9	SCE/SoCalGas	24.5	13	1.5	2.9	15.7	8.8	24.7%	1.2	3.0	1.0	1.5
10	SCE/SoCalGas	24.2	10	1.6	3.0	14.6	9.6	27.3%	1.3	3.1	1.0	1.5
10	SDG&E	24.2	10	1.6	3.0	14.6	9.6	27.3%	1.3	3.1	0.6	1.5
11	PG&E	24.6	11	2.1	3.6	15.4	9.2	29.4%	1.8	3.5	0.4	1.5
12	PG&E	25.5	12	2.1	3.0	15.9	9.6	28.9%	1.8	3.0	0.4	1.7
13	PG&E	25.7	11	2.0	3.8	16.1	9.7	28.9%	1.7	3.7	0.4	1.6
14	SCE/SoCalGas	25.3	15	2.3	3.2	16.3	9.0	30.1%	1.8	3.1	1.3	1.7
14	SDG&E	25.3	15	2.3	3.2	16.3	9.0	30.1%	1.8	3.1	1.2	1.7
15	SCE/SoCalGas	22.4	11	1.7	5.4	15.3	7.1	25.1%	1.4	5.1	1.1	1.5
16	PG&E	30.4	22	3.3	2.7	19.9	10.5	32.6%	2.4	2.8	0.9	1.4

“>1” = indicates cases where there is both first cost savings and annual utility bill savings.

Table 27: Single Family All-Electric Efficiency Package Cost-Effectiveness Results

		BASECASE					Non-Preempted								Equipment - Preempted							
CZ	Utility	Total EDR	Efficiency EDR	CALGreen Tier 1 EDR Target	lbs CO2 per sqft	PV kW	Total EDR	Efficiency EDR	Efficiency EDR Margin	% Comp Margin	lbs CO2 per sqft	PV kW	On-Bill B/C Ratio	TDV B/C Ratio	Total EDR	Efficiency EDR	Efficiency EDR Margin	% Comp Margin	lbs CO2 per sqft	PV kW	On-Bill B/C Ratio	TDV B/C Ratio
1	PG&E	46.8	68.2	36	1.5	3.3	31.8	53.0	15.2	40.2%	1.0	3.3	1.8	1.7	39.9	61.3	6.9	18.3%	1.3	3.3	2.9	2.7
2	PG&E	32.8	53.7	16	1.1	2.8	27.9	48.7	4.9	20.5%	0.9	2.8	1.2	1.1	27.7	48.5	5.1	21.2%	0.9	2.8	2.3	2.1
3	PG&E	33.1	55.6	14	1.0	2.7	28.5	50.9	4.7	20.6%	0.8	2.7	2.6	2.4	28.7	51.2	4.4	19.6%	0.9	2.7	1.8	1.6
4	PG&E	31.3	52.8	12	1.0	2.7	27.9	49.4	3.4	15.5%	0.9	2.7	1.9	1.8	27.4	48.9	3.9	17.6%	0.9	2.7	1.5	1.5
5	PG&E	32.5	54.2	16	1.0	2.6	28.1	49.9	4.4	19.7%	0.9	2.6	2.6	2.3	28.0	49.8	4.4	20.3%	0.9	2.6	1.9	1.7
5	PG&E/SoCalGas	32.5	54.2	16	1.0	2.6	28.1	49.9	4.4	19.7%	0.9	2.6	2.6	2.3	28.0	49.8	4.4	20.3%	0.9	2.6	1.9	1.7
6	SCE/SoCalGas	29.7	55.8	12	0.9	2.7	27.7	53.8	2.0	10.9%	0.8	2.7	1.3	1.4	26.8	53.0	2.9	16.0%	0.8	2.7	2.2	2.3
7	SDG&E	27.1	55.3	7	0.7	2.6	27.1	55.3	0.0	0.0%	0.7	2.6	-	-	24.8	53.0	2.2	16.9%	0.7	2.6	1.6	1.7
8	SCE/SoCalGas	26.1	51.5	10	0.8	2.9	24.5	49.9	1.6	8.9%	0.8	2.9	0.6	1.2	24.4	49.7	1.8	9.7%	0.8	2.9	2.8	3.0
9	SCE/SoCalGas	28.8	51.9	13	0.9	2.9	26.0	49.1	2.8	12.5%	0.8	2.9	0.8	2.0	25.5	48.6	3.3	14.7%	0.8	2.9	2.1	3.2
10	SCE/SoCalGas	28.8	50.7	11	0.9	3.0	25.7	47.6	3.1	14.0%	0.9	3.0	0.9	1.5	25.3	47.2	3.4	15.5%	0.8	3.0	2.3	3.2
10	SDG&E	28.8	50.7	11	0.9	3.0	25.7	47.6	3.1	14.0%	0.9	3.0	1.1	1.5	25.3	47.2	3.4	15.5%	0.8	3.0	2.6	3.2
11	PG&E	30.0	50.2	12	1.1	3.6	25.4	45.6	4.6	16.2%	1.0	3.6	1.2	1.5	24.1	44.3	5.9	20.8%	0.9	3.6	3.0	3.3
12	PG&E	30.9	50.1	13	1.0	3.0	27.1	46.3	3.8	15.3%	0.9	3.0	0.8	1.1	25.8	45.0	5.1	20.4%	0.9	3.0	2.0	2.5
13	PG&E	30.7	51.5	13	1.1	3.8	25.7	46.4	5.1	17.4%	0.9	3.8	1.1	1.4	24.7	45.4	6.0	20.9%	0.9	3.8	2.9	3.3
14	SCE/SoCalGas	31.3	52.2	16	1.4	3.2	25.7	46.6	5.6	18.9%	1.2	3.2	1.0	1.5	25.3	46.2	6.0	20.5%	1.2	3.2	2.3	3.1
14	SDG&E	31.3	52.2	16	1.4	3.2	25.7	46.6	5.6	18.9%	1.2	3.2	1.3	1.5	25.3	46.2	6.0	20.5%	1.2	3.2	2.9	3.1
15	SCE/SoCalGas	26.2	52.8	8	1.3	5.4	20.6	47.2	5.6	16.8%	1.1	5.4	1.1	1.6	18.9	45.5	7.3	21.8%	1.0	5.4	3.3	4.5
16	PG&E	46.5	64.6	39	1.7	2.7	36.8	54.9	9.7	25.2%	1.4	2.7	1.7	1.7	41.6	59.7	4.9	12.7%	1.6	2.7	2.4	2.3

Table 28: Single Family All-Electric Efficiency & PV-PV/Battery Package Cost-Effectiveness Results

		BASECASE				Efficiency & PV							Efficiency & PV/Battery						
CZ	Utility	Total EDR	CALGreen Tier 1 EDR Target	lbs CO2 per sqft	PV kW	Total EDR	Total EDR Margin	% Comp Margin	lbs CO2 per sqft	PV kW	On-Bill B/C Ratio	TDV B/C Ratio	Total EDR	Total EDR Margin	% Comp Margin	lbs CO2 per sqft	PV kW	On-Bill B/C Ratio	TDV B/C Ratio
1	PG&E	46.8	36	1.5	3.3	15.4	31.4	40.2%	0.5	6.0	1.8	1.5	5.6	41.2	51.9%	0.3	6.76	1.4	1.4
2	PG&E	32.8	16	1.1	2.8	13.4	19.4	20.5%	0.5	4.9	1.8	1.4	2.7	30.1	31.5%	0.3	5.51	1.4	1.4
3	PG&E	33.1	14	1.0	2.7	14.6	18.5	20.6%	0.5	4.5	2.2	1.7	3.7	29.3	31.6%	0.2	5.10	1.5	1.6
4	PG&E	31.3	12	1.0	2.7	14.1	17.2	15.5%	0.5	4.5	2.1	1.6	2.8	28.6	26.5%	0.2	5.15	1.5	1.6
5	PG&E	32.5	16	1.0	2.6	14.3	18.2	19.7%	0.5	4.3	2.3	1.8	3.8	28.7	32.7%	0.2	4.84	1.6	1.6
5	PG&E/SoCalGas	32.5	16	1.0	2.6	14.3	18.2	19.7%	0.5	4.3	2.3	1.8	3.8	28.7	32.7%	0.2	4.84	1.6	1.6
6	SCE/SoCalGas	29.7	12	0.9	2.7	15.5	14.3	10.9%	0.6	4.1	1.2	1.5	3.6	26.1	18.9%	0.3	4.68	1.2	1.4
7	SDG&E	27.1	7	0.7	2.6	15.8	11.3	0.7%	0.6	3.7	1.9	1.5	2.9	24.2	6.7%	0.3	4.21	1.3	1.5
8	SCE/SoCalGas	26.1	10	0.8	2.9	15.1	10.9	8.9%	0.6	4.0	1.0	1.5	4.5	21.6	24.9%	0.3	4.54	1.1	1.4
9	SCE/SoCalGas	28.8	13	0.9	2.9	17.3	11.5	12.5%	0.7	4.1	1.1	1.6	7.6	21.3	25.5%	0.4	4.66	1.1	1.5
10	SCE/SoCalGas	28.8	11	0.9	3.0	17.7	11.1	14.0%	0.7	4.2	1.1	1.5	7.6	21.2	27.0%	0.4	4.78	1.1	1.5
10	SDG&E	28.8	11	0.9	3.0	17.7	11.1	14.0%	0.7	4.2	1.7	1.5	7.6	21.2	27.0%	0.4	4.78	1.4	1.5
11	PG&E	30.0	12	1.1	3.6	15.8	14.2	16.2%	0.6	5.4	1.8	1.6	6.8	23.2	29.2%	0.4	6.11	1.5	1.6
12	PG&E	30.9	13	1.0	3.0	15.2	15.7	15.3%	0.5	5.0	1.7	1.4	5.6	25.4	29.3%	0.3	5.62	1.3	1.5
13	PG&E	30.7	13	1.1	3.8	17.3	13.4	17.4%	0.6	5.4	1.7	1.5	8.2	22.5	29.4%	0.4	6.14	1.4	1.5
14	SCE/SoCalGas	31.3	16	1.4	3.2	15.8	15.5	18.9%	0.9	4.8	1.2	1.6	7.4	23.9	30.9%	0.6	5.39	1.4	1.6
14	SDG&E	31.3	16	1.4	3.2	15.8	15.5	18.9%	0.9	4.8	1.8	1.6	7.4	23.9	30.9%	0.6	5.39	1.7	1.6
15	SCE/SoCalGas	26.2	8	1.3	5.4	20.0	6.2	16.8%	1.1	5.5	1.1	1.6	12.7	13.5	27.0%	0.8	6.25	1.2	1.5
16	PG&E	46.5	39	1.7	2.7	19.6	27.0	25.2%	0.9	5.5	2.1	1.6	11.1	35.4	34.3%	0.6	6.17	1.7	1.5

“>1” = indicates cases where there is both first cost savings and annual utility bill savings.

Appendix D – Single Family Measure Summary

Table 29: Single Family Mixed Fuel Efficiency – Non-Preempted Package Measure Summary

CZ	Duct	Infiltratio	Wall	Attic	Roof	Glazing	Slab	DHW	HVAC	PV
1	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
2	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
3	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
4	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
5	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
6	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
7	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	1.0 PV scaling
8	< 12 ft ducts in attic	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
9	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
10	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
11	VLLDCS	Code Min	Code Min	R-38 + R-30 attic	0.25 solar reflectance	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
12	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
13	VLLDCS	Code Min	Code Min	R-38 + R-30 attic	0.25 solar reflectance	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
14	VLLDCS	3 ACH50	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
15	VLLDCS	Code Min	Code Min	R-38 + R-30 attic	0.25 solar reflectance	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
16	VLLDCS	Code Min	Code Min	Code Min	Code Min	0.24/0.50 windows	Code Min	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling

VVLDCS – Verified Low Leakage Ducts in Conditioned Space

Table 30: Single Family Mixed Fuel Efficiency – Equipment, Preempted Package Measure Summary

CZ	Duct	Infiltratio	Wall	Attic	Roof	Glazing	Slab	DHW	HVAC	PV
1	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	96 AFUE, 0.35W/cfm	1.0 PV scaling
2	LLAHU + 2% leakage	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	96 AFUE, 0.35W/cfm	1.0 PV scaling
3	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	96 AFUE, 0.35W/cfm	1.0 PV scaling
4	LLAHU + 2% leakage	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	96 AFUE, 0.35W/cfm	1.0 PV scaling
5	LLAHU + 2% leakage	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	96 AFUE, 0.35W/cfm	1.0 PV scaling
6	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	92 AFUE, 0.35W/cfm	1.0 PV scaling
7	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	92 AFUE, 0.35W/cfm	1.0 PV scaling
8	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	92 AFUE, 0.35W/cfm	1.0 PV scaling
9	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	16 SEER, 92 AFUE, 0.35W/cfm	1.0 PV scaling
10	LLAHU + 2% leakage	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	16 SEER, 92 AFUE, 0.35W/cfm	1.0 PV scaling
11	LLAHU + 2% leakage	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	18 SEER, 96 AFUE, 0.35W/cfm	1.0 PV scaling
12	LLAHU + 2% leakage	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	16 SEER, 92 AFUE, 0.35W/cfm	1.0 PV scaling
13	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	16 SEER, 92 AFUE, 0.35W/cfm	1.0 PV scaling
14	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	16 SEER, 92 AFUE, 0.35W/cfm	1.0 PV scaling
15	LLAHU + 2% leakage	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	16 SEER, 92 AFUE, 0.35W/cfm	1.0 PV scaling
16	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	18 SEER, 96 AFUE, 0.35W/cfm	1.0 PV scaling

LLAHU - Low Leakage Air Handling Unit

VVLDCS – Verified Low Leakage Ducts in Conditioned Space

Table 31: Single Family Mixed Fuel Efficiency & PV/Battery Package Measure Summary

CZ	Duct	Infiltration	Wall	Attic	Roof	Glazing	Slab	DHW	HVAC	PV
1	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 5kWh batt
2	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 5kWh batt
3	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 5kWh batt
4	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 5kWh batt
5	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 5kWh batt
6	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 5kWh batt
7	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Basic CHW credit (0.7)	Code Min	1.0 PV scaling + 5kWh batt
8	< 12 ft ducts in attic	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 5kWh batt
9	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 5kWh batt
10	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 5kWh batt
11	VLLDCS	Code Min	Code Min	R-38 + R-30 attic	0.25 solar reflectance	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 5kWh batt
12	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 5kWh batt
13	VLLDCS	Code Min	Code Min	R-38 + R-30 attic	0.25 solar reflectance	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 5kWh batt
14	VLLDCS	3 ACH50	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 5kWh batt
15	VLLDCS	Code Min	Code Min	R-38 + R-30 attic	0.25 solar reflectance	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 5kWh batt
16	VLLDCS	Code Min	Code Min	Code Min	Code Min	0.24/0.50 windows	Code Min	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 5kWh batt

VVLDCS – Verified Low Leakage Ducts in Conditioned Space

Table 32: Single Family All-Electric Efficiency – Non-Preempted Package Measure Summary

CZ	Duct	Infiltratio	Wall	Attic	Roof	Glazing	Slab	DHW	HVAC	PV
1	VLLDCS	Code Min	Code Min	R-38 + R-30 attic	Code Min	0.24/0.50 windows	R-10 slab insulation	Code Min	0.45 W/cfm	Std Design PV
2	VLLDCS	Code Min	Code Min	Code Min	Code Min	0.24/0.23 windows	R-10 slab insulation	Code Min	0.45 W/cfm	Std Design PV
3	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	Std Design PV
4	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	Std Design PV
5	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	Std Design PV
6	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	0.45 W/cfm	Std Design PV
7	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Std Design PV
8	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	0.45 W/cfm	Std Design PV
9	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Code Min	0.45 W/cfm	Std Design PV
10	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	Std Design PV
11	VLLDCS	Code Min	Code Min	R-38 + R-30 attic	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	Std Design PV
12	VLLDCS	Code Min	Code Min	R-38 + R-30 attic	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	Std Design PV
13	VLLDCS	3 ACH50	Code Min	R-38 + R-30 attic	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	Std Design PV
14	VLLDCS	3 ACH50	Code Min	R-38 + R-30 attic	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	Std Design PV
15	VLLDCS	Code Min	0.043 wall	R-38 + R-30 attic	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	Std Design PV
16	VLLDCS	3 ACH50	Code Min	R-38 + R-30 attic	Code Min	0.24/0.50 windows	Code Min	Code Min	0.45 W/cfm	Std Design PV

VVLDCS – Verified Low Leakage Ducts in Conditioned Space

Table 33: Single Family All-Electric Efficiency – Equipment, Preempted Package Measure Summary

CZ	Duct	Infiltratio	Wall	Attic	Roof	Glazing	Slab	DHW	HVAC	PV
1	LLAHU + 2% leakage	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	18 SEER, 10 HSPF, 0.45W/cfm	Std Design PV
2	LLAHU + 2% leakage	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	18 SEER, 10 HSPF, 0.45W/cfm	Std Design PV
3	LLAHU + 2% leakage	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	18 SEER, 10 HSPF, 0.45W/cfm	Std Design PV
4	LLAHU + 2% leakage	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	18 SEER, 10 HSPF, 0.45W/cfm	Std Design PV
5	LLAHU + 2% leakage	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	18 SEER, 10 HSPF, 0.45W/cfm	Std Design PV
6	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	16 SEER, 9 HSPF, 0.45W/cfm	Std Design PV
7	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	16 SEER, 9 HSPF, 0.45W/cfm	Std Design PV
8	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	0.45 W/cfm	Std Design PV
9	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	16 SEER, 9 HSPF, 0.45W/cfm	Std Design PV
10	LLAHU + 2% leakage	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	16 SEER, 9 HSPF, 0.45W/cfm	Std Design PV
11	LLAHU + 2% leakage	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	18 SEER, 10 HSPF, 0.45W/cfm	Std Design PV
12	LLAHU + 2% leakage	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	18 SEER, 10 HSPF, 0.45W/cfm	Std Design PV
13	LLAHU + 2% leakage	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	18 SEER, 10 HSPF, 0.45W/cfm	Std Design PV
14	LLAHU + 2% leakage	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	18 SEER, 10 HSPF, 0.45W/cfm	Std Design PV
15	LLAHU + 2% leakage	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	18 SEER, 10 HSPF, 0.45W/cfm	Std Design PV
16	LLAHU + 2% leakage	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	18 SEER, 10 HSPF, 0.45W/cfm	Std Design PV

LLAHU - Low Leakage Air Handling Unit

VVLDCS – Verified Low Leakage Ducts in Conditioned Space

Table 34: Single Family All-Electric Efficiency & PV Package Measure Summary

CZ	Duct	Infiltratio	Wall	Attic	Roof	Glazing	Slab	DHW	HVAC	PV
1	VLLDCS	Code Min	Code Min	R-38 + R-30 attic	Code Min	0.24/0.50 windows	R-10 slab insulation	Code Min	0.45 W/cfm	0.9 PV scaling
2	VLLDCS	Code Min	Code Min	Code Min	Code Min	0.24/0.23 windows	R-10 slab insulation	Code Min	0.45 W/cfm	0.9 PV scaling
3	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	0.9 PV scaling
4	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	0.9 PV scaling
5	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	0.9 PV scaling
6	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	0.45 W/cfm	0.9 PV scaling
7	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	0.45 W/cfm	0.9 PV scaling
8	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	0.45 W/cfm	0.9 PV scaling
9	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Code Min	0.45 W/cfm	0.9 PV scaling
10	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	0.9 PV scaling
11	VLLDCS	Code Min	Code Min	R-38 + R-30 attic	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	0.9 PV scaling
12	VLLDCS	Code Min	Code Min	R-38 + R-30 attic	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	0.9 PV scaling
13	VLLDCS	3 ACH50	Code Min	R-38 + R-30 attic	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	0.9 PV scaling
14	VLLDCS	3 ACH50	Code Min	R-38 + R-30 attic	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	0.9 PV scaling
15	VLLDCS	Code Min	0.043 wall	R-38 + R-30 attic	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	0.9 PV scaling
16	VLLDCS	3 ACH50	Code Min	R-38 + R-30 attic	Code Min	0.24/0.50 windows	Code Min	Code Min	0.45 W/cfm	0.9 PV scaling

VVLDCS – Verified Low Leakage Ducts in Conditioned Space

Table 35: Single Family All-Electric Efficiency & PV/Battery Package Measure Summary

CZ	Duct	Infiltration	Wall	Attic	Roof	Glazing	Slab	DHW	HVAC	PV
1	VLLDCS	Code Min	Code Min	R-38 + R-30 attic	Code Min	0.24/0.50 windows	R-10 slab insulation	Code Min	0.45 W/cfm	1.0 PV scaling + 5kWh batt
2	VLLDCS	Code Min	Code Min	Code Min	Code Min	0.24/0.23 windows	R-10 slab insulation	Code Min	0.45 W/cfm	1.0 PV scaling + 5kWh batt
3	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	1.0 PV scaling + 5kWh batt
4	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	1.0 PV scaling + 5kWh batt
5	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	1.0 PV scaling + 5kWh batt
6	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	0.45 W/cfm	1.0 PV scaling + 5kWh batt
7	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	0.45 W/cfm	1.0 PV scaling + 5kWh batt
8	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	0.45 W/cfm	1.0 PV scaling + 5kWh batt
9	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Code Min	0.45 W/cfm	1.0 PV scaling + 5kWh batt
10	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	1.0 PV scaling + 5kWh batt
11	VLLDCS	Code Min	Code Min	R-38 + R-30 attic	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	1.0 PV scaling + 5kWh batt
12	VLLDCS	Code Min	Code Min	R-38 + R-30 attic	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	1.0 PV scaling + 5kWh batt
13	VLLDCS	3 ACH50	Code Min	R-38 + R-30 attic	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	1.0 PV scaling + 5kWh batt
14	VLLDCS	3 ACH50	Code Min	R-38 + R-30 attic	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	1.0 PV scaling + 5kWh batt
15	VLLDCS	Code Min	0.043 wall (SF); 0.048 wall (MF)	R-38 + R-30 attic	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	1.0 PV scaling + 5kWh batt
16	VLLDCS	3 ACH50	Code Min	R-38 + R-30 attic	Code Min	0.24/0.50 windows	Code Min	Code Min	0.45 W/cfm	1.0 PV scaling + 5kWh batt

VVLDCS – Verified Low Leakage Ducts in Conditioned Space

Appendix E – Multifamily Detailed Results

Table 36: Multifamily Mixed Fuel Efficiency Package Cost-Effectiveness Results

Climate Zone	Utility	BASECASE					Non-Preempted								Equipment - Preempted							
		Total EDR	Efficiency EDR	CALGreen Tier 1 EDR Target	lbs CO2 per sqft	PV kW per Building	Total EDR	Efficiency EDR	Efficiency EDR Margin	% Comp Margin	lbs CO2 per sqft	PV kW per Building	On-Bill B/C Ratio	TDV B/C Ratio	Total EDR	Efficiency EDR	Efficiency EDR Margin	% Comp Margin	lbs CO2 per sqft	PV kW per Building	On-Bill B/C Ratio	TDV B/C Ratio
01	PG&E	28.6	60.7	23	2.7	15.9	25.1	57.3	3.4	19.3%	2.3	16.0	1.1	1.2	26.4	58.4	2.3	12.2%	2.5	15.9	1.3	1.4
02	PG&E	25.7	56.5	12	2.4	13.9	24.2	54.7	1.8	9.9%	2.3	13.8	1.0	1.7	23.6	54.2	2.3	12.5%	2.2	13.9	1.1	1.5
03	PG&E	24.7	57.8	10	2.1	13.5	24.0	57.2	0.6	4.7%	2.1	13.5	1.0	1.1	23.1	56.2	1.6	11.2%	1.9	13.4	1.1	1.2
04	PG&E	25.5	56.8	8	2.2	13.6	24.3	55.5	1.3	7.7%	2.1	13.5	0.8	1.2	23.8	54.9	1.9	10.9%	2.0	13.5	1.1	1.7
05	PG&E	24.2	57.4	10	2.1	12.6	23.7	56.9	0.5	4.4%	2.0	12.6	1.0	1.0	22.7	55.9	1.5	10.9%	1.9	12.6	1.2	1.3
05	PG&E/SoCalGas	24.2	57.4	10	2.1	12.6	23.7	56.9	0.5	4.4%	2.0	12.6	0.8	1.0	22.7	55.9	1.5	10.9%	1.9	12.6	1.1	1.3
06	SCE/SoCalGas	26.8	63.2	10	2.2	13.9	25.8	61.9	1.3	7.0%	2.1	13.8	0.6	1.5	25.5	61.9	1.3	7.4%	2.0	13.9	1.4	1.7
07	SDG&E	26.8	64.5	5	2.1	13.2	26.1	63.6	0.9	5.3%	2.1	13.1	0.7	2.2	25.0	62.5	2.0	12.2%	2.0	13.2	1.1	1.4
08	SCE/SoCalGas	25.7	61.8	10	2.2	14.6	24.6	60.3	1.5	7.4%	2.1	14.5	0.7	1.4	24.6	60.7	1.1	5.7%	2.0	14.6	1.4	1.7
09	SCE/SoCalGas	26.4	59.7	13	2.2	14.7	25.0	57.9	1.8	8.2%	2.2	14.4	1.5	3.3	24.1	56.9	2.8	12.9%	2.1	14.4	1.7	2.9
10	SCE/SoCalGas	27.0	58.7	10	2.3	15.1	25.7	57.0	1.7	7.7%	2.2	14.9	0.8	1.7	24.7	55.8	2.9	13.0%	2.1	14.8	2.0	3.3
10	SDG&E	27.0	58.7	10	2.3	15.1	25.7	57.0	1.7	7.7%	2.2	14.9	1.1	1.7	24.7	55.8	2.9	13.0%	2.1	14.8	2.6	3.3
11	PG&E	24.5	54.5	11	2.4	16.6	22.3	51.6	2.9	11.9%	2.2	16.3	0.7	1.2	22.2	51.3	3.2	13.2%	2.2	16.1	1.8	3.3
12	PG&E	25.9	55.3	12	2.3	14.9	24.3	53.4	1.9	8.8%	2.2	14.8	1.1	2.2	23.5	52.5	2.8	12.8%	2.1	14.7	1.2	2.2
13	PG&E	26.1	55.9	11	2.3	17.5	23.7	52.8	3.1	12.1%	2.1	17.1	0.6	1.3	23.7	52.5	3.4	13.2%	2.1	16.9	2.0	3.8
14	SCE/SoCalGas	25.6	55.9	15	2.8	14.6	23.1	52.8	3.1	12.8%	2.5	14.3	0.7	1.2	23.2	52.6	3.3	13.3%	2.5	14.2	2.0	3.0
14	SDG&E	25.6	55.9	15	2.8	14.6	23.1	52.8	3.1	12.8%	2.5	14.3	0.9	1.2	23.2	52.6	3.3	13.3%	2.5	14.2	2.5	3.0
15	SCE/SoCalGas	25.0	59.2	11	2.5	21.6	22.7	55.0	4.2	12.9%	2.4	20.4	1.4	2.3	22.6	54.8	4.4	13.5%	2.3	20.4	>1	>1
16	PG&E	29.4	57.3	22	3.5	13.4	26.6	54.9	2.4	11.3%	3.0	13.7	1.1	1.2	26.9	54.4	2.9	13.1%	3.1	13.2	1.8	2.1

">1" = indicates cases where there is both first cost savings and annual utility bill savings.

Table 37: Multifamily Mixed Fuel Efficiency & PV/Battery Package Cost-Effectiveness Results

		BASECASE				Efficiency & PV/Battery						
CZ	Utility	Total EDR	CALGreen Tier 1 EDR Target	lbs CO2 per sqft	PV kW per Building	Total EDR	Total EDR Margin	% Comp Margin	lbs CO2 per sqft	PV kW per Building	On-Bill B/C Ratio	TDV B/C Ratio
01	PG&E	28.6	23	2.7	15.9	17.1	11.5	29.3%	2.1	16.5	0.4	1.2
02	PG&E	25.7	12	2.4	13.9	14.8	10.9	16.9%	2.1	14.2	0.2	1.6
03	PG&E	24.7	10	2.1	13.5	14.4	10.3	10.7%	1.9	13.9	0.1	1.4
04	PG&E	25.5	8	2.2	13.6	14.3	11.2	15.7%	1.9	13.9	0.2	1.6
05	PG&E	24.2	10	2.1	12.6	14.3	9.9	9.4%	1.8	13.1	0.2	1.4
05	PG&E/SoCalGas	24.2	10	2.1	12.6	14.3	9.9	9.4%	1.8	13.1	0.1	1.4
06	SCE/SoCalGas	26.8	10	2.2	13.9	16.1	10.7	10.0%	1.8	14.2	0.6	1.4
07	SDG&E	26.8	5	2.1	13.2	15.8	11.0	7.3%	1.7	13.6	0.0	1.4
08	SCE/SoCalGas	25.7	10	2.2	14.6	15.8	9.9	13.4%	1.8	14.9	0.7	1.3
09	SCE/SoCalGas	26.4	13	2.2	14.7	16.7	9.7	15.2%	1.8	14.9	0.9	1.5
10	SCE/SoCalGas	27.0	10	2.3	15.1	16.6	10.4	13.7%	1.9	15.3	1.0	1.6
10	SDG&E	27.0	10	2.3	15.1	16.6	10.4	13.7%	1.9	15.3	0.2	1.6
11	PG&E	24.5	11	2.4	16.6	14.0	10.5	19.9%	2.0	16.7	0.4	1.6
12	PG&E	25.9	12	2.3	14.9	15.6	10.3	17.8%	2.0	15.2	0.3	1.7
13	PG&E	26.1	11	2.3	17.5	15.4	10.7	20.1%	2.0	17.5	0.4	1.6
14	SCE/SoCalGas	25.6	15	2.8	14.6	16.0	9.6	20.8%	2.2	14.7	1.1	1.4
14	SDG&E	25.6	15	2.8	14.6	16.0	9.6	20.8%	2.2	14.7	0.5	1.4
15	SCE/SoCalGas	25.0	11	2.5	21.6	16.2	8.8	18.9%	2.1	20.9	1.3	1.7
16	PG&E	29.4	22	3.5	13.4	19.5	9.9	19.3%	2.7	14.1	0.5	1.3

"inf" = indicates cases where there is both first cost savings and annual utility bill savings.

Table 38: Multifamily All-Electric Efficiency Package Cost-Effectiveness Results

		BASECASE					Non-Preempted								Equipment - Preempted							
CZ	Utility	Total EDR	Efficiency EDR	CALGreen Tier 1 EDR Target	lbs CO2 per sqft	PV kW per Building	Total EDR	Efficiency EDR	Efficiency EDR Margin	% Comp Margin	lbs CO2 per sqft	PV kW per Building	On-Bill B/C Ratio	TDV B/C Ratio	Total EDR	Efficiency EDR	Efficiency EDR Margin	% Comp Margin	lbs CO2 per sqft	PV kW per Building	On-Bill B/C Ratio	TDV B/C Ratio
01	PG&E	41.1	70.6	36	1.6	15.9	37.5	67.0	3.6	14.6%	1.5	15.9	1.6	1.4	37.1	67.3	3.3	18.4%	1.4	15.9	2.4	2.3
02	PG&E	34.3	63.4	16	1.4	13.9	32.4	61.5	1.9	9.1%	1.3	13.9	1.7	2.1	31.1	60.2	3.2	15.1%	1.3	13.9	1.6	1.6
03	PG&E	33.5	64.2	14	1.3	13.5	33.5	64.2	0.0	0.0%	1.3	13.5	-	-	30.4	61.5	2.7	19.5%	1.1	13.5	1.7	1.6
04	PG&E	32.0	61.4	12	1.3	13.6	30.5	60.0	1.4	8.0%	1.2	13.6	1.4	1.5	29.7	59.2	2.2	12.2%	1.2	13.6	1.2	1.1
05	PG&E	34.7	65.4	16	1.3	12.6	34.1	64.8	0.6	3.4%	1.3	12.6	1.1	0.9	30.6	61.8	3.6	23.5%	1.2	12.6	2.1	2.0
05	PG&E/SoCalGas	34.7	65.4	16	1.3	12.6	34.1	64.8	0.6	3.4%	1.3	12.6	1.1	0.9	30.6	61.8	3.6	23.5%	1.2	12.6	2.1	2.0
06	SCE/SoCalGas	31.9	65.9	12	1.3	13.9	30.9	64.9	1.0	5.9%	1.3	13.9	0.7	1.3	29.8	63.7	2.2	13.0%	1.2	13.9	1.6	1.9
07	SDG&E	31.7	66.6	7	1.2	13.2	31.1	66.0	0.6	4.6%	1.2	13.2	0.6	1.0	29.7	64.7	1.9	13.6%	1.1	13.2	1.6	1.7
08	SCE/SoCalGas	29.8	63.6	10	1.3	14.6	28.6	62.4	1.2	6.5%	1.2	14.6	0.9	1.7	27.9	61.7	1.9	10.3%	1.2	14.6	1.6	1.8
09	SCE/SoCalGas	30.4	61.9	13	1.3	14.7	28.7	60.3	1.6	8.1%	1.3	14.7	1.3	2.7	28.8	60.4	1.5	7.4%	1.2	14.7	1.6	1.6
10	SCE/SoCalGas	31.2	61.3	11	1.4	15.1	29.3	59.5	1.8	8.7%	1.3	15.1	1.2	2.0	29.3	59.5	1.8	8.6%	1.3	15.1	1.7	2.0
10	SDG&E	31.2	61.3	11	1.4	15.1	29.3	59.5	1.8	8.7%	1.3	15.1	1.5	2.0	29.3	59.5	1.8	8.6%	1.3	15.1	2.0	2.0
11	PG&E	31.9	60.6	12	1.4	16.6	28.5	57.1	3.5	13.1%	1.3	16.6	1.4	1.6	28.1	56.7	3.9	14.4%	1.3	16.6	2.0	2.3
12	PG&E	32.0	59.9	13	1.3	14.9	29.4	57.3	2.6	11.4%	1.2	14.9	0.9	1.1	29.0	57.0	2.9	13.0%	1.2	14.9	1.6	1.6
13	PG&E	32.1	60.5	13	1.4	17.5	28.8	57.2	3.3	12.6%	1.2	17.5	1.3	1.6	28.3	56.7	3.8	14.3%	1.2	17.5	2.0	2.3
14	SCE/SoCalGas	32.5	61.6	16	1.7	14.6	28.9	57.9	3.7	13.8%	1.6	14.6	1.2	1.6	28.7	57.8	3.8	14.3%	1.6	14.6	1.6	2.2
14	SDG&E	32.5	61.6	16	1.7	14.6	28.9	57.9	3.7	13.8%	1.6	14.6	1.5	1.6	28.7	57.8	3.8	14.3%	1.6	14.6	2.0	2.2
15	SCE/SoCalGas	28.2	61.0	8	1.8	21.6	23.9	56.6	4.4	14.2%	1.6	21.6	1.5	2.3	21.9	54.6	6.4	20.6%	1.5	21.6	1.2	1.7
16	PG&E	40.2	66.6	39	1.9	13.4	36.2	62.5	4.1	15.0%	1.7	13.4	2.1	2.1	37.1	63.4	3.2	11.4%	1.7	13.4	1.6	1.7

">1" = indicates cases where there is both first cost savings and annual utility bill savings.

Table 39: Multifamily All-Electric Efficiency & PV-PV/Battery Package Cost-Effectiveness Results

Climate Zone	Utility	BASECASE				Efficiency & PV							Efficiency & PV/Battery						
		Total EDR	CALGreen Tier 1 EDR Target	lbs CO2 per sqft	PV kW per Building	Total EDR	Total EDR Margin	% Comp Margin	lbs CO2 per sqft	PV kW per Building	On-Bill B/C Ratio	TDV B/C Ratio	Total EDR	Total EDR Margin	% Comp Margin	lbs CO2 per sqft	PV kW per Building	On-Bill B/C Ratio	TDV B/C Ratio
01	PG&E	41.1	36	1.6	15.9	18.6	22.5	14.6%	0.8	26.9	2.0	1.5	6.6	34.5	24.6%	0.4	30.3	1.3	1.4
02	PG&E	34.3	16	1.4	13.9	16.8	17.5	9.1%	0.7	21.9	2.4	1.8	3.4	30.9	16.1%	0.3	24.8	1.4	1.7
03	PG&E	33.5	14	1.3	13.5	17.4	16.1	2.6%	0.7	20.8	2.4	1.7	4.0	29.5	8.6%	0.3	23.6	1.3	1.6
04	PG&E	32.0	12	1.3	13.6	17.0	15.0	8.0%	0.7	20.2	2.4	1.8	3.1	28.9	16.0%	0.3	22.9	1.30	1.77
05	PG&E	34.7	16	1.3	12.6	17.6	17.1	3.4%	0.7	19.9	2.5	1.8	4.4	30.3	8.4%	0.3	22.5	1.4	1.7
05	PG&E/SoCalGas	34.7	16	1.3	12.6	17.6	17.1	3.4%	0.7	19.9	2.5	1.8	4.4	30.3	8.4%	0.3	22.5	1.4	1.7
06	SCE/SoCalGas	31.9	12	1.3	13.9	18.1	13.8	5.9%	1.0	19.5	1.2	1.7	4.4	27.5	8.9%	0.5	22.1	1.2	1.6
07	SDG&E	31.7	7	1.2	13.2	18.9	12.8	4.6%	0.9	18.1	2.1	1.8	4.6	27.1	6.6%	0.5	20.5	1.2	1.6
08	SCE/SoCalGas	29.8	10	1.3	14.6	18.2	11.6	6.5%	1.0	19.4	1.3	1.8	5.6	24.2	12.5%	0.5	22.0	1.2	1.6
09	SCE/SoCalGas	30.4	13	1.3	14.7	19.1	11.3	8.1%	1.0	19.4	1.3	1.9	7.1	23.3	15.1%	0.6	22.0	1.3	1.7
10	SCE/SoCalGas	31.2	11	1.4	15.1	20.4	10.8	8.7%	1.1	19.9	1.3	1.8	7.9	23.3	14.7%	0.6	22.5	1.3	1.7
10	SDG&E	31.2	11	1.4	15.1	20.4	10.8	8.7%	1.1	19.9	2.1	1.8	7.9	23.3	14.7%	0.6	22.5	1.4	1.7
11	PG&E	31.9	12	1.4	16.6	18.5	13.4	13.1%	0.8	22.8	2.2	1.8	6.6	25.3	21.1%	0.4	25.8	1.4	1.8
12	PG&E	32.0	13	1.3	14.9	17.6	14.4	11.4%	0.7	21.7	2.1	1.6	5.4	26.6	20.4%	0.4	24.5	1.3	1.7
13	PG&E	32.1	13	1.4	17.5	19.9	12.2	12.6%	0.8	23.3	2.1	1.7	8.2	23.9	20.6%	0.4	26.4	1.4	1.7
14	SCE/SoCalGas	32.5	16	1.7	14.6	18.5	14.0	13.8%	1.3	20.2	1.4	1.9	7.7	24.8	21.8%	0.8	22.8	1.4	1.8
14	SDG&E	32.5	16	1.7	14.6	18.5	14.0	13.8%	1.3	20.2	2.2	1.9	7.7	24.8	21.8%	0.8	22.8	1.7	1.8
15	SCE/SoCalGas	28.2	8	1.8	21.6	21.1	7.1	14.2%	1.5	23.6	1.4	2.1	11.3	16.9	20.2%	1.1	26.6	1.3	1.8
16	PG&E	40.2	39	1.9	13.4	20.6	19.6	15.0%	1.2	22.0	2.6	1.9	10.3	29.9	23.0%	0.8	24.8	1.6	1.7

“>1” = indicates cases where there is both first cost savings and annual utility bill savings.

Appendix F – Multifamily Measure Summary

Table 40: Multifamily Mixed Fuel Efficiency – Non-Preempted Package Measure Summary

CZ	Duct	Infiltration	Wall	Attic	Roof	Glazing	Slab	DHW	HVAC	PV
1	VLLDCS	Code Min	Code Min	Code Min	Code Min	0.24/0.50 windows	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
2	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
3	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
4	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
5	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
6	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
7	Code Min	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
8	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Enh CHW credit (0.6)	0.35 W/cfm	1.0 PV scaling
9	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
10	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
11	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
12	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
13	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
14	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
15	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling
16	VLLDCS	Code Min	Code Min	Code Min	Code Min	0.24/0.50 windows	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling

VLLDCS – Verified Low-Leakage Ducts in Conditioned Space

Table 41: Multifamily Mixed Fuel Efficiency – Equipment, Preempted Package Measure Summary

CZ	Duct	Infiltratio	Wall	Attic	Roof	Glazing	Slab	DHW	HVAC	PV
1	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	16 SEER, 92 AFUE, 0.35W/cfm	1.0 PV scaling
2	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	16 SEER, 92 AFUE, 0.35W/cfm	1.0 PV scaling
3	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	92 AFUE, 0.35W/cfm	1.0 PV scaling
4	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	16 SEER, 0.35 W/cfm	1.0 PV scaling
5	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	92 AFUE, 0.45W/cfm	1.0 PV scaling
6	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	Code Min	1.0 PV scaling
7	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	16 SEER, 0.35 W/cfm	1.0 PV scaling
8	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	Code Min	1.0 PV scaling
9	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	16 SEER, 0.35 W/cfm	1.0 PV scaling
10	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	16 SEER, 0.35 W/cfm	1.0 PV scaling
11	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	16 SEER, 92 AFUE, 0.35W/cfm	1.0 PV scaling
12	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	16 SEER, 92 AFUE, 0.35W/cfm	1.0 PV scaling
13	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	16 SEER, 92 AFUE, 0.35W/cfm	1.0 PV scaling
14	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	16 SEER, 92 AFUE, 0.35W/cfm	1.0 PV scaling
15	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	16 SEER, 0.35 W/cfm	1.0 PV scaling
16	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	95 EF, basic compact dist.	16 SEER, 92 AFUE, 0.35W/cfm	1.0 PV scaling

VLLDCS – Verified Low-Leakage Ducts in Conditioned Space

Table 42: Multifamily Mixed Fuel Efficiency & PV/Battery Package Measure Summary

CZ	Duct	Infiltration	Wall	Attic	Roof	Glazing	Slab	DHW	HVAC	PV
1	VLLDCS	Code Min	Code Min	Code Min	Code Min	0.24/0.50 windows	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 22kWh batt
2	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 22kWh batt
3	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 22kWh batt
4	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 22kWh batt
5	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 22kWh batt
6	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 22kWh batt
7	Code Min	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 22kWh batt
8	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Enh CHW credit (0.6)	0.35 W/cfm	1.0 PV scaling + 22kWh batt
9	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 22kWh batt
10	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 22kWh batt
11	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 22kWh batt
12	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 22kWh batt
13	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 22kWh batt
14	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 22kWh batt
15	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 22kWh batt
16	VLLDCS	Code Min	Code Min	Code Min	Code Min	0.24/0.50 windows	R-10 slab insulation	Basic CHW credit (0.7)	0.35 W/cfm	1.0 PV scaling + 22kWh batt

VLLDCS – Verified Low-Leakage Ducts in Conditioned Space

Table 43: Multifamily All-Electric Efficiency – Non-Preempted Package Measure Summary

CZ	Duct	Infiltration	Wall	Attic	Roof	Glazing	Slab	DHW	HVAC	PV
1	VLLDCS	Code Min	Code Min	Code Min	Code Min	0.24/0.50 windows	R-10 slab insulation	Code Min	0.45 W/cfm	Std Design PV
2	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	Std Design PV
3	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Std Design PV
4	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	Std Design PV
5	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Code Min	Code Min	Std Design PV
6	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Code Min	0.45 W/cfm	Std Design PV
7	Code Min	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Code Min	0.45 W/cfm	Std Design PV
8	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Code Min	0.45 W/cfm	Std Design PV
9	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Code Min	0.45 W/cfm	Std Design PV
10	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	Std Design PV
11	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Code Min	0.45 W/cfm	Std Design PV
12	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Code Min	0.45 W/cfm	Std Design PV
13	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Code Min	0.45 W/cfm	Std Design PV
14	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Code Min	0.45 W/cfm	Std Design PV
15	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Code Min	0.45 W/cfm	Std Design PV
16	VLLDCS	Code Min	Code Min	Code Min	Code Min	0.24/0.50 windows	R-10 slab insulation	Code Min	0.45 W/cfm	Std Design PV

VLLDCS – Verified Low-Leakage Ducts in Conditioned Space

Table 44: Multifamily All-Electric Efficiency – Equipment, Preempted Package Measure Summary

CZ	Duct	Infiltratio	Wall	Attic	Roof	Glazing	Slab	DHW	HVAC	PV
1	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	16 SEER, 9 HSPF, 0.45W/cfm	Std Design PV
2	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	16 SEER, 9 HSPF, 0.45W/cfm	Std Design PV
3	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	16 SEER, 9 HSPF, 0.45W/cfm	Std Design PV
4	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	16 SEER, 9 HSPF, 0.45W/cfm	Std Design PV
5	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	16 SEER, 9 HSPF, 0.45W/cfm	Std Design PV
6	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	0.45 W/cfm	Std Design PV
7	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	0.45 W/cfm	Std Design PV
8	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	0.45 W/cfm	Std Design PV
9	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	0.45 W/cfm	Std Design PV
10	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	0.45 W/cfm	Std Design PV
11	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	16 SEER, 9 HSPF, 0.45W/cfm	Std Design PV
12	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	16 SEER, 9 HSPF, 0.45W/cfm	Std Design PV
13	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	16 SEER, 9 HSPF, 0.45W/cfm	Std Design PV
14	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	16 SEER, 9 HSPF, 0.45W/cfm	Std Design PV
15	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	18 SEER, 10 HSPF, 0.45W/cfm	Std Design PV
16	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	NEEA Tier 3 HPWH	16 SEER, 9 HSPF, 0.45W/cfm	Std Design PV

VLLDCS – Verified Low-Leakage Ducts in Conditioned Space

Table 45: Multifamily All-Electric Efficiency & PV Package Measure Summary

CZ	Duct	Infiltration	Wall	Attic	Roof	Glazing	Slab	DHW	HVAC	PV
1	VLLDCS	Code Min	Code Min	Code Min	Code Min	0.24/0.50 windows	R-10 slab insulation	Code Min	0.45 W/cfm	0.9 PV scaling
2	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	0.9 PV scaling
3	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	0.9 PV scaling
4	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	0.9 PV scaling
5	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Code Min	Code Min	0.9 PV scaling
6	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Code Min	0.45 W/cfm	0.9 PV scaling
7	Code Min	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Code Min	0.45 W/cfm	0.9 PV scaling
8	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Code Min	0.45 W/cfm	0.9 PV scaling
9	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Code Min	0.45 W/cfm	0.9 PV scaling
10	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	0.9 PV scaling
11	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Code Min	0.45 W/cfm	0.9 PV scaling
12	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Code Min	0.45 W/cfm	0.9 PV scaling
13	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Code Min	0.45 W/cfm	0.9 PV scaling
14	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Code Min	0.45 W/cfm	0.9 PV scaling
15	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Code Min	0.45 W/cfm	0.9 PV scaling
16	VLLDCS	Code Min	Code Min	Code Min	Code Min	0.24/0.50 windows	R-10 slab insulation	Code Min	0.45 W/cfm	0.9 PV scaling

VLLDCS – Verified Low-Leakage Ducts in Conditioned Space

Table 46: Multifamily All-Electric Efficiency & PV/Battery Package Measure Summary

CZ	Duct	Infiltration	Wall	Attic	Roof	Glazing	Slab	DHW	HVAC	PV
1	VLLDCS	Code Min	Code Min	Code Min	Code Min	0.24/0.50 windows	R-10 slab insulation	Code Min	0.45 W/cfm	1.0 PV scaling + 22kWh batt
2	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	1.0 PV scaling + 22kWh batt
3	Code Min	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	1.0 PV scaling + 22kWh batt
4	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	1.0 PV scaling + 22kWh batt
5	VLLDCS	Code Min	Code Min	Code Min	Code Min	Code Min	R-10 slab insulation	Code Min	Code Min	1.0 PV scaling + 22kWh batt
6	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Code Min	0.45 W/cfm	1.0 PV scaling + 22kWh batt
7	Code Min	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Code Min	0.45 W/cfm	1.0 PV scaling + 22kWh batt
8	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Code Min	0.45 W/cfm	1.0 PV scaling + 22kWh batt
9	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	Code Min	Code Min	0.45 W/cfm	1.0 PV scaling + 22kWh batt
10	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	Code Min	R-10 slab insulation	Code Min	0.45 W/cfm	1.0 PV scaling + 22kWh batt
11	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Code Min	0.45 W/cfm	1.0 PV scaling + 22kWh batt
12	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Code Min	0.45 W/cfm	1.0 PV scaling + 22kWh batt
13	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Code Min	0.45 W/cfm	1.0 PV scaling + 22kWh batt
14	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Code Min	0.45 W/cfm	1.0 PV scaling + 22kWh batt
15	VLLDCS	Code Min	Code Min	Code Min	0.25 solar reflectance	0.24/0.23 windows	R-10 slab insulation	Code Min	0.45 W/cfm	1.0 PV scaling + 22kWh batt
16	VLLDCS	Code Min	Code Min	Code Min	Code Min	0.24/0.50 windows	R-10 slab insulation	Code Min	0.45 W/cfm	1.0 PV scaling + 22kWh batt

VLLDCS – Verified Low-Leakage Ducts in Conditioned Space

Appendix G – Results by Climate Zone

Climate Zone 1

Table 47: Single Family Climate Zone 1 Results Summary

Climate Zone 1 PG&E Single Family		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	581	n/a	n/a	3.00	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	480	5.0	(0.08)	2.51	0.49	$1,355	3.38	2.82
	Efficiency-Equipment	0	440	6.5	(0.07)	2.32	0.68	$1,280	4.92	4.10
	Efficiency & PV/Battery	(28)	480	10.5	0.04	2.40	0.60	$5,311	0.87	1.61
All-Electric[2]	Code Compliant	7,079	0	n/a	n/a	1.51	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	4,461	0	15.0	0.00	1.01	0.50	$7,642	1.79	1.66
	Efficiency-Equipment	5,933	0	6.5	0.00	1.29	0.22	$2,108	2.94	2.74
	Efficiency & PV	889	0	31.0	2.67	0.52	1.00	$18,192	1.81	1.45
	Efficiency & PV/Battery	(14)	0	41.0	3.45	0.28	1.23	$24,770	1.45	1.40
Mixed Fuel to All-Electric[3]	Code Compliant	7,079	0	0.0	0.00	1.51	1.49	($5,349)	0.37	0.91
	Efficiency & PV	889	0	31.0	2.67	0.52	2.48	$12,844	1.43	2.11
	Neutral Cost	5,270	0	8.0	1.35	1.26	1.74	$0	0.00	1.09
	Min Cost Effectiveness	3,106	0	18.0	2.97	0.95	2.04	($6,372)	1.08	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, Neutral Cost, and Min Cost Effectiveness packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Table 48: Multifamily Climate Zone 1 Results Summary (Per Dwelling Unit)

Climate Zone 1 PG&E Multifamily		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel [1]	Code Compliant	(0)	180	n/a	n/a	2.75	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	147	3.0	0.00	2.31	0.44	$960	1.10	1.18
	Efficiency-Equipment	(0)	159	2.0	(0.01)	2.48	0.27	$507	1.29	1.41
	Efficiency & PV/Battery	(14)	147	11.5	0.07	2.13	0.61	$3,094	0.35	1.21
All-Electric [2]	Code Compliant	2,624	0	n/a	n/a	1.62	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	2,328	0	3.5	0.00	1.46	0.15	$949	1.55	1.40
	Efficiency-Equipment	2,278	0	3.0	0.00	1.41	0.20	$795	2.39	2.26
	Efficiency & PV	499	0	22.5	1.37	0.75	0.86	$5,538	2.04	1.50
	Efficiency & PV/Battery	(7)	0	34.5	1.80	0.38	1.24	$8,919	1.33	1.43
Mixed Fuel to All-Electric [3]	Code Compliant	2,624	0	0.0	0.00	1.62	1.13	($2,337)	0.38	1.01
	Efficiency & PV	62	0	22.5	1.37	0.75	2.00	$3,202	1.63	>1
	Neutral Cost	1,693	0	9.5	0.70	1.25	1.50	$0	0.00	1.57
	Min Cost Effectiveness	1,273	0	14.0	1.01	1.09	1.66	($1,052)	1.14	3.76

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, Neutral Cost, and Min Cost Effectiveness packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Climate Zone 2

Table 49: Single Family Climate Zone 2 Results Summary

Climate Zone 2 PG&E Single Family		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	421	n/a	n/a	2.23	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	0	360	3.0	(0.04)	1.94	0.30	$1,504	1.63	1.66
	Efficiency-Equipment	(0)	352	3.0	(0.03)	1.90	0.33	$724	3.77	3.63
	Efficiency & PV/Battery	(22)	360	10.0	0.06	1.82	0.41	$5,393	0.47	1.56
All-Electric[2]	Code Compliant	5,014	0	n/a	n/a	1.11	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	4,079	0	4.5	0.00	0.94	0.18	$3,943	1.21	1.07
	Efficiency-Equipment	4,122	0	5.0	0.00	0.94	0.17	$2,108	2.25	2.10
	Efficiency & PV	847	0	19.0	2.07	0.49	0.63	$12,106	1.83	1.38
	Efficiency & PV/Battery	(15)	0	30.0	2.71	0.26	0.86	$18,132	1.37	1.43
Mixed Fuel to All-Electric[3]	Code Compliant	5,014	0	0.0	0.00	1.11	1.12	($5,349)	0.52	1.59
	Efficiency & PV	847	0	19.0	2.07	0.49	1.75	$6,758	1.76	39.70
	Neutral Cost	2,891	0	9.5	1.36	0.82	1.41	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Table 50: Multifamily Climate Zone 2 Results Summary (Per Dwelling Unit)

Climate Zone 2 PG&E Multifamily		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	150	n/a	n/a	2.37	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	0	142	1.5	(0.02)	2.25	0.12	$309	0.97	1.75
	Efficiency-Equipment	(0)	134	2.0	(0.01)	2.15	0.22	$497	1.08	1.49
	Efficiency & PV/Battery	(11)	142	10.5	0.04	2.07	0.30	$2,413	0.17	1.60
All-Electric[2]	Code Compliant	2,151	0	n/a	n/a	1.38	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	2,038	0	1.5	0.00	1.32	0.06	$361	1.73	2.05
	Efficiency-Equipment	1,928	0	3.0	0.00	1.25	0.13	$795	1.56	1.56
	Efficiency & PV	476	0	17.5	1.00	0.72	0.67	$3,711	2.42	1.82
	Efficiency & PV/Battery	(7)	0	30.5	1.36	0.35	1.04	$6,833	1.38	1.74
Mixed Fuel to All-Electric[3]	Code Compliant	2,151	0	0.0	0.00	1.38	0.99	($2,337)	0.53	1.42
	Efficiency & PV	60	0	17.5	1.00	0.72	1.65	$1,375	3.31	>1
	Neutral Cost	1,063	0	10.5	0.70	0.96	1.41	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Climate Zone 3

Table 51: Single Family Climate Zone 3 Results Summary

Climate Zone 3 PG&E Single Family		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	348	n/a	n/a	1.88	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	296	2.5	(0.03)	1.63	0.26	$1,552	1.28	1.31
	Efficiency-Equipment	(0)	273	4.0	(0.03)	1.52	0.37	$1,448	1.91	1.97
	Efficiency & PV/Battery	(20)	296	10.0	0.07	1.50	0.38	$5,438	0.38	1.38
All-Electric[2]	Code Compliant	4,355	0	n/a	n/a	1.00	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	3,584	0	4.5	0.00	0.85	0.15	$1,519	2.60	2.36
	Efficiency-Equipment	3,670	0	4.0	0.00	0.86	0.14	$2,108	1.76	1.62
	Efficiency & PV	790	0	18.0	1.77	0.46	0.54	$8,517	2.22	1.68
	Efficiency & PV/Battery	(12)	0	29.0	2.37	0.23	0.76	$14,380	1.50	1.58
Mixed Fuel to All-Electric[3]	Code Compliant	4,355	0	0.0	0.00	1.00	0.89	($5,349)	0.55	1.53
	Efficiency & PV	790	0	18.0	1.77	0.46	1.43	$3,169	2.88	>1
	Neutral Cost	2,217	0	10.5	1.35	0.70	1.18	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Table 52: Multifamily Climate Zone 3 Results Summary (Per Dwelling Unit)

Climate Zone 3 PG&E Multifamily		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	133	n/a	n/a	2.13	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	127	0.5	(0.00)	2.06	0.07	$175	1.00	1.11
	Efficiency-Equipment	(0)	119	1.5	(0.00)	1.94	0.19	$403	1.11	1.23
	Efficiency & PV/Battery	(10)	127	10.0	0.05	1.86	0.27	$2,279	0.11	1.41
All-Electric[2]	Code Compliant	1,944	0	n/a	n/a	1.27	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	1,944	0	0.0	0.00	1.27	0.00	$0	-	-
	Efficiency-Equipment	1,698	0	2.5	0.00	1.13	0.14	$795	1.73	1.58
	Efficiency & PV	457	0	16.0	0.92	0.69	0.58	$3,272	2.43	1.73
	Efficiency & PV/Battery	(7)	0	29.5	1.26	0.33	0.94	$6,344	1.32	1.64
Mixed Fuel to All-Electric[3]	Code Compliant	1,944	0	0.0	0.00	1.27	0.86	($2,337)	0.58	1.46
	Efficiency & PV	57	0	16.0	0.92	0.69	1.43	$936	4.18	>1
	Neutral Cost	845	0	11.5	0.70	0.85	1.28	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Climate Zone 4

Table 53: Single Family Climate Zone 4 Results Summary

Climate Zone 4 PG&E Single Family		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	0	347	n/a	n/a	1.88	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	0	306	2.5	(0.03)	1.68	0.20	$1,556	0.93	1.15
	Efficiency-Equipment	(0)	294	2.5	(0.02)	1.62	0.26	$758	2.39	2.67
	Efficiency & PV/Battery	(18)	306	10.0	0.07	1.55	0.33	$5,434	0.30	1.48
All-Electric[2]	Code Compliant	4,342	0	n/a	n/a	1.00	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	3,775	0	3.0	0.00	0.89	0.11	$1,519	1.92	1.84
	Efficiency-Equipment	3,747	0	3.5	0.00	0.88	0.12	$2,108	1.52	1.52
	Efficiency & PV	814	0	17.0	1.84	0.48	0.52	$8,786	2.13	1.62
	Efficiency & PV/Battery	(11)	0	28.5	2.44	0.25	0.75	$14,664	1.46	1.61
Mixed Fuel to All-Electric[3]	Code Compliant	4,342	0	0.0	0.00	1.00	0.88	($5,349)	0.55	1.59
	Efficiency & PV	814	0	17.0	1.84	0.48	1.40	$3,438	2.64	>1
	Neutral Cost	2,166	0	10.0	1.35	0.70	1.18	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Table 54: Multifamily Climate Zone 4 Results Summary (Per Dwelling Unit)

Climate Zone 4 PG&E Multifamily		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	134	n/a	n/a	2.16	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	127	1.0	(0.01)	2.06	0.10	$329	0.75	1.24
	Efficiency-Equipment	(0)	123	1.5	(0.01)	2.01	0.15	$351	1.06	1.74
	Efficiency & PV/Battery	(9)	127	11.0	0.04	1.87	0.29	$2,429	0.17	1.60
All-Electric[2]	Code Compliant	1,887	0	n/a	n/a	1.25	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	1,794	0	1.0	0.00	1.21	0.05	$361	1.38	1.54
	Efficiency-Equipment	1,712	0	2.0	0.00	1.15	0.10	$795	1.23	1.09
	Efficiency & PV	453	0	15.0	0.83	0.69	0.57	$3,158	2.43	1.81
	Efficiency & PV/Battery	(7)	0	28.5	1.17	0.32	0.93	$6,201	1.30	1.77
Mixed Fuel to All-Electric[3]	Code Compliant	1,887	0	0.0	0.00	1.25	0.90	($2,337)	0.65	1.77
	Efficiency & PV	57	0	15.0	0.83	0.69	1.47	$822	4.96	>1
	Neutral Cost	767	0	11.0	0.70	0.82	1.33	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design..

Climate Zone 5 PG&E

Table 55: Single Family Climate Zone 5 PG&E Results Summary

Climate Zone 5 PG&E Single Family		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	0	331	n/a	n/a	1.79	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	281	2.5	(0.03)	1.55	0.24	$1,571	1.10	1.22
	Efficiency-Equipment	(0)	279	2.5	(0.02)	1.54	0.25	$772	2.29	2.48
	Efficiency & PV/Battery	(14)	281	9.0	0.07	1.43	0.36	$5,433	0.37	1.32
All-Electric[2]	Code Compliant	4,452	0	n/a	n/a	1.01	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	3,687	0	4.0	0.00	0.86	0.15	$1,519	2.58	2.31
	Efficiency-Equipment	3,737	0	4.0	0.00	0.87	0.14	$2,108	1.85	1.70
	Efficiency & PV	798	0	18.0	1.72	0.46	0.55	$8,307	2.31	1.76
	Efficiency & PV/Battery	(8)	0	28.5	2.29	0.24	0.78	$14,047	1.59	1.63
Mixed Fuel to All-Electric[3]	Code Compliant	4,452	0	0.0	0.00	1.01	0.78	($5,349)	0.48	1.32
	Efficiency & PV	798	0	18.0	1.72	0.46	1.33	$2,959	2.72	>1
	Neutral Cost	2,172	0	11.0	1.35	0.70	1.10	$0	>1	40.07

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Table 56: Multifamily Climate Zone 5 PG&E Results Summary (Per Dwelling Unit)

Climate Zone 5 PG&E Multifamily		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	0	131	n/a	n/a	2.10	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	126	0.5	(0.00)	2.03	0.07	$180	0.99	1.03
	Efficiency-Equipment	(0)	117	1.5	(0.00)	1.92	0.19	$358	1.24	1.34
	Efficiency & PV/Battery	(7)	126	9.5	0.05	1.84	0.26	$2,273	0.15	1.38
All-Electric[2]	Code Compliant	2,044	0	n/a	n/a	1.32	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	1,990	0	0.5	0.00	1.30	0.03	$247	1.09	0.86
	Efficiency-Equipment	1,738	0	3.5	0.00	1.15	0.17	$795	2.15	2.03
	Efficiency & PV	465	0	17.0	0.91	0.70	0.62	$3,293	2.53	1.82
	Efficiency & PV/Battery	(6)	0	30.0	1.24	0.34	0.98	$6,314	1.44	1.69
Mixed Fuel to All-Electric[3]	Code Compliant	2,044	0	0.0	0.00	1.32	0.78	($2,337)	0.50	1.28
	Efficiency & PV	58	0	17.0	0.91	0.70	1.40	$956	3.80	>1
	Neutral Cost	874	0	12.5	0.70	0.87	1.23	$0	>1	23.44

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Climate Zone 5 PG&E/SoCalGas

Table 57: Single Family Climate Zone 5 PG&E/SoCalGas Results Summary

Climate Zone 5 PG&E/SoCalGas Single Family		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	0	331	n/a	n/a	1.79	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	281	2.5	(0.03)	1.55	0.24	$1,571	0.92	1.22
	Efficiency-Equipment	(0)	279	2.5	(0.02)	1.54	0.25	$772	1.98	2.48
	Efficiency & PV/Battery	(14)	281	9.0	0.07	1.43	0.36	$5,433	0.31	1.32
All-Electric[2]	Code Compliant	4,452	0	n/a	n/a	1.01	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	3,687	0	4.0	0.00	0.86	0.15	$1,519	2.58	2.31
	Efficiency-Equipment	3,737	0	4.0	0.00	0.87	0.14	$2,108	1.85	1.70
	Efficiency & PV	798	0	18.0	1.72	0.46	0.55	$8,307	2.31	1.76
	Efficiency & PV/Battery	(8)	0	28.5	2.29	0.24	0.78	$14,047	1.59	1.63
Mixed Fuel to All-Electric[3]	Code Compliant	4,452	0	0.0	0.00	1.01	0.78	($5,349)	0.48	1.32
	Efficiency & PV	798	0	18.0	1.72	0.46	1.33	$2,959	2.75	>1
	Neutral Cost	2,172	0	11.0	1.35	0.70	1.10	$0	>1	40.07

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Table 58: Multifamily Climate Zone 5 PG&E/SoCalGas Results Summary (Per Dwelling Unit)

Climate Zone 5 PG&E/SoCalGas Multifamily		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	0	131	n/a	n/a	2.10	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	126	0.5	(0.00)	2.03	0.07	$180	0.85	1.03
	Efficiency-Equipment	(0)	117	1.5	(0.00)	1.92	0.19	$358	1.09	1.34
	Efficiency & PV/Battery	(7)	126	9.5	0.05	1.84	0.26	$2,273	0.14	1.38
All-Electric[2]	Code Compliant	2,044	0	n/a	n/a	1.32	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	1,990	0	0.5	0.00	1.30	0.03	$247	1.09	0.86
	Efficiency-Equipment	1,738	0	3.5	0.00	1.15	0.17	$795	2.15	2.03
	Efficiency & PV	465	0	17.0	0.91	0.70	0.62	$3,293	2.53	1.82
	Efficiency & PV/Battery	(6)	0	30.0	1.24	0.34	0.98	$6,314	1.44	1.69
Mixed Fuel to All-Electric[3]	Code Compliant	2,044	0	0.0	0.00	1.32	0.78	($2,337)	0.65	1.28
	Efficiency & PV	58	0	17.0	0.91	0.70	1.40	$956	4.98	>1
	Neutral Cost	874	0	12.5	0.70	0.87	1.23	$0	>1	23.44

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Climate Zone 6

Table 59: Single Family Climate Zone 6 Results Summary

Climate Zone 6 SCE/SoCalGas Single Family		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	249	n/a	n/a	1.57	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	0	229	2.0	(0.02)	1.47	0.10	$1,003	0.66	1.15
	Efficiency-Equipment	(0)	218	1.5	(0.01)	1.41	0.15	$581	1.58	2.04
	Efficiency & PV/Battery	(13)	229	9.5	0.08	1.22	0.34	$4,889	0.84	1.27
All-Electric[2]	Code Compliant	3,099	0	n/a	n/a	0.87	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	2,885	0	2.0	0.00	0.83	0.05	$926	1.31	1.41
	Efficiency-Equipment	2,746	0	2.5	0.00	0.80	0.08	$846	2.20	2.29
	Efficiency & PV	722	0	14.0	1.37	0.63	0.24	$6,341	1.19	1.48
	Efficiency & PV/Battery	(6)	0	26.0	1.93	0.33	0.55	$12,036	1.15	1.43
Mixed Fuel to All-Electric[3]	Code Compliant	3,099	0	0.0	0.00	0.87	0.69	($5,349)	1.19	2.46
	Efficiency & PV	722	0	14.0	1.37	0.63	0.93	$992	3.07	>1
	Neutral Cost	959	0	12.0	1.36	0.67	0.89	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Table 60: Multifamily Climate Zone 6 Results Summary (Per Dwelling Unit)

Climate Zone 6 SCE/SoCalGas Multifamily		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	114	n/a	n/a	2.17	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	112	1.0	(0.01)	2.14	0.03	$190	0.65	1.49
	Efficiency-Equipment	(0)	103	1.0	(0.00)	2.03	0.15	$213	1.43	1.74
	Efficiency & PV/Battery	(6)	112	10.5	0.04	1.76	0.41	$2,294	0.56	1.35
All-Electric[2]	Code Compliant	1,558	0	n/a	n/a	1.28	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	1,531	0	1.0	0.00	1.26	0.02	$231	0.65	1.34
	Efficiency-Equipment	1,430	0	2.0	0.00	1.20	0.08	$361	1.62	1.91
	Efficiency & PV	427	0	13.5	0.70	0.97	0.31	$2,580	1.24	1.71
	Efficiency & PV/Battery	(5)	0	27.5	1.02	0.49	0.79	$5,590	1.22	1.58
Mixed Fuel to All-Electric[3]	Code Compliant	1,558	0	0.0	0.00	1.28	0.90	($2,337)	2.59	2.38
	Efficiency & PV	53	0	13.5	0.70	0.97	1.20	$243	9.50	>1
	Neutral Cost	459	0	12.5	0.70	0.99	1.18	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Climate Zone 7

Table 61: Single Family Climate Zone 7 Results Summary

Climate Zone 7 SDG&E Single Family		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	196	n/a	n/a	1.30	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	196	0.0	0.00	1.30	0.00	$0	-	-
	Efficiency-Equipment	0	171	1.5	(0.00)	1.18	0.12	$606	1.50	1.40
	Efficiency & PV/Battery	(12)	189	9.0	0.10	1.04	0.26	$4,028	0.06	1.32
All-Electric[2]	Code Compliant	2,479	0	n/a	n/a	0.75	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	2,479	0	0.0	0.00	0.75	0.00	$0	-	-
	Efficiency-Equipment	2,222	0	2.0	0.00	0.69	0.06	$846	1.60	1.65
	Efficiency & PV	674	0	11.0	1.10	0.58	0.17	$4,436	1.87	1.55
	Efficiency & PV/Battery	(6)	0	24.0	1.61	0.29	0.46	$9,936	1.25	1.47
Mixed Fuel to All-Electric[3]	Code Compliant	2,479	0	0.0	0.00	0.75	0.55	($5,349)	1.04	2.54
	Efficiency & PV	674	0	11.0	1.10	0.58	0.72	($912)	>1	>1
	Neutral Cost	267	0	13.5	1.35	0.55	0.75	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Table 62: Multifamily Climate Zone 7 Results Summary (Per Dwelling Unit)

Climate Zone 7 SDG&E Multifamily		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	110	n/a	n/a	2.11	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	108	0.5	(0.01)	2.08	0.03	$90	0.73	2.24
	Efficiency-Equipment	(0)	99	2.0	(0.00)	1.96	0.15	$366	1.07	1.41
	Efficiency & PV/Battery	(6)	108	11.0	0.05	1.71	0.40	$2,188	0.03	1.40
All-Electric[2]	Code Compliant	1,434	0	n/a	n/a	1.21	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	1,416	0	0.5	0.00	1.20	0.01	$202	0.60	1.02
	Efficiency-Equipment	1,319	0	1.5	0.00	1.14	0.07	$361	1.59	1.71
	Efficiency & PV	412	0	12.5	0.61	0.94	0.27	$2,261	2.08	1.76
	Efficiency & PV/Battery	(5)	0	27.0	0.92	0.47	0.74	$5,203	1.19	1.62
Mixed Fuel to All-Electric[3]	Code Compliant	1,434	0	0.0	0.00	1.21	0.90	($2,337)	1.12	2.47
	Efficiency & PV	51	0	12.5	0.61	0.94	1.17	($75)	>1	>1
	Neutral Cost	294	0	13.5	0.70	0.91	1.20	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Climate Zone 8

Table 63: Single Family Climate Zone 8 Results Summary

Climate Zone 8 SCE/SoCalGas Single Family		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	206	n/a	n/a	1.38	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	198	1.0	(0.02)	1.34	0.05	$581	0.57	1.41
	Efficiency-Equipment	0	181	1.5	(0.01)	1.27	0.12	$586	1.30	1.82
	Efficiency & PV/Battery	(13)	198	8.0	0.08	1.11	0.27	$4,466	0.90	1.31
All-Electric[2]	Code Compliant	2,576	0	n/a	n/a	0.80	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	2,483	0	1.5	0.00	0.78	0.02	$926	0.57	1.22
	Efficiency-Equipment	2,352	0	1.5	0.00	0.75	0.05	$412	2.82	3.03
	Efficiency & PV	703	0	10.5	1.13	0.62	0.18	$5,373	1.00	1.48
	Efficiency & PV/Battery	(7)	0	21.5	1.67	0.32	0.48	$11,016	1.09	1.42
Mixed Fuel to All-Electric[3]	Code Compliant	2,576	0	0.0	0.00	0.80	0.58	($5,349)	1.83	2.99
	Efficiency & PV	703	0	10.5	1.13	0.62	0.77	$25	107.93	>1
	Neutral Cost	439	0	11.0	1.36	0.60	0.78	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Table 64: Multifamily Climate Zone 8 Results Summary (Per Dwelling Unit)

Climate Zone 8 SCE/SoCalGas Multifamily		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	109	n/a	n/a	2.18	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	106	1.5	(0.02)	2.13	0.05	$250	0.70	1.36
	Efficiency-Equipment	(0)	99	1.0	(0.00)	2.04	0.14	$213	1.37	1.67
	Efficiency & PV/Battery	(6)	106	9.5	0.03	1.77	0.41	$2,353	0.74	1.32
All-Electric[2]	Code Compliant	1,409	0	n/a	n/a	1.26	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	1,373	0	1.0	0.00	1.24	0.02	$231	0.87	1.72
	Efficiency-Equipment	1,276	0	1.5	0.00	1.18	0.08	$361	1.63	1.75
	Efficiency & PV	426	0	11.5	0.60	0.99	0.27	$2,240	1.26	1.78
	Efficiency & PV/Battery	(5)	0	24.0	0.92	0.53	0.73	$5,249	1.24	1.59
Mixed Fuel to All-Electric[3]	Code Compliant	1,409	0	0.0	0.00	1.26	0.91	($2,337)	6.69	2.67
	Efficiency & PV	53	0	11.5	0.60	0.99	1.18	($96)	>1	>1
	Neutral Cost	309	0	12.0	0.70	0.98	1.20	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Climate Zone 9

Table 65: Single Family Climate Zone 9 Results Summary

Climate Zone 9 SCE/SoCalGas Single Family		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	0	229	n/a	n/a	1.53	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	216	2.5	(0.04)	1.46	0.07	$912	0.69	1.97
	Efficiency-Equipment	0	201	2.5	(0.04)	1.38	0.15	$574	1.80	3.66
	Efficiency & PV/Battery	(14)	216	8.5	0.05	1.23	0.30	$4,785	0.99	1.48
All-Electric[2]	Code Compliant	2,801	0	n/a	n/a	0.87	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	2,645	0	2.5	0.00	0.84	0.04	$1,180	0.78	1.96
	Efficiency-Equipment	2,460	0	3.0	0.00	0.80	0.07	$846	2.11	3.22
	Efficiency & PV	745	0	11.5	1.16	0.66	0.21	$5,778	1.08	1.64
	Efficiency & PV/Battery	(9)	0	21.0	1.72	0.37	0.50	$11,454	1.11	1.53
Mixed Fuel to All-Electric[3]	Code Compliant	2,801	0	0.0	0.00	0.87	0.66	($5,349)	1.67	2.90
	Efficiency & PV	745	0	11.5	1.16	0.66	0.87	$429	7.15	>1
	Neutral Cost	594	0	10.0	1.36	0.67	0.86	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Table 66: Multifamily Climate Zone 9 Results Summary (Per Dwelling Unit)

Climate Zone 9 SCE/SoCalGas Multifamily		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	0	111	n/a	n/a	2.24	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	109	1.5	(0.03)	2.19	0.05	$136	1.46	3.35
	Efficiency-Equipment	(0)	101	2.5	(0.03)	2.08	0.16	$274	1.66	2.87
	Efficiency & PV/Battery	(7)	109	9.5	0.03	1.84	0.40	$2,234	0.90	1.49
All-Electric[2]	Code Compliant	1,468	0	n/a	n/a	1.33	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	1,414	0	1.5	0.00	1.30	0.03	$231	1.29	2.70
	Efficiency-Equipment	1,334	0	1.5	0.00	1.25	0.08	$361	1.63	1.58
	Efficiency & PV	441	0	11.0	0.60	1.04	0.29	$2,232	1.34	1.91
	Efficiency & PV/Battery	(7)	0	23.0	0.92	0.58	0.75	$5,236	1.28	1.67
Mixed Fuel to All-Electric[3]	Code Compliant	1,468	0	0.0	0.00	1.33	0.91	($2,337)	4.38	2.55
	Efficiency & PV	55	0	11.0	0.60	1.04	1.20	($104)	>1	>1
	Neutral Cost	331	0	11.0	0.70	1.03	1.21	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Climate Zone 10 SCE/SoCalGas

Table 67: Single Family Climate Zone 10 SCE/SoCalGas Results Summary

Climate Zone 10 SCE/SoCalGas Single Family		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	239	n/a	n/a	1.61	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	217	3.0	(0.07)	1.48	0.13	$1,648	0.63	1.33
	Efficiency-Equipment	(0)	209	3.0	(0.06)	1.45	0.16	$593	2.05	3.84
	Efficiency & PV/Battery	(12)	217	9.5	0.03	1.25	0.36	$5,522	1.00	1.48
All-Electric[2]	Code Compliant	2,981	0	n/a	n/a	0.94	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	2,673	0	3.0	0.00	0.88	0.07	$1,773	0.92	1.52
	Efficiency-Equipment	2,563	0	3.0	0.00	0.85	0.10	$949	2.27	3.19
	Efficiency & PV	762	0	11.0	1.17	0.70	0.24	$6,405	1.08	1.50
	Efficiency & PV/Battery	(6)	0	21.0	1.74	0.41	0.53	$12,129	1.11	1.51
Mixed Fuel to All-Electric[3]	Code Compliant	2,981	0	0.0	0.00	0.94	0.67	($5,349)	1.45	2.66
	Efficiency & PV	762	0	11.0	1.17	0.70	0.91	$1,057	3.04	>1
	Neutral Cost	770	0	9.0	1.36	0.74	0.87	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Table 68: Multifamily Climate Zone 10 SCE/SoCalGas Results Summary (Per Dwelling Unit)

Climate Zone 10 SCE/SoCalGas Multifamily		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	112	n/a	n/a	2.29	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	108	1.5	(0.02)	2.23	0.06	$278	0.81	1.69
	Efficiency-Equipment	(0)	102	2.5	(0.04)	2.13	0.16	$250	1.96	3.27
	Efficiency & PV/Battery	(6)	108	10.0	0.03	1.88	0.41	$2,376	0.98	1.57
All-Electric[2]	Code Compliant	1,507	0	n/a	n/a	1.39	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	1,425	0	1.5	0.00	1.34	0.05	$361	1.16	2.00
	Efficiency-Equipment	1,369	0	1.5	0.00	1.31	0.08	$361	1.71	1.98
	Efficiency & PV	450	0	10.5	0.60	1.09	0.30	$2,371	1.31	1.79
	Efficiency & PV/Battery	(4)	0	23.0	0.93	0.63	0.76	$5,395	1.27	1.69
Mixed Fuel to All-Electric[3]	Code Compliant	1,507	0	0.0	0.00	1.39	0.90	($2,337)	3.35	2.36
	Efficiency & PV	56	0	10.5	0.60	1.09	1.20	$34	70.89	>1
	Neutral Cost	372	0	10.5	0.70	1.10	1.19	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Climate Zone 10 SDGE

Table 69: Single Family Climate Zone 10 SDGE Results Summary

Climate Zone 10 SDG&E Single Family		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	239	n/a	n/a	1.61	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	217	3.0	(0.07)	1.48	0.13	$1,648	0.80	1.33
	Efficiency-Equipment	(0)	209	3.0	(0.06)	1.45	0.16	$593	2.64	3.84
	Efficiency & PV/Battery	(12)	217	9.5	0.03	1.25	0.36	$5,522	0.58	1.48
All-Electric[2]	Code Compliant	2,981	0	n/a	n/a	0.94	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	2,673	0	3.0	0.00	0.88	0.07	$1,773	1.08	1.52
	Efficiency-Equipment	2,563	0	3.0	0.00	0.85	0.10	$949	2.62	3.19
	Efficiency & PV	762	0	11.0	1.17	0.70	0.24	$6,405	1.68	1.50
	Efficiency & PV/Battery	(6)	0	21.0	1.74	0.41	0.53	$12,129	1.42	1.51
Mixed Fuel to All-Electric[3]	Code Compliant	2,981	0	0.0	0.00	0.94	0.67	($5,349)	0.90	2.66
	Efficiency & PV	762	0	11.0	1.17	0.70	0.91	$1,057	4.55	>1
	Neutral Cost	770	0	9.0	1.36	0.74	0.87	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Table 70: Multifamily Climate Zone 10 SDGE Results Summary (Per Dwelling Unit)

Climate Zone 10 SDG&E Multifamily		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	112	n/a	n/a	2.29	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	108	1.5	(0.02)	2.23	0.06	$278	1.09	1.69
	Efficiency-Equipment	(0)	102	2.5	(0.04)	2.13	0.16	$250	2.60	3.27
	Efficiency & PV/Battery	(6)	108	10.0	0.03	1.88	0.41	$2,376	0.23	1.57
All-Electric[2]	Code Compliant	1,507	0	n/a	n/a	1.39	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	1,425	0	1.5	0.00	1.34	0.05	$361	1.53	2.00
	Efficiency-Equipment	1,369	0	1.5	0.00	1.31	0.08	$361	2.05	1.98
	Efficiency & PV	450	0	10.5	0.60	1.09	0.30	$2,371	2.12	1.79
	Efficiency & PV/Battery	(4)	0	23.0	0.93	0.63	0.76	$5,395	1.44	1.69
Mixed Fuel to All-Electric[3]	Code Compliant	1,507	0	0.0	0.00	1.39	0.90	($2,337)	0.73	2.36
	Efficiency & PV	56	0	10.5	0.60	1.09	1.20	$34	54.15	>1
	Neutral Cost	372	0	10.5	0.70	1.10	1.19	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Climate Zone 11

Table 71: Single Family Climate Zone 11 Results Summary

Climate Zone 11 PG&E Single Family		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	378	n/a	n/a	2.14	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	333	4.0	(0.19)	1.90	0.24	$3,143	0.78	1.20
	Efficiency-Equipment	0	320	5.0	(0.21)	1.83	0.31	$1,222	2.50	3.68
	Efficiency & PV/Battery	(18)	333	9.0	(0.09)	1.78	0.36	$7,026	0.36	1.51
All-Electric[2]	Code Compliant	4,585	0	n/a	n/a	1.15	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	3,815	0	4.5	0.00	0.99	0.16	$3,735	1.24	1.47
	Efficiency-Equipment	3,533	0	5.5	0.00	0.93	0.22	$2,108	2.97	3.33
	Efficiency & PV	957	0	14.0	1.79	0.60	0.55	$10,827	1.84	1.55
	Efficiency & PV/Battery	(13)	0	23.0	2.49	0.36	0.79	$17,077	1.49	1.61
Mixed Fuel to All-Electric[3]	Code Compliant	4,585	0	0.0	0.00	1.15	0.99	($5,349)	0.49	1.69
	Efficiency & PV	957	0	14.0	1.79	0.60	1.54	$5,478	1.64	>1
	Neutral Cost	2,429	0	7.0	1.36	0.85	1.29	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Table 72: Multifamily Climate Zone 11 Results Summary (Per Dwelling Unit)

Climate Zone 11 PG&E Multifamily		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	141	n/a	n/a	2.38	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	0	127	2.5	(0.05)	2.18	0.20	$850	0.65	1.17
	Efficiency-Equipment	(0)	126	3.0	(0.06)	2.16	0.22	$317	1.84	3.29
	Efficiency & PV/Battery	(9)	127	10.5	0.01	2.00	0.38	$2,950	0.39	1.60
All-Electric[2]	Code Compliant	1,974	0	n/a	n/a	1.42	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	1,732	0	3.5	0.00	1.29	0.13	$1,011	1.40	1.64
	Efficiency-Equipment	1,707	0	3.5	0.00	1.26	0.16	$795	2.02	2.33
	Efficiency & PV	504	0	13.0	0.77	0.81	0.61	$3,601	2.22	1.81
	Efficiency & PV/Battery	(6)	0	25.0	1.14	0.45	0.98	$6,759	1.42	1.81
Mixed Fuel to All-Electric[3]	Code Compliant	1,974	0	0.0	0.00	1.42	0.96	($2,337)	0.56	1.33
	Efficiency & PV	63	0	13.0	0.77	0.81	1.56	$1,264	3.03	>1
	Neutral Cost	866	0	9.0	0.70	0.99	1.38	$0	>1	73.96

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Climate Zone 12

Table 73: Single Family Climate Zone 12 Results Summary

Climate Zone 12 PG&E Single Family		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	390	n/a	n/a	2.11	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	344	3.5	(0.06)	1.88	0.23	$1,679	1.18	1.83
	Efficiency-Equipment	0	338	3.0	(0.05)	1.85	0.26	$654	3.31	4.65
	Efficiency & PV/Battery	(23)	344	9.5	0.04	1.76	0.35	$5,568	0.43	1.72
All-Electric[2]	Code Compliant	4,492	0	n/a	n/a	1.05	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	3,958	0	3.5	0.00	0.94	0.10	$3,735	0.78	1.06
	Efficiency-Equipment	3,721	0	5.0	0.00	0.90	0.15	$2,108	2.00	2.51
	Efficiency & PV	867	0	15.5	1.97	0.51	0.53	$11,520	1.69	1.41
	Efficiency & PV/Battery	(15)	0	25.0	2.62	0.29	0.76	$17,586	1.29	1.48
Mixed Fuel to All-Electric[3]	Code Compliant	4,492	0	0.0	0.00	1.05	1.07	($5,349)	0.63	1.89
	Efficiency & PV	867	0	15.5	1.97	0.51	1.60	$6,172	1.77	>1
	Neutral Cost	2,374	0	8.0	1.35	0.76	1.36	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Table 74: Multifamily Climate Zone 12 Results Summary (Per Dwelling Unit)

Climate Zone 12 PG&E Multifamily		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	143	n/a	n/a	2.33	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	135	1.5	(0.02)	2.21	0.12	$291	1.10	2.22
	Efficiency-Equipment	0	128	2.5	(0.03)	2.12	0.21	$434	1.25	2.22
	Efficiency & PV/Battery	(11)	135	10.0	0.03	2.03	0.30	$2,394	0.30	1.75
All-Electric[2]	Code Compliant	1,963	0	n/a	n/a	1.34	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	1,792	0	2.5	0.00	1.24	0.09	$1,011	0.91	1.12
	Efficiency-Equipment	1,744	0	2.5	0.00	1.21	0.13	$795	1.56	1.63
	Efficiency & PV	472	0	14.0	0.84	0.73	0.60	$3,835	2.08	1.65
	Efficiency & PV/Battery	(8)	0	26.5	1.20	0.38	0.96	$6,943	1.26	1.68
Mixed Fuel to All-Electric[3]	Code Compliant	1,963	0	0.0	0.00	1.34	1.00	($2,337)	0.64	1.66
	Efficiency & PV	59	0	14.0	0.84	0.73	1.60	$1,498	2.88	>1
	Neutral Cost	872	0	9.5	0.70	0.92	1.42	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Climate Zone 13

Table 75: Single Family Climate Zone 13 Results Summary

Climate Zone 13 PG&E Single Family		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	352	n/a	n/a	2.02	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	311	4.5	(0.21)	1.80	0.22	$3,060	0.76	1.28
	Efficiency-Equipment	(0)	292	5.5	(0.24)	1.70	0.32	$611	5.26	8.40
	Efficiency & PV/Battery	(19)	311	9.5	(0.11)	1.69	0.33	$6,954	0.36	1.56
All-Electric[2]	Code Compliant	4,180	0	n/a	n/a	1.08	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	3,428	0	5.0	0.00	0.92	0.15	$4,154	1.12	1.40
	Efficiency-Equipment	3,177	0	6.0	0.00	0.87	0.21	$2,108	2.88	3.30
	Efficiency & PV	934	0	13.0	1.61	0.57	0.50	$10,532	1.70	1.47
	Efficiency & PV/Battery	(11)	0	22.0	2.32	0.35	0.73	$16,806	1.40	1.54
Mixed Fuel to All-Electric[3]	Code Compliant	4,180	0	0.0	0.00	1.08	0.94	($5,349)	0.54	1.83
	Efficiency & PV	934	0	13.0	1.61	0.57	1.44	$5,184	1.56	>1
	Neutral Cost	2,092	0	7.0	1.36	0.79	1.23	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Table 76: Multifamily Climate Zone 13 Results Summary (Per Dwelling Unit)

Climate Zone 13 PG&E Multifamily		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	135	n/a	n/a	2.30	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	123	3.0	(0.05)	2.12	0.18	$831	0.63	1.27
	Efficiency-Equipment	(0)	121	3.0	(0.07)	2.10	0.21	$290	1.95	3.75
	Efficiency & PV/Battery	(9)	123	10.5	0.00	1.95	0.35	$2,936	0.38	1.64
All-Electric[2]	Code Compliant	1,849	0	n/a	n/a	1.36	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	1,629	0	3.0	0.00	1.24	0.12	$1,011	1.31	1.56
	Efficiency-Equipment	1,590	0	3.5	0.00	1.21	0.16	$795	1.98	2.28
	Efficiency & PV	501	0	12.0	0.73	0.80	0.56	$3,462	2.12	1.71
	Efficiency & PV/Battery	(5)	0	23.5	1.11	0.44	0.92	$6,650	1.35	1.74
Mixed Fuel to All-Electric[3]	Code Compliant	1,849	0	0.0	0.00	1.36	0.94	($2,337)	0.63	1.54
	Efficiency & PV	63	0	12.0	0.73	0.80	1.50	$1,125	3.22	>1
	Neutral Cost	773	0	8.5	0.70	0.94	1.36	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Climate Zone 14 SCE/SoCalGas

Table 77: Single Family Climate Zone 14 SCE/SoCalGas Results Summary

Climate Zone 14 SCE/SoCalGas Single Family		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	371	n/a	n/a	2.35	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	319	4.5	(0.17)	2.06	0.29	$1,662	1.57	2.46
	Efficiency-Equipment	(0)	305	5.5	(0.19)	1.98	0.36	$799	3.95	6.14
	Efficiency & PV/Battery	(5)	319	9.0	(0.08)	1.83	0.52	$5,526	1.31	1.74
All-Electric[2]	Code Compliant	4,725	0	n/a	n/a	1.38	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	3,819	0	5.5	0.00	1.19	0.19	$4,154	0.95	1.46
	Efficiency-Equipment	3,676	0	6.0	0.00	1.16	0.22	$2,108	2.29	3.13
	Efficiency & PV	953	0	15.5	1.60	0.93	0.45	$10,459	1.21	1.62
	Efficiency & PV/Battery	(2)	0	23.5	2.21	0.63	0.75	$16,394	1.35	1.59
Mixed Fuel to All-Electric[3]	Code Compliant	4,725	0	0.0	0.00	1.38	0.97	($5,349)	0.72	1.67
	Efficiency & PV	953	0	15.5	1.60	0.93	1.42	$5,111	1.01	>1
	Neutral Cost	2,299	0	8.5	1.35	1.15	1.19	$0	0.00	>1
	Min Cost Effectiveness	1,853	0	10.0	1.61	1.12	1.23	($1,000)	1.24	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, Neutral Cost, and Min Cost Effectiveness packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Table 78: Multifamily Climate Zone 14 SCE/SoCalGas Results Summary (Per Dwelling Unit)

Climate Zone 14 SCE/SoCalGas Multifamily		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	141	n/a	n/a	2.76	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	126	3.0	(0.04)	2.53	0.23	$874	0.73	1.21
	Efficiency-Equipment	(0)	126	3.0	(0.05)	2.52	0.23	$347	1.96	2.99
	Efficiency & PV/Battery	(3)	126	9.5	0.01	2.18	0.58	$2,957	1.09	1.39
All-Electric[2]	Code Compliant	2,022	0	n/a	n/a	1.73	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	1,759	0	3.5	0.00	1.58	0.15	$1,011	1.24	1.65
	Efficiency-Equipment	1,748	0	3.5	0.00	1.56	0.16	$795	1.59	2.20
	Efficiency & PV	504	0	14.0	0.70	1.26	0.47	$3,356	1.39	1.91
	Efficiency & PV/Battery	(2)	0	24.5	1.03	0.79	0.94	$6,380	1.36	1.77
Mixed Fuel to All-Electric[3]	Code Compliant	2,022	0	0.0	0.00	1.73	1.03	($2,337)	1.13	1.48
	Efficiency & PV	63	0	14.0	0.70	1.26	1.50	$1,019	2.57	>1
	Neutral Cost	772	0	10.0	0.70	1.41	1.35	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Climate Zone 14 SDGE

Table 79: Single Family Climate Zone 14 SDGE Results Summary

Climate Zone 14 SDG&E Single Family		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	371	n/a	n/a	2.35	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	319	4.5	(0.17)	2.06	0.29	$1,662	1.92	2.46
	Efficiency-Equipment	(0)	305	5.5	(0.19)	1.98	0.36	$799	4.88	6.14
	Efficiency & PV/Battery	(5)	319	9.0	(0.08)	1.83	0.52	$5,526	1.23	1.74
All-Electric[2]	Code Compliant	4,725	0	n/a	n/a	1.38	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	3,819	0	5.5	0.00	1.19	0.19	$4,154	1.30	1.46
	Efficiency-Equipment	3,676	0	6.0	0.00	1.16	0.22	$2,108	2.92	3.13
	Efficiency & PV	953	0	15.5	1.60	0.93	0.45	$10,459	1.80	1.62
	Efficiency & PV/Battery	(2)	0	23.5	2.21	0.63	0.75	$16,394	1.67	1.59
Mixed Fuel to All-Electric[3]	Code Compliant	4,725	0	0.0	0.00	1.38	0.97	($5,349)	0.60	1.67
	Efficiency & PV	953	0	15.5	1.60	0.93	1.42	$5,111	1.94	>1
	Neutral Cost	2,299	0	8.5	1.35	1.15	1.19	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Table 80: Multifamily Climate Zone 14 SDGE Results Summary (Per Dwelling Unit)

Climate Zone 14 SDG&E Multifamily		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	141	n/a	n/a	2.76	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	126	3.0	(0.04)	2.53	0.23	$874	0.93	1.21
	Efficiency-Equipment	(0)	126	3.0	(0.05)	2.52	0.23	$347	2.48	2.99
	Efficiency & PV/Battery	(3)	126	9.5	0.01	2.18	0.58	$2,957	0.51	1.39
All-Electric[2]	Code Compliant	2,022	0	n/a	n/a	1.73	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	1,759	0	3.5	0.00	1.58	0.15	$1,011	1.47	1.65
	Efficiency-Equipment	1,748	0	3.5	0.00	1.56	0.16	$795	2.00	2.20
	Efficiency & PV	504	0	14.0	0.70	1.26	0.47	$3,356	2.16	1.91
	Efficiency & PV/Battery	(2)	0	24.5	1.03	0.79	0.94	$6,380	1.69	1.77
Mixed Fuel to All-Electric[3]	Code Compliant	2,022	0	0.0	0.00	1.73	1.03	($2,337)	0.51	1.48
	Efficiency & PV	63	0	14.0	0.70	1.26	1.50	$1,019	2.60	>1
	Neutral Cost	772	0	10.0	0.70	1.41	1.35	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Climate Zone 15

Table 81: Single Family Climate Zone 15 Results Summary

Climate Zone 15 SCE/SoCalGas Single Family		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	0	149	n/a	n/a	1.69	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	0	141	4.5	(0.43)	1.56	0.13	$2,179	1.00	1.58
	Efficiency-Equipment	(0)	132	4.5	(0.45)	1.51	0.18	($936)	>1	>1
	Efficiency & PV/Battery	(3)	141	7.0	(0.34)	1.38	0.32	$6,043	1.15	1.51
All-Electric[2]	Code Compliant	2,149	0	n/a	n/a	1.32	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	1,230	0	5.5	0.00	1.12	0.20	$4,612	1.12	1.58
	Efficiency-Equipment	866	0	7.0	0.00	1.04	0.28	$2,108	3.30	4.47
	Efficiency & PV	1,030	0	6.0	0.12	1.10	0.22	$5,085	1.12	1.57
	Efficiency & PV/Battery	(2)	0	13.0	0.83	0.84	0.48	$11,382	1.16	1.54
Mixed Fuel to All-Electric[3]	Code Compliant	2,149	0	0.0	0.00	1.32	0.37	($5,349)	1.73	2.21
	Efficiency & PV	1,030	0	6.0	0.12	1.10	0.59	($264)	>1	>1
	Neutral Cost	23	0	6.0	1.36	1.13	0.57	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Table 82: Multifamily Climate Zone 15 Results Summary (Per Dwelling Unit)

Climate Zone 15 SCE/SoCalGas Multifamily		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	0	93	n/a	n/a	2.53	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	0	92	4.0	(0.15)	2.42	0.11	$510	1.35	2.28
	Efficiency-Equipment	0	86	4.0	(0.16)	2.33	0.20	($157)	>1	>1
	Efficiency & PV/Battery	(3)	92	8.5	(0.10)	2.13	0.40	$2,604	1.29	1.70
All-Electric[2]	Code Compliant	1,243	0	n/a	n/a	1.78	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	954	0	4.0	0.00	1.61	0.17	$1,011	1.50	2.28
	Efficiency-Equipment	764	0	6.0	0.00	1.50	0.29	$1,954	1.24	1.72
	Efficiency & PV	548	0	7.0	0.24	1.50	0.28	$1,826	1.43	2.07
	Efficiency & PV/Battery	(3)	0	16.5	0.62	1.08	0.70	$5,020	1.34	1.80
Mixed Fuel to All-Electric[3]	Code Compliant	1,243	0	0.0	0.00	1.78	0.75	($2,337)	6.36	2.35
	Efficiency & PV	68	0	7.0	0.24	1.50	1.03	($511)	>1	>1
	Neutral Cost	78	0	7.5	0.70	1.48	1.05	$0	>1	>1

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Climate Zone 16

Table 83: Single Family Climate Zone 16 Results Summary

Climate Zone 16 PG&E Single Family		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	(0)	605	n/a	n/a	3.31	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	0	454	5.0	0.01	2.59	0.72	$3,542	1.62	1.46
	Efficiency-Equipment	0	474	6.0	(0.08)	2.66	0.65	$2,441	2.19	2.20
	Efficiency & PV/Battery	(18)	454	10.5	0.10	2.36	0.95	$7,399	0.87	1.37
All-Electric[2]	Code Compliant	7,694	0	n/a	n/a	1.73	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	5,696	0	9.5	0.00	1.38	0.35	$5,731	1.72	1.69
	Efficiency-Equipment	6,760	0	4.5	0.00	1.55	0.18	$2,108	2.36	2.32
	Efficiency & PV	1,032	0	26.5	2.75	0.94	0.79	$16,582	2.09	1.62
	Efficiency & PV/Battery	(11)	0	35.0	3.45	0.64	1.09	$22,838	1.71	1.55
Mixed Fuel to All-Electric[3]	Code Compliant	7,694	0	0.0	0.00	1.73	1.58	($5,349)	0.31	0.68
	Efficiency & PV	1,032	0	26.5	2.75	0.94	2.37	$11,234	1.55	2.02
	Neutral Cost	5,398	0	8.5	1.35	1.51	1.80	$0	0.00	0.74
	Min Cost Effectiveness	3,358	0	16.0	2.56	1.32	1.99	($4,753)	1.24	1.40

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, Neutral Cost, and Min Cost Effectiveness packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

Table 84: Multifamily Climate Zone 16 Results Summary (Per Dwelling Unit)

Climate Zone 16 PG&E Multifamily		Annual Net kWh	Annual therms	EDR Margin[4]	PV Size Change (kW)[5]	CO2-Equivalent Emissions (lbs/sf)		NPV of Lifetime Incremental Cost ($)	Benefit to Cost Ratio (B/C)	
						Total	Reduction		On-Bill	TDV
Mixed Fuel[1]	Code Compliant	0	206	n/a	n/a	3.45	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	(0)	172	2.0	0.03	3.02	0.44	$937	1.11	1.19
	Efficiency-Equipment	(0)	183	2.5	(0.02)	3.12	0.33	$453	1.76	2.15
	Efficiency & PV/Battery	(9)	172	9.5	0.08	2.65	0.80	$3,028	0.47	1.28
All-Electric[2]	Code Compliant	2,699	0	n/a	n/a	1.86	n/a	n/a	n/a	n/a
	Efficiency-Non-Preempted	2,329	0	4.0	0.00	1.70	0.16	$843	2.08	2.05
	Efficiency-Equipment	2,470	0	3.0	0.00	1.74	0.13	$795	1.59	1.70
	Efficiency & PV	518	0	19.5	1.07	1.23	0.63	$4,423	2.58	1.89
	Efficiency & PV/Battery	(6)	0	29.5	1.42	0.75	1.11	$7,533	1.65	1.69
Mixed Fuel to All-Electric[3]	Code Compliant	2,699	0	0.0	0.00	1.86	1.59	($2,337)	0.43	1.03
	Efficiency & PV	65	0	19.5	1.07	1.23	2.22	$2,087	2.87	>1
	Neutral Cost	1,518	0	10.0	0.70	1.56	1.90	$0	>1	2.58

[1]All reductions and incremental costs relative to the **mixed fuel** code compliant home.
[2]All reductions and incremental costs relative to the **all-electric** code compliant home.
[3]All reductions and incremental costs relative to the **mixed fuel** code compliant home except the EDR Margins are relative to the Standard Design for each case which is the **all-electric** code compliant home. Incremental costs for these packages reflect the cots used in the On-Bill cost effectiveness methodology. Costs differ for the TDV methodology due to differences in the site gas infrastructure costs (see Section 2.6).
[4]This represents the Efficiency EDR Margin for the Efficiency-Non-Preempted and Efficiency-Equipment packages and Total EDR Margin for the Efficiency & PV, Efficiency & PV/Battery, and Neutral Cost packages.
[5]Positive values indicate an increase in PV capacity relative to the Standard Design.

CALIFORNIA ENERGY CODES & STANDARDS
A STATEWIDE UTILITY PROGRAM

Last modified: 2021/03/12

2020 REACH CODE
COST-EFFECTIVENESS ANALYSIS:

Detached Accessory Dwelling Units

Prepared by:
TRC, P2S Engineers

Prepared for:
Christopher Kuch, Codes and Standards Program, Southern California Edison Company

SDGE A Sempra Energy utility
SoCalGas A Sempra Energy utility
SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company
PG&E Pacific Gas and Electric Company

Legal Notice

This report was prepared by Southern California Edison Company and funded by the California utility customers under the auspices of the California Public Utilities Commission.

Acronym List

B/C – Benefit-to-Cost Ratio

CBECC - California Building Energy Code Compliance

CBSC - California Building Standards Commission

CEC - California Energy Commission

CZ – Climate Zone

GHG - Greenhouse Gas

IOU – Investor-Owned Utility

POU – Publicly Owned Utility

PG&E – Pacific Gas & Electric (utility)

SCE – Southern California Edison (utility)

SCG – Southern California Gas (utility)

SDG&E – San Diego Gas & Electric (utility)

CPAU – City of Palo Alto Utilities

SMUD – Sacramento Municipal Utility District

LADWP – Los Angeles Department of Water and Power

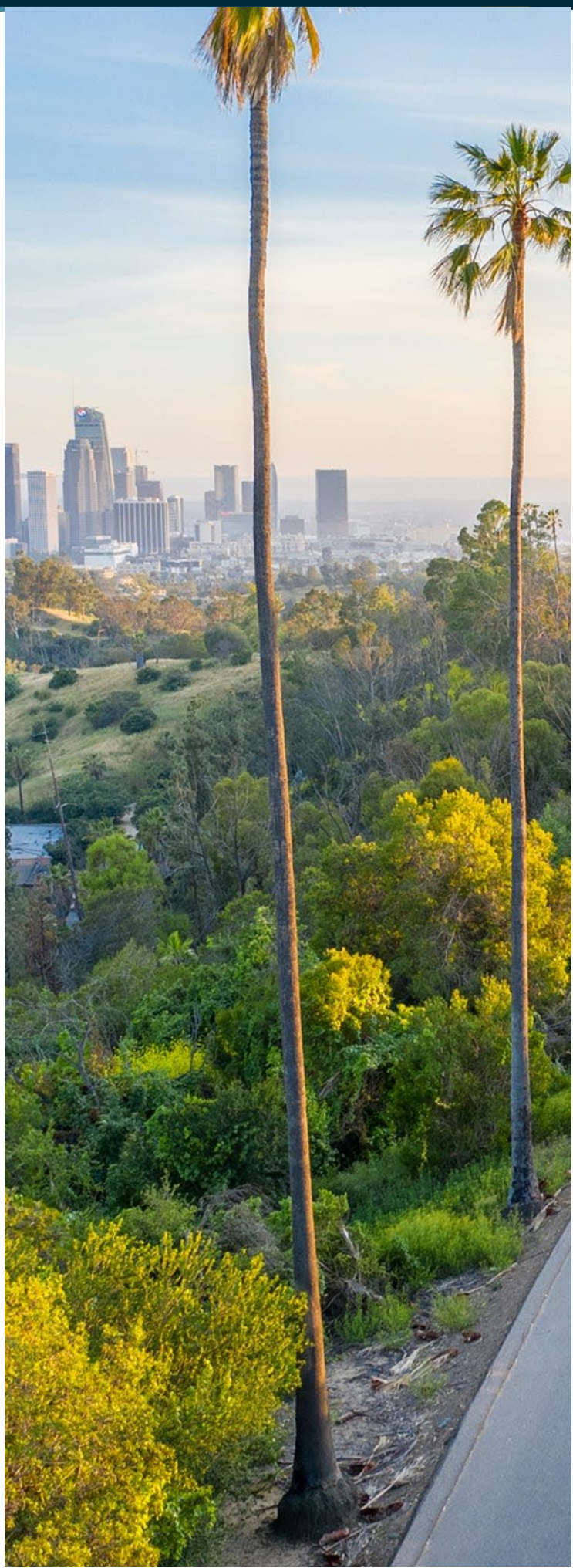
kWh – Kilowatt Hour

NPV – Net Present Value

PV - Solar Photovoltaic

TDV - Time Dependent Valuation

Title 24 – California Code of Regulations Title 24, Part 6



Summary of Revisions		
Date	**Description**	**Reference (page or section)**
3/12/2021	Original Release	NA

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1 Introduction

The California Building Energy Efficiency Standards Title 24, Part 6 (Title 24) (CEC, 2019) is maintained and updated every three years by two state agencies: the California Energy Commission (the Energy Commission) and the Building Standards Commission (BSC). In addition to enforcing the code, local jurisdictions have the authority to adopt local energy efficiency ordinances—or reach codes—that exceed the minimum standards defined by Title 24 (as established by Public Resources Code Section 25402.1(h)2 and Section 10-106 of the Building Energy Efficiency Standards). Local jurisdictions must demonstrate that the requirements of the proposed ordinance are cost-effective and do not result in buildings consuming more energy than is permitted by Title 24. In addition, the jurisdiction must obtain approval from the Energy Commission and file the ordinance with the BSC for the ordinance to be legally enforceable.

This report documents cost-effective combinations of measures that exceed the minimum state requirements, the 2019 Building Energy Efficiency Standards, effective January 1, 2020, for newly constructed detached Accessory Dwelling Unit (ADU) buildings. This report was developed in coordination with the California Statewide Investor-Owned Utilities (CA IOUs) Codes and Standards Program, key consultants, and engaged cities—collectively known as the Reach Code Team.

The Reach Code Team published a residential new construction report in 2019 that documented the cost-effectiveness of energy measure packages of single family and low-rise multifamily prototypes (Statewide Reach Code Team, 2019). Based on stakeholder requests, this report extends that analysis to Residential Detached Accessory Dwelling Units (ADUs). Measures include energy efficiency, electrification, solar photovoltaics (PV), and battery storage.

The Department of Energy (DOE) sets minimum efficiency standards for equipment and appliances that are federally regulated under the National Appliance Energy Conservation Act, including heating, cooling, and water heating equipment (E-CFR, 2020). Since state and local governments are prohibited from adopting higher minimum efficiencies than the federal standards require, the focus of this study is to identify and evaluate cost-effective packages that do not include high efficiency heating, cooling, and water heating equipment. High efficiency appliances are often the easiest and most affordable measures to increase energy performance. While federal preemption limits reach code mandatory requirements for covered appliances, in practice, builders may install any package of compliant measures to achieve the performance requirements.

2 Methodology and Assumptions

The Reach Codes Team analyzed one prototype design to represent a detached ADU building using the cost-effectiveness methodology detailed in this section below. The general methodology is consistent with analyses of other prototypes, whereas some specifics such as utility rate selection are customized for the residential detached ADU prototype.

2.1 Reach Codes

This section describes the approach to calculating cost-effectiveness including benefits, costs, metrics, and utility rate selection.

2.1.1 Benefits

This analysis used both on-bill and time dependent valuation (TDV) of energy-based approaches to evaluate cost-effectiveness. Both on-bill and TDV require estimating and quantifying the energy savings and costs associated with energy measures. The primary difference between on-bill and TDV is how energy is valued:

- On-Bill: Customer-based lifecycle cost approach that values energy based upon estimated site energy usage and customer on-bill savings using electricity and natural gas utility rate schedules over a 30-year duration for the detached ADU accounting for a three percent discount rate and energy cost inflation per Appendix 7.4 .
- TDV: TDV was developed by the Energy Commission to reflect the time dependent value of energy including long-term projected costs of energy such as the cost of providing energy during peak periods of demand and other societal costs including projected costs for carbon emissions and grid transmission impacts. This metric values energy use differently depending on the fuel source (gas, electricity, and propane), time of day, and season. Electricity used (or saved) during peak periods has a much higher value than electricity used (or saved) during off-peak periods.

The Reach Code Team performed energy simulations using the most recent software available for 2019 Title 24 code compliance analysis, CBECC-Res 2019.1.3. The Team also used CBECC-Res 2022.0.1 RV for testing the impacts of updated weather files and 2022 TDV multipliers on cost-effectiveness. 2022 weather files have more cooling loads and less heating loads, and 2022 TDV multipliers increased significantly for fossil-fuel sources to reflect CO2 price forecasts and emissions abatement, while comparatively reducing for electricity to reflect increased renewable generation penetration (California Energy Commission, 2019).

2.1.2 Costs

The Reach Code Team assessed the incremental costs and savings of the energy packages over the lifecycle of 30 years. Incremental costs represent the equipment, installation, replacements, and maintenance costs of the proposed measure relative to the 2019 Title 24 Standards minimum requirements or standard industry practices. The Reach Code Team obtained measure costs from manufacturer distributors, contractors, literature review, and online sources such as Home Depot and RS Means. Taxes and contractor markups were added as appropriate. Maintenance and replacement costs are included.

2.1.3 Metrics

Cost-effectiveness is presented using net present value (NPV) and benefit-to-cost (B/C) ratio metrics.

- NPV: The Reach Code Team uses net savings (NPV benefits minus NPV costs) as the cost-effectiveness metric. If the net savings of a measure or package is positive, it is considered cost effective. Negative net savings represent net costs to the consumer. A measure that has negative energy cost benefits (energy cost increase) can still be cost effective if the costs to implement the measure are even more negative (i.e., construction and maintenance cost savings).

- B/C Ratio: Ratio of the present value of all benefits to the present value of all costs over 30 years (NPV benefits divided by NPV costs). The criteria for cost-effectiveness is a B/C greater than 1.0. A value of one indicates the savings over the life of the measure are equivalent to the incremental cost of that measure. A value greater than one represents a positive return on investment.

Improving the energy performance of a building often requires an initial investment. In most cases the benefit is represented by annual on-bill utility or TDV savings, and the cost by incremental first cost and replacement costs. However, some packages result in initial construction cost savings (negative incremental cost), and either energy cost savings (positive benefits), or increased energy costs (negative benefits). In cases where both construction costs and energy-related savings are negative, the construction cost savings are treated as the benefit while the increased energy costs are the cost. In cases where a measure or package is cost-effective immediately (i.e., upfront construction cost savings and lifetime energy cost savings), B/C ratio cost-effectiveness is represented by “>1”. Because of these situations, NPV savings are also reported, which, in these cases, are positive values.

2.1.4 Utility Rates

In coordination with the CA IOU rate team, and the publicly available information for several Publicly-Owned-Utilities (POUs), the Reach Code Team determined appropriate utility rates for each climate zone and package. The utility tariffs, summarized in Table 1, were determined based on the annual load profile of the prototype and the corresponding package, the most prevalent rate in each territory, and information assuring that the rates were not getting phased out.

TRC assumed that the ADU would have a separate electric and gas meter. A time-of-use (TOU) rate was applied to all cases. For cases with PV generation, the approved NEM tariffs were applied along with minimum daily use billing and mandatory non-bypassable charges. For the PV cases annual electric production was always less than annual electricity consumption; and therefore, no credits for surplus generation were necessary. For a more detailed breakdown of the rates selected refer to Appendix 7.2 - Utility Rate Schedules.

Table 1. Utility Tariffs Used Based on Climate Zone

Climate Zones	Electric / Gas Utility	Electricity	Natural Gas
IOUs			
1-5,11-13,16	PG&E	E-TOU Option C	G-1
6, 8-10, 14, 15	SCE / Southern California Gas Company	TOU-D Option 4-9	GM
7, 10, 14	San Diego Gas and Electric Company (SDG&E)	TOU-DR-1	GM
POUs			
4	City of Palo Alto (CPAU)	E-1	G-1
12	Sacramento Municipal Utility District (SMUD) / PG&E	R TOD Option 5-8	G-1
6, 8, 9	Los Angeles Department of Water and Power (LADWP) / SCG	R-1	GM (GM-E)
16	Los Angeles Department of Water and Power (LADWP) / PG&E	R-1	G-1

Utility rates are assumed to escalate over time, using assumptions from research conducted by Energy and Environmental Economics (E3) in the 2019 study Residential Building Electrification in California (Energy & Environmental Economics, 2019). Escalation of natural gas rates between 2020 and 2022 is based on the currently

filed General Rate Cases for PG&E, SoCalGas and SDG&E. From 2023 through 2025, gas rates are assumed to escalate at four percent per year above inflation, which reflects historical rate increases between 2013 and 2018. Escalation of electricity rates from 2020 through 2025 is assumed to be four percent per year above inflation, based on electric utility estimates. After 2025, escalation rates for both natural gas and electric rates are assumed to drop to a more conservative one percent escalation per year above inflation for long-term rate trajectories beginning in 2026 through 2050. See Appendix 7.4 - ***Utility Rate Schedules*** for additional details.

2.2 Greenhouse Gas Emissions

The analysis uses the greenhouse gas (GHG) emissions estimates built-in to CBECC-Res. There are 8760 hourly multipliers accounting for time dependent energy use and carbon emissions based on source emissions, including renewable portfolio standard projections. Natural gas fugitive emissions, which are shown to be substantial, are not included. There are two strings of multipliers—one for Northern California climate zones, and another for Southern California climate zones.[1].

[1] CBECC-Res multipliers are the same for CZs 1-5 and 11-13 (presumed to be Northern California), while there is another set of multipliers for CZs 6-10 and 14-16 (assumed to be Southern California).

3 Prototypes, Measure Packages, and Costs

This section describes the prototype and the scope of analysis drawing from previous 2019 Reach Code research where necessary.

A customized detached ADU prototype was built to reflect California construction. TRC designed the baseline prototype to be mixed fuel and have total EDR margins as close to zero as possible to reflect a prescriptively compliant new construction building in each climate zone.

ADUs are additional dwelling units typically built on the property of an existing single-family parcel. ADUs are defined as new construction in the energy code when they are ground-up developments, do not convert an existing space to livable space, and are not attached to the primary dwelling. The Reach Code Team leveraged prior research and performed interviews to help define the detached ADU baseline and measure packages, primarily to include infrastructural costs.

3.1 Prior Reach Code Research

In 2019, the Statewide CA IOU Reach Codes Team analyzed the cost-effectiveness of residential new construction projects for mixed-fuel plus efficiency, all-electric plus efficiency, and demand flexibility packages (Statewide Reach Codes Team 2019a). Using this analysis, several cities and counties in California adopted local energy code amendments encouraging or requiring that low-rise residential new construction to be all-electric. However, many jurisdictions exempted ADUs from these requirements due to uncertainties around how infrastructural and operational costs may be different between mixed-fuel and all-electric detached ADUs, and to avoid potentially stifling ADU development.

Because the mixed-fuel packages plus efficiency ADUs are not subject to jurisdictional exemptions, this study focuses on a new construction all-electric detached ADU and discerns how infrastructural costs and operational costs may impact the cost-effectiveness compared to a mixed-fuel baseline.

3.2 Prototype Characteristics

To determine a typical set of ADU characteristics, the Reach Code team contacted over twenty ADU builders and city staff members from regions representing Sacramento, the San Francisco Bay Area, the Los Angeles area, and the San Diego area. Ultimately, four builders with construction experience with multiple projects and two city staff members with experience reviewing and approving ADU project plans were interviewed. Respondents indicated that there are not particular determinants for siting and sizing detached ADUs other than the site conditions—maximizing available space is the key consideration. Responses varied greatly on detached ADU size, as client preference, location, and avoidance of impact fees were expressed as considerations. Sizes can range from roughly 300 ft^2 for a studio to over 1200 ft^2 for a two-bedroom unit. The Reach Code team selected an average size of 750 ft^2 as a typical size for a detached ADU. 750 ft^2 also relates to a threshold for state regulation over which impact fees and discretionary approval would be applied. Some other findings include:

- **Setback requirements** follow the four-foot setback requirements of state Assembly Bill 881. Mechanical equipment may not reside in the setbacks, however, interviewees indicated that there is always one side of the ADU that isn't against a setback. Mechanical equipment can usually be placed along those sides and be hidden by a shed or fence.
- Mechanical **equipment footprints** may be too big to include inside an ADU with limited floor area, so clients tend to want to locate the mechanical equipment outside. This is reflected in the all-electric Package 2 (see *Section **3.4***).
- Some cities have **noise ordinances** that limit maximum decibels at the property line, which may pose issues for exterior heat pump water heaters or heating, ventilation, and air-conditioning (HVAC) equipment. These maximum noise requirements range from 50-66 decibels (dBs), and exterior heat pump equipment commonly ranges between 45-60 decibels at the equipment. Interviewees did not express significant concerns about

noise ordinances because manufacturers can provide sound blankets to reduce the decibel rating by five or more decibels, or developers can locate equipment in an insulated shed to reduce noise.

- When adding a detached ADU the primary dwelling's **electrical panel and service connection** nearly always needs to be upgraded at least to a 125-amp panel, and at least a 200-amp panel where solar PV is being installed. A 225-amp panel is also common. Electrical upgrades cost roughly $3500, for most common existing panel sizes or upgraded panel sizes.
- The **distance** between the detached ADU and primary dwelling can range widely due to lot size and location of meter and other infrastructure, from as little as five feet to over 100 feet. Based on respondent feedback, the Reach Code Team used an average distance of 50 feet as the length for both the natural gas and electrical line extensions for costing purposes.
- Cities do not impose a differing **fee structure** between all-electric or mixed-fuel ADU design. Fees range from $4,000 - $6,000 including inspections.

Table 2 summarizes the ADU prototype characteristics, based on prescriptive Title 24 new construction requirements.

Table 2. Detached ADU Baseline Mixed-fuel Prototype Characteristics

Conditioned floor area (ft^2)	750
Number of stories	1
Distance from primary dwelling (ft)	50
Wall U-factor	0.048 (CZ 1-5, 8-16), 0.065 (CZ 6,7)
Roof Assembly	Option B in Table 150.1-A of Title 24 2019
Window-to-floor area ratio	20%
Solar PV size	Each climate zone sized as 'Specific PV System Scaling' = 1 offsetting 100% of electricity load

3.3 Measure Definitions and Costs

ADU measures fall into two categories: those associated with building all-electric, and those associated with general efficiency and demand flexibility.

3.3.1 All-Electric

For HVAC and water heating appliance-related costs, the Reach Code Team primarily leveraged measure definitions and costs from the 2019 Residential New Construction Reach Code Cost-Effectiveness Study. For HVAC system, air-conditioning is included in both baseline and proposed models. For in-house and site infrastructure the Reach Code Team developed new data based on interviews and RS Means.

The Reach Code Team found that a new detached ADU would require that the building owner upgrade the service connection to the lot in both the mixed-fuel ADU design and the all-electric design. The most common size for this upgrade is 225A, which would not represent an incremental cost from the mixed-fuel project to the all-electric project. Feeder wiring to the ADU and the ADU subpanel will need to be slightly upgraded for the all-electric design. Electric vehicle (EV) infrastructure upgrades are excluded from this analysis as ADUs are not required to have dedicated parking – however, a 225-amp panel is likely to be sufficient for some EV infrastructure for a majority of existing homes. The total cost for the all-electric measures is summarized in Table 3.

Table 3. New Construction Detached ADU Construction Costs, All CZs

	Mixed-Fuel Cost	All-Electric Measure	All-Electric Cost	All-Electric Incremental Cost	Source
Appliances: Space heater, water heater, clothes dryer, range.				($221)	Residential New Construction Report (2019) Table 6
In-house gas plumbing	$540	In-house electrical upgrades for branch circuits	$600	$60	RSMeans
Site gas service extension	$1,998	No site gas service	$0	($1998)	Interviews, RSMeans
Site electrical service connection upgrade 225A	$3,500	Site electrical service connection upgrade 225A	$3,500	$0	
100A Feeder to ADU with breaker	$933	125A feeder to ADU	$1,206	$273	
100A ADU subpanel	$733	125A ADU subpanel	$946	$213	
Outdoor closet	n/a	Heat pump water heater closet*	$650	$650	
Total (HPWH outside closet)	**$7,704**		**$6,901**	**($1,024)**	
Total (HPWH in conditioned space)	**$7,704**		**$6,251**	**($1,674)**	

* Additional cost for outdoor closet is required only for climate zones where heat pump water heater is located 'Outside'.

3.3.2 Efficiency and Solar PV

The Reach Code team used the efficiency measures and costs developed in the 2019 Residential New Construction report (2019). The measures are summarized below by climate zone, including measure costs, in Table 4.

Table 4. Measures for Detached ADU

Measure Name	Applicable Climate Zones	Incremental Cost Description	Cost for ADU Prototype
Verified low leakage ducts in conditioned space (including HERS* verification)	All	$0.31/ft^2 of floor area + $110 HERS test	$343
Low pressure drop ducts - 2% vs 5%	All	$96/hr labor for installation	$96
Reduced infiltration: 3ACH50 vs 5ACH50	13, 14, 16	$0.115/ft^2 + $100 HERS test	$186
Exterior wall insulation: R-7.5 vs R-5 (U-0.043)	15	$0.36/ft^2 of floor area	$272
High performance attics: R-38 attic floor + R-30 Under Deck	1, 11-16	$0.34/ft^2 attic floor + $1.61/ft^2 roof	$1,563
Cool roof - 0.25 vs 0.20	9-15	$0.09/ft^2 of roof	$73
Improved fenestration	1, 2, 16	$4.23/ft^2 of window	$381

Measure Name	Applicable Climate Zones	Incremental Cost Description	Cost for ADU Prototype
Slab edge insulation: R-10 vs R-0	1-5, 10-15	$4/linear foot	$339
Solar PV to offset 90% of the annual electricity use**	All	$3.99/Wdc	$800-$6,200 depending on climate zone
Total Costs			$4,500 - $10,253 depending on climate zone.

*HERS = Home Energy Rating System
**Incremental cost for added PV over and above the prescriptive PV size in baseline models.

The cost for solar PV is derived from an LBNL study (Barbose, 2019) and Rooftop Solar PV System Measure Study (California Energy Commission, 2017), summarized in Table 5. Solar PV prices have been discounted to reflect the federal solar investment tax credit, by an average of 26% over 2021 and 2022.

Table 5. Solar PV Measure Cost Breakdown

	Unit Cost, $2020 Present Value	Useful Life (yrs.)	Source
Solar PV System	$3.70 / Wdc	30	LBNL Study
Inverter Replacement, year 11	$0.15 / Wdc	10	E3 Rooftop Solar PV System Report (CEC 2017)[2]
Inverter Replacement, year 21	$0.12 / Wdc	10	
Annual Maintenance Costs	$0.02 / Wdc	1	
Total	**$3.99 / Wdc**		

3.4 Measure Packages

The Reach Code Team examined the two electrification packages against a baseline mixed-fuel prescriptive package:

- Detached ADU Baseline Package: Mixed-fuel prescriptively built, including gas utility extension from primarily dwelling to detached ADU.
- All-Electric Prescriptive Minimum: All-electric prescriptively built, including heat pump water heater location per Residential Alternate Calculation Method (ACM), shown in Table 6. Includes electric utility extension upgrade from the primary dwelling to the detached ADU and avoided cost of gas utility extension. This package has the same PV size as mixed-fuel prescriptive baseline model, offsetting 100 percent of annual electricity demand.
- All-Electric Energy Efficiency + PV: All-electric prescriptively built as above, except water heater location is outside in exterior closet in all climate zones except Climate Zones 14, 15, and 16, plus energy efficiency measures, and additional solar PV (offsetting 90 percent of kWh load) to improve cost-effectiveness based on prior reach code research.

[2] Available at: https://efiling.energy.ca.gov/getdocument.aspx?tn=221366

Table 6. Heat Pump Water Heater Location, All-Electric Prescriptive Baseline

Climate Zone	Single-Family
01	Outside
02	Conditioned
03	Outside
04	Conditioned
05	Outside
06	Outside
07	Outside
08	Conditioned
09	Conditioned
10	Conditioned
11	Conditioned
12	Conditioned
13	Conditioned
14	Conditioned
15	Conditioned
16	Conditioned

Source: California Energy Commission, Residential ACM

The Reach Code Team analyzed some additional measure packages:

- 2022 TDV: Both electrification packages, 'Prescriptive Minimum' and 'Energy Efficiency + PV' are analyzed against the mixed-fuel baseline package using 2022 TDV multipliers and weather files in CBECC-Res 2022 software.
- Efficiency-Only: The All-Electric Energy Efficiency + PV package is analyzed using CBECC-Res 2019 without solar PV measure to evaluate the impact of efficiency measures alone, in the case that solar PV cannot be installed due to shading.

4 Results

Results are presented as per the prototype-specific Measure Packages described in Section 3.

There are several overarching factors to keep in mind when reviewing the results include:

- What constitutes a **'benefit'** or a **'cost'** varies with the scenarios because both energy savings, and incremental construction costs may be negative depending on the package. Typically, utility bill savings are categorized as a 'benefit' while incremental construction costs are treated as 'costs.' In cases where both construction costs are negative and utility bill savings are negative, the construction cost savings are treated as the 'benefit' while the utility bill negative savings are the 'cost.'
- All-electric packages will have lower **GHG emissions** than mixed-fuel packages in all cases, due to the clean power sources currently available from California's power providers.
- Since January 2020, compliance of low-rise residential building is analyzed using **Energy Design Rating (EDR)**. This rating scales from 1 to 100 with 100 being the performance equivalent of a 2006 International Energy Conservation Code (IECC). This study uses 'Total EDR Margin' as a compliance metric that accounts for all compliant loads along with renewable energy and battery storage. 'Total EDR Margin' of 0 represents a prescriptively compliant building that exactly matches the minimum energy budget prescribed by the 2019 T24 code.
- To receive the Energy Commission's approval, local reach codes that amend the energy code must **both be cost effective** compared to the mixed-fuel baseline package **and exceed the energy performance budget** using 'Total EDR Margin' metric (i.e., have a positive compliance margin) compared to the standard model in the compliance software. To emphasize these two important factors, the figures in this Section highlight in green the modeling results that have a positive compliance margin and/or are cost effective. This will allow readers to identify whether a scenario is fully or partially supportive of a reach code, and the opportunities/challenges that the scenario presents. Conversely, *Section 5* only highlights results that have **both** a positive compliance margin and are cost effective, to allow readers to identify reach code-ready scenarios.
- When performance modeling residential buildings of three stories or less (such as the Detached ADU), the Standard Design is electric if the Proposed Design is electric, which removes TDV-related penalties and associated negative compliance margins. This essentially allows for a **compliance pathway for all-electric residential buildings**.
- As mentioned in *Section 2.1.4*, the Reach Code Team coordinated with utilities to select tariffs for each prototype given the annual energy demand profile and the most prevalent rates in each utility territory. The Reach Code Team **did not compare a variety of tariffs** to determine their impact on cost-effectiveness although utility rate changes or updates can affect on-bill cost-effectiveness results.
- As a point of comparison, **mixed-fuel baseline** energy figures are provided in *Appendix **7.2***.
- The cost-effectiveness results for 2022 analysis differs from 2019 mainly in $TDV savings, but also differs slightly in energy consumption which translates in minor difference in on-bill energy savings. The Reach Code Team has not reported the software outputs for 2022 EDR margins as the 2022 Title 24 Part 6 code is still being developed.

4.1 All-Electric Prescriptive Minimum Results

Table 7 shows results of the ADU all-electric prescriptive minimum compared to a mixed-fuel baseline using 2019 TDV, with heat pump water heater location as per Residential ACM manual (reference Table 6). With federal-minimum efficiencies for mechanical equipment, the all-electric prescriptive pathway is not cost effective in any climate zone using IOU rates with 2019 TDV. However, with relatively lower electric prices and higher gas prices of POUs, the package is on-bill cost effective in some climate zones.

Table 7. Cost-Effectiveness for ADU: All-Electric Prescriptive Minimum, 2019 TDV

CZ	Utility	Annual Elec Savings (kWh)	Annual Gas Savings (therms)	Annual GHG Reductions (mtons)	Total EDR Margin	Incremental Package Cost	Lifecycle Utility Cost Savings	Lifecycle $TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
CZ01	PG&E	(3,600)	259	0.1	0.00	($1,024)	($7,213)	($6,951)	0.1	0.1	($6,190)	($5,927)
CZ02	PG&E	(2,646)	198	0.3	0.00	($1,674)	($3,753)	($3,897)	0.4	0.4	($2,079)	($2,223)
CZ03	PG&E	(2,397)	174	0.3	0.00	($1,024)	($3,518)	($4,366)	0.3	0.2	($2,495)	($3,342)
CZ04	PG&E	(2,263)	170	0.3	0.00	($1,674)	($2,996)	($2,765)	0.6	0.6	($1,322)	($1,092)
CZ04-2	CPAU	(2,263)	170	0.3	0.00	($1,674)	$1,389	($2,765)	>1	0.6	$3,062	($1,092)
CZ05	PG&E	(2,524)	170	0.2	0.00	($1,024)	($4,969)	($4,883)	0.2	0.2	($3,945)	($3,860)
CZ05-2	SCG	(2,524)	170	0.2	0.00	($1,024)	($4,842)	($4,883)	0.2	0.2	($3,818)	($3,860)
CZ06	SCE	(1,853)	136	0.3	0.00	($1,024)	($2,943)	($3,154)	0.3	0.3	($1,920)	($2,131)
CZ06-2	LA	(1,853)	136	0.3	0.00	($1,024)	$1,357	($3,154)	>1	0.3	$2,381	($2,131)
CZ07	SDG&E	(1,604)	121	0.3	0.00	($1,024)	($3,993)	($3,035)	0.3	0.3	($2,970)	($2,012)
CZ08	SCE	(1,594)	122	0.4	0.00	($1,674)	($2,282)	($2,279)	0.7	0.7	($609)	($605)
CZ08-2	LA	(1,594)	122	0.4	0.00	($1,674)	$1,477	($2,279)	>1	0.7	$3,151	($605)
CZ09	SCE	(1,669)	128	0.6	0.00	($1,674)	($2,403)	($2,476)	0.7	0.7	($729)	($803)
CZ09-2	LA	(1,669)	128	0.6	0.00	($1,674)	$1,509	($2,476)	>1	0.7	$3,183	($803)
CZ10	SDG&E	(1,714)	130	0.5	0.00	($1,674)	($5,035)	($2,544)	0.3	0.7	($3,362)	($871)
CZ10-2	SCE	(1,714)	130	0.5	0.00	($1,674)	($2,549)	($2,544)	0.7	0.7	($876)	($871)
CZ11	PG&E	(2,333)	177	0.4	0.00	($1,674)	($3,533)	($3,676)	0.5	0.5	($1,859)	($2,003)
CZ12	PG&E	(2,319)	182	0.5	0.00	($1,674)	($2,695)	($3,257)	0.6	0.5	($1,022)	($1,584)
CZ12-2	SMUD	(2,319)	182	0.5	0.00	($1,674)	$627	($3,257)	>1	0.5	$2,301	($1,584)
CZ13	PG&E	(2,158)	167	0.3	0.00	($1,674)	($2,683)	($3,334)	0.6	0.5	($1,009)	($1,661)
CZ14	SDG&E	(2,388)	175	0.7	0.00	($1,674)	($7,894)	($3,378)	0.2	0.5	($6,220)	($1,705)
CZ14-2	SCE	(2,388)	175	0.7	0.00	($1,674)	($4,476)	($3,378)	0.4	0.5	($2,803)	($1,705)
CZ15	SCE	(1,330)	99	(0.2)	0.00	($1,674)	($1,766)	($2,398)	0.9	0.7	($92)	($724)
CZ16	PG&E	(3,439)	274	(0.3)	0.00	($1,674)	($5,558)	($6,187)	0.3	0.3	($3,885)	($4,514)
CZ16-2	LA	(3,439)	274	(0.3)	0.00	($1,674)	$2,821	($6,187)	>1	0.3	$4,495	($4,514)

As shown in Table 8 below, the all-electric prescriptive minimum detached ADU is cost effective on TDV basis in all climate zones except 1 and 16 when using 2022 TDV and weather files, in contrast with results using 2019 TDV.

Table 8. Cost-Effectiveness for ADU: All-Electric Prescriptive Minimum, 2022 TDV

CZ	Utility	Annual Elec Savings (kWh)	Annual Gas Savings (therms)	Annual GHG Reductions (mtons)	Total EDR Margin	Upfront Incremental Package Cost	Lifecycle Utility Cost Savings	Lifecycle $TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
CZ01	PG&E	(3,353)	242	0.7	0.00	($1,024)	($6,533)	($1,656)	0.2	0.6	($5,509)	($632)
CZ02	PG&E	(2,445)	180	0.7	0.00	($1,674)	($3,617)	$219	0.5	>1	($1,944)	$1,893
CZ03	PG&E	(2,111)	153	0.6	0.00	($1,024)	($3,192)	($7)	0.3	137.2	($2,168)	$1,016
CZ04	PG&E	(1,880)	142	0.6	0.00	($1,674)	($2,437)	($167)	0.7	10.0	($763)	$1,507
CZ04-2	CPAU	(1,880)	142	0.6	0.00	($1,674)	$2,513	($167)	>1	10.0	$4,186	$1,507
CZ05	PG&E	(2,113)	145	0.6	0.00	($1,024)	($3,904)	($811)	0.3	1.3	($2,880)	$212
CZ05-2	SCG	(2,113)	145	0.6	0.00	($1,024)	($3,564)	($811)	0.3	1.3	($2,541)	$212
CZ06	SCE	(1,623)	121	0.4	0.00	($1,024)	($2,545)	$62	0.4	>1	($1,521)	$1,086
CZ06-2	LA	(1,623)	121	0.4	0.00	($1,024)	$1,381	$62	>1	>1	$2,405	$1,086
CZ07	SDG&E	(1,563)	117	0.4	0.00	($1,024)	($4,231)	$98	0.2	>1	($3,207)	$1,122
CZ08	SCE	(1,426)	114	0.4	0.00	($1,674)	($1,738)	$606	1.0	>1	($64)	$2,279
CZ08-2	LA	(1,426)	114	0.4	0.00	($1,674)	$1,598	$606	>1	>1	$3,271	$2,279
CZ09	SCE	(1,517)	119	0.4	0.00	($1,674)	($1,986)	$239	0.8	>1	($312)	$1,912
CZ09-2	LA	(1,517)	119	0.4	0.00	($1,674)	$1,556	$239	>1	>1	$3,229	$1,912
CZ10	SDG&E	(1,631)	125	0.4	0.00	($1,674)	($4,978)	$537	0.3	>1	($3,304)	$2,210
CZ10-2	SCE	(1,631)	125	0.4	0.00	($1,674)	($2,363)	$537	0.7	>1	($689)	$2,210
CZ11	PG&E	(2,155)	163	0.7	0.00	($1,674)	($3,472)	$192	0.5	>1	($1,798)	$1,865
CZ12	PG&E	(2,108)	163	0.7	0.00	($1,674)	($2,788)	$244	0.6	>1	($1,114)	$1,917
CZ12-2	SMUD	(2,108)	163	0.7	0.00	($1,674)	$464	$244	>1	>1	$2,138	$1,917
CZ13	PG&E	(1,887)	143	0.7	0.00	($1,674)	($2,765)	($93)	0.6	18.0	($1,092)	$1,581
CZ14	SDG&E	(2,187)	158	0.4	0.00	($1,674)	($7,311)	($321)	0.2	5.2	($5,638)	$1,353
CZ14-2	SCE	(2,187)	158	0.4	0.00	($1,674)	($4,058)	($321)	0.4	5.2	($2,385)	$1,353
CZ15	SCE	(1,286)	97	0.5	0.00	($1,674)	($1,636)	($112)	1.0	15.0	$38	$1,562
CZ16	PG&E	(3,137)	249	0.5	0.00	($1,674)	($4,873)	($2,248)	0.3	0.7	($3,200)	($575)
CZ16-2	LA	(3,137)	249	0.5	0.00	($1,674)	$2,502	($2,248)	>1	0.7	$4,175	($575)

4.2 All Electric Plus Efficiency and PV Results

Table 9 shows results of the all-electric prescriptive minimum using 2019 TDV with 1) heat pump water heater location is outside in exterior closet in all climate zones except Climate Zones 14, 15, and 16, 2) energy efficiency measures, and 3) additional solar PV capacity. The all-electric detached ADU is cost effective using either the on-bill or TDV approach in several climate zones. Also, similar to the package above, it is always on-bill cost effective using POU rates.

Table 9. Cost-Effectiveness for ADU: All-Electric Energy Efficiency + Additional PV, 2019 TDV

CZ	Utility	Annual Elec Savings (kWh)	Annual Gas Savings (therms)	Annual GHG Reductions (mtons)	Total EDR Margin	Upfront Incremental Package Cost	Lifecycle Utility Cost Savings	Lifecycle $TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
CZ01	PG&E	(524)	259	0.8	29.30	$5,794	$4,323	$4,123	0.7	0.7	($1,472)	($1,671)
CZ02	PG&E	(497)	198	0.8	18.70	$3,207	$2,159	$3,333	0.7	1.0	($1,048)	$126
CZ03	PG&E	(459)	174	0.8	19.00	$2,363	$2,331	$2,348	1.0	1.0	($32)	($15)
CZ04	PG&E	(465)	170	0.7	16.10	$2,314	$1,934	$2,635	0.8	1.1	($380)	$320
CZ04-2	CPAU	(465)	170	0.7	16.10	$2,314	$5,434	$2,635	2.3	1.1	$3,120	$320
CZ05	PG&E	(472)	170	0.7	20.00	$2,339	$2,538	$2,206	1.1	0.9	$199	($133)
CZ05-2	SCG	(472)	170	0.7	20.00	$2,339	$2,664	$2,206	1.1	0.9	$326	($133)
CZ06	SCE	(427)	136	0.6	16.10	$1,512	$1,836	$1,898	1.2	1.3	$324	$386
CZ06-2	LA	(427)	136	0.6	16.10	$1,512	$4,487	$1,898	3.0	1.3	$2,975	$386
CZ07	SDG&E	(404)	121	0.6	14.00	$1,170	$2,843	$1,134	2.4	1.0	$1,672	($36)
CZ08	SCE	(421)	122	0.6	12.20	$1,244	$1,503	$1,618	1.2	1.3	$260	$375
CZ08-2	LA	(421)	122	0.6	12.20	$1,244	$4,058	$1,618	3.3	1.3	$2,814	$375
CZ09	SCE	(439)	128	0.8	12.90	$1,317	$1,641	$2,170	1.2	1.6	$324	$853
CZ09-2	LA	(439)	128	0.8	12.90	$1,317	$4,227	$2,170	3.2	1.6	$2,910	$853
CZ10	SDG&E	(449)	130	0.8	12.20	$1,680	$2,168	$2,065	1.3	1.2	$488	$385
CZ10-2	SCE	(449)	130	0.8	12.20	$1,680	$1,632	$2,065	1.0	1.2	($49)	$385
CZ11	PG&E	(535)	177	0.9	15.00	$3,975	$1,994	$3,433	0.5	0.9	($1,980)	($542)
CZ12	PG&E	(494)	182	0.9	15.60	$4,121	$1,508	$3,510	0.4	0.9	($2,613)	($611)
CZ12-2	SMUD	(494)	182	0.9	15.60	$4,121	$4,685	$3,510	1.1	0.9	$564	($611)
CZ13	PG&E	(525)	167	0.7	13.30	$3,991	$1,917	$3,109	0.5	0.8	($2,074)	($881)
CZ14	SDG&E	(515)	175	1.1	15.90	$3,316	$3,257	$3,874	1.0	1.2	($59)	$558
CZ14-2	SCE	(515)	175	1.1	15.90	$3,316	$2,363	$3,874	0.7	1.2	($953)	$558
CZ15	SCE	(544)	99	0.2	7.40	$1,744	$1,630	$1,534	0.9	0.9	($115)	($210)
CZ16	PG&E	(547)	274	0.4	23.10	$4,091	$3,785	$3,801	0.9	0.9	($306)	($290)
CZ16-2	LA	(547)	274	0.4	23.10	$4,091	$9,042	$3,801	2.2	0.9	$4,951	($290)

Table 10 shows that All-Electric detached ADUs are TDV cost effective in all climate zones using 2022 TDV when including efficiency measures and additional solar PV. Note that the EDR margins have been removed since the 2022 Title 24 Part 6 code has not yet completed rulemaking at the time of the draft, but preliminary results indicate that all EDR margins will be positive.

Table 10. Cost-Effectiveness for ADU: All-Electric Energy Efficiency + Additional PV, 2022 TDV Results

CZ	Utility	Annual Elec Savings (kWh)	Annual Gas Savings (therms)	Annual GHG Reductions (mtons)	Total EDR Margin	Upfront Incremental Package Cost	Lifecycle Utility Cost Savings	Lifecycle $TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
CZ01	PG&E	(512)	242	0.3	>0	$5,648	$3,588	$7,903	0.6	1.4	($2,060)	$2,255
CZ02	PG&E	(479)	180	0.4	>0	$3,012	$1,936	$6,490	0.6	2.2	($1,076)	$3,478
CZ03	PG&E	(441)	153	0.3	>0	$2,070	$2,119	$5,235	1.0	2.5	$49	$3,165
CZ04	PG&E	(444)	142	0.4	>0	$1,875	$1,780	$4,473	0.9	2.4	($95)	$2,597
CZ04-2	CPAU	(444)	142	0.4	>0	$1,875	$5,210	$4,473	2.8	2.4	$3,335	$2,597
CZ05	PG&E	(443)	145	0.4	>0	$1,949	$2,121	$4,416	1.1	2.3	$173	$2,468
CZ05-2	SCG	(443)	145	0.4	>0	$1,949	$2,461	$4,416	1.3	2.3	$513	$2,468
CZ06	SCE	(413)	121	0.3	>0	$1,049	$1,550	$4,256	1.5	4.1	$501	$3,208
CZ06-2	LA	(413)	121	0.3	>0	$1,049	$4,067	$4,256	3.9	4.1	$3,018	$3,208
CZ07	SDG&E	(409)	117	0.3	>0	$1,073	$2,480	$3,899	2.3	3.6	$1,407	$2,826
CZ08	SCE	(431)	114	0.3	>0	$975	$1,458	$4,086	1.5	4.2	$483	$3,110
CZ08-2	LA	(431)	114	0.3	>0	$975	$3,825	$4,086	3.9	4.2	$2,850	$3,110
CZ09	SCE	(434)	119	0.3	>0	$1,049	$1,608	$4,002	1.5	3.8	$560	$2,954
CZ09-2	LA	(434)	119	0.3	>0	$1,049	$3,960	$4,002	3.8	3.8	$2,912	$2,954
CZ10	SDG&E	(457)	125	0.3	>0	$1,485	$1,760	$4,404	1.2	3.0	$274	$2,919
CZ10-2	SCE	(457)	125	0.3	>0	$1,485	$1,525	$4,404	1.0	3.0	$40	$2,919
CZ11	PG&E	(524)	163	0.4	>0	$3,853	$1,517	$5,752	0.4	1.5	($2,336)	$1,899
CZ12	PG&E	(481)	163	0.4	>0	$3,829	$1,293	$5,448	0.3	1.4	($2,535)	$1,619
CZ12-2	SMUD	(481)	163	0.4	>0	$3,829	$4,066	$5,448	1.1	1.4	$237	$1,619
CZ13	PG&E	(514)	143	0.4	>0	$3,503	$2,400	$4,852	0.7	1.4	($1,103)	$1,349
CZ14	SDG&E	(496)	158	0.3	>0	$2,731	$2,772	$5,873	1.0	2.2	$41	$3,142
CZ14-2	SCE	(496)	158	0.3	>0	$2,731	$2,090	$5,873	0.8	2.2	($641)	$3,142
CZ15	SCE	(539)	97	0.5	>0	$1,549	$1,608	$3,383	1.0	2.2	$58	$1,834
CZ16	PG&E	(526)	249	0.3	>0	$3,871	$3,173	$6,689	0.8	1.7	($698)	$2,818
CZ16-2	LA	(526)	249	0.8	>0	$3,871	$8,099	$6,689	2.1	1.7	$4,227	$2,818

5 Summary

The Reach Codes Team developed packages of energy efficiency measures as well as packages combining energy efficiency with solar PV generation, simulated them in building modeling software, and gathered costs to determine the cost-effectiveness of multiple scenarios. The Reach Codes Team coordinated assumptions with multiple utilities, cities, and building community experts to develop a set of assumptions considered reasonable in the current market. Changing assumptions, such as the period of analysis, measure selection, cost assumptions, energy escalation rates, or utility tariffs are likely to change results.

Table 11 summarizes results for each prototype and depicts the compliance margins achieved for each climate zone and package. Because local reach codes must both exceed the Energy Commission performance budget (i.e., have a positive compliance margin) and be cost-effective, the Reach Code Team highlighted cells meeting these two requirements to help clarify the upper boundary for potential reach code policies:

- Cells highlighted in **green** depict a positive compliance margin and cost-effective results using both On-Bill and TDV approaches.
- Cells highlighted in **yellow** depict a positive compliance and cost-effective results using either the On-Bill or TDV approach.
- Cells **not highlighted** either depict a negative compliance margin or a package that was not cost effective using either the On-Bill or TDV approach.

The Reach Code Team found that all-electric detached ADUs can have positive compliance margins and are cost effective in all climate zones through either the utility bill or TDV metrics when compared to a mixed fuel baseline. This is true for either prescriptive minimum or efficiency + PV packages. To promote decarbonization, local jurisdictions may choose to include new construction detached ADUs in all-electric requirements.

Table 11. Detached ADU Summary of EDR Margin and Cost-Effectiveness

CZ	Utility	All Electric, 2019 EDR		All Electric, 2022 EDR	
		Code Minimum	EE+PV	Code Minimum	EE+PV
CZ01	PG&E	0.0	29.3	0.0	>0
CZ02	PG&E	0.0	18.7	0.0	>0
CZ03	PG&E	0.0	19.0	0.0	>0
CZ04	PG&E	0.0	16.1	0.0	>0
CZ04-2	CPAU	0.0	16.1	0.0	>0
CZ05	PG&E	0.0	20.0	0.0	>0
CZ05-2	SCG	0.0	20.0	0.0	>0
CZ06	SCE	0.0	16.1	0.0	>0
CZ06-2	LADWP	0.0	16.1	0.0	>0
CZ07	SDG&E	0.0	14.0	0.0	>0
CZ08	SCE	0.0	12.2	0.0	>0
CZ08-2	LADWP	0.0	12.2	0.0	>0
CZ09	SCE	0.0	12.9	0.0	>0
CZ09-2	LADWP	0.0	12.9	0.0	>0
CZ10	SDG&E	0.0	12.2	0.0	>0
CZ10-2	SCE	0.0	12.2	0.0	>0
CZ11	PG&E	0.0	15.0	0.0	>0
CZ12	PG&E	0.0	15.6	0.0	>0
CZ12-2	SMUD	0.0	15.6	0.0	>0
CZ13	PG&E	0.0	13.3	0.0	>0
CZ14	SDG&E	0.0	15.9	0.0	>0
CZ14-2	SCE	0.0	15.9	0.0	>0
CZ15	SCE	0.0	7.4	0.0	>0
CZ16	PG&E	0.0	23.1	0.0	>0
CZ16-2	LADWP	0.0	23.1	0.0	>0

6 References

Barbose, G. a. (2019, October). Tracking the Sun. Pricing and Design Trends for Distributed Photovoltaic Systems in the United States 2019 Edition. Retrieved from https://emp.lbl.gov/sites/default/files/tracking_the_sun_2019_report.pdf

California Energy Commission. (2017). Rooftop Solar PV System. Measure number: 2019-Res-PV-D Prepared by Energy and Environmental Economics, Inc. Retrieved from https://efiling.energy.ca.gov/getdocument.aspx?tn=221366

California Energy Commission. (2019). Retrieved from https://ww2.energy.ca.gov/title24/2022standards/prerulemaking/documents/2019-10-17_workshop/2019-10-17_presentations.php

E3. (2020). *E3 Rooftop Solar PV System Report.* Retrieved from https://efiling.energy.ca.gov/getdocument.aspx?tn=221366

E-CFR. (2020). *https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=8de751f141aaa1c1c9833b36156faf67&mc=true&n=pt10.3.431&r=PART&ty=HTML#se10.3.431_197*. Retrieved from Electronic Code of Federal Regulations: https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=8de751f141aaa1c1c9833b36156faf67&mc=true&n=pt10.3.431&r=PART&ty=HTML#se10.3.431_197

National Renewable Energy Laboratory. (2018). *National Renewable Energy Laboratory (NREL) Q1 2018.* Retrieved from https://www.nrel.gov/docs/fy19osti/72399.pdf

Self Generation Incentive Program. (2020). Retrieved from http://localenergycodes.com/download/430/file_path/fieldList/PV%20Plus%20Battery%20Storage%20Report

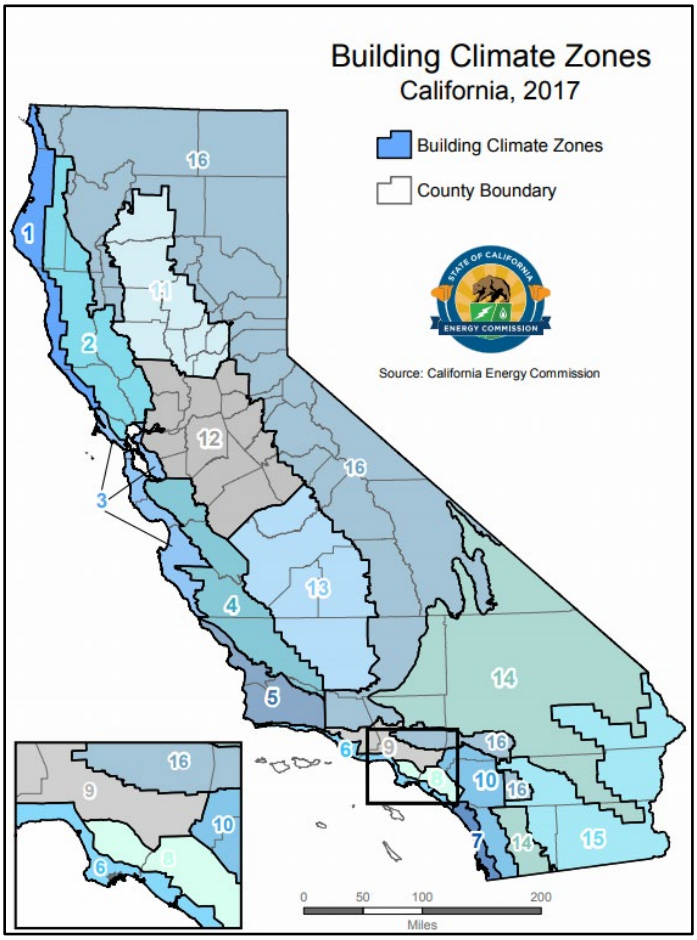
Statewide Reach Code Team. (2019, August). 2019 Cost-effectiveness Study: Low-Rise Residential New Construction. Prepared for Pacific Gas and Electric Company. Prepared by Frontier Energy. Retrieved from https://localenergycodes.com/download/800/file_path/fieldList/2019%20Res%20NC%20Reach%20Codes

7 Appendices

7.1 Map of California Climate Zones

Climate zone geographical boundaries are depicted in Figure 1. The map in Figure 1 along with a zip-code search directory is available at: https://ww2.energy.ca.gov/maps/renewable/building_climate_zones.html

Figure 1. Map of California climate zones.



7.2 Mixed Fuel Baseline Energy Figures

Table 12 show the annual electricity and natural gas consumption and on-bill cost, total EDR margin, and GHG emissions for each prototype under the mixed-fuel design baseline. The non-zero EDR margins are largely a result of compliance software complexities, and they are not expected to significantly impact the proposed case results or nature of recommendations. The annual kWh usage is 0 since code requires that PV offset 100 percent of kWh usage.

Table 12. Detached ADU Mixed Fuel Baseline

CZ	Utility	Annual Electricity Consumption (kWh)	Annual Natural Gas Consumption (Therms)	Annual Electricity Cost	Annual Natural Gas Cost	Total Annual Utility Cost	Annual GHG Emissions (mtons)
CZ01	PG&E	0	259	$194	$358	$552	1.0
CZ02	PG&E	0	198	$194	$269	$463	0.9
CZ03	PG&E	0	174	$189	$237	$425	0.9
CZ04	PG&E	0	170	$185	$231	$416	0.8
CZ04-2	CPAU	0	170	$131	$297	$429	0.8
CZ05	PG&E	0	170	$167	$232	$399	0.8
CZ05-2	SCG	0	170	$167	$237	$404	0.8
CZ06	SCE	0	136	$156	$202	$358	0.8
CZ06-2	LA	0	136	$124	$202	$326	0.8
CZ07	SDG&E	0	121	$160	$200	$359	0.8
CZ08	SCE	0	122	$161	$187	$348	0.9
CZ08-2	LA	0	122	$124	$187	$311	0.9
CZ09	SCE	0	128	$172	$193	$366	1.1
CZ09-2	LA	0	128	$125	$193	$318	1.1
CZ10	SDG&E	0	130	$166	$215	$381	1.0
CZ10-2	SCE	0	130	$183	$195	$379	1.0
CZ11	PG&E	0	177	$205	$244	$450	1.0
CZ12	PG&E	0	182	$197	$250	$447	1.0
CZ12-2	SMUD	0	182	$293	$250	$542	1.0
CZ13	PG&E	0	167	$224	$231	$454	0.9
CZ14	SDG&E	0	175	$178	$290	$468	1.4
CZ14-2	SCE	0	175	$212	$243	$455	1.4
CZ15	SCE	0	99	$333	$163	$496	0.5
CZ16	PG&E	0	274	$181	$379	$560	0.6
CZ16-2	LA	0	274	$123	$379	$502	0.6

7.3 All-Electric Energy Efficiency Only Results

Table 13 and Table 14 show the cost-effectiveness results for the all-electric energy efficiency package without PV compared to the mixed-fuel baseline without PV, in scenarios where PV cannot be installed. Without PV, the efficiency packages selected are cost effective under 2022 TDV in most Climate Zones. It is likely that a different set of efficiency measures can improve cost effectiveness, given that the all-electric prescriptive minimum is TDV cost-effective (reference Table 8), though optimization of efficiency measure packages have not been examined in this study.

Note that the 2022 EDR margins have been removed since the 2022 Title 24 Part 6 code has not yet completed rulemaking at the time of the draft, but preliminary results indicate that all EDR margins will be positive.

Table 13. Cost-Effectiveness for ADU: All-Electric Energy Efficiency Without PV, 2019 TDV

CZ	Utility	Elec Savings (kWh)	Gas Savings (therms)	GHG Reductions (mtons)	Total EDR Margin	Incremental Package Cost	Lifecycle Utility Cost Savings	$TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
CZ01	PG&E	(2,760)	259	0.8	9.30	$1,698	($7,485)	($3,679)	-4.4	-2.2	($9,183)	($5,377)
CZ02	PG&E	(2,492)	198	0.6	1.00	$135	($7,004)	($3,739)	-51.9	-27.7	($7,139)	($3,874)
CZ03	PG&E	(2,151)	174	0.5	2.80	($246)	($6,522)	($3,578)	0.0	0.1	($6,276)	($3,332)
CZ04	PG&E	(2,171)	170	0.5	0.30	($246)	($6,890)	($3,428)	0.0	0.1	($6,644)	($3,182)
CZ04-2	CPAU	(2,171)	170	0.5	0.30	($246)	($3,483)	($3,428)	0.1	0.1	($3,237)	($3,182)
CZ05	PG&E	(2,284)	170	0.5	2.70	($246)	($7,393)	($4,140)	0.0	0.1	($7,147)	($3,894)
CZ05-2	SCG	(2,284)	170	0.5	2.70	($246)	($7,266)	($4,140)	0.0	0.1	($7,021)	($3,894)
CZ06	SCE	(1,790)	136	0.4	1.70	($585)	($3,428)	($2,823)	0.2	0.2	($2,843)	($2,238)
CZ06-2	LA	(1,790)	136	0.4	1.70	($585)	$1,475	($2,823)	>1	0.2	$2,060	($2,238)
CZ07	SDG&E	(1,592)	121	0.4	0.70	($585)	($5,304)	($3,042)	0.1	0.2	($4,719)	($2,457)
CZ08	SCE	(1,622)	122	0.4	0	($585)	($2,987)	($2,644)	0.2	0.2	($2,402)	($2,059)
CZ08-2	LA	(1,622)	122	0.4	0	($585)	$1,405	($2,644)	>1	0.2	$1,990	($2,059)
CZ09	SCE	(1,685)	128	0.4	1.50	($512)	($2,763)	($2,198)	0.2	0.2	($2,251)	($1,686)
CZ09-2	LA	(1,685)	128	0.4	1.50	($512)	$1,481	($2,198)	>1	0.2	$1,993	($1,686)
CZ10	SDG&E	(1,714)	130	0.4	1.60	($173)	($6,070)	($2,211)	0.0	0.1	($5,897)	($2,038)
CZ10-2	SCE	(1,714)	130	0.4	1.60	($173)	($2,821)	($2,211)	0.1	0.1	($2,649)	($2,038)
CZ11	PG&E	(2,255)	177	0.5	2.60	$1,390	($5,976)	($2,879)	-4.3	-2.1	($7,366)	($4,270)
CZ12	PG&E	(2,282)	182	0.5	1.20	$1,390	($6,151)	($3,012)	-4.4	-2.2	($7,541)	($4,403)
CZ12-2	SMUD	(2,282)	182	0.5	1.20	$1,390	$730	($3,012)	0.5	-2.2	($661)	($4,403)
CZ13	PG&E	(2,084)	167	0.5	2.40	$1,577	($5,407)	($2,465)	-3.4	-1.6	($6,983)	($4,041)
CZ14	SDG&E	(2,066)	175	0.6	4.50	$927	($5,783)	($1,635)	-6.2	-1.8	($6,710)	($2,562)
CZ14-2	SCE	(2,066)	175	0.6	4.50	$927	($3,804)	($1,635)	-4.1	-1.8	($4,731)	($2,562)
CZ15	SCE	(949)	99	0.4	4.80	$1,013	($413)	($10)	-0.4	0.0	($1,426)	($1,023)
CZ16	PG&E	(2,872)	274	0.9	5.10	$799	($6,367)	($4,021)	-8.0	-5.0	($7,166)	($4,820)
CZ16-2	LA	(2,872)	274	0.9	5.10	$799	$3,889	($4,021)	4.9	-5.0	$3,090	($4,820)

Table 14. Cost-Effectiveness for ADU: All-Electric Energy Efficiency Without PV, 2022 TDV

CZ	Utility	Elec Savings (kWh)	Gas Savings (therms)	GHG Reductions (mtons)	Total EDR Margin	Incremental Package Cost	Lifecycle Utility Cost Savings	$TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
CZ01	PG&E	(2,629)	242	0.7	>0	$1,698	($7,361)	$1,769	-4.3	1.0	($9,059)	$71
CZ02	PG&E	(2,279)	180	0.5	>0	$135	($6,500)	$1,060	-48.2	7.9	($6,635)	$925
CZ03	PG&E	(1,958)	153	0.4	>0	($246)	($6,269)	$764	0.0	>1	($6,023)	$1,009
CZ04	PG&E	(1,852)	142	0.4	>0	($246)	($6,124)	$57	0.0	>1	($5,879)	$303
CZ04-2	CPAU	(1,852)	142	0.4	>0	($246)	($3,703)	$57	0.1	>1	($3,457)	$303
CZ05	PG&E	(1,984)	145	0.4	>0	($246)	($6,680)	($167)	0.0	1.5	($6,434)	$78
CZ05-2	SCG	(1,984)	145	0.4	>0	($246)	($6,340)	($167)	0.0	1.5	($6,095)	$78
CZ06	SCE	(1,585)	121	0.4	>0	($585)	($2,706)	$615	0.2	>1	($2,121)	$1,200
CZ06-2	LA	(1,585)	121	0.4	>0	($585)	$1,466	$615	>1	>1	$2,051	$1,200
CZ07	SDG&E	(1,520)	117	0.4	>0	($585)	($5,017)	$528	0.1	>1	($4,432)	$1,113
CZ08	SCE	(1,499)	114	0.3	>0	($585)	($2,627)	$493	0.2	>1	($2,042)	$1,078
CZ08-2	LA	(1,499)	114	0.3	>0	($585)	$1,456	$493	>1	>1	$2,041	$1,078
CZ09	SCE	(1,545)	119	0.3	>0	($512)	($2,351)	$421	0.2	>1	($1,839)	$933
CZ09-2	LA	(1,545)	119	0.3	>0	($512)	$1,511	$421	>1	>1	$2,023	$933
CZ10	SDG&E	(1,641)	125	0.4	>0	($173)	($5,824)	$674	0.0	>1	($5,651)	$847
CZ10-2	SCE	(1,641)	125	0.4	>0	($173)	($2,814)	$674	0.1	>1	($2,641)	$847
CZ11	PG&E	(2,087)	163	0.4	>0	$1,390	($5,602)	$1,063	-4.0	0.8	($6,993)	($328)
CZ12	PG&E	(2,094)	163	0.4	>0	$1,390	($5,856)	$634	-4.2	0.5	($7,246)	($757)
CZ12-2	SMUD	(2,094)	163	0.4	>0	$1,390	$500	$634	0.4	0.5	($890)	($757)
CZ13	PG&E	(1,786)	143	0.4	>0	$1,577	($4,659)	$995	-3.0	0.6	($6,236)	($582)
CZ14	SDG&E	(1,887)	158	0.5	>0	$927	($5,466)	$1,460	-5.9	1.6	($6,393)	$534
CZ14-2	SCE	(1,887)	158	0.5	>0	$927	($3,266)	$1,460	-3.5	1.6	($4,193)	$534
CZ15	SCE	(917)	97	0.3	>0	$1,013	($361)	$2,200	-0.4	2.2	($1,374)	$1,187
CZ16	PG&E	(2,642)	249	0.8	>0	$799	($6,054)	$354	-7.6	0.4	($6,853)	($445)
CZ16-2	LA	(2,642)	249	0.8	>0	$799	$3,419	$354	4.3	0.4	$2,620	($445)

7.4 Utility Rate Schedules

The Reach Codes Team used the CA IOU and POU rate tariffs detailed below to determine the On-Bill savings for each package.

7.4.1 Pacific Gas & Electric

ELECTRIC SCHEDULE E-TOU-C Sheet 2

RESIDENTIAL TIME-OF-USE (PEAK PRICING 4 - 9 p.m. EVERY DAY)

RATES:
(Cont'd.)

E-TOU-C TOTAL RATES

Total Energy Rates ($ per kWh)	PEAK		OFF-PEAK	
Summer				
Total Usage	$0.41333	(I)	$0.34989	(I)
Baseline Credit (Applied to Baseline Usage Only)	($0.08633)	(R)	($0.08633)	(R)
Winter				
Total Usage	$0.31624	(I)	$0.29891	(I)
Baseline Credit (Applied to Baseline Usage Only)	($0.08633)	(R)	($0.08633)	(R)
Delivery Minimum Bill Amount ($ per meter per day)	$0.32854			
California Climate Credit (per household, per semi-annual payment occurring in the April and October bill cycles)[†]	($35.73)			

ELECTRIC SCHEDULE E-TOU-C Sheet 4

RESIDENTIAL TIME-OF-USE (PEAK PRICING 4 - 9 p.m. EVERY DAY)

SPECIAL CONDITIONS:

1. BASELINE (TIER 1) QUANTITIES: The following quantities of electricity are to be used to define usage eligible for the baseline credit (also see Rule 19 for additional allowances for medical needs):

BASELINE QUANTITIES (kWh PER DAY)

Baseline Territory*	Code B - Basic Quantities		Code H - All-Electric Quantities	
	Summer	Winter	Summer	Winter
	Tier I	Tier I	Tier I	Tier I
P	14.2	12.0	16.0	27.4
Q	10.3	12.0	8.9	27.4
R	18.6	11.3	20.9	28.1
S	15.8	11.1	18.7	24.9
T	6.8	8.2	7.5	13.6
V	7.5	8.8	10.9	16.9
W	20.2	10.7	23.6	20.0
X	10.3	10.5	8.9	15.4
Y	11.0	12.1	12.6	25.3
Z	6.2	8.1	7.0	16.5

2. TIME PERIODS FOR **E-TOU-C**: Times of the year and times of the day are defined as follows:

Summer (service from June 1 through September 30):

Peak: 4:00 p.m. to 9:00 p.m. All days

Off-Peak: All other times

Winter (service from October 1 through May 31):

Peak: 4:00 p.m. to 9:00 p.m. All days

Off-Peak: All other times

Pacific Gas and Electric Company®
U 39 San Francisco, California

Revised Cal. P.U.C. Sheet No. 35808-G
Cancelling Revised Cal. P.U.C. Sheet No. 35753-G

GAS SCHEDULE G-1 Sheet 1
RESIDENTIAL SERVICE

APPLICABILITY: This rate schedule[1] applies to natural gas service to Core End-Use Customers on PG&E's Transmission and/or Distribution Systems. To qualify, service must be to individually-metered single family premises for residential use, including those in a multifamily complex, and to separately-metered common areas in a multifamily complex where Schedules GM, GS, or GT are not applicable. Common area accounts that are separately metered by PG&E have an option of switching to a core commercial rate schedule. Common area accounts are those accounts that provide gas service to common use areas as defined in Rule 1.

Per D.15-10-032 and D.18-03-017, transportation rates include GHG Compliance Cost for non-covered entities. Customers who are directly billed by the Air Resources Board (ARB), i.e., covered entities, are exempt from paying AB 32 GHG Compliance Costs through PG&E's rates.[2] A "Cap-and-Trade Cost Exemption" credit for these costs will be shown as a line item on exempt customers' bills.[3, 4]

TERRITORY: Schedule G-1 applies everywhere within PG&E's natural gas Service Territory.

RATES: Customers on this schedule pay a Procurement Charge and a Transportation Charge, per meter, as shown below. The Transportation Charge will be no less than the Minimum Transportation Charge, as follows:

	Per Day			
Minimum Transportation Charge:[5]	$$0.13151			
	Per Therm			
	Baseline		Excess	
Procurement:	$0.23187	(R)	$0.23187	(R)
Transportation Charge:	$1.13126		$1.64861	
Total:	$1.36313	(R)	$1.88048	(R)
California Natural Gas Climate Credit (per Household, annual payment occurring in the April bill cycle)	($27.18)			

GAS SCHEDULE G-1
RESIDENTIAL SERVICE

Sheet 2

BASELINE QUANTITIES: The delivered quantities of gas shown below are billed at the rates for baseline use.

BASELINE QUANTITIES (Therms Per Day Per Dwelling Unit)

Baseline Territories ***	Summer (April-October) Effective Apr. 1, 2020		Winter Off-Peak (Nov,Feb,Mar) Effective Nov. 1, 2019		Winter On-Peak (Dec, Jan) Effective Dec. 1, 2019	
P	0.39	(R)	1.88	(R)	2.16	(I)
Q	0.59	(R)	1.55	(R)	2.16	(I)
R	0.36	(R)	1.28	(R)	1.97	(I)
S	0.39	(R)	1.38	(R)	2.06	(I)
T	0.59	(R)	1.38	(R)	1.81	(I)
V	0.62	(R)	1.51	(R)	1.84	(I)
W	0.39	(R)	1.18	(R)	1.84	(I)
X	0.49	(R)	1.55	(R)	2.16	(I)
Y	0.69	(R)	2.15	(R)	2.65	(I)

SEASONAL CHANGES: The summer season is April-October, the winter off-peak season is November, February and March, and the winter on-peak season is December and January. Baseline quantities for bills that include the April 1, November 1 and December 1 seasonal changeover dates will be calculated by multiplying the applicable daily baseline quantity for each season by the number of days in each season for the billing period.

7.4.2 Southern California Edison

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

Southern California Edison — Revised — Cal. PUC Sheet No. 68632-E
Rosemead, California (U 338-E) — Cancelling — Revised — Cal. PUC Sheet No. 68540-E

Schedule TOU-D
TIME-OF-USE
DOMESTIC
(Continued)

Sheet 2

RATES

Customers receiving service under this Schedule will be charged the applicable rates under Option 4-9 PM, Option 4-9 PM-CPP, Option 5-8 PM, Option 5-8 PM-CPP, Option PRIME, Option PRIME-CPP Option A, Option A-CPP, Option B, or Option B-CPP, as listed below. CPP Event Charges will apply to all energy usage during CPP Event Energy Charge periods and CPP Non-Event Energy Credits will apply as a reduction on CPP Non-Event Energy Credit Periods during Summer Season weekdays, 4:00 p.m. to 9:00 p.m., as described in Special Conditions 1 and 3, below:

	Delivery Service		
Option 4-9 PM / Option 4-9 PM-CPP	Total[1]	UG***	DWREC[3]
Energy Charge - $/kWh			
Summer Season - On-Peak	0.21574 (I)	0.17870 (I)	(0.00007)
Mid-Peak	0.21574 (I)	0.10434 (R)	(0.00007)
Off-Peak	0.17099 (I)	0.07584 (R)	(0.00007)
Winter Season - Mid-Peak	0.21574 (I)	0.12676 (R)	(0.00007)
Off-Peak	0.17099 (I)	0.08874 (R)	(0.00007)
Super-Off-Peak	0.16567 (I)	0.07025 (R)	(0.00007)
Baseline Credit**** - $/kWh	(0.07456) (R)	0.00000	
Basic Charge - $/day			
Single-Family Residence	0.031		
Multi-Family Residence	0.024		
Minimum Charge** - $/day			
Single Family Residence	0.346		
Multi-Family Residence	0.346		
Minimum Charge (Medical Baseline)** - $/day			
Single Family Residence	0.173		
Multi-Family Residence	0.173		
California Climate Credit[4]	(37.00) (I)		
California Alternate Rates for			
Energy Discount - %	100.00*		
Family Electric Rate Assistance Discount - %	100.00		
Option 4-9 PM-CPP			
CPP Event Energy Charge - $/kWh		0.80000	
Summer CPP Non-Event Credit			
On-Peak Energy Credit - $/kWh		(0.15170)	
Maximum Available Credit - $/kWh*****			
Summer Season		(0.58504) (R)	

* Represents 100% of the discount percentage as shown in the applicable Special Condition of this Schedule.
** The Minimum Charge is applicable when the Delivery Service Energy Charge, plus the applicable Basic Charge is less than the Minimum Charge.
*** The ongoing Competition Transition Charge CTC of $0.00089 per kWh is recovered in the UG component of Generation. (I)
**** The Baseline Credit applies up to 100% of the Baseline Allocation, regardless of Time of Use. The Baseline Allocation is set forth in Preliminary Statement, Part H.
*****The Maximum Available Credit is the capped credit amount for CPP Customers dual participating in other demand response programs.
1 Total = Total Delivery Service rates are applicable to Bundled Service, Direct Access (DA) and Community Choice Aggregation Service (CCA Service) Customers, except DA and CCA Service Customers are not subject to the DWRBC rate component of this Schedule but instead pay the DWRBC as provided by Schedule DA-CRS or Schedule CCA-CRS.
2 Generation = The Gen rates are applicable only to Bundled Service Customers.
3 DWREC = Department of Water Resources (DWR) Energy Credit – For more information on the DWR Energy Credit, see the Billing Calculation Special Condition of this Schedule.
4 Applied on an equal basis, per household, semi-annually. See the Special Conditions of this Schedule for more information.

(Continued)

(To be inserted by utility)
Advice 4172-E-A
Decision

Issued by
Carla Peterman
Senior Vice President

(To be inserted by Cal. PUC)
Date Submitted Mar 13, 2020
Effective Apr 13, 2020
Resolution

2C12

Schedule TOU-D
TIME-OF-USE
DOMESTIC
(Continued)

Sheet 12

SPECIAL CONDITIONS

1. Applicable rate time periods are defined as follows:

Option 4-9 PM, Option 4-9 PM-CPP, Option PRIME, Option PRIME-CPP :

TOU Period	Weekdays		Weekends and Holidays	
	Summer	Winter	Summer	Winter
On-Peak	4 p.m. - 9 p.m.	N/A	N/A	N/A
Mid-Peak	N/A	4 p.m. - 9 p.m.	4 p.m. - 9 p.m.	4 p.m. - 9 p.m.
Off-Peak	All other hours	9 p.m. - 8 a.m.	All other hours	9 p.m. - 8 a.m.
Super-Off-Peak	N/A	8 a.m. - 4 p.m.	N/A	8 a.m. - 4 p.m.
CPP Event Period	4 p.m. - 9 p.m.	4 p.m. - 9 p.m.	N/A	N/A

7.4.3 Southern California Gas

SOUTHERN CALIFORNIA GAS COMPANY Revised CAL. P.U.C. SHEET NO. 57658-G
LOS ANGELES, CALIFORNIA CANCELING Revised CAL. P.U.C. SHEET NO. 57573-G

Schedule No. GM Sheet 2
MULTI-FAMILY SERVICE
(Includes GM-E, GM-C, GM-EC, GM-CC, GT-ME, GT-MC and all GMB Rates)
(Continued)

APPLICABILITY (Continued)

Multi-family Accommodations built prior to December 15, 1981 and currently served under this schedule may also be eligible for service under Schedule No. GS. If an eligible Multi-family Accommodation served under this schedule converts to an applicable submetered tariff, the tenant rental charges shall be revised for the duration of the lease to reflect removal of the energy related charges.

Eligibility for service hereunder is subject to verification by the Utility.

TERRITORY

Applicable throughout the service territory.

RATES

	GM/GT-M	GMB/GT-MB
Customer Charge, per meter, per day:	16.438¢	$16.357
For "Space Heating Only" customers, a daily Customer Charge applies during the winter period from November 1 through April 30[1/]:	33.149¢	

GM

	GM-E	GM-EC[3/]	GT-ME	
Baseline Rate, per therm (baseline usage defined per Special Conditions 3 and 4):				
Procurement Charge:[2/]	27.580¢	25.654¢	N/A	I
Transmission Charge:	77.909¢	77.909¢	77.909¢	
Total Baseline Charge (all usage):	105.489¢	103.563¢	77.909¢	I
Non-Baseline Rate, per therm (usage in excess of baseline usage):				
Procurement Charge:[2/]	27.580¢	25.654¢	N/A	I
Transmission Charge:	114.709¢	114.709¢	114.709¢	
Total Non Baseline Charge (all usage):	142.289¢	140.363¢	114.709¢	I

	GM-C	GM-CC[3/]	GT-MC	
Non-Baseline Rate, per therm (usage in excess of baseline usage):				
Procurement Charge:[2/]	27.580¢	25.654¢	N/A	I
Transmission Charge:	114.709¢	114.709¢	114.709¢	
Total Non Baseline Charge (all usage):	142.289¢	140.363¢	114.709¢	I

[1/] For the summer period beginning May 1 through October 31, with some exceptions, usage will be accumulated to at least 20 Ccf (100 cubic feet) before billing, or it will be included with the first bill of the heating season which may cover the entire duration since a last bill was generated for the current calendar year.
(Footnotes continue next page.)

(Continued)

(TO BE INSERTED BY UTILITY)
ADVICE LETTER NO. 5636
DECISION NO. 98-07-068
2C8

ISSUED BY
Dan Skopec
Vice President
Regulatory Affairs

(TO BE INSERTED BY CAL. PUC)
SUBMITTED May 29, 2020
EFFECTIVE Jun 1, 2020
RESOLUTION NO.

3. Baseline Usage: The following usage is to be billed at the Baseline rate for Multi-family Accommodation units. Usage in excess of applicable Baseline allowances will be billed at the Non-Baseline rate.

Per Residence	Daily Therm Allowance for Climate Zones*		
	1	2	3
Summer (May 1-Oct.31)	0.473	0.473	0.473
Winter (Nov. 1-Apr.30)	1.691	1.823	2.950

* Climate Zones are described in the Preliminary Statement.

7.4.4 San Diego Gas & Electric

SCHEDULE TOU-DR1

RESIDENTIAL TIME-OF-USE

RATES

Total Rates:

Description – TOU DR1	UDC Total Rate	DWR-BC Rate	EECC Rate + DWR Credit	Total Rate
Summer:				
On-Peak	0.20577	0.00580	0.29042	0.50199
Off-Peak	0.20577	0.00580	0.09305	0.30462
Super Off-Peak	0.20577	0.00580	0.04743	0.25900
Winter:				
On-Peak	0.27206	0.00580	0.07844	0.35630
Off-Peak	0.27206	0.00580	0.06961	0.34747
Super Off-Peak	0.27206	0.00580	0.05981	0.33767
Summer Baseline Adjustment Credit up to 130% of Baseline	(0.07136)			(0.07136)
Winter Baseline Adjustment Credit up to 130% of Baseline	(0.07136)			(0.07136)
Minimum Bill ($/day)	0.338			0.338

SDGE
San Diego Gas & Electric Company
San Diego, California

Revised Cal. P.U.C. Sheet No. 24762-G
Canceling Revised Cal. P.U.C. Sheet No. 24749-G

SCHEDULE GM

Sheet 2

MULTI-FAMILY NATURAL GAS SERVICE
(Includes Rates for GM, GM-C and GTC/GTCA)

RATES

	GM	GM-C		GTC/GTCA[1]
Baseline Rate, per therm (baseline usage defined in Special Condition 4)				
Procurement Charge[2]	$0.26263	$0.26263	R	N/A
Transmission Charge	$1.39202	$1.39202		$1.40414
Total Baseline Charge	$1.65465	$1.65465	R	$1.40414
Non-Baseline Rate (usage in excess of baseline usage)				
Procurement Charge[2]	$0.26263	$0.26263	R	N/A
Transmission Charge	$1.62888	$1.62888		$1.64100
Total Non-Baseline Charge	$1.89151	$1.89151	R	$1.64100
Minimum Bill, per day[3]				
Non-CARE customers	$0.13151	$0.13151		$0.13151
CARE customers	$0.10521	$0.10521		$0.10521

Franchise Fee Differential:

A Franchise Fee Differential of 1.03% will be applied to the monthly billings calculated under this schedule for all customers within the corporate limits of the City of San Diego. Such Franchise Fee Differential shall be so indicated and added as a separate item to bills rendered to such customers.

Additional Charges

Rates may be adjusted to reflect any applicable taxes, franchise fees or other fees, regulatory surcharges, and interstate or intrastate pipeline charges that may occur.

SPECIAL CONDITIONS

1. Definitions. The definitions of principal terms used in this schedule are found either herein or in Rule 1, Definitions.

2. Number of Therms. The number of therms to be billed shall be determined in accordance with Rule 2. The daily therm allowance in the Baseline Usage, shown in Special Condition 4, shall be multiplied by the number of qualified residential units. It is the responsibility of the customer to advise the Utility within 15 days following any change in the submetering arrangements or the number of dwelling units or Mobilehome Park spaces provided gas service. The number of qualifying units is subject to verification by the Utility.

3. Exclusions. Gas service for non-domestic enterprises such as rooming houses, boarding houses, dormitories, rest homes, military barracks, transient trailer parks, stores, restaurants, service stations, and other similar establishments will be separately metered and billed under the applicable schedules.

[1] The rates for core transportation-only customers, with the exception of customers taking service under Schedule GT-NGV, include any FERC Settlement Proceeds Memorandum Account (FSPMA) credit adjustments.
[2] This charge is applicable to Utility Procurement Customers and includes the GPC and GPC-A Procurement Charges shown in Schedule GPC which are subject to change monthly as set forth in Special Condition 7.
[3] Effective starting May 1, 2020, the minimum bill is calculated as the minimum bill charge of $0.13151 per day times the number of days in the billing cycle (approximately $4 per month) with a 20% discount applied for CARE customer resulting in a minimum bill charge of $0.10521 per day (approximately $3.20 per month).

(Continued)

2C6
Advice Ltr. No. 2889-G
Decision No.

Issued by
Dan Skopec
Vice President
Regulatory Affairs

Submitted Aug 7, 2020
Effective Aug 10, 2020
Resolution No.

7.4.5 City of Palo Alto Utilities

RESIDENTIAL ELECTRIC SERVICE

UTILITY RATE SCHEDULE E-1

A. APPLICABILITY:

This Rate Schedule applies to separately metered single-family residential dwellings receiving Electric Service from the City of Palo Alto Utilities.

B. TERRITORY:

This rate schedule applies everywhere the City of Palo Alto provides Electric Service.

C. UNBUNDLED RATES:

Per kilowatt-hour (kWh)	Commodity	Distribution	Public Benefits	Total
Tier 1 usage	$0.08339	$0.04971	$0.00447	$0.13757
Tier 2 usage Any usage over Tier 1	0.11569	0.07351	0.00447	0.19367
Minimum Bill ($/day)				0.3283

D. SPECIAL NOTES:

1. Calculation of Cost Components

The actual bill amount is calculated based on the applicable rates in Section C above and adjusted for any applicable discounts, surcharges and/or taxes. On a Customer's bill statement, the bill amount may be broken down into appropriate components as calculated under Section C.

2. Calculation of Usage Tiers

Tier 1 Electricity usage shall be calculated and billed based upon a level of 11 kWh per day, prorated by Meter reading days of Service. As an example, for a 30-day bill, the Tier 1 level would be 330 kWh. For further discussion of bill calculation and proration, refer to Rule and Regulation 11.

{End}

CITY OF PALO ALTO UTILITIES
Issued by the City Council

Supersedes Sheet No E-1-1
dated 7-1-2018

CITY OF PALO ALTO UTILITIES

Sheet No **E-1-1**
Effective 7-1-2019

RESIDENTIAL GAS SERVICE

UTILITY RATE SCHEDULE G-1

A. APPLICABILITY:

This schedule applies to the following Customers receiving Gas Service from City of Palo Alto Utilities:

1. Separately-metered single-family residential Customers.
2. Separately-metered multi-family residential Customers in multi-family residential facilities.

B. TERRITORY:

This schedule applies anywhere the City of Palo Alto provides Gas Service.

C. UNBUNDLED RATES: Per Service

Monthly Service Charge: $10.37

Tier 1 Rates: Per Therm

Supply Charges:

1. Commodity (Monthly Market Based) ..... $0.10-$2.00
2. Cap and Trade Compliance Charge ..... $0.00-$0.25
3. Transportation Charge ..... $0.00-$0.15
4. Carbon Offset Charge ..... $0.00-$0.10

Distribution Charge: $0.5038

Tier 2 Rates: (All usage over 100% of Tier 1)

Supply Charges:

1. Commodity (Monthly Market Based) $0.10-2.00
2. Cap and Trade Compliance Charge ..... $0.00-$0.25
3. Transportation Charge ..... $0.00-$0.15
4. Carbon Offset Charge ..... $0.00-$0.10

Distribution Charge: $1.2882

D. SPECIAL NOTES:

1. Calculation of Cost Components

CITY OF PALO ALTO UTILITIES
Issued by the City Council

Supersedes Sheet No G-1-1
dated 7-1-2019

CITY OF PALO ALTO UTILITIES

Sheet No G-1-1
Effective 7-1-2020

The 'Commodity and Volumetric Rates' are selected for the latest available month of December 2020.[3]

7.4.6 Sacramento Municipal Utilities District (Electric Only)

Residential Time-of-Day Service
Rate Schedule R-TOD

I. Applicability

This Rate Schedule R-TOD applies to single- and three-phase service for the following types of residential premises:

1. Individual or dual metered residences with digital communicating meter installed, including single-family homes, duplexes, apartments, and condominiums; and
2. General farm service where the meter also serves the residence or additional meters on a farm where the electricity consumed is solely for domestic purposes.

Master-metered service to a qualifying multifamily accommodation or mobile home parks are not eligible for Time-of-Day rates under rate schedule R-TOD.

For the purposes of this schedule a "month" is considered to be a single billing period of 27 to 34 days.

A. Time-of-Day (5-8 p.m.) Rate (rate category RT02)

1. The TOD (5-8 p.m.) Rate is the standard rate for SMUD's residential customers. Eligible customers can elect the Fixed Rate under Rate Schedule R as an alternative rate.
2. Customers who have an eligible renewable electrical generation facility under Rate Schedule NEM1 that was approved for installation by SMUD after December 31, 2017, must be on the TOD (5-8 p.m.) Rate.
3. Customers who have an eligible renewable electrical generation facility under Rate Schedule NEM2 must be on the TOD (5-8 p.m.) Rate.
4. This rate has five kilowatt-hour (kWh) prices, depending on the time-of-day and season as shown below. Holidays are detailed in Section V. Conditions of Service.

Summer (Jun 1 - Sept 30)	**Peak**	Weekdays between 5:00 p.m. and 8:00 p.m.
	Mid-Peak	Weekdays between noon and midnight except during the Peak hours.
	Off-Peak	All other hours, including weekends and holidays[1].
Non-Summer (Oct 1 - May 31)	**Peak**	Weekdays between 5:00 p.m. and 8:00 p.m.
	Off-Peak	All other hours, including weekends and holidays[1].

[1] See Section V. Conditions of Service

[3] https://www.cityofpaloalto.org/civicax/filebank/documents/30399

II. Firm Service Rates

A. Time-of-Day (5-8 p.m.) Rate	Rate Category RT02
Non-Summer Prices* – January 1 through May 31	
System Infrastructure Fixed Charge per month	$21.05
Electricity Usage Charge	
Peak $/kWh	$0.1388
Off-Peak $/kWh	$0.1006
Summer Prices - June 1 through September 30	
System Infrastructure Fixed Charge per month	$21.05
Electricity Usage Charge	
Peak $/kWh	$0.2941
Mid-Peak $/kWh	$0.1671
Off-Peak $/kWh	$0.1209
Non-Summer Prices* – October 1 through December 31	
System Infrastructure Fixed Charge per month	$21.70
Electricity Usage Charge	
Peak $/kWh	$0.1430
Off-Peak $/kWh	$0.1035

* Non-Summer Season includes Fall (Oct 1 – Nov 30), Winter (Dec 1 – Mar 31) and Spring (Apr 1 – May 31) periods.

7.4.7 Los Angeles Department of Water and Power (Electric Only)

Residential Service Rate Summary Time of Use R-1(B)

Eligibility

Applicable to service to single-family, single-family with guest house, individually metered accommodations, as well as to separately metered common areas of condominiums and cooperatives devoted primarily to residential uses and whose energy and capacity requirements do not exceed those for Small General Service Schedule A-1. Battery chargers, motors and appliances, which conform in capacities to applicable electrical codes, and meet requirements of the Department's Rules, may be served under this schedule. Not applicable to single-family residential customers with an on-site transformer dedicated solely to that individual customer.

The Department requires mandatory service under Rate B for customers whose annual monthly average consumption reach or exceed 3000 kWh during the preceding 12 month period. If a customer's annual monthly average consumption does not reach or exceed 3,000 kWh in a year's period, a customer may choose to receive service either under Rate A or B. However, when a customer served under Rate B requests a change to Rate A, that customer may not revert to Rate B before 12 months have elapsed.

Monthly rates beginning July 1, 2019	High Season June - Sep.			Low Season Oct. - May		
Residential R-1(B)	Capped	Incremental	Total	Capped	Incremental	Total
Rate B - Time of Use						
Service Charge $ per month	$8.00	$4.00	**$12.00**	$8.00	$4.00	**$12.00**
Energy Charge - $ per kWh						
High Peak Period	$0.16061	-$0.00203	**$0.15858**	$0.06515	$0.03503	**$0.10018**
Low Peak Period	$0.08144	$0.01874	**$0.10018**	$0.06515	$0.03503	**$0.10018**
Base Period	$0.04655	$0.02619	**$0.07274**	$0.05045	$0.02619	**$0.07664**
Electric Vehicle Discount $ (1)	-$0.02500	$0.00000	**-$0.02500**	-$0.02500	$0.00000	**-$0.02500**
Rates below are in addition to above Charges						
Elements Only in Capped Ordinance						
ECA - per kWh	$0.05690	$0.00000	**$0.05690**	$0.05690	$0.00000	**$0.05690**
ESA - per kWh	$0.00147	$0.00000	**$0.00147**	$0.00147	$0.00000	**$0.00147**
RCA - per kWh	$0.00300	$0.00000	**$0.00300**	$0.00300	$0.00000	**$0.00300**
Elements Only in Incremental Ordinance						
VEA - per kWh*	Refer to www.LADWP.com >About Us >Power Rates >Variable Energy Factors and Reliability Cost Adjustment Factor for current Quarterly Electric Adjustment Factors					
CRPSEA - per kWh*						
VRPSEA - per kWh*						
IRCA - per kWh						

ECA- Energy Cost Adjustment
ESA - Electric Subsidy Adjustment
RCA - Reliability Cost Adjustment
VEA - Variable Energy Adjustment
CRPSEA - Capped Renewable Portfolio Standard Energy Adjustment
VRPSEA - Variable Renewable Portfolio Standard Energy Adjustment
IRCA - Incremental Reliability Cost Adjustment
High Peak Period : 1:00 p.m. – 5:00 p.m., Monday through Friday
Low Peak Period: 10:00 a.m. – 1:00 p.m., Monday through Friday, and 5:00 p.m. – 8:00 p.m., Monday through Friday.
Base Period: 8:00 p.m. – 10:00 a.m., Monday through Friday, all day Saturday and Sunday.
(1) Conditions for this element set in the capped ordinance.
*This value will be computed quarterly in accordance with the incremental electric rate ordinance.

7.4.8 Fuel Escalation Rates

Escalation of natural gas rates between 2020 and 2022 is based on the currently filed General Rate Cases for PG&E, SoCalGas, and SDG&E. From 2023 through 2025, gas rates are assumed to escalate at 4 percent per year above inflation, which reflects historical rate increases between 2013 and 2018. Escalation of electricity rates from 2020 through 2025 is assumed to be 2 percent per year above inflation, based on electric utility estimates. After 2025, escalation rates for both natural gas and electric rates are assumed to drop to a more conservative 1 percent escalation per year above inflation for long-term rate trajectories beginning in 2026 through 2050.

Table 15 below demonstrate the escalation rates used for residential (detached ADU) buildings.

Table 15. Real Utility Rate Escalation Rate Assumptions

	Statewide Electric Residential Average Rate (%/year, real)	Natural Gas Residential Core Rate (%/yr escalation, real)		
		PG&E	SoCalGas	SDG&E
2020	2.0%	1.48%	6.37%	5.00%
2021	2.0%	5.69%	4.12%	3.14%
2022	2.0%	1.11%	4.12%	2.94%
2023	2.0%	4.0%	4.0%	4.0%
2024	2.0%	4.0%	4.0%	4.0%
2025	2.0%	4.0%	4.0%	4.0%
2026	1.0%	1.0%	1.0%	1.0%
2027	1.0%	1.0%	1.0%	1.0%
2028	1.0%	1.0%	1.0%	1.0%
2029	1.0%	1.0%	1.0%	1.0%
2030	1.0%	1.0%	1.0%	1.0%
2031	1.0%	1.0%	1.0%	1.0%
2032	1.0%	1.0%	1.0%	1.0%
2033	1.0%	1.0%	1.0%	1.0%
2034	1.0%	1.0%	1.0%	1.0%
2035	1.0%	1.0%	1.0%	1.0%
2036	1.0%	1.0%	1.0%	1.0%
2037	1.0%	1.0%	1.0%	1.0%
2038	1.0%	1.0%	1.0%	1.0%
2039	1.0%	1.0%	1.0%	1.0%
2040	1.0%	1.0%	1.0%	1.0%
2041	1.0%	1.0%	1.0%	1.0%
2042	1.0%	1.0%	1.0%	1.0%
2043	1.0%	1.0%	1.0%	1.0%
2044	1.0%	1.0%	1.0%	1.0%
2045	1.0%	1.0%	1.0%	1.0%
2046	1.0%	1.0%	1.0%	1.0%
2047	1.0%	1.0%	1.0%	1.0%
2048	1.0%	1.0%	1.0%	1.0%
2049	1.0%	1.0%	1.0%	1.0%

Source: Energy & Environmental Economics, 2019, Reach Code Team

Get In Touch

The adoption of reach codes can differentiate jurisdictions as efficiency leaders and help accelerate the adoption of new equipment, technologies, code compliance, and energy savings strategies.

As part of the Statewide Codes & Standards Program, the Reach Codes Subprogram is a resource available to any local jurisdiction located throughout the state of California.

Our experts develop robust toolkits as well as provide specific technical assistance to local jurisdictions (cities and counties) considering adopting energy reach codes. These include cost-effectiveness research and analysis, model ordinance language and other code development and implementation tools, and specific technical assistance throughout the code adoption process.

If you are interested in finding out more about local energy reach codes, the Reach Codes Team stands ready to assist jurisdictions at any stage of a reach code project.

Visit LocalEnergyCodes.com to access our resources and sign up for newsletters

Contact info@localenergycodes.com for no-charge assistance from expert Reach Code advisors

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CALIFORNIA ENERGY CODES & STANDARDS

A STATEWIDE UTILITY PROGRAM

Title 24, Parts 6 and 11
Local Energy Efficiency Ordinances

2019 Mid-Rise New Construction Reach Code Cost-Effectiveness Study

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EnergySoft

Last Modified: June 22, 2020

LEGAL NOTICE

This report was prepared by Pacific Gas and Electric Company and funded by the California utility customers under the auspices of the California Public Utilities Commission.

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Acronyms

2020 PV$	Present value costs in 2020
ACM	Alternative Calculation Method
B/C	Lifecycle Benefit-to-Cost Ratio
BSC	Building Standards Commission
CBECC-Com	Computer program developed by the California Energy Commission for use in demonstrating compliance with the California Residential Building Energy Efficiency Standards
CFI	California Flexible Installation
CFM	Cubic Feet per Minute
CPC	California Plumbing Code
CZ	California Climate Zone
DHW	Domestic Hot Water
DOE	Department of Energy
DWHR	Drain Water Heat Recovery
EDR	Energy Design Rating
EER	Energy Efficiency Ratio
EF	Energy Factor
EPS	Expanded Polystyrene
HERS Rater	Home Energy Rating System Rater
HPWH	Heat Pump Water Heater
HVAC	Heating, Ventilation, and Air Conditioning
IOU	Investor Owned Utility
kBtu	kilo-British thermal unit
kWh	Kilowatt Hour
kW_{DC}	Kilowatt Direct Current. Nominal rated power of a photovoltaic system
LBNL	Lawrence Berkeley National Laboratory
LCC	Lifecycle Cost
MF	Multifamily
NAECA	National Appliance Energy Conservation Act
NEM	Net Energy Metering
NPV	Net Present Value
PG&E	Pacific Gas and Electric Company
PV	Photovoltaic
SCE	Southern California Edison

SDG&E	San Diego Gas and Electric
SF	Solar Fraction
SHGC	Solar Heat Gain Coefficient
SMUD	Sacramento Municipal Utility District
CASE	Codes and Standards Enhancement
TDV	Time Dependent Valuation
Therm	Unit for quantity of heat that equals 100,000 British thermal units
Title 24	Title 24, Part 6
TOU	Time-Of-Use
UEF	Uniform Energy Factor
W	Watts

1 Introduction

The California Building Energy Efficiency Standards Title 24, Part 6 (Title 24) (California Energy Commission, 2018b) is maintained and updated every three years by two state agencies, the California Energy Commission (Energy Commission) and the Building Standards Commission (BSC). In addition to enforcing the code, local jurisdictions have the authority to adopt local energy efficiency ordinances, or reach codes, that exceed the minimum standards defined by Title 24 (as established by Public Resources Code Section 25402.1(h)2 and Section 10-106 of the Building Energy Efficiency Standards). Local jurisdictions must demonstrate that the requirements of the proposed ordinance are cost-effective and do not result in buildings consuming more energy than is permitted by Title 24. In addition, the jurisdiction must obtain approval from the Energy Commission and file the ordinance with the BSC for the ordinance to be legally enforceable.

This report documents cost-effective combinations of measures that exceed the minimum state requirements, the 2019 Building Energy Efficiency Standards, effective January 1, 2020, for new mid-rise (four- to seven-story) multifamily residential construction. The analysis includes evaluation of both mixed-fuel and all-electric residential construction, documenting that the performance requirements can be met by either type of building design. Compliance package options and cost-effectiveness analysis in all 16 California climate zones (CZs) are presented (see Appendix A – California Climate Zone Map for a graphical depiction of Climate Zone locations).

2 Methodology and Assumptions

This analysis uses two different metrics to assess cost-effectiveness. Both methodologies require estimating and quantifying the incremental costs and energy savings associated with energy efficiency measures. The main difference between the methodologies is the manner in which they value energy and thus the cost savings of reduced or avoided energy use:

- **Utility Bill Impacts (On-Bill)**: Customer-based Lifecycle Cost (LCC) approach that values energy based upon estimated site energy usage and customer on-bill savings using electricity and natural gas utility rate schedules over a 30-year duration accounting for discount rate and energy cost inflation.
- **Time Dependent Valuation (TDV)**: Energy Commission LCC methodology, which is intended to capture the "societal value or cost" of energy use including long-term projected costs, such as the cost of providing energy during peak periods of demand and other societal costs, such as projected costs for carbon emissions, as well as grid transmission and distribution impacts. This metric values energy use differently depending on the fuel source (gas, electricity, and propane), time of day, and season. Electricity used (or saved) during peak periods has a much higher value than electricity used (or saved) during off-peak periods (Horii et al., 2014). This is the methodology used by the Energy Commission in evaluating cost-effectiveness for efficiency measures in Title 24, Part 6.

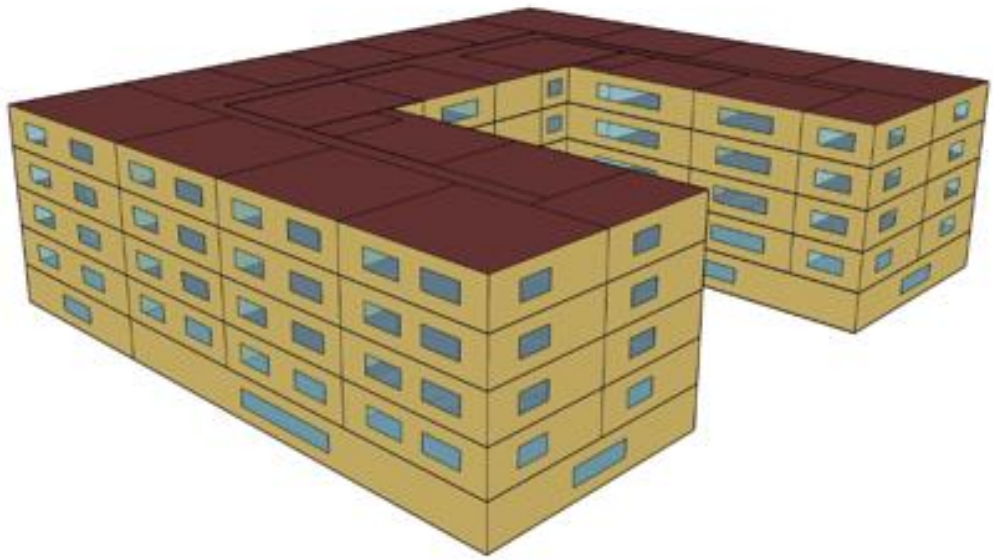
2.1 Building Prototypes

The Energy Commission defines building prototypes which it uses to evaluate the cost-effectiveness of proposed changes to Title 24 requirements. The CEC recently developed new prototype designs for multifamily buildings to more closely reflect typical designs for new multifamily buildings across the state. The new prototypes include two low-rise residential designs, a mid-rise, and a high-rise design. At the time that this report was written, there was one mid-rise multifamily prototype, which is used in this analysis in development of the above-code packages (TRC, 2019). The midrise prototype is a 6-story building with one below-grade parking level, ground floor commercial space, and four stories of residential space. Table 1 describes the basic characteristics of the mid-rise prototype and Figure 1 shows a depiction of the building.

Table 1: Prototype Characteristics

Characteristic	Multifamily 5-Story Mid-Rise
Conditioned Floor Area	113,100 ft^2 Total: 33,660 ft^2 Nonresidential & 79,440 ft^2 Residential
Number of Stories	6 Stories Total: 1 Story Parking Garage (below grade) 1 Story of Nonresidential Space 4 Stories of Residential Space
Number of Dwelling Units / Bedrooms	(8) studios, (40) 1-bed units, (32) 2-bed units, & (8) 3-bed units
Foundation	Concrete podium with underground parking
Wall Assembly	Wood frame over a first-floor concrete podium
Roof Assembly	Flat roof
Window-to-Wall Area Ratio	22.5%
HVAC System	Ducted split heat pumps at each apartment
Domestic Hot Water System	Gas central boiler with solar thermal sized to meet the prescriptive requirements by climate zone

Source: TRC 2019



Source: TRC 2019

Figure 1: 5-story mid-rise multifamily prototype depiction.

The methodology used in the analyses for the prototypical building type begins with a design that meets the minimum 2019 Title 24 prescriptive requirements (zero compliance margin). Table 140.3-B and 140.3-C in the 2019 Title 24 (California Energy Commission, 2018a) lists the prescriptive measures that determine the baseline design in each climate zone for the nonresidential and high-rise residential spaces, respectively. Other features are consistent with the Standard Design in the Nonresidential ACM Reference Manual (California Energy Commission, 2019a) with one exception. The apartments use split system heat pumps instead of a split furnace

and air conditioner that is prescribed in Table 2 of the Nonresidential ACM Reference Manual. This modeling choice was made to better reflect current market data, which shows heat pumps to be the most common system type and a very low prevalence of gas furnaces for multifamily buildings four stories and greater. This is based on a report completed by TRC (TRC, 2019) and validated by analysis of CA HERS Registry Data by SCE that showed 47% of low-rise multifamily new construction in the 2013 and 2016 code cycles had electric space heating. The analysis also assumed electric cooking in the apartment units to reflect current market data. Laundry was not addressed in this study. The building prototype assumes central laundry facilities and no laundry in the units.

2.2 Measure Analysis

EnergyPro 8.1, which uses the California Building Energy Code Compliance simulation tool, CBECC-Com 2019.1.2, as the simulation engine, was used to evaluate energy impacts using the 2019 Title 24 prescriptive standards as the benchmark, and the 2019 TDV values. CBECC-Com was used for this analysis to evaluate the mid-rise building for code compliance under the 2019 non-residential standards. TDV is the energy metric used by the Energy Commission since the 2005 Title 24 energy code to evaluate compliance with the Title 24 Standards.

Using the 2019 baseline as the starting point, prospective energy efficiency measures were identified and modeled to determine the projected site energy (Therm and kWh) and compliance impacts. Annual utility costs were calculated using hourly data output from CBECC-Com, and electricity and natural gas tariffs for each of the investor owned utilities (IOUs).

This analysis focused on the residential apartments only. A prior study and report demonstrated the cost-effectiveness of above code packages for nonresidential buildings (Statewide Reach Code Team, 2019a). The Statewide Reach Code Team selected measures for evaluation based on the residential and nonresidential 2019 reach code analysis ((Statewide Reach Code Team, 2019a), (Statewide Reach Code Team, 2019b)) as well as experience with and outreach to architects, builders, and engineers along with general knowledge of the relative acceptance of many measures. Efficiency measure packages found to be cost-effective in the nonresidential building reach code analysis were applied to the nonresidential spaces for evaluating performance relative to compliance, but the incremental costs and energy impacts of these measures on the nonresidential spaces were not included in this analysis. Refer to the nonresidential reach code study for more details (Statewide Reach Code Team, 2019a).

2.2.1 Federal Preemption

The Department of Energy (DOE) sets minimum efficiency standards for equipment and appliances that are federally regulated under the National Appliance Energy Conservation Act (NAECA), including heating, cooling, and water heating equipment. Since state and local governments are prohibited from adopting policies that mandate higher minimum efficiencies than the federal standards require, the focus of this study is to identify and evaluate cost-effective packages that do not include high efficiency equipment. While this study is limited by federal preemption, in practice builders may use any package of compliant measures to achieve the performance goals, including high efficiency appliances. Often, these measures are the simplest and most affordable measures to increase energy performance.

2.2.2 Energy Efficiency Measures

Following are descriptions of each of the efficiency measures evaluated for the residential spaces under this analysis. Because not all of the measures described below were found to be cost-effective, and cost-effectiveness varied by climate zone, not all measures are included in all packages and some of the measures listed are not included in any final package.

Improved Fenestration – Lower U-factor: Reduce window U-factor to 0.25 Btu/hr-ft^2-°F. The prescriptive maximum U-factor is 0.36 in all climates. This measure is applied to all windows on floors two through five.

Improved Fenestration – Lower SHGC: Reduce window solar heat gain coefficient (SHGC) to 0.22. The prescriptive maximum SHGC is 0.25 for fixed windows in all climates. The Statewide Reach Code Team evaluated increased SHGC in heating dominated climates (Climate Zone 1, 3, 5, and 16) but results were better with a lower SHGC. This measure is applied to all windows on floors two through five.

Exterior Wall Insulation: Add one inch of R-4 exterior continuous insulation. To meet the prescriptive wall requirements, it's assumed that exterior wall insulation is used in the basecase, therefore this measure adds additional R-value to existing exterior insulation. This measure is applied to all walls on floors two through five.

HERS Verification of Hot Water Pipe Insulation: The California Plumbing Code (CPC) requires pipe insulation on all hot water lines. This measure provides credit for HERS Rater verification of pipe insulation requirements according to the procedures outlined in the 2019 Reference Appendices RA3.6.3. (California Energy Commission, 2018b).

Low Pressure Drop Ducts: Upgrade the duct distribution system to reduce external static pressure and meet a maximum fan efficacy of 0.25 watts per cfm operating at full speed. This may involve upsizing ductwork, reducing the total effective length of ducts, and/or selecting low pressure drop components, such as filters. This measure is applied to the ducted split heat pumps serving the apartments.

Solar Thermal: Prescriptively, central water heating systems require a solar thermal system with a 20% solar fraction in Climates Zones 1 through 9 and 35% solar fraction in Climate Zones 10 through 16. This measure upgrades the prescriptive solar thermal system to meet a 50% solar fraction in all climates, assuming there is available roof space for the additional collectors.

Drain Water Heat Recovery: Add drain water heat recovery with a 50% effectiveness to serve all the apartments. The assumption is for an unequal flow design where the output of the heat exchanger feeds only the cold water inlets to the apartment showers, not the water heater cold water makeup.

Efficiency measures were applied to the nonresidential spaces based on the 2019 Nonresidential Reach Code Cost-Effectiveness Study (Statewide Reach Code Team, 2019a).

2.2.3 All Electric Measures

This analysis assumes that the basecase prototype model uses individual heat pumps for space heating and all electric appliances in the apartments. Therefore, the domestic hot water system is the only equipment serving the apartment spaces to electrify in the all-electric design . The Statewide Reach Code Team evaluated two configurations for electric heat pump water heaters (HPWHs) described below.

Clustered Heat Pump Water Heater: This clustered design uses residential integrated storage HPWHs to serve more than one apartment; 4 to 5 bedrooms on average for a total of 32 HPWHs in the 88-unit building. The water heaters are located in interior closets throughout the building and designed for short plumbing runs without using a hot water recirculation loop. A minimum efficiency 2.0 UEF HPWH was used for this analysis (to avoid federal preemption). This approach has been selectively used in multifamily projects because of its reliance on lower cost small capacity HPWH products. Since it uses residential equipment with each HPWH serving fewer than 8 apartments the CBECC-Com compliance software had the capability to evaluate this design strategy, even before central HPWH recirculation options were incorporated into the software. The clustered strategy is not a prescriptive option but is allowed in the performance path if the water heater serves no more than 8 units and has no recirculation control. The standard design assumes solar thermal, so the proposed design is penalized in compliance for no solar thermal and made up with other efficiency measures.

Prescriptive Central Heat Pump Water Heater: Per Section 150.1(c)8C of the 2019 Standards, the Energy Commission made an executive determination outlining requirements of a prescriptive approach for central heat pump water heating systems in December 2019 (California Energy Commission, 2019b). Key aspects of the prescriptive approach are described below:

- The system must be configured with a design similar to what is presented in the schematic in Figure 2 of the executive determination document.
- HPWH must be single-pass split system with the compressor located outdoors and be able to operate down to -20°F. In CBECC-Com 2019.1.2, the current version at the time of writing this report, the software only has the capability of modeling Sanden HPWHs.
- The system must include either a solar thermal water heating system that meets the current prescriptive requirements or 0.1 kW_{DC} of photovoltaic system capacity per apartment/dwelling unit.

For this configuration the Statewide Reach Code Team evaluated costs for a central HPWH system using Sanden compressors that met these prescriptive requirements. Based on the system sizing requirements, 15 Sanden units and 1,200 gallons of primary storage capacity are required for the 88-unit building. At the time that cost-effectiveness was initially compared for the two HPWH configurations, the latest CBECC-Com software with the ability to model central HPWH systems was not yet available. To estimate the energy use for the central configuration, the water heating energy use for the clustered configuration was used. It is expected that the energy use of the central system will be higher than the clustered approach primarily as a result of recirculation pump energy and losses.

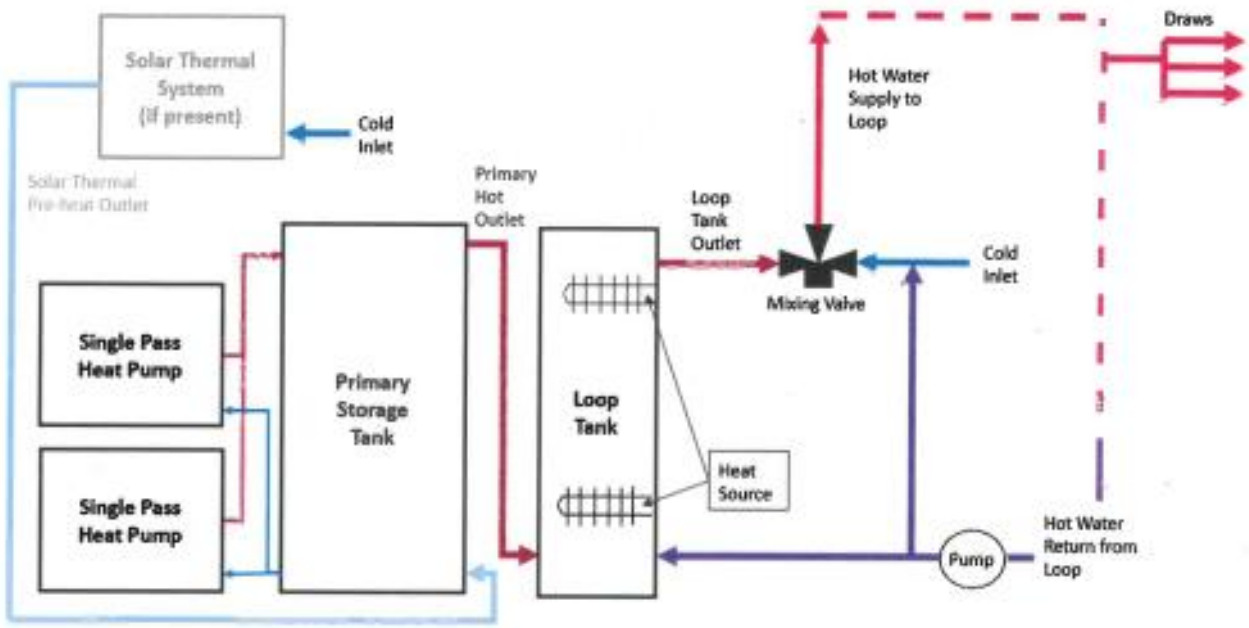


Figure 2: Prescriptive central heat pump water heater system schematic.

All-electric measures were applied to the nonresidential spaces based on the 2019 Nonresidential Reach Code Cost-Effectiveness Study (Statewide Reach Code Team, 2019a).

2.2.4 Renewable Energy

Solar Photovoltaic (PV): There is no existing requirement for PV in the 2019 Title 24 nonresidential code for high-rise residential buildings (four or more stories). The PV sizing methodology was developed to offset a portion of annual residential electricity use and avoid oversizing which would violate net energy metering (NEM)

rules. In all cases, PV is evaluated using the PV simulations within CBECC-Com using a Standard module type, 180 degree azimuth, and 22 degree .tilt. The analysis evaluated PV system capacities equal to 0.1, 0.2, 0.3, and 1 kW_{DC} per apartment. The PV system offsets approximately XX4%, XX8%, XX13%, and 42%, of the apartment electricity usage, respectively. Assuming 15 Watts per square foot for a typical commercial PV system, 1 kW_{DC} per apartment, or 88 kW_{DC} total, would take up about 25% of the total roof area.

2.3 Package Development

Four packages were evaluated for each climate zone, as described below.

1) **Efficiency – Mixed-fuel**: This package applies efficiency measures that don't trigger federal preemption including envelope, water heating distribution, and duct distribution efficiency measures.
2) **Efficiency – All Electric**: This package applies efficiency measures that don't trigger federal preemption in addition to converting any natural gas appliances to electric appliances. For the residential spaces, only water heating is converted from natural gas to electric.
3) **Efficiency & PV – Mixed-fuel**: Beginning with the Efficiency Package , PV was added to offset a portion of the apartment estimated electricity use.
4) **Efficiency & PV – All Electric**: Beginning with the Efficiency Package, PV was added to offset a portion of the apartment estimated electricity use.

2.4 Incremental Costs

2.4.1 Energy Efficiency Measure Costs

Table 22 summarizes the incremental cost assumptions for measures evaluated in this study relative to the residential parts of the building. Incremental costs represent the equipment, installation, replacement, and maintenance costs of the proposed measures relative to the base case. Replacement costs are applied to PV inverters and battery systems over the 30-year evaluation period. There is no assumed maintenance on the envelope, HVAC, or DHW measures. Costs were estimated to reflect costs to the building owner. When costs were obtained from a source that did not already include builder overhead and profit, a markup of 10% was added. All costs are provided as present value in 2020 (2020 PV$). Costs due to variations in furnace, air conditioner, and heat pump capacity by climate zone were not accounted for in the analysis.

Table 2: Incremental Cost Assumptions

Measure	Performance Level	Incremental Cost (2020 PV$)	Source & Notes
Non-Preempted Measures			
Window U-factor	0.25 vs 0.36	$28,301	$6.95/ft^2 window area based on analysis conducted for the 2019 and 2022 Title 24 code cycles (Statewide CASE Team, 2018).
Window SHGC	0.22 vs 0.25	$0	Data from CASE Report along with direct feedback from Statewide CASE Team that higher SHGC does not necessarily have any incremental cost impact (Statewide CASE Team, 2017b).
Exterior Wall Insulation	Add 1-inch	$14,058	$0.86/ft^2 based on adding 1" of exterior insulation on a wall with some level of existing exterior insulation. Costs are averaged from two sources ((Statewide CASE Team, 2014), (Statewide CASE Team, 2017a)) and for expanded polystyrene (EPS) and polyisocyanurate products with a 10% mark-up added to account for cost increases over time.
HERS Verified Pipe Insulation	HERS verified pipe insulation vs no verification	$7,260	$83 per apartment for a HERS Rater to conduct verification of pipe insulation based on feedback from HERS Raters.
Low Pressure Drop Ducts	0.25 W/cfm vs 0.35 W/cfm	$12,654	$144 per apartment. Costs assume 1.5 hourshrs labor per multifamily apartment. Labor rate of $96 per hour is from 2019 RSMeans for sheet metal workers and includes an average City Cost Index for labor for California cities.
Solar Thermal	50% solar fraction vs prescriptive 20%-35%	$79,560	Costs based on 2022 multifamily solar thermal measure CASE proposal (Statewide CASE Team, 2020) and include first cost of $70,727 and $8,834 present value for replacement/maintenance costs.
Drain Water Heat Recovery	50% effectiveness, flows to shower	$16,984	Costs from 2019 DWHR CASE Report which assumes 1 heat exchanger per 4 units (Statewide CASE Team, 2017c). Costs do not include additional cost of water meters at each apartment (per SB7), which would add approx. $175 per dwelling unit.
Renewable Energy (PV)			
PV System	System size varies	$3.17/$W_{DC}$	First costs are from LBNL's Tracking the Sun 2018 costs (Barbose et al., 2018) and represent costs for the first half of 2018 of $2.90/$W_{DC}$ for nonresidential systems ≤500 kW_{DC}. These costs were reduced by 16% for the solar investment tax credit, which is the average credit over years 2020-2022. Inverter replacement cost of $0.14/$W_{DC}$ present value includes replacements at year 11 at $0.15/$W_{DC}$ (nominal) and at year 21 at $0.12/$W_{DC}$ (nominal) per the 2019 PV CASE Report (California Energy Commission, 2017). System maintenance costs of $0.31/$W_{DC}$ present value assumes additional $0.02/$W_{DC}$ (nominal) annually per the 2019 PV CASE Report (California Energy Commission, 2017). 10% overhead and profit added to all costs.

2.4.2 All Electric Measure Costs

The Statewide Reach Code Team reached out to stakeholders to collect project cost information for central gas boilers and both clustered and central HPWH designs. Project data sources included Association for Energy Affordability (AEA), Redwood Energy, Mithun, Ecotope, and the All-Electric Multifamily Compliance Pathway 2022 Draft CASE Report (Statewide CASE Team, 2020). Costs are presented in Table 3.

Table 3: Costs for Gas versus Electric Water Heating Equipment over 30-Year Period of Analysis

	Central Gas Boiler (CZs 1-9)	Central Gas Boiler (CZs 10-16)	Clustered HPWH	Central HPWH
System Quantity/Description	1 boiler recirc		32 units 80 gal. each no recirc	15 units .1,200-gal total recirc
Total Equipment Cost	$98,733		$126,778	$213,364
Solar Thermal	(20% SF) 110,096	(35% SF) $131,817	-	-
Solar PV	-	-	-	$23,580 (8.8 kW_{DC})
Total First Cost	$202,920	$224,641	$126,778	$236,944
Maintenance/Replacement Cost (NPV)	$69,283	$69,283	$81,374	$120,683
Total Cost (NPV)	$272,203	$293,924	$208,152	$357,627
Incremental Cost CZ 1-9 (NPV)			($64,051)	$85,424
Incremental Cost CZ 10-16 (NPV)			($85,772)	$63,703

Typical costs for the water heating systems are based on the following assumptions:

Central Gas Boiler: Based on the average of total estimated project costs from contractors for four multi-family projects ranging from 32 to 340 apartments and cost estimates for mid-rise and high-rise buildings from the All-Electric Multifamily Compliance Pathway 2022 Draft CASE Report (Statewide CASE Team, 2020). The cost per dwelling unit ranged from $547 to $2,089 and the average cost applied in this analysis was $1,122 per dwelling unit. Costs include installation of gas piping from the building meter to the water heater. Water heater lifetime is assumed to be 15 years and the net present value replacement cost at year 15 is $63,373.

Clustered HPWH: Based on costs from one project with RHEEM HPWHs used in a clustered design. Costs include water heater interior closet, electrical outlets, and increased breaker size and sub feed. Water heater based on 2.0 UEF 80-gallon appliance with 32 total HPWHs serving the building (1 per 4 to 5 bedrooms). Water heater lifetime is assumed to be 15 years and the net present value replacement cost at year 15 is $81,374. This design assumes 8 water heater closets per floor, at approximately 15 square feet per closet. While this has an impact on leasable floor area, the design impacts have been found to be minimal when addressed early in design.

Central HPWH: Based on average total installed project costs from four multi-family projects with Sanden HPWHs ranging from 4 to 16 Sanden units per project. The cost per Sanden HPWH ranged from $13,094 to $15,766 and the average cost applied in this analysis was $14,224 per HPWH. Based on the prescriptive system sizing requirements, 15 Sanden units are required for the 88-unit building, resulting in a total first cost of $213,364. Water heater lifetime is assumed to be 15 years. Because Sanden HPWHS are an emerging technology in the United States, it is expected that over time their costs will decrease and for replacement at year 15 the costs are assumed to have decreased by 15%.

Solar Thermal: Based on system costs provided in the All-Electric Multifamily Compliance Pathway 2022 Draft CASE Report (Statewide CASE Team, 2020). First costs reflect the material, labor, and markup costs presented in the Draft CASE Report for the mid-rise prototype. Replacement and maintenance costs assume replacement of the solar thermal tank at year 15 at $6,110 and glycol replacement of $1,300 each time at years 9, 18, and 27. The cost of the remaining useful life of the glycol at year 30 is deducted from the final cost. The Draft CASE Report included costs for replacing the solar collectors at year 20. Collectors can have longer lifetimes up to 30 years if well maintained, therefore this analysis does not assume any replacement of the collectors over the 30 year analysis period.

Table 4: Solar Thermal Detailed Costs over 30-Year Period of Analysis

Solar Fraction	20%	35%
Materials	$33,975	$48,975
Labor	$47,740	$49,776
Markup	27.5%	27.5%
First Cost	$104,187	$125,908
Replacement/Maintenance (PV)	$5,910	$5,910
Total PV Cost	**$110,096**	**$131,817**

2.4.3 Natural Gas Infrastructure Costs

This analysis assumes that in an all-electric new construction project, natural gas would not be supplied to the building. Eliminating natural gas to the building would save costs associated with connecting a service line from the street main to the building, piping distribution within the building, and monthly meter connection charges from the utility. Incremental costs for natural gas infrastructure in the mixed-fuel building are presented in Table 5. Cost data for the plan review and service extension was estimated on a per building basis and then apportioned to the residential and nonresidential portions of the buildings based on annual gas consumption. For the basecase prototype building 49% to 93% of estimated building annual gas use is attributed to the residential water heating system across all climate zones. A statewide average of 80% was calculated and applied to the costs in Table 5 based on housing starts provided by the California Energy Commission for the 2019 Title 24 code development process. The meter costs were based on the service provided to the residential and nonresidential portion of the building separately. Following the table are descriptions of assumptions for each of the cost components. Costs for gas piping from the meter to the gas boilers are included in the central gas boiler costs above. Gas piping distribution costs were typically included in total project costs and could not be broken out in all cases.

Table 5: Natural Gas Infrastructure Cost Savings for All-Electric Building

Item	Total	NonResidential Portion	Residential Portion
Natural Gas Plan Review	$2,316	$452	$1,864
Service Extension[1]	$4,600	$898	$3,702
Meter	$7,200	$3,600	$3,600
Total First Cost	***$14,116***	***$4,950***	***$9,166***

[1]Service extension costs include 50% reduction assuming portion of the costs are passed on to gas customers.

Natural Gas Plan Review: Total costs are based on TRC's 2019 reach code analysis for Palo Alto (TRC, 2019) and then split between the residential and nonresidential spaces in the building proportionately according to annual gas consumption with 80% of the annual load is attributed to residential units on a statewide basis.

Service Extension: Service extension costs to the building were taken from PG&E memo dated December 5, 2019, to Energy Commission staff, include costs for trenching, and assume non-residential new construction within a developed area (see Appendix C – PG&E Gas Infrastructure Cost Memo, PG&E, 2019). The total cost of

$9,200 from the memo is reduced by 50% to account for the portion of the costs paid for by all customers due to application of Utility Gas Main Extensions rules[1]. The resultant cost is apportioned between the residential and nonresidential spaces in the building based on annual gas consumption of residential and nonresidential uses, with 80% of the annual load natural gas use attributed to residential units on a statewide basis.

Meter: Cost per meter provided by PG&E for commercial meters. Assume one meter for nonresidential boilers serving space heating and service water heating, and another for residential boilers serving domestic hot water.

2.5 Cost-effectiveness

Cost-effectiveness was evaluated for all 16 California climate zones and is presented based on both TDV energy, using the Energy Commission's LCC methodology, and an On-Bill approach using residential customer utility rates. Both methodologies require estimating and quantifying the value of the energy impact associated with energy efficiency measures over the life of the measures (30 years) as compared to the prescriptive Title 24 requirements.

Cost-effectiveness is presented using both lifecycle net present value (NPV) savings and benefit-to-cost (B/C) ratio metrics, which represent the cost-effectiveness of a measure over a 30-year lifetime taking into account discounting of future savings and costs.

- **Net Present Value (NPV) Savings:** NPV benefits minus NPV costs is reported as a cost effectiveness metric. If the net savings of a measure or package is positive, it is considered cost effective. Negative savings represent net costs. A measure that has negative energy cost benefits (energy cost increase) can still be cost effective if the costs to implement the measure are more negative (i.e., material and maintenance cost savings).
- **Benefit-to-Cost (B/C) Ratio:** Ratio of the present value of all benefits to the present value of all costs over 30 years (NPV benefits divided by NPV costs). The criteria for cost effectiveness is a B/C greater than 1.0. A value of one indicates the NPV of the savings over the life of the measure is equivalent to the NPV of the lifetime incremental cost of that measure. A value greater than one represents a positive return on investment. The B/C ratio is calculated according to Equation 1.

Equation 1

$$Benefit - to - Cost\ Ratio = \frac{NPV\ of\ lifetime\ benefit}{NPV\ of\ lifetime\ cost}$$

Improving the efficiency of a project often requires an initial incremental investment. In most cases the benefit is represented by annual "On-Bill" utility or TDV savings, and the cost by incremental first cost and replacement costs. However, some packages result in initial construction cost savings (negative incremental cost), and either energy cost savings (positive benefits), or increased energy costs (negative benefits). In cases where both construction costs and energy-related savings are negative, the construction cost savings are treated as the 'benefit' while the increased energy costs are the 'cost.' In cases where a measure or package is cost-effective immediately (i.e. upfront construction cost savings and lifetime energy cost savings), B/C ratio cost-effectiveness is represented by ">1". Because of these situations, NPV savings are also reported, which, in these cases, are positive values.

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[1] PG&E Rule 15: https://www.pge.com/tariffs/tm2/pdf/GAS_RULES_15.pdf

SoCalGas Rule 20: https://www.socalgas.com/regulatory/tariffs/tm2/pdf/20.pdf

SDG&E Rule 15: http://regarchive.sdge.com/tm2/pdf/GAS_GAS-RULES_GRULE15.pdf

The lifetime costs or benefits are calculated according to Equation 2.

Equation 2

$$\boldsymbol{PV\ of\ lifetime\ cost/benefit = \sum_{t=1}^{n} Annual\ cost/benefit_t * (1+r)^t}$$

Where:

- *n* = analysis term
- *r* = real discount rate
- *t* = year at which cost/benefit is incurred

The following summarizes the assumptions applied in this analysis to both methodologies.

- Analysis term of 30 years
- Real discount rate of 3% (does not include inflation)

2.5.1 On-Bill Customer Lifecycle Cost

Residential utility rates were used to calculate utility costs for all cases and determine On-Bill customer cost-effectiveness for the proposed packages. Utility costs of the nonresidential spaces were not evaluated in this study, only apartment and water heating energy use. The Statewide Reach Code Team obtained the recommended utility rates from each IOU based on the assumption that the reach codes go into effect in 2020. Annual utility costs were calculated using hourly electricity and gas output from CBECC-Com, and applying the utility tariffs summarized in Table 6. Appendix B – Utility Tariff Details includes details on the utility rate schedules used for this study. The applicable residential time-of-use (TOU) rate was applied to all cases. For cases with PV generation, the approved NEM2 tariffs were applied along with minimum daily use billing and mandatory non-bypassable charges. For the PV cases annual electric production was always less than annual electricity consumption; and therefore, no credits for surplus generation were necessary. Future changes to the NEM tariffs are likely; however, there is a lot of uncertainty about what those changes will be and if they will become effective during the 2019 Title 24 code cycle (2020-2022).

Based on guidance from the IOUs, the residential electric TOU tariffs that apply to individually metered residential apartments were also used to calculate electricity costs for the central water heating systems. Where baseline allowances are included in the tariffs (SCE TOU-D and SDG&E TOU-DR1) the allowances were applied on a per unit basis for all-electric service.

Based on guidance from the IOUs, master metered multifamily service gas tariffs were used to calculate gas costs for the central water heating systems. The baseline quantities were applied on a per unit basis, as is defined in the schedules, and when available water heating only baseline values were used.

Utility rates were applied to each climate zone based on the predominant IOU serving the population of each zone according to Table 6. Climate Zones 10 and 14 are evaluated with both SCE/SoCalGas and SDG&E tariffs since each utility has customers within these climate zones. Climate Zone 5 is evaluated under both PG&E and SoCalGas natural gas rates. Two municipal utility rates were also evaluated, Sacramento Municipal Utility District (SMUD) in Climate Zone 12 and City of Palo Alto Utilities (CPAU) in Climate Zone 4.

Table 6: IOU Utility Tariffs Applied Based on Climate Zone

Climate Zones	Electric/Gas Utility	Electricity (Apartment Use)	Electricity (Central Water Heating)	Natural Gas (Central Water Heating)[1]
1-5, 11-13, 16	PG&E	E-TOU-C	E-TOU-C	PG&E GM
5	PG&E/SoCalGas			SoCalGas GM-E
6, 8-10, 14,15	SCE/SoCalGas	TOU-D (Option 4-9)	TOU-D (Option 4-9)	
7, 10, 14	SDG&E	TOU-DR1	TOU-DR1	SDG&E GM
12	SMUD/PG&E	R-TOD (RT02)	GSN-T	PG&E GM
4	CPAU	E-1	E-2	G-2

[1] These rates are allowed assuming no gas is used in the apartments.

Utility rates are assumed to escalate over time, using assumptions from research conducted by Energy and Environmental Economics (E3) in the 2019 study Residential Building Electrification in California (Energy & Environmental Economics, 2019). Escalation of natural gas rates between 2019 and 2022 is based on the currently filed General Rate Cases (GRCs) for PG&E, SoCalGas and SDG&E. From 2023 through 2025, gas rates are assumed to escalate at 4% per year above inflation, which reflects historical rate increases between 2013 and 2018. Escalation of electricity rates from 2019 through 2025 is assumed to be 2% per year above inflation, based on electric utility estimates. After 2025, escalation rates for both natural gas and electric rates are assumed to drop to a more conservative 1% escalation per year above inflation for long-term rate trajectories beginning in 2026 through 2050. See Appendix B – Utility Tariff Details for additional details.

2.5.2 TDV Lifecycle Cost

Cost-effectiveness was also assessed using the Energy Commission's TDV LCC methodology. TDV is a normalized monetary format developed and used by the Energy Commission for comparing electricity and natural gas savings, and it considers the cost of electricity and natural gas consumed during different times of the day and year. The 2019 TDV values are based on long term discounted costs of 30 years for all residential measures. The CBECC-Com simulation software results are expressed in terms of TDV kBtus. The present value of the energy cost savings in dollars is calculated by multiplying the TDV kBtu savings by a net present value (NPV) factor, also developed by the Energy Commission. The 30-year NPV factor is $0.154/TDV kBtu for nonresidential projects under 2019 Title 24.

Like the customer B/C ratio, a TDV B/C ratio value of one indicates the savings over the life of the measure are equivalent to the incremental cost of that measure. A value greater than one represents a positive return on investment. The ratio is calculated according to Equation 3.

Equation 3

$$TDV\ Benefit - to - Cost\ Ratio = \frac{TDV\ energy\ savings\ *\ NPV\ factor}{NPV\ of\ lifetime\ incremental\ cost}$$

2.6 Greenhouse Gas Emissions

Equivalent CO2 emission savings were calculated based on estimates from Zero Code reports available in CBECC-Com simulation software.[2] Electricity emissions vary by region and by hour of the year, accounting for time dependent energy use and carbon emissions based on source emissions, including renewable portfolio standard

[2] More information at: : https://zero-code.org/wp-content/uploads/2018/11/ZERO-Code-TSD-California.pdf

projections. Two distinct hourly profiles, one for Climate Zones 1 through 5 and 11 through 13 and another for Climate Zones 6 through 10 and 14 through 16. For natural gas a fixed factor of 0.005307 metric tons/therm is used. To compare the mixed fuel and all-electric cases side-by-side, greenhouse gas (GHG) emissions are presented as CO2-equivalent emissions per dwelling unit.

3 Results

The primary objective of the evaluation is to identify cost-effective, non-preempted performance targets for mid-rise multifamily buildings, under both mixed-fuel and all-electric cases, to support the design of local ordinances requiring new mid-rise residential buildings to exceed the minimum state requirements. The packages presented are representative examples of designs and measures that can be used to meet the requirements. In practice, a builder can use any combination of non-preempted or preempted compliant measures to meet the requirements.

This analysis evaluated a package of efficiency measures applied to a mixed-fuel design and a similar package for an all-electric design. Each design was evaluated using the predominant utility rates in all 16 California climate zones. Solar PV was also added to the efficiency packages and a sensitivity analysis was conducted at various PV system capacities to optimize cost-effectiveness.

Although some of the efficiency measures evaluated were not cost-effective and were eliminated, the following measures are included in at least one package:

- Improved fenestration
- Wall insulation
- Low pressure-drop distribution system
- HERS verified pipe insulation

The following measures were evaluated but were found to not be cost-effective and were not included in any of the packages.

- Solar thermal system with higher solar fraction than prescriptive requirements
- Drain water heat recovery

Cost-effectiveness results for the all-electric case are based upon the clustered HPWH approach only. Lower first costs with the clustered approach resulted in better cost-effectiveness than the central HPWH design.

3.1 Mid-Rise Multifamily Results

Table 7 and Table 9 present results for the mixed-fuel and all-electric packages, respectively. Each table shows cost-effectiveness results for **Efficiency Only** packages and **Efficiency + PV** packages (with a 17.6 kW_{DC} PV system sized based on 0.2 kW_{DC} per apartment). Both mixed-fuel and all-electric results are relative to the mixed-fuel 2019 Title 24 prescriptive baseline. B/C ratios for all packages are presented according to both the On-Bill and TDV methodologies for the mixed-fuel and the all-electric cases, respectively. Detailed results are presented in *Appendix D – Detailed Results Mixed-Fuel* and *Appendix E – Detailed Results All-Electric*.

Efficiency Only:

Compliance margins for the **Mixed-Fuel Efficiency Only** cases range from 5% to 8%, which meets the CALGreen Tier 1 energy performance requirement for high-rise residential buildings. **Mixed-Fuel Efficiency Only** cases are cost-effective based on TDV in all climate zones except for 1 and 16. The cases are cost-effective from an On-Bill perspective in all climate zones except 1.

The **All-Electric Efficiency Only** package does not meet minimum code requirements in Climate Zones 1 and 16. Compliance margins for all other climate zones range from 1% to 5%. **All-Electric Efficiency Only** cases are cost-

effective in all climate zones based on TDV. Cost-effectiveness from an On-Bill perspective is favorable in all climate zones except 1, 16, and 5 in SCG territory.

Efficiency + PV:

Several PV system size options were evaluated for the **Efficiency + PV** packages. Of the PV system sizes evaluated, 0.2 kW_{DC} per apartment represents the smallest system that resulted in B/C ratios greater than one based on both metrics in all climate zones for the mixed-fuel scenario. Adding a 0.1 kW_{DC} per apartment in the all-electric cases, resulted in B/C ratios greater than one in all climate zones.

Table 11 and Table 12 describe the efficiency measures included in the mixed-fuel and all-electric packages, respectively.

Table 7: Mixed-Fuel Package Results: Efficiency Only (SAVINGS/COST PER APARTMENT)

Climate Zone	Elec Utility	Gas Utility	Comp. Margin	Total Gas Savings (therms)	Total Electric Savings (kWh)	GHG Reductions (lb. CO2)	Savings (2020 PV$)		Incremental Cost (2020 PV$)	B/C Ratio[1]		NPV	
							Utility Cost Savings	TDV Savings		On-Bill	TDV	On-Bill	TDV
CZ01	PGE	PGE	5.8%	0	26	18	$133	$105	$304	0.44	0.35	($171)	($199)
CZ02	PGE	PGE	5.9%	0	47	29	$391	$285	$144	2.72	1.98	$248	$141
CZ03	PGE	PGE	6.7%	0	44	27	$345	$226	$144	2.40	1.57	$202	$82
CZ04	PGE	PGE	6.6%	0	61	37	$465	$331	$144	3.24	2.31	$321	$188
CZ04-2	CPAU	CPAU	6.6%	0	61	37	$248	$331	$144	1.73	2.31	$104	$188
CZ05	PGE	PGE	6.7%	0	42	24	$320	$206	$144	2.22	1.43	$176	$62
CZ05-2	PGE	SCG	6.7%	0	42	24	$320	$206	$144	2.22	1.43	$176	$62
CZ06	SCE	SCG	7.1%	0	74	42	$424	$351	$144	2.95	2.44	$280	$207
CZ07	SDGE	SDGE	7.6%	0	81	48	$593	$374	$144	4.13	2.60	$449	$230
CZ08	SCE	SCG	7.0%	0	84	50	$484	$420	$144	3.37	2.92	$341	$276
CZ09	SCE	SCG	6.5%	0	83	51	$468	$441	$144	3.26	3.06	$324	$297
CZ10	SCE	SCG	6.5%	0	82	50	$410	$427	$144	2.85	2.97	$266	$283
CZ10-2	SDGE	SDGE	6.5%	0	82	50	$599	$427	$144	4.16	2.97	$455	$283
CZ11	PGE	PGE	6.8%	0	104	70	$637	$635	$625	1.02	1.02	$11	$10
CZ12	PGE	PGE	6.8%	0	93	60	$572	$568	$304	1.88	1.87	$268	$265
CZ12-2	SMUD	PGE	6.8%	0	93	71	$319	$568	$304	1.05	1.87	$15	$265
CZ13	PGE	PGE	7.3%	0	132	89	$798	$779	$625	1.28	1.25	$173	$154
CZ14	SCE	SCG	6.0%	0	80	49	$407	$449	$304	1.34	1.48	$103	$145
CZ14-2	SDGE	SDGE	6.0%	0	80	49	$576	$449	$304	1.90	1.48	$273	$145
CZ15	SCE	SCG	6.8%	0	145	93	$719	$802	$625	1.15	1.28	$94	$177
CZ16	PGE	PGE	7.4%	0	117	76	$646	$563	$625	1.03	0.90	$21	($62)

[1] Values in red indicate B/C ratios less than 1.

Table 8: Mixed-Fuel Package Results: PV + Efficiency 0.2 kW_{DC} per Apartment (SAVINGS/COST PER APARTMENT)

Climate Zone	Elec Utility	Gas Utility	Comp. Margin	Total Gas Savings (therms)	Total Electric Savings (kWh)	GHG Reductions (lb. CO2)	Savings (2020 PV$)		Incremental Cost (2020 PV$)	B/C Ratio[1]		NPV	
							Utility Cost Savings	TDV Savings		On-Bill	TDV	On-Bill	TDV
CZ01	PGE	PGE	5.8%	0	291	131	$1,637	$1,090	$937	1.75	1.16	$701	$153
CZ02	PGE	PGE	5.9%	0	360	163	$2,431	$1,469	$777	3.13	1.89	$1,655	$692
CZ03	PGE	PGE	6.7%	0	359	161	$2,400	$1,397	$777	3.09	1.80	$1,624	$620
CZ04	PGE	PGE	6.6%	0	385	176	$2,579	$1,562	$777	3.32	2.01	$1,802	$785
CZ04-2	CPAU	CPAU	6.6%	0	61	176	$1,335	$1,562	$777	1.72	2.01	$558	$785
CZ05	PGE	PGE	6.7%	0	379	168	$2,480	$1,461	$777	3.19	1.88	$1,704	$685
CZ05-2	PGE	SCG	6.7%	0	379	168	$2,480	$1,461	$777	3.19	1.88	$1,704	$685
CZ06	SCE	SCG	7.1%	0	392	178	$1,987	$1,587	$777	2.56	2.04	$1,210	$810
CZ07	SDGE	SDGE	7.6%	0	411	189	$2,770	$1,647	$777	3.57	2.12	$1,993	$870
CZ08	SCE	SCG	7.0%	0	402	186	$2,059	$1,708	$777	2.65	2.20	$1,282	$931
CZ09	SCE	SCG	6.5%	0	410	192	$1,876	$1,742	$777	2.41	2.24	$1,099	$965
CZ10	SCE	SCG	6.5%	0	409	190	$1,797	$1,681	$777	2.31	2.16	$1,020	$904
CZ10-2	SDGE	SDGE	6.5%	0	409	190	$2,646	$1,681	$777	3.41	2.16	$1,869	$904
CZ11	PGE	PGE	6.8%	0	422	206	$2,438	$1,877	$1,258	1.94	1.49	$1,180	$619
CZ12	PGE	PGE	6.8%	0	406	193	$2,352	$1,794	$937	2.51	1.91	$1,415	$857
CZ12-2	SMUD	PGE	6.8%	0	406	193	$1,226	$1,794	$937	1.31	1.91	$289	$857
CZ13	PGE	PGE	7.3%	0	441	221	$2,548	$1,965	$1,258	2.03	1.56	$1,290	$707
CZ14	SCE	SCG	6.0%	0	439	201	$1,923	$1,901	$937	2.05	2.03	$987	$964
CZ14-2	SDGE	SDGE	6.0%	0	439	201	$2,819	$1,901	$937	3.01	2.03	$1,882	$964
CZ15	SCE	SCG	6.8%	0	478	234	$2,128	$2,110	$1,258	1.69	1.68	$870	$852
CZ16	PGE	PGE	7.4%	0	457	222	$2,567	$1,818	$1,258	2.04	1.44	$1,309	$560

[1] Values in red indicate B/C ratios less than 1.

Table 9: All-Electric Package Results: Efficiency Only (SAVINGS/COSTS PER APARTMENT)

Climate Zone	Elec Utility	Gas Utility	Comp. Margin	Total Gas Savings (therms)	Total Electric Savings (kWh)	GHG Reductions (lb. CO2)	Savings (2020 PV$)		Incremental Cost (2020 PV$)	B/C Ratio[1,2]		NPV	
							Utility Cost Savings	TDV Savings		On-Bill	TDV	On-Bill	TDV
CZ01	PGE	PGE	-0.4%	125	-873	1040	-$674	$199	-$446	0.7	>1	($228)	$645
CZ02	PGE	PGE	1.6%	114	-762	971	-$238	$528	-$606	2.5	>1	$368	$1,134
CZ03	PGE	PGE	1.1%	115	-767	975	-$287	$390	-$606	2.1	>1	$319	$996
CZ04	PGE	PGE	3.4%	111	-714	952	-$102	$625	-$606	6.0	>1	$504	$1,231
CZ04-2	CPAU	CPAU	3.4%	111	-714	952	$345	$625	-$606	>1	>1	$951	$1,231
CZ05	PGE	PGE	1.3%	117	-788	991	-$350	$391	-$606	1.7	>1	$255	$996
CZ05-2	PGE	SCG	1.3%	117	-788	991	-$827	$391	-$606	0.7	>1	($221)	$996
CZ06	SCE	SCG	3.7%	107	-670	933	$153	$612	-$606	>1	>1	$759	$1,218
CZ07	SDGE	SDGE	4.8%	106	-653	930	-$58	$665	-$606	10.4	>1	$547	$1,271
CZ08	SCE	SCG	3.9%	104	-633	912	$227	$693	-$606	>1	>1	$833	$1,298
CZ09	SCE	SCG	3.8%	104	-633	912	$212	$739	-$606	>1	>1	$817	$1,345
CZ10	SCE	SCG	1.8%	90	-626	743	-$214	$396	-$853	4.0	>1	$639	$1,249
CZ10-2	SDGE	SDGE	1.8%	90	-626	743	-$478	$396	-$853	1.8	>1	$375	$1,249
CZ11	PGE	PGE	2.0%	91	-619	769	-$241	$430	-$371	1.5	>1	$130	$802
CZ12	PGE	PGE	1.4%	94	-662	773	-$414	$288	-$693	1.7	>1	$279	$980
CZ12-2	SMUD	PGE	1.4%	94	-662	773	$1,060	$288	-$693	>1	>1	$1,753	$980
CZ13	PGE	PGE	2.6%	90	-579	777	-$62	$505	-$371	6.0	>1	$309	$876
CZ14	SCE	SCG	1.1%	92	-653	759	-$258	$305	-$693	2.7	>1	$435	$998
CZ14-2	SDGE	SDGE	1.1%	92	-653	759	-$532	$305	-$693	1.3	>1	$161	$998
CZ15	SCE	SCG	4.4%	74	-409	679	$332	$832	-$371	>1	>1	$704	$1,203
CZ16	PGE	PGE	-5.8%	108	-777	895	-$621	$127	-$371	0.6	>1	($250)	$498

[1] Values in red indicate B/C ratios less than 1.

[2] “>1” indicates cases where there are both incremental measure cost savings and energy cost savings.

Table 10: All-Electric Package Results: PV + Efficiency 0.1 kW_{DC} per Apartment (SAVINGS/COSTS PER APARTMENT)

Climate Zone	Elec Utility	Gas Utility	Comp. Margin	Total Gas Savings (therms)	Total Electric Savings (kWh)	GHG Reductions (lb. CO2)	Savings (2020 PV$)		Incremental Cost (2020 PV$)	B/C Ratio[1,2]		NPV	
							Utility Cost Savings	TDV Savings		On-Bill	TDV	On-Bill	TDV
CZ01	PGE	PGE	-0.4%	125	-741	1,097	$78	$692	-$129	>1	>1	$208	$821
CZ02	PGE	PGE	1.6%	114	-606	1,038	$782	$1,120	-$289	>1	>1	$1,071	$1,409
CZ03	PGE	PGE	1.1%	115	-609	1,042	$741	$975	-$289	>1	>1	$1,030	$1,264
CZ04	PGE	PGE	3.4%	111	-552	1,021	$955	$1,240	-$289	>1	>1	$1,244	$1,529
CZ04-2	CPAU	CPAU	3.4%	111	-714	1,021	$904	$1,240	-$289	>1	>1	$1,194	$1,529
CZ05	PGE	PGE	1.3%	117	-619	1,063	$730	$1,018	-$289	>1	>1	$1,019	$1,307
CZ05-2	PGE	SCG	1.3%	117	-619	1,063	$254	$1,018	-$289	>1	>1	$543	$1,307
CZ06	SCE	SCG	3.7%	107	-512	1,001	$935	$1,231	-$289	>1	>1	$1,224	$1,520
CZ07	SDGE	SDGE	4.8%	106	-488	1,000	$1,049	$1,302	-$289	>1	>1	$1,339	$1,591
CZ08	SCE	SCG	3.9%	104	-474	981	$1,014	$1,337	-$289	>1	>1	$1,304	$1,626
CZ09	SCE	SCG	3.8%	104	-469	983	$924	$1,390	-$289	>1	>1	$1,213	$1,679
CZ10	SCE	SCG	1.8%	90	-463	813	$480	$1,023	-$536	>1	>1	$1,016	$1,559
CZ10-2	SDGE	SDGE	1.8%	90	-463	813	$546	$1,023	-$536	>1	>1	$1,082	$1,559
CZ11	PGE	PGE	2.0%	91	-460	837	$660	$1,052	-$55	>1	>1	$714	$1,106
CZ12	PGE	PGE	1.4%	94	-505	839	$476	$900	-$376	>1	>1	$852	$1,276
CZ12-2	SMUD	PGE	1.4%	94	-505	839	$1,513	$900	-$376	>1	>1	$1,890	$1,276
CZ13	PGE	PGE	2.6%	90	-424	843	$813	$1,098	-$55	>1	>1	$867	$1,153
CZ14	SCE	SCG	1.1%	92	-473	835	$500	$1,031	-$376	>1	>1	$877	$1,407
CZ14-2	SDGE	SDGE	1.1%	92	-473	835	$589	$1,031	-$376	>1	>1	$965	$1,407
CZ15	SCE	SCG	4.4%	74	-242	750	$1,037	$1,485	-$55	>1	>1	$1,091	$1,540
CZ16	PGE	PGE	-5.8%	108	-608	969	$339	$754	-$55	>1	>1	$394	$809

[1] Values in red indicate B/C ratios less than 1.

[2] ">1" indicates cases where there are both incremental measure cost savings and energy cost savings.

Table 11: Mixed-Fuel Measure Package Summary

Climate Zone	Compliance Margin	MEASURE SPECIFICATION Window U-value	Window SHGC	Add Wall Ins.	Fan Watt Draw	HERS Pipe Ins.
CZ01	5.8%			+ 1"	0.25 W/cfm	No
CZ02	5.9%		0.22		0.25 W/cfm	No
CZ03	6.7%		0.22		0.25 W/cfm	No
CZ04	6.6%		0.22		0.25 W/cfm	No
CZ05	6.7%		0.22		0.25 W/cfm	No
CZ06	7.1%		0.22		0.25 W/cfm	No
CZ07	7.6%		0.22		0.25 W/cfm	No
CZ08	7.0%		0.22		0.25 W/cfm	No
CZ09	6.5%		0.22		0.25 W/cfm	No
CZ10	6.5%		0.22		0.25 W/cfm	No
CZ11	6.8%	0.25	0.22	+ 1"	0.25 W/cfm	No
CZ12	7.3%		0.22	+ 1"	0.25 W/cfm	No
CZ13	7.3%	0.25	0.22	+ 1"	0.25 W/cfm	No
CZ14	6.8%		0.22	+ 1"	0.25 W/cfm	No
CZ15	6.8%	0.25	0.22	+ 1"	0.25 W/cfm	No
CZ16	7.4%	0.25	0.22	+ 1"	0.25 W/cfm	No

Table 12: All-Electric Measure Package Summary

Climate Zone	Compliance Margin	MEASURE SPECIFICATION Window U-value	Window SHGC	Add Wall Ins.	Fan Watt Draw	HERS Pipe Ins.
CZ01	-0.4%			+ 1"	0.25 W/cfm	Yes
CZ02	1.6%		0.22		0.25 W/cfm	Yes
CZ03	1.1%		0.22		0.25 W/cfm	Yes
CZ04	3.4%		0.22		0.25 W/cfm	Yes
CZ05	1.3%		0.22		0.25 W/cfm	Yes
CZ06	3.7%		0.22		0.25 W/cfm	Yes
CZ07	4.8%		0.22		0.25 W/cfm	Yes
CZ08	3.9%		0.22		0.25 W/cfm	Yes
CZ09	3.8%		0.22		0.25 W/cfm	Yes
CZ10	1.8%		0.22		0.25 W/cfm	Yes
CZ11	2.0%	0.25	0.22	+ 1"	0.25 W/cfm	Yes
CZ12	2.0%		0.22	+ 1"	0.25 W/cfm	Yes
CZ13	2.6%	0.25	0.22	+ 1"	0.25 W/cfm	Yes
CZ14	2.0%		0.22	+ 1"	0.25 W/cfm	Yes
CZ15	4.4%	0.25	0.22	+ 1"	0.25 W/cfm	Yes
CZ16	-5.8%	0.25	0.22	+ 1"	0.25 W/cfm	Yes

4 Conclusions & Summary

This report evaluated the feasibility and cost-effectiveness of "above code" performance specifications for newly constructed mid-rise multifamily buildings. The analysis included application of efficiency measures, electric appliances, and PV in all 16 California climate zones, and found cost-effective packages across the state. For the building designs and climate zones where cost-effective packages were identified, the results of this analysis can be used by local jurisdictions to support the adoption of reach codes. Cost-effectiveness was evaluated according to two metrics: On-Bill customer lifecycle benefit-to-cost ratio and TDV lifecycle benefit-to-cost ratio.

For mixed-fuel buildings, this analysis demonstrates that there are cost-effective **Efficiency Only** packages that achieve a minimum 5% compliance margin in most climate zones. The exception is Climate Zone 1 where the package was not cost-effective based on either the TDV or the On-Bill methodology. In all other cases the package is cost-effective for at least one of the metrics.

When 0.1 kW_{DC} per apartment is included, all climate zones are cost-effective based on at least one of the metrics. The addition of 0.1 kW_{DC} per apartment, or 8.8 kW_{DC} total for the building, results in an incremental cost for the PV system of $27,855. When 0.2 kW_{DC} per apartment is included, all climate zones are cost-effective based on both metrics. The addition of 0.2 kW_{DC} per apartment, or 17.6 kW_{DC} for the building, results in an incremental cost for the PV system of $55,711.

This study evaluated electrification of residential loads in new mid-rise multifamily buildings. Based on typical construction across California, the basecase condition incorporated all electric appliances within the apartment spaces. As a result, only central water heating was converted from natural gas to electric as part of this analysis. For all-electric buildings, this analysis demonstrates that there are cost-effective **All-Electric Efficiency Only** packages that meet minimum Title 24 code compliance in all climate zones except 1 and 16. The package is cost-effective based on the TDV methodology in all climate zones. It is cost-effective based on the On-Bill methodology in Climate Zones 2 through 15, except for Climate Zones 5 in SCG territory.

When 0.1 kW_{DC} per apartment is included, all climate zones are cost-effective based on both metrics. The addition of 0.1 kW_{DC} per apartment, or 8.8 kW_{DC} for the building, results in an incremental cost for the PV system of $27,855.

Additional considerations

- This study found that electrification of central domestic hot water loads, in combination with efficiency measures, can result in a benefit to the consumer through lower utility bills under certain electricity and gas tariff scenarios (Climate Zones 6, 8, 9, 15, 4 in CPAU territory, and 12 in SMUD territory territory). The all-electric results demonstrate a trend with On-Bill cost-effectiveness across the different electric utilities. Net Present Value in SCE and SDG&E territories, as well as SMUD and CPAU territories, are typically higher than the cases in PG&E territory. This indicates that rate design can play an important role in encouraging or discouraging electrification.
- This study did not evaluate federally preempted high efficiency appliances. Specifying high efficiency equipment is a viable approach to meeting Title 24 code compliance and local ordinance requirements and is commonly used by project teams. Other studies have found that efficiency packages and electrification packages that employ high efficiency equipment can be quite cost-effective ((Statewide Reach Code Team, 2019b), (Energy & Environmental Economics. 2019)).
- If PV capacity is added to both the mixed-fuel and all-electric efficiency packages, all cases are cost-effective based on at least one of the two evaluated metrics. In some cases, cost-effectiveness improves, and in other cases it decreases relative to the case with efficiency and/or electrification measures only. The cost-effectiveness of adding PV up to 1 kW per apartment, as an independent measure, results in On-Bill benefit-to-cost ratios between 2.3 and 3.1 for PGE territory, 2.1 to 2.3 for SCE territory, and 3.2 to 3.5 for SDG&E territory. The TDV B/C ratio for PV alone is approximately 2.0 for most climate zones

for all service territories. Adding PV in addition to the efficiency packages improves cost-effectiveness where the B/C ratios for the efficiency measures alone are lower than the B/C ratios for PV alone, and vice versa where they are higher. Annual basecase electricity costs and annual utility savings from PV are lower in SCE territory than in PG&E and SDG&E territories. This is due to lower off-peak cost and a bigger difference in peak versus off-peak rate for the TOU-D SCE electricity rate tariff. Most PV production occurs during off-peak times (4 pm to 9 pm peak period).

Table 13 summarizes compliance margin and cost-effectiveness results for the mixed-fuel and all-electric cases. Compliance margin is reported in the cells and cost-effectiveness is indicated by the color of the cell according to the following:

- Cells highlighted in green depict a positive compliance margin and cost-effective results using both On-Bill and TDV approaches.
- Cells highlighted in yellow depict a positive compliance margin and cost-effective results using either the On-Bill or TDV approach but not both.
- Cells not highlighted either depict a negative compliance margin (red text) or a package that was not cost-effective using either the On-Bill or TDV approach.

For more detail on the results, please refer to *Section 3.1* Mid-Rise Multifamily Results, *Appendix D – Detailed Results Mixed-Fuel* and *Appendix E – Detailed Results All-Electric*.

Table 13: Mid-Rise Multifamily Summary of Compliance Margin and Cost-Effectiveness

			Mixed-Fuel				All-Electric			
Climate Zone	Elec Utility	Gas Utility	No PV	0.1 kW_{DC} /Apt	0.2 kW_{DC} /Apt	0.3 kW_{DC} /Apt	No PV	0.1 kW_{DC} /Apt	0.2 kW_{DC} /Apt	0.3 kW_{DC} /Apt
CZ01	PGE	PGE	5.8%	5.8%	5.8%	5.8%	-0.4%	-0.4%	-0.4%	-0.4%
CZ02	PGE	PGE	5.9%	5.9%	5.9%	5.9%	1.6%	1.6%	1.6%	1.6%
CZ03	PGE	PGE	6.7%	6.7%	6.7%	6.7%	1.1%	1.1%	1.1%	1.1%
CZ04	PGE	PGE	6.6%	6.6%	6.6%	6.6%	3.4%	3.4%	3.4%	3.4%
CZ04-2	CPAU	CPAU	6.6%	6.6%	6.6%	6.6%	3.4%	3.4%	3.4%	3.4%
CZ05	PGE	PGE	6.7%	6.7%	6.7%	6.7%	1.3%	1.3%	1.3%	1.3%
CZ05-2	PGE	SCG	6.7%	6.7%	6.7%	6.7%	1.3%	1.3%	1.3%	1.3%
CZ06	SCE	SCG	7.1%	7.1%	7.1%	7.1%	3.7%	3.7%	3.7%	3.7%
CZ07	SDGE	SDGE	7.6%	7.6%	7.6%	7.6%	4.8%	4.8%	4.8%	4.8%
CZ08	SCE	SCG	7.0%	7.0%	7.0%	7.0%	3.9%	3.9%	3.9%	3.9%
CZ09	SCE	SCG	6.5%	6.5%	6.5%	6.5%	3.8%	3.8%	3.8%	3.8%
CZ10	SCE	SCG	6.5%	6.5%	6.5%	6.5%	1.8%	1.8%	1.8%	1.8%
CZ10-2	SDGE	SDGE	6.5%	6.5%	6.5%	6.5%	1.8%	1.8%	1.8%	1.8%
CZ11	PGE	PGE	6.8%	6.8%	6.8%	6.8%	2.0%	2.0%	2.0%	2.0%
CZ12	PGE	PGE	6.8%	6.8%	6.8%	6.8%	1.4%	1.4%	1.4%	1.4%
CZ12-2	SMUD	PGE	6.8%	6.8%	6.8%	6.8%	1.4%	1.4%	1.4%	1.4%
CZ13	PGE	PGE	7.3%	7.3%	7.3%	7.3%	2.6%	2.6%	2.6%	2.6%
CZ14	SCE	SCG	6.0%	6.0%	6.0%	6.0%	1.1%	1.1%	1.1%	1.1%
CZ14-2	SDGE	SDGE	6.0%	6.0%	6.0%	6.0%	1.1%	1.1%	1.1%	1.1%
CZ15	SCE	SCG	6.8%	6.8%	6.8%	6.8%	4.4%	4.4%	4.4%	4.4%
CZ16	PGE	PGE	7.4%	7.4%	7.4%	7.4%	-5.8%	-5.8%	-5.8%	-5.8%

5 References

California Energy Commission. 2017. Rooftop Solar PV System. Measure number: 2019-Res-PV-D Prepared by Energy and Environmental Economics, Inc. https://efiling.energy.ca.gov/getdocument.aspx?tn=221366

California Energy Commission. 2018a. 2019 Building Energy Efficiency Standards for Residential and Nonresidential Buildings. CEC-400-2018-020-CMF. December 2018. California Energy Commission. https://www.energy.ca.gov/2018publications/CEC-400-2018-020/CEC-400-2018-020-CMF.pdf

California Energy Commission. 2018b. 2019 Reference Appendices. CEC-400-2018-021-CMF. December 2018. California Energy Commission. https://www.energy.ca.gov/2018publications/CEC-400-2018-021/CEC-400-2018-021-CMF.pdf

California Energy Commission. 2019a. 2019 Nonresidential Alternative Calculation Method Reference Manual. CEC-400-2019-006-CMF. May 2019. California Energy Commission. https://ww2.energy.ca.gov/2019publications/CEC-400-2019-006/CEC-400-2019-006-CMF.pdf

California Energy Commission. 2019b. Executive Director Determination Pursuant to Section 150.1(c)8C for Central Heat Pump Water Heating System. December 26, 2019. https://efiling.energy.ca.gov/GetDocument.aspx?tn=231318&DocumentContentId=63067

Energy & Environmental Economics. 2019. Residential Building Electrification in California. April 2019. https://www.ethree.com/wp-content/uploads/2019/04/E3_Residential_Building_Electrification_in_California_April_2019.pdf

Horii, B., E. Cutter, N. Kapur, J. Arent, and D. Conotyannis. 2014. "Time Dependent Valuation of Energy for Developing Building Energy Efficiency Standards." http://www.energy.ca.gov/title24/2016standards/prerulemaking/documents/2014-07-09_workshop/2017_TDV_Documents/

Barbose, Galen and Darghouth, Naim. 2018. Tracking the Sun. Installed Price Trends for Distributed Photovoltaic Systems in the United States – 2018 Edition. Lawrence Berkeley National Laboratory. September 2018. https://emp.lbl.gov/sites/default/files/tracking_the_sun_2018_edition_final_0.pdf

Statewide CASE Team. 2014. Codes and Standards Enhancement (CASE) Initiative Nonresidential Opaque Envelope. December 2014. https://title24stakeholders.com/wp-content/uploads/2019/02/2016-T24-CASE-Report-NR-Opaque-Envelope-Dec2014-V3.pdf

Statewide CASE Team. 2017a. Codes and Standards Enhancement (CASE) Initiative High Performance Walls – Final Report. September 2017. http://title24stakeholders.com/wp-content/uploads/2017/09/2019-T24-CASE-Report_HPW_Final_September-2017.pdf

Statewide CASE Team. 2017b. Codes and Standards Enhancement (CASE) Initiative Residential High Performance Windows & Doors – Final Report. August 2017. http://title24stakeholders.com/wp-content/uploads/2017/09/2019-T24-CASE-Report_Res-Windows-and-Doors_Final_September-2017.pdf

Statewide CASE Team. 2017c. Codes and Standards Enhancement (CASE) Initiative Drain Water Heat Recovery – Final Report. July 2017. https://title24stakeholders.com/wp-content/uploads/2017/09/2019-T24-CASE-Report_DWHR_Final_September-2017.pdf

Statewide CASE Team. 2018. Energy Savings Potential and Cost-Effectiveness Analysis of High Efficiency Windows in California. Prepared by Frontier Energy. May 2018. https://www.etcc-ca.com/reports/energy-savings-potential-and-cost-effectiveness-analysis-high-efficiency-windows-california

Statewide CASE Team. 2020. All-Electric Multifamily Compliance Pathway Draft CASE Report. https://title24stakeholders.com/wp-content/uploads/2018/10/2022-T24-Draft-CASE-Report_MF-All-Electric.pdf

Statewide Reach Code Team. 2019a. 2019 Nonresidential New Construction Reach Code Cost Effectiveness Study. Prepared for Southern California Edison. Prepared by TRC. July 25, 2019. https://localenergycodes.com/download/801/file_path/fieldList/2019%20NR%20NC%20Cost%20Effectiveness%20Study-2019-07-25.pdf

Statewide Reach Code Te am. 2019b. 2019 Cost-effectiveness Study: Low-Rise Residential New Construction. Prepared for Pacific Gas and Electric Company. Prepared by Frontier Energy. August 1, 2019. https://localenergycodes.com/download/800/file_path/fieldList/2019%20Res%20NC%20Reach%20Codes

TRC. 2018. City of Palo Alto 2019 Title 24 Energy Reach Code Cost-effectiveness Analysis Draft. September 2018. https://cityofpaloalto.org/civicax/filebank/documents/66742

TRC. 2019. Multifamily Prototypes. June 7, 2019. Submitted to Southern California Edison. https://title24stakeholders.com/wp-content/uploads/2019/06/SCE-MFModeling_MultifamilyPrototypesReport_2019-06-07_clean.pdf

Appendix A – California Climate Zone Map

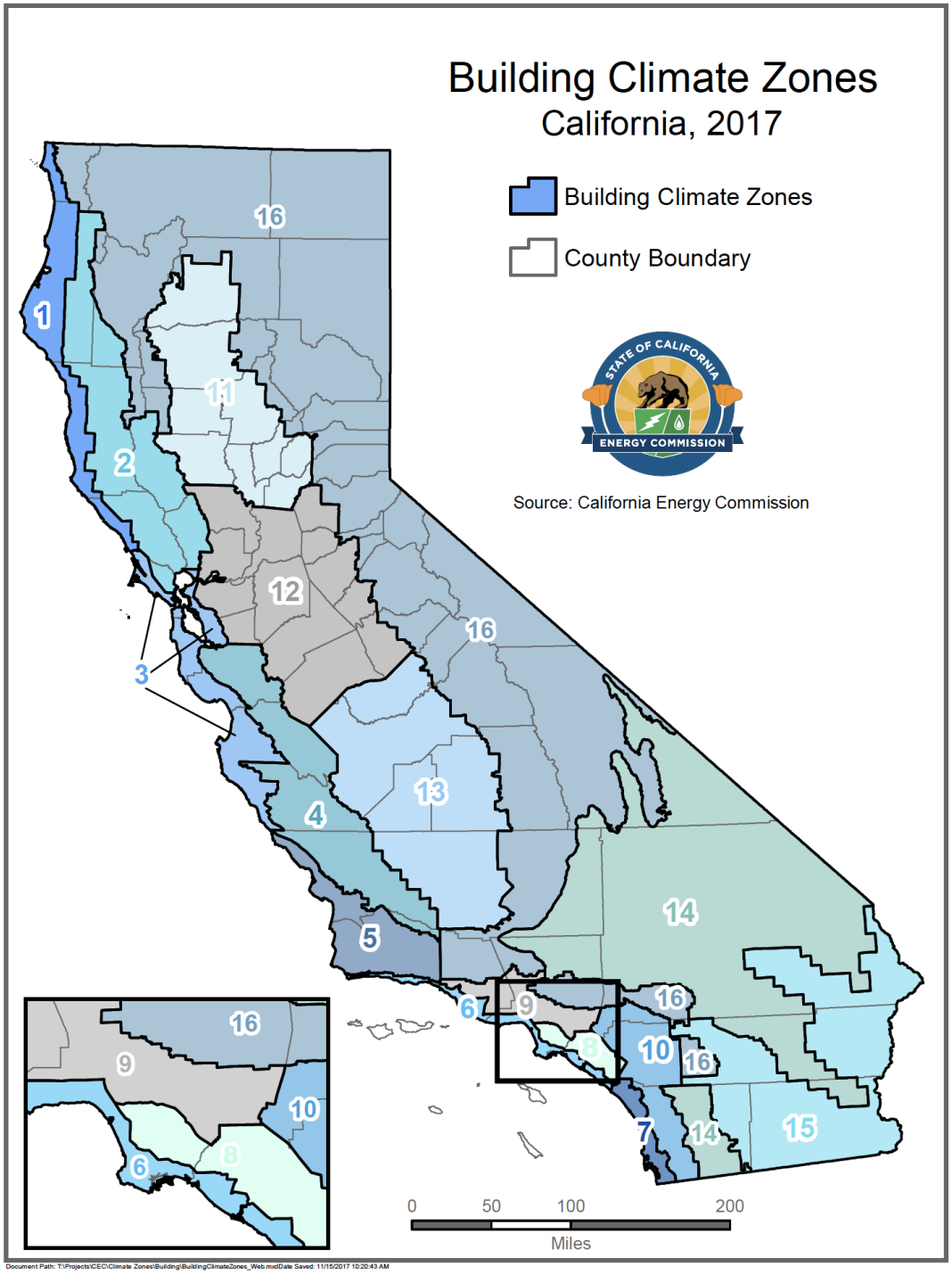

Figure 3: Map of California climate zones. (Source, California Energy Commission[3])

[3] https://ww2.energy.ca.gov/maps/renewable/building_climate_zones.html

Appendix B – Utility Tariff Details

PG&E

The following pages provide details on the PG&E electricity and natural gas tariffs applied in this study. Table 14 describes the baseline territories that were assumed for each climate zone.

Table 14: PG&E Baseline Territory by Climate Zone

	Baseline Territory
CZ01	V
CZ02	X
CZ03	T
CZ04	X
CZ05	T
CZ11	R
CZ12	S
CZ13	R
CZ16	Y

The PG&E monthly gas rate in $/therm was applied on a monthly basis for the 12-month period ending April 2020 according to the rates shown in Table 15. Rates are based on historical data provided by PG&E.[4]

Table 15: PG&E Monthly Gas Rate ($/Therm)

Month	Procurement Charge	Transportation Charge		Total Charge	
		Baseline	Excess	Baseline	Excess
Jan 2020	$0.45813	$0.99712	$1.59540	$1.45525	$2.05353
Feb 2020	$0.44791	$0.99712	$1.59540	$1.44503	$2.04331
Mar 2020	$0.35346	$1.13126	$1.64861	$1.48472	$2.00207
Apr 2020	$0.23856	$1.13126	$1.64861	$1.36982	$1.88717
May 2019	$0.21791	$0.99933	$1.59892	$1.21724	$1.81683
June 2019	$0.20648	$0.99933	$1.59892	$1.20581	$1.80540
July 2019	$0.28462	$0.99933	$1.59892	$1.28395	$1.88354
Aug 2019	$0.30094	$0.96652	$1.54643	$1.26746	$1.84737
Sept 2019	$0.25651	$0.96652	$1.54643	$1.22303	$1.80294
Oct 2019	$0.27403	$0.98932	$1.58292	$1.26335	$1.85695
Nov 2019	$0.33311	$0.96729	$1.54767	$1.30040	$1.88078
Dec 2019	$0.40178[7/]	$0.96729	$1.54767	$1.36907	$1.94945

[4]The PG&E procurement and transportation charges were obtained from the following site: https://www.pge.com/tariffs/GRF.SHTML#RESGAS

Pacific Gas and Electric Company
U 39 San Francisco, California

Revised Cal. P.U.C. Sheet No. 46539-E
Cancelling Revised Cal. P.U.C. Sheet No. 46325-E

ELECTRIC SCHEDULE E-TOU-C Sheet 2
RESIDENTIAL TIME-OF-USE (PEAK PRICING 4 - 9 p.m. EVERY DAY)

RATES:
(Cont'd.)

E-TOU-C TOTAL RATES

Total Energy Rates ($ per kWh)	PEAK		OFF-PEAK	
Summer				
Total Usage	$0.41333	(I)	$0.34989	(I)
Baseline Credit (Applied to Baseline Usage Only)	($0.08633)	(R)	($0.08633)	(R)
Winter				
Total Usage	$0.31624	(I)	$0.29891	(I)
Baseline Credit (Applied to Baseline Usage Only)	($0.08633)	(R)	($0.08633)	(R)
Delivery Minimum Bill Amount ($ per meter per day)	$0.32854			
California Climate Credit (per household, per semi-annual payment occurring in the April and October bill cycles)[1]	($35.73)			(T)

Total bundled service charges shown on customer's bills are unbundled according to the component rates shown below. Where the delivery minimum bill amount applies, the customer's bill will equal the sum of (1) the delivery minimum bill amount plus (2) for bundled service, the generation rate times the number of kWh used. For revenue accounting purposes, the revenues from the delivery minimum bill amount will be assigned to the Transmission, Transmission Rate Adjustments, Reliability Services, Public Purpose Programs, Nuclear Decommissioning, Competition Transition Charges, Energy Cost Recovery Amount, DWR Bond, and New System Generation Charges based on kWh usage times the corresponding unbundled rate component per kWh, with any residual revenue assigned to Distribution.

[1] Pursuant to D.20-04-027, distribution of the October 2020 California Climate Credit will be advanced and split to the May 2020 and June 2020 bill cycles, $17.87 and $17.86 respectively.. (N) (N)

(Continued)

Advice 5661-E-B
Decision

Issued by
Robert S. Kenney
Vice President, Regulatory Affairs

Submitted April 28, 2020
Effective May 1, 2020
Resolution

Pacific Gas and Electric Company
U 39 San Francisco, California

	Revised	Cal. P.U.C. Sheet No.	46540-E
Cancelling	Revised	Cal. P.U.C. Sheet No.	46252-E

ELECTRIC SCHEDULE E-TOU-C Sheet 3
RESIDENTIAL TIME-OF-USE (PEAK PRICING 4 - 9 p.m. EVERY DAY)

RATES: (Cont'd.)

UNBUNDLING OF E-TOU-C TOTAL RATES

Energy Rates by Component ($ per kWh)	PEAK		OFF-PEAK	
Generation:				
Summer (all usage)	$0.16735	(R)	$0.11391	(R)
Winter (all usage)	$0.11859	(R)	$0.10356	(R)
Distribution:**				
Summer (all usage)	$0.12767	(I)	$0.11767	(I)
Winter (all usage)	$0.07935	(I)	$0.07705	(I)

Conservation Incentive Adjustment (Baseline Usage)	($0.03294)	(I)
Conservation Incentive Adjustment (Over Baseline Usage)	$0.05339	(I)
Transmission* (all usage)	$0.03595	
Transmission Rate Adjustments* (all usage)	$0.00314	
Reliability Services* (all usage)	($0.00066)	
Public Purpose Programs (all usage)	$0.01296	(I)
Nuclear Decommissioning (all usage)	$0.00101	(I)
Competition Transition Charges (all usage)	$0.00096	(R)
Energy Cost Recovery Amount (all usage)	$0.00005	(I)
DWR Bond (all usage)	$0.00580	
New System Generation Charge (all usage)**	$0.00571	(I)

* Transmission, Transmission Rate Adjustments and Reliability Service charges are combined for presentation on customer bills.
** Distribution and New System Generation Charges are combined for presentation on customer bills.

(Continued)

Advice	5661-E-B	Issued by	Submitted	April 28, 2020
Decision		**Robert S. Kenney**	Effective	May 1, 2020
		Vice President, Regulatory Affairs	Resolution	

Pacific Gas and Electric Company
U 39 San Francisco, California

Revised Cal. P.U.C. Sheet No. 46190-E
Cancelling Revised Cal. P.U.C. Sheet No. 43414-E

ELECTRIC SCHEDULE E-TOU-C Sheet 4 (T)
RESIDENTIAL TIME-OF-USE (PEAK PRICING 4 - 9 p.m. EVERY DAY)

SPECIAL CONDITIONS:

1. BASELINE (TIER 1) QUANTITIES: The following quantities of electricity are to be used to define usage eligible for the baseline credit (also see Rule 19 for additional allowances for medical needs):

BASELINE QUANTITIES (kWh PER DAY)

Baseline Territory*	Code B - Basic Quantities		Code H - All-Electric Quantities	
	Summer	Winter	Summer	Winter
	Tier I	Tier I	Tier I	Tier I
P	14.2	12.0	16.0	27.4
Q	10.3	12.0	8.9	27.4
R	18.6	11.3	20.9	28.1
S	15.8	11.1	18.7	24.9
T	6.8	8.2	7.5	13.6
V	7.5	8.8	10.9	16.9
W	20.2	10.7	23.6	20.0
X	10.3	10.5	8.9	15.4
Y	11.0	12.1	12.6	25.3
Z	6.2	8.1	7.0	16.5

2. TIME PERIODS FOR **E-TOU-C**: Times of the year and times of the day are defined as follows: (T)

Summer (service from June 1 through September 30):

Peak: 4:00 p.m. to 9:00 p.m. All days

Off-Peak: All other times

Winter (service from October 1 through May 31):

Peak: 4:00 p.m. to 9:00 p.m. All days

Off-Peak: All other times

* The applicable baseline territory is described in Part A of the Preliminary Statement

(Continued)

Advice 5759-E Issued by Submitted February 14, 2020
Decision D.19-07-004 **Robert S. Kenney** Effective March 1, 2020
Vice President, Regulatory Affairs Resolution

Pacific Gas and Electric Company
U 39 San Francisco, California

Revised Cal. P.U.C. Sheet No. 35762-G
Cancelling Revised Cal. P.U.C. Sheet No. 35696-G

GAS SCHEDULE GM Sheet 2
MASTER-METERED MULTIFAMILY SERVICE

RATES: Customers on this schedule pay a Procurement Charge and a Transportation Charge, per meter, as follows:

	Per Therm Baseline		Per Therm Excess	
Procurement Charge:	$0.23856	(R)	$0.23856	(R)
Transportation Charge:	$1.13126		$1.64861	
Total:	$1.36982	(R)	$1.88717	(R)
California Natural Gas Climate Credit (per Household, annual payment occurring in the April bill cycle)	($27.18)			

Public Purpose Program Surcharge:

Customers served under this schedule are subject to a gas Public Purpose Program (PPP) Surcharge under Schedule G-PPPS.

See Preliminary Statement, Part B for the Default Tariff Rate Components.

The Procurement Charge on this schedule is equivalent to the rate shown on informational Schedule G-CP—Gas Procurement Service to Core End-Use Customers.

Pacific Gas and Electric Company
U 39 San Francisco, California

Revised Cal. P.U.C. Sheet No. 35447-G
Cancelling Revised Cal. P.U.C. Sheet No. 34307-G

GAS SCHEDULE GM Sheet 3
MASTER-METERED MULTIFAMILY SERVICE

BASELINE QUANTITIES: The above rates are applicable only to residential use. PG&E may require the Customer to submit a completed "Declaration of Eligibility for Baseline Quantities for Residential Rates." The delivered quantities of gas shown below are billed at the rates for baseline use. As an exception, service under this schedule not used to supply space heating but used to supply water heating from a central source to residential dwelling units that are individually metered by PG&E for either gas or electricity will be billed using a baseline quantity of 0.5 therms per dwelling unit per day (Code W) in all baseline territories and in both seasons.

BASELINE QUANTITIES (Therms Per Day Per Dwelling Unit)

Baseline Territories **	Summer (April-October) Effective Apr. 1, 2020		Winter Off-Peak (Nov,Feb,Mar) Effective Nov. 1, 2019		Winter On-Peak (Dec, Jan) Effective Dec. 1, 2019		(T) | (T)
P	0.29	(R)	0.87	(R)	1.00	(I)	
Q	0.49	(R)	0.64	(R)	0.77	(I)	
R	0.33	(R)	0.84	(R)	1.19	(I)	
S	0.29	(R)	0.54	(R)	0.68	(I)	
T	0.49	(R)	0.94	(R)	1.06	(R)	
V	0.56		1.18	(R)	1.29	(I)	
W	0.23	(R)	0.61	(R)	0.87	(R)	
X	0.33	(R)	0.64	(R)	0.77	(I)	
Y	0.36		0.87	(R)	1.00	(I)	

SEASONAL CHANGES: The summer season is April-October, the winter off-peak season is November, February and March, and the winter on-peak season is December and January. Baseline quantities for bills that include the April 1, November 1 and December 1 seasonal changeover dates will be calculated by multiplying the applicable daily baseline quantity for each season by the number of days in each season for the billing period.

STANDARD MEDICAL QUANTITIES: Additional medical quantities (Code M) are available as provided in Rule 19.

RESIDENTIAL DWELLING UNITS: It is the responsibility of the Customer to advise PG&E within 15 days following any change in the number of residential dwelling units, mobile home spaces, and permanent-residence RV units receiving gas service.

CENTRAL BOILERS: Service to central boilers for water and/or space heating will be billed with monthly baseline quantities related to the number of dwelling units furnished such water and/or space heating.

SCE

The following pages provide details on are the SCE electricity tariffs applied in this study. Table 16 describes the baseline territories that were assumed for each climate zone.

Table 16: SCE Baseline Territory by Climate Zone

	Baseline Territory
CZ06	6
CZ08	8
CZ09	9
CZ10	10
CZ14	14
CZ15	15

Schedule TOU-D
TIME-OF-USE
DOMESTIC
(Continued)

Sheet 2

RATES

Customers receiving service under this Schedule will be charged the applicable rates under Option 4-9 PM, Option 4-9 PM-CPP, Option 5-8 PM, Option 5-8 PM-CPP, Option PRIME, Option PRIME-CPP Option A, Option A-CPP, Option B, or Option B-CPP, as listed below. CPP Event Charges will apply to all energy usage during CPP Event Energy Charge periods and CPP Non-Event Energy Credits will apply as a reduction on CPP Non-Event Energy Credit Periods during Summer Season weekdays, 4:00 p.m. to 9:00 p.m., as described in Special Conditions 1 and 3, below:

	Delivery Service		
Option 4-9 PM / Option 4-9 PM-CPP	Total[1]	UG***	DWREC[3]
Energy Charge - $/kWh			
Summer Season - On-Peak	0.21574 (I)	0.17870 (I)	(0.00007)
Mid-Peak	0.21574 (I)	0.10434 (R)	(0.00007)
Off-Peak	0.17099 (I)	0.07584 (R)	(0.00007)
Winter Season - Mid-Peak	0.21574 (I)	0.12676 (R)	(0.00007)
Off-Peak	0.17099 (I)	0.08874 (R)	(0.00007)
Super-Off-Peak	0.16567 (I)	0.07025 (R)	(0.00007)
Baseline Credit**** - $/kWh	(0.07456) (R)	0.00000	
Basic Charge - $/day			
Single-Family Residence	0.031		
Multi-Family Residence	0.024		
Minimum Charge** - $/day			
Single Family Residence	0.346		
Multi-Family Residence	0.346		
Minimum Charge (Medical Baseline)** - $/day			
Single Family Residence	0.173		
Multi-Family Residence	0.173		
California Climate Credit[4]	(37.00) (I)		
California Alternate Rates for			
Energy Discount - %	100.00*		
Family Electric Rate Assistance Discount - %	100.00		
Option 4-9 PM-CPP			
CPP Event Energy Charge - $/kWh		0.80000	
Summer CPP Non-Event Credit			
On-Peak Energy Credit - $/kWh		(0.15170)	
Maximum Available Credit - $/kWh*****			
Summer Season		(0.58504) (R)	

* Represents 100% of the discount percentage as shown in the applicable Special Condition of this Schedule.
** The Minimum Charge is applicable when the Delivery Service Energy Charge, plus the applicable Basic Charge is less than the Minimum Charge.
*** The ongoing Competition Transition Charge CTC of $0.00089 per kWh is recovered in the UG component of Generation. (I)
**** The Baseline Credit applies up to 100% of the Baseline Allocation, regardless of Time of Use. The Baseline Allocation is set forth in Preliminary Statement, Part H.
***** The Maximum Available Credit is the capped credit amount for CPP Customers dual participating in other demand response programs.
1 Total = Total Delivery Service rates are applicable to Bundled Service, Direct Access (DA) and Community Choice Aggregation Service (CCA Service) Customers, except DA and CCA Service Customers are not subject to the DWRBC rate component of this Schedule but instead pay the DWRBC as provided by Schedule DA-CRS or Schedule CCA-CRS.
2 Generation = The Gen rates are applicable only to Bundled Service Customers.
3 DWREC = Department of Water Resources (DWR) Energy Credit – For more information on the DWR Energy Credit, see the Billing Calculation Special Condition of this Schedule.
4 Applied on an equal basis, per household, semi-annually. See the Special Conditions of this Schedule for more information.

Schedule TOU-D
TIME-OF-USE
DOMESTIC
(Continued)

Sheet 12 (T)

SPECIAL CONDITIONS

1. Applicable rate time periods are defined as follows:

Option 4-9 PM, Option 4-9 PM-CPP, Option PRIME, Option PRIME-CPP : (T)

TOU Period	Weekdays		Weekends and Holidays	
	Summer	Winter	Summer	Winter
On-Peak	4 p.m. - 9 p.m.	N/A	N/A	N/A
Mid-Peak	N/A	4 p.m. - 9 p.m.	4 p.m. - 9 p.m.	4 p.m. - 9 p.m.
Off-Peak	All other hours	9 p.m. - 8 a.m.	All other hours	9 p.m. - 8 a.m.
Super-Off-Peak	N/A	8 a.m. - 4 p.m.	N/A	8 a.m. - 4 p.m.
CPP Event Period	4 p.m. - 9 p.m.	4 p.m. - 9 p.m.	N/A	N/A

Summer Daily Allocations (June through September)

Baseline Region Number	Daily kWh Allocation	All-Electric Allocation
5	17.2	17.9
6	11.4	8.8
8	12.6	9.8
9	16.5	12.4
10	18.9	15.8
13	22.0	24.6
14	18.7	18.3
15	46.4	24.1
16	14.4	13.5

Winter Daily Allocations (October through May)

Baseline Region Number	Daily kWh Allocation	All-Electric Allocation
5	18.7	29.1
6	11.3	13.0
8	10.6	12.7
9	12.3	14.3
10	12.5	17.0
13	12.6	24.3
14	12.0	21.3
15	9.9	18.2
16	12.6	23.1

SoCalGas

Following are the SoCalGas natural gas tariffs applied in this study. Table 17 describes the baseline territories that were assumed for each climate zone.

Table 17: SoCalGas Baseline Territory by Climate Zone

	Baseline Territory
CZ05	2
CZ06	1
CZ08	1
CZ09	1
CZ10	1
CZ14	2
CZ15	1

The SoCalGas monthly gas rate in $/therm was applied on a monthly basis for the 12-month period ending April 2020 according to the rates shown in Table 18. Historical natural gas rate data was only available for SoCalGas' procurement charges[5]. To estimate total costs by month, the baseline and excess transmission charges were assumed to be relatively consistence and applied for the entire year based on April 2020 costs.

Table 18: SoCalGas Monthly Gas Rate ($/Therm)

Month	Procurement Charge	Transmission Charge		Total Charge	
		Baseline	Excess	Baseline	Excess
Jan 2020	$0.34730	$0.81742	$1.17186	$1.16472	$1.51916
Feb 2020	$0.28008	$0.81742	$1.17186	$1.09750	$1.45194
Mar 2020	$0.22108	$0.81742	$1.17186	$1.03850	$1.39294
Apr 2020	$0.20307	$0.81742	$1.17186	$1.02049	$1.37493
May 2019	$0.23790	$0.81742	$1.17186	$1.05532	$1.40976
June 2019	$0.24822	$0.81742	$1.17186	$1.06564	$1.42008
July 2019	$0.28475	$0.81742	$1.17186	$1.10217	$1.45661
Aug 2019	$0.27223	$0.81742	$1.17186	$1.08965	$1.44409
Sept 2019	$0.26162	$0.81742	$1.17186	$1.07904	$1.43348
Oct 2019	$0.30091	$0.81742	$1.17186	$1.11833	$1.47277
Nov 2019	$0.27563	$0.81742	$1.17186	$1.09305	$1.44749
Dec 2019	$0.38067	$0.81742	$1.17186	$1.19809	$1.55253

[5] The SoCalGas procurement and transmission charges were obtained from the following site: https://www.socalgas.com/for-your-business/energy-market-services/gas-prices

SOUTHERN CALIFORNIA GAS COMPANY Revised CAL. P.U.C. SHEET NO. 57458-G
LOS ANGELES, CALIFORNIA CANCELING Revised CAL. P.U.C. SHEET NO. 57432-G

Schedule No. GM Sheet 2
MULTI-FAMILY SERVICE
(Includes GM-E, GM-C, GM-EC, GM-CC, GT-ME, GT-MC and all GMB Rates)
(Continued)

APPLICABILITY (Continued)

Multi-family Accommodations built prior to December 15, 1981 and currently served under this schedule may also be eligible for service under Schedule No. GS. If an eligible Multi-family Accommodation served under this schedule converts to an applicable submetered tariff, the tenant rental charges shall be revised for the duration of the lease to reflect removal of the energy related charges.

Eligibility for service hereunder is subject to verification by the Utility.

TERRITORY

Applicable throughout the service territory.

RATES

	GM/GT-M	GMB/GT-MB
Customer Charge, per meter, per day:	16.438¢	$16.357
For "Space Heating Only" customers, a daily Customer Charge applies during the winter period from November 1 through April 30[1/]:	33.149¢	

GM

	GM-E	GM-EC[3/]	GT-ME	
Baseline Rate, per therm (baseline usage defined per Special Conditions 3 and 4):				
Procurement Charge:[2/]	20.307¢	20.307¢	N/A	R
Transmission Charge:	81.742¢	81.742¢	81.742¢	
Total Baseline Charge (all usage):	102.049¢	102.049¢	81.742¢	R
Non-Baseline Rate, per therm (usage in excess of baseline usage):				
Procurement Charge:[2/]	20.307¢	20.307¢	N/A	R
Transmission Charge:	117.186¢	117.186¢	117.186¢	
Total Non Baseline Charge (all usage):	137.493¢	137.493¢	117.186¢	R

	GM-C	GM-CC[3/]	GT-MC	
Non-Baseline Rate, per therm (usage in excess of baseline usage):				
Procurement Charge:[2/]	20.307¢	20.307¢	N/A	R
Transmission Charge:	117.186¢	117.186¢	117.186¢	
Total Non Baseline Charge (all usage):	137.493¢	137.493¢	117.186¢	R

[1/] For the summer period beginning May 1 through October 31, with some exceptions, usage will be accumulated to at least 20 Ccf (100 cubic feet) before billing, or it will be included with the first bill of the heating season which may cover the entire duration since a last bill was generated for the current calendar year.
(Footnotes continue next page.)

(Continued)

(TO BE INSERTED BY UTILITY)
ADVICE LETTER NO. 5614
DECISION NO.
2C7

ISSUED BY
Dan Skopec
Vice President
Regulatory Affairs

(TO BE INSERTED BY CAL. PUC)
SUBMITTED Apr 6, 2020
EFFECTIVE Apr 10, 2020
RESOLUTION NO. G-3351

SOUTHERN CALIFORNIA GAS COMPANY Revised CAL. P.U.C. SHEET NO. 57168-G
LOS ANGELES, CALIFORNIA CANCELING Revised CAL. P.U.C. SHEET NO. 41015-G

Schedule No. GM Sheet 5
MULTI-FAMILY SERVICE
(Includes GM-E, GM-C, GM-EC, GM-CC, GT-ME, GT-MC and all GMB Rates)
(Continued)

SPECIAL CONDITIONS (Continued)

3. (Continued)

Codes	Per Residence	Daily Therm Allowance for Climate Zones* 1	2	3
1	Space heating only			
	Summer	0.000	0.000	0.000
	Winter	1.210	1.343	2.470
2	Water heating and cooking	0.477	0.477	0.477
3	Cooking, water heating and space heating			
	Summer	0.473	0.473	0.473
	Winter	1.691	1.823	2.950
4	Cooking and space heating			
	Summer	0.088	0.088	0.088
	Winter	1.299	1.432	2.559
5	Cooking only	0.089	0.089	0.089
6	Water heating only	0.388	0.388	0.388
7	Water heating and space heating			
	Summer	0.385	0.385	0.385
	Winter	1.601	1.734	2.861

* Climate Zones are described in the Preliminary Statement.

4. Medical Baseline: Upon completion of an application and verification by a state-licensed physician, nurse practitioner, physician's assistant, or osteopath (Form No. 4859-E), an additional Baseline allowance of 0.822 therms per day will be provided for paraplegic, quadriplegic, or hemiplegic persons, those afflicted with multiple sclerosis or scleroderma, or persons being treated for a life threatening illness or who have a compromised immune system. T N

   Where it is established that the energy required for a Life-Support Device, as defined in Rule No. 1, exceeds 0.822 therms per day, an additional uniform daily Baseline allowance will be provided. The amount of the additional allowance will be determined by the Utility from load and operating time data of the Life-Support Device.

5. Space Heating Only: Applies to customers who are using gas primarily for space heating, as determined by survey or under the presumption that customers who use less than 11 Ccf per month during each of the regular billing periods ending in August and September qualify for Heat Only billing.

(Continued)

(TO BE INSERTED BY UTILITY)
ADVICE LETTER NO. 5576-A
DECISION NO. 02-04-026

ISSUED BY
Dan Skopec
Vice President

(TO BE INSERTED BY CAL. PUC)
SUBMITTED Jan 31, 2020
EFFECTIVE Feb 27, 2020

SDG&E

Following are the SDG&E electricity and natural gas tariffs applied in this study. Table 19 describes the baseline territories that were assumed for each climate zone. All-Electric baseline allowances were applied.

Table 19: SDG&E Baseline Territory by Climate Zone

	Baseline Territory
CZ07	Coastal
CZ10	Inland
CZ14	Mountain

San Diego Gas & Electric Company
San Diego, California

Revised Cal. P.U.C. Sheet No. 33144-E
Canceling Revised Cal. P.U.C. Sheet No. 32930-E

SCHEDULE TOU-DR1
RESIDENTIAL TIME-OF-USE

Sheet 2

RATES

Total Rates:

Description – TOU DR1	UDC Total Rate		DWR-BC Rate	EECC Rate + DWR Credit		Total Rate	
Summer:							
On-Peak	0.22374	I	0.00580	0.29042	R	0.51996	R
Off-Peak	0.22374	I	0.00580	0.09305	R	0.32259	R
Super Off-Peak	0.22374	I	0.00580	0.04743	R	0.27697	R
Winter:							
On-Peak	0.25734	R	0.00580	0.07844	R	0.34158	R
Off-Peak	0.25734	R	0.00580	0.06961	R	0.33275	R
Super Off-Peak	0.25734	R	0.00580	0.05981	R	0.32295	R
Summer Baseline Adjustment Credit up to 130% of Baseline	(0.07506)	I				(0.07506)	I
Winter Baseline Adjustment Credit up to 130% of Baseline	(0.06833)	I				(0.06833)	I
Minimum Bill ($/day)	0.338					0.338	

Note:
(1) Total Rates consist of UDC, Schedule DWR-BC (Department of Water Resources Bond Charge), and Schedule EECC (Electric Energy Commodity Cost) rates, with the EECC rates reflecting a DWR Credit.
(2) Total Rates presented are for customers that receive commodity supply and delivery service from Utility.
(3) DWR-BC charges do not apply to CARE customers.
(4) As identified in the rates tables, customer bills will also include line-item summer and winter credits for usage up to 130% of baseline to provide the rate capping benefits adopted by Assembly Bill 1X and Senate Bill 695.

(Continued)

2C8
Advice Ltr. No. 3514-E
Decision No. D.20-01-021

Issued by
Dan Skopec
Vice President
Regulatory Affairs

Submitted Mar 26, 2020
Effective Apr 1, 2020
Resolution No.

Time Periods

All time periods listed are applicable to local time. The definition of time will be based upon the date service is rendered.

TOU Periods – Weekdays	Summer	Winter
On-Peak	4:00 p.m. – 9:00 p.m.	4:00 p.m. – 9:00 p.m.
Off-Peak	6:00 a.m. – 4:00 p.m.; 9:00 p.m. - midnight	6:00 a.m. – 4:00 p.m. Excluding 10:00 a.m. – 2:00 p.m. in March and April; 9:00 p.m. - midnight
Super Off-Peak	Midnight – 6:00 a.m.	Midnight – 6:00 a.m. 10:00 a.m. – 2:00 p.m. in March and April
TOU Period – Weekends and Holidays	Summer	Winter
On-Peak	4:00 p.m. – 9:00 p.m.	4:00 p.m. – 9:00 p.m.
Off-Peak	2:00 p.m. – 4:00 p.m.; 9:00 p.m. - midnight	2:00 p.m. – 4:00 p.m.; 9:00 p.m. - midnight
Super Off-Peak	Midnight – 2:00 p.m.	Midnight – 2:00 p.m.

Seasons:	Summer	June 1 – October 31
	Winter	November 1 – May 31

Baseline Usage: The following quantities of electricity are used to calculate the baseline adjustment credit.

	Baseline Allowance For Climatic Zones*			
	Coastal	Inland	Mountain	Desert
Basic Allowance				
Summer (June 1 to October 31)	9.0	10.4	13.6	15.9
Winter (November 1 to May 31)	9.2	9.6	12.9	10.9
All Electric**				
Summer (June 1 to October 31)	6.8	9.2	15,6	17.5
Winter (November 1 to May 31)	10.4	13.4	23.4	18.1

* Climatic Zones are shown on the Territory Served, Map No. 1.

** All Electric allowances are available upon application to those customers who have permanently installed space heating or who have electric water heating and receive no energy from another source.

San Diego Gas & Electric Company
San Diego, California

Revised Cal. P.U.C. Sheet No. 24487-G
Canceling Revised Cal. P.U.C. Sheet No. 24422-G

SCHEDULE GM

Sheet 2

MULTI-FAMILY NATURAL GAS SERVICE
(Includes Rates for GM, GM-C and GTC/GTCA)

RATES

	GM		GM-C	GTC/GTCA[1]
Baseline Rate, per therm (baseline usage defined in Special Condition 4)				
Procurement Charge[2]	$0.20327	R	$0.22130	N/A
Transmission Charge	$1.35946		$1.35946	$1.37374
Total Baseline Charge	$1.56273	R	$1.58076	$1.37374
Non-Baseline Rate (usage in excess of baseline usage)				
Procurement Charge[2]	$0.20327	R	$0.22130	N/A
Transmission Charge	$1.59125		$1.59125	$1.60553
Total Non-Baseline Charge	$1.79452	R	$1.81255	$1.60553
Minimum Bill, per day[3]				
Non-CARE customers	$0.09863		$0.09863	$0.09863
CARE customers	$0.07890		$0.07890	$0.07890

(Continued)

2C6
Issued by
Dan Skopec
Vice President
Regulatory Affairs

Submitted Mar 31, 2020
Effective Apr 1, 2020
Resolution No.

Advice Ltr. No. 2858-G
Decision No.

Baseline Usage. The following quantities of gas are to be billed at the baseline rate for multi-family units. Usage in excess of applicable baseline usage will be billed at non-baseline rates.

	Daily Therm Allowance Per Residential Unit
Summer (May 1 to October 31, inclusive)	0.345
Winter (November 1 to April 30, inclusive)	1.082

The SDG&E monthly gas rate in $/therm was applied on a monthly basis for the 12-month period ending April 2020 according to the rates shown in Table 20. Historical natural gas rate data was only available for SoCalGas' procurement charges[6]. To estimate total costs by month, the baseline and excess transmission charges were assumed to be relatively consistence and applied for the entire year based on April 2020 costs.

Table 20: SDG&E Monthly Gas Rate ($/Therm)

Month	Procurement Charge	Transmission Charge		Total Charge	
		Baseline	Excess	Baseline	Excess
Jan 2020	$0.34761	$1.36166	$1.59166	$1.70927	$1.93927
Feb 2020	$0.28035	$1.36166	$1.59166	$1.64201	$1.87201
Mar 2020	$0.22130	$1.36166	$1.59166	$1.58296	$1.81296
Apr 2020	$0.20327	$1.35946	$1.59125	$1.56273	$1.79452
May 2019	$0.23804	$1.06349	$1.25253	$1.30153	$1.49057
June 2019	$0.24838	$1.06349	$1.25253	$1.31187	$1.50091
July 2019	$0.28491	$1.06349	$1.25253	$1.34840	$1.53744
Aug 2019	$0.27239	$1.06349	$1.25253	$1.33588	$1.52492
Sept 2019	$0.26178	$1.06349	$1.25253	$1.32527	$1.51431
Oct 2019	$0.30109	$1.06349	$1.25253	$1.36458	$1.55362
Nov 2019	$0.27580	$1.06349	$1.25253	$1.33929	$1.52833
Dec 2019	$0.38090	$1.06349	$1.25253	$1.44439	$1.63343

[6] The SDG&E procurement and transmission charges were obtained from the following sets of documents:
http://regarchive.sdge.com/tm2/pdf/GAS_GAS-SCHEDS_GM_2020.pdf
http://regarchive.sdge.com/tm2/pdf/GAS_GAS-SCHEDS_GM_2019.pdf

SMUD

Following are the SMUD electricity tariffs applied in this study.

RTOD Rate Schedule

II. Firm Service Rates

A. Time-of-Day (5-8 p.m.) Rate	**Rate Category RT02**
Non-Summer Prices* – January 1 through May 31	
System Infrastructure Fixed Charge per month	$21.05
Electricity Usage Charge	
Peak $/kWh	$0.1388
Off-Peak $/kWh	$0.1006
Summer Prices - June 1 through September 30	
System Infrastructure Fixed Charge per month	$21.05
Electricity Usage Charge	
Peak $/kWh	$0.2941
Mid-Peak $/kWh	$0.1671
Off-Peak $/kWh	$0.1209
Non-Summer Prices* – October 1 through December 31	
System Infrastructure Fixed Charge per month	$21.70
Electricity Usage Charge	
Peak $/kWh	$0.1430
Off-Peak $/kWh	$0.1035

* Non-Summer Season includes Fall (Oct 1 – Nov 30), Winter (Dec 1 – Mar 31) and Spring (Apr 1 – May 31) periods.

Summer (Jun 1 - Sept 30)	**Peak**	Weekdays between 5:00 p.m. and 8:00 p.m.
	Mid-Peak	Weekdays between noon and midnight except during the Peak hours.
	Off-Peak	All other hours, including weekends and holidays[1].
Non-Summer (Oct 1 - May 31)	**Peak**	Weekdays between 5:00 p.m. and 8:00 p.m.
	Off-Peak	All other hours, including weekends and holidays[1].

GSN_T Rate Schedule:

II. Firm Service Rates

Rate Category	Nondemand GSN_T	Flat GFN	Demand GSS_T
Winter Season – January 1 through May 31			
System Infrastructure Fixed Charge - per month per meter	$21.15	$9.45	$25.75
Site Infrastructure Charge *(per 12 months max kW or contract capacity)*	n/a	n/a	$7.94
Electricity Usage Charge			
All day $/kWh	$0.1365	$0.1381	$0.1071
Summer Season - June 1 through September 30			
System Infrastructure Fixed Charge - per month per meter	$21.15	$9.45	$25.75
Site Infrastructure Charge *(per 12 months max kW or contract capacity)*	n/a	n/a	$7.94
Electricity Usage Charge			
On-peak $/kWh	$0.3151	$0.1381	$0.2733
Off-peak $/kWh	$0.1152	$0.1381	$0.0948

Rate Category	Nondemand GSN_T	Flat GFN	Demand GSS_T
Winter Season - October 1 through December 31			
System Infrastructure Fixed Charge - per month per meter	$21.80	$9.70	$26.50
Site Infrastructure Charge *(per 12 months max kW or contract capacity)*	n/a	n/a	$8.18
Electricity Usage Charge			
All day $/kWh	$0.1406	$0.1423	$0.1103

D. Billing Periods

1. **Winter (October 1 – May 31) All hours are off-peak.**

2. **Summer Time-of-Use Billing Periods (June 1 – September 30)**

On-Peak	Summer weekdays between 3:00 p.m. and 6:00 p.m.
Off-Peak	All other hours, including holidays shown below

CPAU

Following are the CPAU electricity and natural gas tariffs applied in this study.

E1 Rate Schedule:

RESIDENTIAL ELECTRIC SERVICE

UTILITY RATE SCHEDULE E-1

A. APPLICABILITY:

This Rate Schedule applies to separately metered single-family residential dwellings receiving Electric Service from the City of Palo Alto Utilities.

B. TERRITORY:

This rate schedule applies everywhere the City of Palo Alto provides Electric Service.

C. UNBUNDLED RATES:

Per kilowatt-hour (kWh)	Commodity	Distribution	Public Benefits	Total
Tier 1 usage	$0.08339	$0.04971	$0.00447	$0.13757
Tier 2 usage Any usage over Tier 1	0.11569	0.07351	0.00447	0.19367
Minimum Bill ($/day)				0.3283

E2 Rate Schedule:

RESIDENTIAL MASTER-METERED AND SMALL NON-RESIDENTIAL ELECTRIC SERVICE

UTILITY RATE SCHEDULE E-2

A. APPLICABILITY:

This Rate Schedule applies to the following Customers receiving Electric Service from the City of Palo Alto Utilities:

1. Small non-residential Customers receiving Non-Demand Metered Electric Service; and
2. Customers with Accounts at Master-Metered multi-family facilities.

B. TERRITORY:

This rate schedule applies everywhere the City of Palo Alto provides Electric Service.

C. UNBUNDLED RATES:

Per kilowatt-hour (kWh)	Commodity	Distribution	Public Benefits	Total
Summer Period	$0.11855	$0.08551	$0.00447	$0.20853
Winter Period	0.08502	0.05675	0.00447	0.14624
Minimum Bill ($/day)				0.8359

G-2 Rate Schedule:

RESIDENTIAL MASTER-METERED AND COMMERCIAL GAS SERVICE

UTILITY RATE SCHEDULE G-2

A. APPLICABILITY:

This schedule applies to the following Customers receiving Gas Service from the City of Palo Alto Utilities:

1. Commercial Customers who use less than 250,000 therms per year at one site.
2. Master-metered residential Customers in multi-family residential facilities.

B. TERRITORY:

This schedule applies anywhere the City of Palo Alto provides Gas Service.

C. UNBUNDLED RATES: Per Service

Monthly Service Charge: $104.95

Per Therm

Supply Charges:

1. Commodity (Monthly Market Based) ..... $0.10-$2.00
2. Cap and Trade Compliance Charges $0.00-0.25
3. Transportation Charge.....$0.00-$0.15
4. Carbon Offset Charge .....$0.00-$0.10

Distribution Charge: $0.6102

G2 Monthly Per Therm Rates:

Effective Date	Commodity Rate	Cap and Trade Compliance Charge	Transportation Charge	Carbon Offset Charge	G2 Total Volumetric Rate
1/1/20	$0.3289	0.033	0.09941	0.040	1.11151
2/1/20	0.2466	0.033	0.09941	0.040	1.02921
3/1/20	0.2416	0.033	0.09891	0.040	1.02371
4/1/20	0.2066	0.033	0.09891	0.040	0.98871
5/1/20	0.2258	0.033	0.09891	0.040	1.00791
6/1/20	0.2279	0.033	0.09891	0.040	1.01001
7/1/19	0.2471	0.033	0.11757	0.040	1.04787
j8/1/19	0.2507	0.033	0.10066	0.040	1.03456
9/1/19	0.2461	0.033	0.10066	0.040	1.02996
10/1/19	0.2811	0.033	0.10288	0.040	1.06718
11/1/19	0.2923	0.033	0.10288	0.040	1.07838
12/1/19	0.3781	0.033	0.10288	0.040	1.16418

Escalation Assumptions

The average annual escalation rates in the following table were used in this study and are from E3's 2019 study Residential Building Electrification in California (Energy & Environmental Economics, 2019). These rates are applied to the 2019 rate schedules over a 30-year period beginning in 2020. SDG&E was not covered in the E3 study. The Statewide Reach Code Team reviewed SDG&E's GRC filing and applied the same approach that E3 applied for PG&E and SoCalGas to arrive at average escalation rates between 2020 and 2022. The statewide electricity escalation rates were also applied to the analysis for SMUD and CPAU. PG&E gas escalation rates were applied to CPAU as the best available estimate since CPAU uses PG&E gas infrastructure.

Table 21: Real Utility Rate Escalation Rate Assumptions

	Statewide Electric Residential Average Rate (%/year, real)	Natural Gas Residential Core Rate (%/yr escalation, real)		
		PG&E	SoCalGas	SDG&E
2020	2.0%	1.48%	6.37%	5.00%
2021	2.0%	5.69%	4.12%	3.14%
2022	2.0%	1.11%	4.12%	2.94%
2023	2.0%	4.0%	4.0%	4.0%
2024	2.0%	4.0%	4.0%	4.0%
2025	2.0%	4.0%	4.0%	4.0%
2026	1.0%	1.0%	1.0%	1.0%
2027	1.0%	1.0%	1.0%	1.0%
2028	1.0%	1.0%	1.0%	1.0%
2029	1.0%	1.0%	1.0%	1.0%
2030	1.0%	1.0%	1.0%	1.0%
2031	1.0%	1.0%	1.0%	1.0%
2032	1.0%	1.0%	1.0%	1.0%
2033	1.0%	1.0%	1.0%	1.0%
2034	1.0%	1.0%	1.0%	1.0%
2035	1.0%	1.0%	1.0%	1.0%
2036	1.0%	1.0%	1.0%	1.0%
2037	1.0%	1.0%	1.0%	1.0%
2038	1.0%	1.0%	1.0%	1.0%
2039	1.0%	1.0%	1.0%	1.0%
2040	1.0%	1.0%	1.0%	1.0%
2041	1.0%	1.0%	1.0%	1.0%
2042	1.0%	1.0%	1.0%	1.0%
2043	1.0%	1.0%	1.0%	1.0%
2044	1.0%	1.0%	1.0%	1.0%
2045	1.0%	1.0%	1.0%	1.0%
2046	1.0%	1.0%	1.0%	1.0%
2047	1.0%	1.0%	1.0%	1.0%
2048	1.0%	1.0%	1.0%	1.0%
2049	1.0%	1.0%	1.0%	1.0%

Appendix C – PG&E Gas Infrastructure Cost Memo

Pacific Gas and Electric Company

Janice Berman
Director – Grid Edge
Pacific Gas and Electric Company
Mail Code B9F
P.O. Box 770000
San Francisco, CA 94177-00001

December 5, 2019

Energy Commission Staff:

On March 2, 2018, PG&E provided gas extension cost estimates for residential existing and new subdivisions (see attached memo). We have recently updated our estimates and are therefore providing an updated memo.

In addition to mainline and service extension costs, we are also providing estimates of the cost of gas meters for different building types including both residential and commercial customers. These estimates are based on PG&E historical jobs.

Developing gas extension cost estimates is complex and the actual costs are project dependent. Costs vary widely with location, terrain, distance to the nearest main, joint trenching, materials, number of dwellings per development, and several other site and job-specific conditions. For these reasons, it is not practical to come up with estimates that represent every case. Instead we are including estimates based on historical averages taken from projects within PG&E's territory. It is not recommended to compare specific project costs to these estimates as any number of factors could lead to higher or lower costs than these averages are representing.

We are also including estimates for in-house gas infrastructure costs and specific plan review costs. These estimates are from external sources, and are not based on PG&E data, but have been provided for the sake of completeness and for use in energy efficiency analysis.

To further anchor the estimates, several assumptions have been made:

1. It is assumed that during new construction, gas infrastructure will likely be joint trenched with electric infrastructure. As a result, the incremental cost of trenching associated with the gas infrastructure alone is minimal. Therefore, all mainline cost estimates exclude trench costs. Service extension cost estimates include both estimates with and without trench costs. In the case where new construction would require overhead electric and underground gas infrastructure, the estimates with trench costs included for service extensions should be utilized.

2. It is assumed that new construction in an existing subdivision would not generally require a mainline extension. In cases where a mainline extension would be required to an existing subdivision, the costs are highly dependent on the location, terrain, and distance to the nearest main.

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3. These estimates are for total costs. The cost estimates have not been reduced to account for the portion of the costs paid by all customers due to application of Rule 15[1] and Rule 16[2] allowances. Hence, costs to the specific customer may be lower than the estimates below, as the specific customer benefits from the Rule 15 and Rule 16 allowances.

Table 1: PG&E Gas Infrastructure Cost Estimates

	Existing Subdivision/Development	New Greenfield Subdivision/Development
Mainline Extension	N/A[3]	Single-Family $17/ft[4] Multi-Family $11/ft[4]
Service Extension (Typically 1" pipe from mainline to the meter)	$6750 per service/building[4] (excludes trench costs) $9200 per service/building[4] (includes trench costs)	$1300 per service/building[4] (includes mainline extension costs within the subdivision; excludes trench costs) $1850 per service/building[4] (includes mainline extension costs within the subdivision; includes trench costs)
Meter	Residential Single Family $300 per meter[5] Residential Multi-Family $300 per meter + $300 per meter manifold outlet[5] Small/Medium Commercial $3600 per meter[6]	Residential Single Family $300 per meter[5] Residential Multi-Family $300 per meter + $300 per meter manifold outlet[5] Small/Medium Commercial $3600 per meter[6]

[1] https://www.pge.com/tariffs/tm2/pdf/ELEC_RULES_15.pdf
[2] https://www.pge.com/tariffs/tm2/pdf/ELEC_RULES_16.pdf
[3] It is assumed that new construction in an existing subdivision would not require a main extension.
[4] Estimates based on PG&E jobs from Jan 2016 - Dec 2017 from PG&E's Service Planning team.
[5] Estimates from PG&E's Dedicated Estimating Team. For Multi-Family units, the costs of $300 per meter and $300 per meter manifold outlet should be combined for a total of $600 per meter.
[6] PG&E Marginal Customer Access Cost Estimates presented in the 2018 Gas Cost Allocation Proceedings (GCAP), A.17-09-006, Exhibit PG&E-2, Appendix A, Section A, Table A-1. The Average Connection Cost per Customer values were included in the MCAC workpaper that accompanied the GCAP testimony

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	Large Commercial $32,000 per meter[6]	Large Commercial $32,000 per meter[6]

Note: Service extension cost estimates for New Greenfield Subdivisions include mainline extension costs as well. Therefore, mainline cost estimates can be ignored for the purpose of estimating total project costs.

Table 2: Gas Infrastructure Cost Estimates from Other Sources

	Existing Subdivision/Development	New Greenfield Subdivision/Development
In-House Infrastructure	Single-Family $800[7] Multi-Family $600 per unit[7] Medium Office $600-4500[7,8] Medium Retail $10,000[8]	Single-Family $800[7] Multi-Family $600 per unit[7] Medium Office $600-4500[7,8] Medium Retail $10,000[8]
Plan Review (Will vary by city and often not a fixed fee)	Residential Palo Alto - $850[9] Nonresidential Palo Alto - $2316[9]	Residential Palo Alto - $850[9] Nonresidential Palo Alto - $2316[9]

Please let us know if there are any follow-up questions or clarifications.

Best regards,

[7] Frontier Energy, Inc., Misti Bruceri & Associates, LLC. 2019. "2019 Cost-effectiveness Study: Low Rise Residential New Construction." Available at: https://localenergycodes.com/content/performance-ordinances
[8] TRC, EnergySoft. 2019. "2019 Nonresidential New Construction Reach Code Cost Effectiveness Study." Available at: https://localenergycodes.com/content/performance-ordinances
[9] TRC. 2018. "City of Palo Alto 2019 Title 24 Energy Reach Code Cost Effectiveness Analysis Draft." Available at: http://cityofpaloalto.org/civicax/filebank/documents/66742

Appendix D – Detailed Results Mixed-Fuel

Table 22: Mixed-Fuel Efficiency Only Package Results (SAVINGS/COST PER APARTMENT)[1]

			Apartments			Central Water Heating			Total	Savings (2020 PV$)			B/C Ratio[1]	
Climate Zone	Elec Utility	Gas Utility	Gas Savings (therms)	Elec Savings (kWh)	Year 1 Utility Cost Savings	Gas Savings (therms)	Elec Savings (kWh)	Year 1 Utility Cost Savings	Year 1 Utility Cost Savings	On-Bill Utility Cost Savings	TDV Cost Savings	Total Inc. Cost ($)	On-Bill	TDV
CZ01	PGE	PGE	0.0	26	$6	0.0	0	$0	$6	$133	$105	$304	0.44	0.35
CZ02	PGE	PGE	0.0	47	$17	0.0	0	$0	$17	$391	$285	$144	2.72	1.98
CZ03	PGE	PGE	0.0	44	$15	0.0	0	$0	$15	$345	$226	$144	2.40	1.57
CZ04	PGE	PGE	0.0	61	$20	0.0	0	$0	$20	$465	$331	$144	3.24	2.31
CZ04-2	CPAU	CPAU	0.0	61	$10	0.0	0	$0	$10	$248	$331	$144	1.73	2.31
CZ05	PGE	PGE	0.0	42	$14	0.0	0	$0	$14	$320	$206	$144	2.22	1.43
CZ05-2	PGE	SCG	0.0	42	$14	0.0	0	$0	$14	$320	$206	$144	2.22	1.43
CZ06	SCE	SCG	0.0	74	$18	0.0	0	$0	$18	$424	$351	$144	2.95	2.44
CZ07	SDGE	SDGE	0.0	81	$25	0.0	0	$0	$25	$593	$374	$144	4.13	2.60
CZ08	SCE	SCG	0.0	84	$20	0.0	0	$0	$20	$484	$420	$144	3.37	2.92
CZ09	SCE	SCG	0.0	83	$20	0.0	0	$0	$20	$468	$441	$144	3.26	3.06
CZ10	SCE	SCG	0.0	82	$17	0.0	0	$0	$17	$410	$427	$144	2.85	2.97
CZ10-2	SDGE	SDGE	0.0	82	$25	0.0	0	$0	$25	$599	$427	$144	4.16	2.97
CZ11	PGE	PGE	0.0	104	$27	0.0	0	$0	$27	$637	$635	$625	1.02	1.02
CZ12	PGE	PGE	0.0	93	$24	0.0	0	$0	$24	$572	$568	$304	1.88	1.87
CZ12-2	SMUD	PGE	0.0	93	$13	0.0	0	$0	$13	$319	$568	$304	1.05	1.87
CZ13	PGE	PGE	0.0	132	$34	0.0	0	$0	$34	$798	$779	$625	1.28	1.25
CZ14	SCE	SCG	0.0	80	$17	0.0	0	$0	$17	$407	$449	$304	1.34	1.48
CZ14-2	SDGE	SDGE	0.0	80	$24	0.0	0	$0	$24	$576	$449	$304	1.90	1.48
CZ15	SCE	SCG	0.0	145	$30	0.0	0	$0	$30	$719	$802	$625	1.15	1.28
CZ16	PGE	PGE	0.0	117	$27	0.0	0	$0	$27	$646	$563	$625	1.03	0.90

[1] Values in red indicate B/C ratios less than 1.

Table 23: Mixed-Fuel Efficiency + PV Package Results (SAVINGS/COST PER APARTMENT)[1]

			0.1 kW_{DC} per Apartment					0.2 kW_{DC} per Apartment				
Climate Zone	Elec Utility	Gas Utility	On-Bill Utility Cost Savings (2020 PV$)	TDV Cost Savings (2020 PV$)	Total Inc. Cost	On-Bill B/C Ratio	TDV B/C Ratio	On-Bill Utility Cost Savings (2020 PV$)	TDV Cost Savings (2020 PV$)	Total Inc. Cost	On-Bill B/C Ratio	TDV B/C Ratio
CZ01	PGE	PGE	$885	$597	$620	1.43	0.96	$1,637	$1,090	$937	1.75	1.16
CZ02	PGE	PGE	$1,411	$877	$460	3.07	1.91	$2,431	$1,469	$777	3.13	1.89
CZ03	PGE	PGE	$1,373	$812	$460	2.98	1.76	$2,400	$1,397	$777	3.09	1.80
CZ04	PGE	PGE	$1,522	$947	$460	3.31	2.06	$2,579	$1,562	$777	3.32	2.01
CZ04-2	CPAU	CPAU	$807	$947	$460	1.75	2.06	$1,335	$1,562	$777	1.72	2.01
CZ05	PGE	PGE	$1,400	$834	$460	3.04	1.81	$2,480	$1,461	$777	3.19	1.88
CZ05-2	PGE	SCG	$1,400	$834	$460	3.04	1.81	$2,480	$1,461	$777	3.19	1.88
CZ06	SCE	SCG	$1,206	$969	$460	2.62	2.11	$1,987	$1,587	$777	2.56	2.04
CZ07	SDGE	SDGE	$1,701	$1,010	$460	3.69	2.19	$2,770	$1,647	$777	3.57	2.12
CZ08	SCE	SCG	$1,272	$1,064	$460	2.76	2.31	$2,059	$1,708	$777	2.65	2.20
CZ09	SCE	SCG	$1,181	$1,091	$460	2.57	2.37	$1,876	$1,742	$777	2.41	2.24
CZ10	SCE	SCG	$1,104	$1,054	$460	2.40	2.29	$1,797	$1,681	$777	2.31	2.16
CZ10-2	SDGE	SDGE	$1,622	$1,054	$460	3.52	2.29	$2,646	$1,681	$777	3.41	2.16
CZ11	PGE	PGE	$1,537	$1,256	$942	1.63	1.33	$2,438	$1,877	$1,258	1.94	1.49
CZ12	PGE	PGE	$1,462	$1,181	$620	2.36	1.90	$2,352	$1,794	$937	2.51	1.91
CZ12-2	SMUD	PGE	$772	$1,181	$620	1.25	1.90	$1,226	$1,794	$937	1.31	1.91
CZ13	PGE	PGE	$1,673	$1,372	$942	1.78	1.46	$2,548	$1,965	$1,258	2.03	1.56
CZ14	SCE	SCG	$1,165	$1,175	$620	1.88	1.89	$1,923	$1,901	$937	2.05	2.03
CZ14-2	SDGE	SDGE	$1,697	$1,175	$620	2.74	1.89	$2,819	$1,901	$937	3.01	2.03
CZ15	SCE	SCG	$1,423	$1,456	$942	1.51	1.55	$2,128	$2,110	$1,258	1.69	1.68
CZ16	PGE	PGE	$1,606	$1,191	$942	1.71	1.26	$2,567	$1,818	$1,258	2.04	1.44

[1] Values in red indicate B/C ratios less than 1.

Table 24: Mixed-Fuel Efficiency + PV Package Results, cont. (SAVINGS/COST PER APARTMENT)[1]

			0.3 kW_{DC} per Apartment					1 kW_{DC} per Apartment				
Climate Zone	Elec Utility	Gas Utility	On-Bill Utility Cost Savings (2020 PV$)	TDV Cost Savings (2020 PV$)	Total Inc. Cost	On-Bill B/C Ratio	TDV B/C Ratio	On-Bill Utility Cost Savings (2020 PV$)	TDV Cost Savings (2020 PV$)	Total Inc. Cost	On-Bill B/C Ratio	TDV B/C Ratio
CZ01	PGE	PGE	$2,389	$1,582	$1,253	1.91	1.26	$7,466	$5,029	$3,469	2.15	1.45
CZ02	PGE	PGE	$3,452	$2,061	$1,093	3.16	1.88	$9,590	$6,203	$3,309	2.90	1.87
CZ03	PGE	PGE	$3,428	$1,982	$1,093	3.14	1.81	$9,687	$6,079	$3,309	2.93	1.84
CZ04	PGE	PGE	$3,635	$2,177	$1,093	3.32	1.99	$9,992	$6,483	$3,309	3.02	1.96
CZ04-2	CPAU	CPAU	$1,863	$2,177	$1,093	1.70	1.99	$5,184	$6,483	$3,309	1.57	1.96
CZ05	PGE	PGE	$3,561	$2,089	$1,093	3.26	1.91	$10,109	$6,482	$3,309	3.05	1.96
CZ05-2	PGE	SCG	$3,561	$2,089	$1,093	3.26	1.91	$10,109	$6,482	$3,309	3.05	1.96
CZ06	SCE	SCG	$2,769	$2,206	$1,093	2.53	2.02	$7,593	$6,534	$3,309	2.29	1.97
CZ07	SDGE	SDGE	$3,805	$2,283	$1,093	3.48	2.09	$10,818	$6,739	$3,309	3.27	2.04
CZ08	SCE	SCG	$2,838	$2,352	$1,093	2.60	2.15	$7,543	$6,861	$3,309	2.28	2.07
CZ09	SCE	SCG	$2,570	$2,393	$1,093	2.35	2.19	$7,285	$6,948	$3,309	2.20	2.10
CZ10	SCE	SCG	$2,490	$2,308	$1,093	2.28	2.11	$7,197	$6,697	$3,309	2.17	2.02
CZ10-2	SDGE	SDGE	$3,670	$2,308	$1,093	3.36	2.11	$10,636	$6,697	$3,309	3.21	2.02
CZ11	PGE	PGE	$3,338	$2,498	$1,575	2.12	1.59	$9,480	$6,846	$3,791	2.50	1.81
CZ12	PGE	PGE	$3,242	$2,406	$1,253	2.59	1.92	$9,299	$6,694	$3,469	2.68	1.93
CZ12-2	SMUD	PGE	$1,680	$2,406	$1,253	1.34	1.92	$4,855	$6,694	$3,469	1.40	1.93
CZ13	PGE	PGE	$3,423	$2,558	$1,575	2.17	1.62	$9,402	$6,709	$3,791	2.48	1.77
CZ14	SCE	SCG	$2,682	$2,626	$1,253	2.14	2.10	$7,820	$7,707	$3,469	2.25	2.22
CZ14-2	SDGE	SDGE	$3,940	$2,626	$1,253	3.14	2.10	$11,557	$7,707	$3,469	3.33	2.22
CZ15	SCE	SCG	$2,832	$2,764	$1,575	1.80	1.76	$7,676	$7,342	$3,791	2.03	1.94
CZ16	PGE	PGE	$3,527	$2,445	$1,575	2.24	1.55	$10,032	$6,836	$3,791	2.65	1.80

[1] Values in red indicate B/C ratios less than 1.

Appendix E – Detailed Results All-Electric

Table 25: All-Electric Efficiency Only Package Results (SAVINGS/COST PER APARTMENT)[1,2]

			Apartments			Central Water Heating			Total	Savings (2020 PV$)			B/C Ratio	
Climate Zone	Elec Utility	Gas Utility	Gas Savings (therms)	Elec Savings (kWh)	Year 1 Utility Cost Savings	Gas Savings (therms)	Elec Savings (kWh)	Year 1 Utility Cost Savings	Year 1 Utility Cost Savings	On-Bill Utility Cost Savings	TDV Cost Savings	Total Inc. Cost ($)	On-Bill	TDV
CZ01	PGE	PGE	0.0	26	$6	124.6	-899	-$46	-$40	-$674	$199	-$446	0.7	>1
CZ02	PGE	PGE	0.0	48	$17	114.3	-810	-$38	-$21	-$238	$528	-$606	2.5	>1
CZ03	PGE	PGE	0.0	44	$15	114.9	-811	-$38	-$23	-$287	$390	-$606	2.1	>1
CZ04	PGE	PGE	0.0	62	$20	110.7	-775	-$35	-$15	-$102	$625	-$606	6.0	>1
CZ04-2	CPAU	CPAU	0.0	62	$11	110.7	-775	-$5	$5	$345	$625	-$606	>1	>1
CZ05	PGE	PGE	0.0	42	$14	117.3	-830	-$40	-$26	-$350	$391	-$606	1.7	>1
CZ05-2	PGE	SCG	0.0	42	$14	117.3	-830	-$66	-$53	-$827	$391	-$606	0.7	>1
CZ06	SCE	SCG	0.0	74	$18	107.0	-744	-$28	-$10	$153	$612	-$606	>1	>1
CZ07	SDGE	SDGE	0.0	81	$25	105.9	-734	-$43	-$18	-$58	$665	-$606	10.4	>1
CZ08	SCE	SCG	0.0	84	$20	103.6	-717	-$27	-$6	$227	$693	-$606	>1	>1
CZ09	SCE	SCG	0.0	83	$20	103.5	-716	-$27	-$7	$212	$739	-$606	>1	>1
CZ10	SCE	SCG	0.0	83	$17	90.0	-709	-$40	-$23	-$214	$396	-$853	4.0	>1
CZ10-2	SDGE	SDGE	0.0	83	$25	90.0	-709	-$59	-$34	-$478	$396	-$853	1.8	>1
CZ11	PGE	PGE	0.0	104	$27	91.1	-723	-$46	-$19	-$241	$430	-$371	1.5	>1
CZ12	PGE	PGE	0.0	93	$24	93.9	-755	-$51	-$27	-$414	$288	-$693	1.7	>1
CZ12-2	SMUD	PGE	0.0	93	$13	93.9	-755	$22	$36	$1,060	$288	-$693	>1	>1
CZ13	PGE	PGE	0.0	132	$34	89.6	-711	-$45	-$11	-$62	$505	-$371	6.0	>1
CZ14	SCE	SCG	0.0	80	$17	92.2	-733	-$42	-$25	-$258	$305	-$693	2.7	>1
CZ14-2	SDGE	SDGE	0.0	80	$24	92.2	-733	-$61	-$36	-$532	$305	-$693	1.3	>1
CZ15	SCE	SCG	0.0	145	$30	73.8	-554	-$28	$3	$332	$832	-$371	>1	>1
CZ16	PGE	PGE	0.0	119	$28	107.8	-896	-$64	-$37	-$621	$127	-$371	0.6	>1

[1] Values in red indicate B/C ratios less than 1.

[2] ">1" indicates cases where there are both incremental measure cost savings and energy cost savings.

Table 26: Table 19: All-Electric Efficiency + PV Package Results (SAVINGS/COST PER APARTMENT)[1,2]

			0.1 kW_{DC} per Apartment					0.2 kW_{DC} per Apartment				
Climate Zone	Elec Utility	Gas Utility	On-Bill Utility Cost Savings (2020 PV$)	TDV Cost Savings (2020 PV$)	Total Inc. Cost	On-Bill B/C Ratio	TDV B/C Ratio	On-Bill Utility Cost Savings (2020 PV$)	TDV Cost Savings (2020 PV$)	Total Inc. Cost	On-Bill B/C Ratio	TDV B/C Ratio
CZ01	PGE	PGE	$78	$692	-$129	>1	>1	$830	$1,184	$187	4.44	6.33
CZ02	PGE	PGE	$782	$1,120	-$289	>1	>1	$1,802	$1,712	$27	65.85	62.55
CZ03	PGE	PGE	$741	$975	-$289	>1	>1	$1,768	$1,560	$27	64.62	57.02
CZ04	PGE	PGE	$955	$1,240	-$289	>1	>1	$2,012	$1,855	$27	73.51	67.79
CZ04-2	CPAU	CPAU	$904	$1,240	-$289	>1	>1	$1,432	$1,855	$27	52.33	67.79
CZ05	PGE	PGE	$730	$1,018	-$289	>1	>1	$1,810	$1,646	$27	66.14	60.14
CZ05-2	PGE	SCG	$254	$1,018	-$289	>1	>1	$1,334	$1,646	$27	48.74	60.14
CZ06	SCE	SCG	$935	$1,231	-$289	>1	>1	$1,716	$1,849	$27	62.71	67.56
CZ07	SDGE	SDGE	$1,049	$1,302	-$289	>1	>1	$2,118	$1,938	$27	77.41	70.82
CZ08	SCE	SCG	$1,014	$1,337	-$289	>1	>1	$1,802	$1,981	$27	65.83	72.37
CZ09	SCE	SCG	$924	$1,390	-$289	>1	>1	$1,619	$2,040	$27	59.16	74.56
CZ10	SCE	SCG	$480	$1,023	-$536	>1	>1	$1,173	$1,650	-$219	>1	>1
CZ10-2	SDGE	SDGE	$546	$1,023	-$536	>1	>1	$1,570	$1,650	-$219	>1	>1
CZ11	PGE	PGE	$660	$1,052	-$55	>1	>1	$1,560	$1,673	$262	5.96	6.39
CZ12	PGE	PGE	$476	$900	-$376	>1	>1	$1,366	$1,513	-$60	>1	>1
CZ12-2	SMUD	PGE	$1,513	$900	-$376	>1	>1	$1,967	$1,513	-$60	>1	>1
CZ13	PGE	PGE	$813	$1,098	-$55	>1	>1	$1,687	$1,691	$262	6.44	6.46
CZ14	SCE	SCG	$500	$1,031	-$376	>1	>1	$1,259	$1,757	-$60	>1	>1
CZ14-2	SDGE	SDGE	$589	$1,031	-$376	>1	>1	$1,710	$1,757	-$60	>1	>1
CZ15	SCE	SCG	$1,037	$1,485	-$55	>1	>1	$1,741	$2,139	$262	6.65	8.17
CZ16	PGE	PGE	$339	$754	-$55	>1	>1	$1,299	$1,381	$262	4.96	5.27

[1] Values in red indicate B/C ratios less than 1.

[2] ">1" indicates cases where there are both incremental measure cost savings and energy cost savings. Values in red indicate B/C ratios less than 1.0

Table 27: All-Electric Package Results with PV, cont. (SAVINGS/COST PER APARTMENT) [1,2]

			0.3 kW_{DC} per Apartment					1.0 kW_{DC} per Apartment				
Climate Zone	Elec Utility	Gas Utility	On-Bill Utility Cost Savings (2020 PV$)	TDV Cost Savings (2020 PV$)	Total Inc. Cost	On-Bill B/C Ratio	TDV B/C Ratio	On-Bill Utility Cost Savings (2020 PV$)	TDV Cost Savings (2020 PV$)	Total Inc. Cost	On-Bill B/C Ratio	TDV B/C Ratio
CZ01	PGE	PGE	$1,582	$1,676	$504	3.14	3.33	$6,660	$5,123	$2,719	2.45	1.88
CZ02	PGE	PGE	$2,822	$2,304	$344	8.21	6.70	$8,960	$6,446	$2,560	3.50	2.52
CZ03	PGE	PGE	$2,796	$2,146	$344	8.13	6.24	$9,055	$6,242	$2,560	3.54	2.44
CZ04	PGE	PGE	$3,069	$2,470	$344	8.92	7.18	$9,425	$6,777	$2,560	3.68	2.65
CZ04-2	CPAU	CPAU	$1,960	$2,470	$344	5.70	7.18	$5,281	$6,777	$2,560	2.06	2.65
CZ05	PGE	PGE	$2,890	$2,274	$344	8.40	6.61	$9,439	$6,667	$2,560	3.69	2.60
CZ05-2	PGE	SCG	$2,414	$2,274	$344	7.02	6.61	$8,962	$6,667	$2,560	3.50	2.60
CZ06	SCE	SCG	$2,498	$2,467	$344	7.26	7.17	$7,322	$6,796	$2,560	2.86	2.65
CZ07	SDGE	SDGE	$3,154	$2,575	$344	9.17	7.49	$10,166	$7,030	$2,560	3.97	2.75
CZ08	SCE	SCG	$2,581	$2,625	$344	7.51	7.63	$7,286	$7,133	$2,560	2.85	2.79
CZ09	SCE	SCG	$2,314	$2,691	$344	6.73	7.83	$7,028	$7,247	$2,560	2.75	2.83
CZ10	SCE	SCG	$1,866	$2,277	$97	19.22	23.46	$6,573	$6,666	$2,313	2.84	2.88
CZ10-2	SDGE	SDGE	$2,594	$2,277	$97	26.72	23.46	$9,560	$6,666	$2,313	4.13	2.88
CZ11	PGE	PGE	$2,461	$2,294	$578	4.25	3.97	$8,602	$6,641	$2,794	3.08	2.38
CZ12	PGE	PGE	$2,256	$2,125	$257	8.78	8.28	$8,313	$6,413	$2,473	3.36	2.59
CZ12-2	SMUD	PGE	$2,421	$2,125	$257	9.43	8.28	$5,596	$6,413	$2,473	2.26	2.59
CZ13	PGE	PGE	$2,562	$2,284	$578	4.43	3.95	$8,541	$6,435	$2,794	3.06	2.30
CZ14	SCE	SCG	$2,017	$2,482	$257	7.85	9.67	$7,155	$7,563	$2,473	2.89	3.06
CZ14-2	SDGE	SDGE	$2,831	$2,482	$257	11.02	9.67	$10,448	$7,563	$2,473	4.23	3.06
CZ15	SCE	SCG	$2,445	$2,793	$578	4.23	4.83	$7,289	$7,371	$2,794	2.61	2.64
CZ16	PGE	PGE	$2,260	$2,009	$578	3.91	3.47	$8,764	$6,399	$2,794	3.14	2.29

[1] Values in red indicate B/C ratios less than 1.

[2] ">1" indicates cases where there are both incremental measure cost savings and energy cost savings. Values in red indicate B/C ratios less than 1.0

2019 Cost-Effectiveness Study:

2020 Analysis of High-Rise Residential New Construction

Last Modified: 2021-02-22

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LEGAL NOTICE

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Acronym List

2020 PV$	Present Value costs in 2020 dollars
ACM	Alternative Calculation Method
B/C	Benefit-to-Cost as in Benefit-to-Cost ratio
BSC	Building Standards Commission
CALGreen	California Green Building Standards Code (California Code of Regulations Title 24, Part 11)
CASE	Codes and Standards Enhancement
CBECC-Com	California Building Energy Code Compliance software program developed by the California Energy Commission for use in demonstrating compliance with the Non-Residential California Building Energy Efficiency Standards
cfm	Cubic Feet per Minute
CPAU	City of Palo Alto Utilities
CPC	California Plumbing Code
CZ	California Climate Zone
DOAS	Dedicated Outdoor Air System
ERV/HRV	Energy- or Heat-Recovery Ventilation
EPS	Expanded Polystyrene
ft^2	Square foot
GHG	Greenhouse Gas
GRC	General Rate Case
HERS Rater	Home Energy Rating System Rater
HPWH	Heat Pump Water Heater
HVAC	Heating, Ventilation, and Air Conditioning
IOU	Investor-Owned Utility
kBtu	kilo-British thermal unit
kWh	kilowatt-hour
kWDC	Direct Current kilowatt. Nominal rated power of a photovoltaic system
LCC	Lifecycle Cost
NEM	Net Energy Metering
NPV	Net Present Value
PG&E	Pacific Gas and Electric Company
PV	Photovoltaic
SCE	Southern California Edison

SDG&E	San Diego Gas and Electric
SHGC	Solar Heat Gain Coefficient
SMUD	Sacramento Municipal Utility District
TDV	Time Dependent Valuation
therm	Unit for quantity of heat that equals 100,000 British thermal units
Title 24	California Code of Regulations Title 24, Part 6
TOU	Time-Of-Use
UEF	Uniform Energy Factor
W	Watt
WDC	Watt Direct Current.

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1 Introduction

The California Codes and Standards Reach Codes program provides technical support to local governments considering adopting a local ordinance (reach code) intended to support meeting local and/or statewide energy and greenhouse gas (GHG) reduction goals. The program facilitates adoption and implementation of the code when requested by local jurisdictions by providing resources such as cost-effectiveness studies, model language, sample findings, and other supporting documentation. This cost-effectiveness study was sponsored by Pacific Gas and Electric Company (PG&E). Local jurisdictions that are considering adopting ordinances may contact the program for support through its website, LocalEnergyCodes.com.

The California Building Energy Efficiency Standards Title 24, or Title 24, Part 6 (Title 24) (California Energy Commission, 2018a) is maintained and updated every three years by two state agencies: the California Energy Commission (Energy Commission) and the Building Standards Commission (BSC). In addition to enforcing the code, local jurisdictions have the authority to adopt local energy efficiency ordinances—or reach codes—that exceed the minimum standards defined by Title 24 (as established by Public Resources Code Section 25402.1(h)2 and Section 10-106 of the Building Energy Efficiency Standards). Local jurisdictions must demonstrate that the requirements of the proposed ordinance are cost-effective and result in buildings consuming less energy than is permitted by Title 24. In addition, the jurisdiction must obtain approval from the Energy Commission and file the ordinance with the BSC for the ordinance to be legally enforceable.

This report documents cost-effective combinations of measures that exceed the minimum state requirements, 2019 Title 24, effective January 1, 2020. Local jurisdictions in California may consider adopting local energy ordinances to achieve energy savings beyond what will be accomplished by enforcing building efficiency requirements that apply statewide. This report was developed in coordination with the California Statewide Investor-Owned Utilities (IOUs) Codes and Standards Program, key consultants, and engaged cities—collectively known as the Statewide Reach Codes Team.

The focus of this study is on new high-rise (eight stories and higher) multifamily residential construction. The analysis evaluates both mixed-fuel and all-electric residential construction, documenting performance requirements that can be met by either type of building design. Compliance package options and cost-effectiveness analysis in all 16 California climate zones (CZs) are presented (see Appendix A – Map of California Climate Zones for a graphical depiction of climate zone locations). This analysis complements the analysis conducted for mid-rise multifamily residential construction in June 2020 (Statewide Reach Codes Team, 2020).

2 Methodology and Assumptions

This analysis uses two different metrics to assess cost effectiveness. Both methodologies require estimating and quantifying the incremental costs and energy savings associated with energy efficiency measures. The main difference between the methodologies is the way they value energy and thus the cost savings of reduced or avoided energy use:

- **Utility Bill Impacts (On-Bill)**: Customer-based Lifecycle Cost (LCC) approach that values energy based upon estimated site energy usage and customer On-Bill savings using electricity and natural gas utility rate schedules over a 30-year duration accounting for discount rate and energy cost inflation.
- **Time Dependent Valuation (TDV)**: Energy Commission LCC methodology, which is intended to capture the "societal value or cost" of energy use including long-term projected costs, such as the cost of providing energy during peak periods of demand and other societal costs, such as projected costs for carbon emissions, as well as grid transmission and distribution impacts. This metric values energy use differently depending on the fuel source (natural gas, electricity, and propane), time of day, and season. Electricity used (or saved) during peak periods has a much higher value than electricity used (or saved) during off-peak periods (Horii et al., 2014). This is the methodology used by the Energy Commission in evaluating cost effectiveness for efficiency measures in Title 24. Both 2019 and 2022 TDV multipliers are evaluated and documented in this analysis.

The general approach applied in this analysis is to evaluate performance and determine cost effectiveness of various packages of energy measures in high-rise multifamily dwelling units. The California Building Energy Code Compliance – Commercial (CBECC-Com) 2019.1.3 and 2022 beta compliance simulation tools were used to evaluate energy savings for all measures. 2022 weather files were used to evaluate site energy use and TDV cost effectiveness along with the 2022 TDV.

2.1 Building Prototypes

The Energy Commission defines building prototypes which it uses to evaluate the cost effectiveness of proposed changes to Title 24 requirements. The Energy Commission recently developed new prototype designs for multifamily buildings to more closely reflect typical designs for new multifamily buildings across the state. The new prototypes include two low-rise residential designs, a mid-rise, and a high-rise design. This analysis uses the new high-rise multifamily prototype (TRC, 2019), which is a variation of the previous ten-story high-rise prototype used in prior code cycles. The high-rise prototype is a ten-story building with two below-grade parking levels, ground floor commercial space, and nine stories of residential space. Table 1 describes the basic characteristics of the high-rise prototype and Figure 1 shows a depiction of the building.

Table 1: Prototype Characteristics

	Multifamily 10-Story High-Rise
Conditioned Floor Area	125,400 Square Foot (ft^2) Total: 24,960 ft^2 Nonresidential[a] & 100,440 ft^2 Residential
Number of Stories	12 Stories Total: 2-Story Parking Garage (below grade) 1 Story of Nonresidential Space 9 Stories of Residential Space
Number of Dwelling Units/Bedrooms	(18) Studios, (54) 1-Bed Units, & (45) 2-Bed Units
Foundation	Concrete Podium with Underground Parking
Wall Assembly	Steel Frame
Roof Assembly	Flat Roof
Window-to-Wall Area Ratio	40%
HVAC System	Ducted split system heat pumps at each dwelling unit. Dedicated outdoor air system for dwelling unit ventilation.
Domestic Hot Water System	Gas central boiler with solar thermal sized to meet the prescriptive requirements by climate zone.

[a.] includes ground floor commercial space, corridors and common areas.

Source: TRC, 2019.

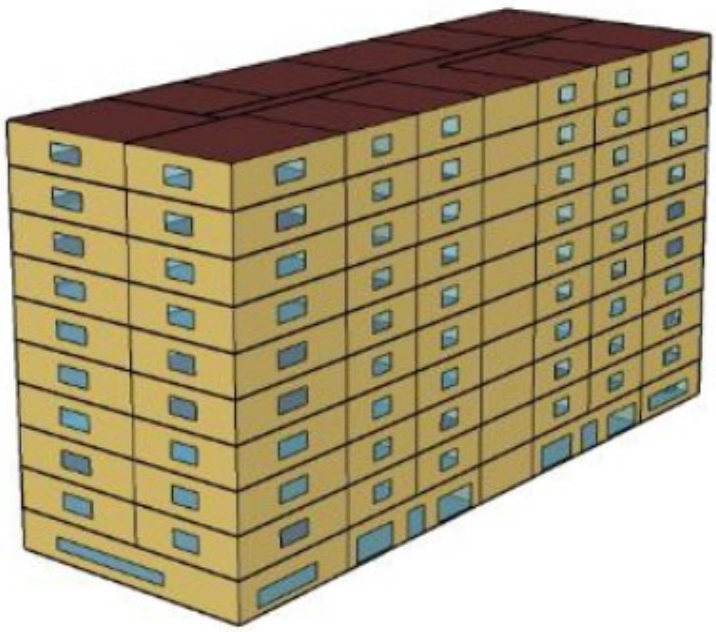

Figure 1: Ten-story high-rise multifamily prototype depiction.

Source: TRC, 2019.

The methodology used in the analyses for the prototypical building type begins with a design that meets the minimum 2019 Title 24 prescriptive requirements (zero compliance margin). Table 140.3-B and 140.3-C in the 2019 Title 24 (California Energy Commission, 2018a) list the prescriptive measures that determine the baseline design in each climate zone for the nonresidential and high-rise residential spaces, respectively. Other features are consistent with the Standard Design in the Nonresidential Alternative Calculation Method (ACM) Reference Manual (California Energy Commission, 2019a) with two exceptions:

1. The dwelling units use split system heat pumps instead of a split furnace and air conditioner that is prescribed in Table 2 of the Nonresidential ACM Reference Manual. This modeling choice was made to better reflect current market data, which shows heat pumps to be the most common system type and a very low prevalence of gas furnaces for multifamily buildings four stories and greater (TRC, 2019). In most climate zones the difference between a heat pump or gas furnace is nearly compliance neutral.
2. A dedicated outdoor air system (DOAS) is used for ventilation serving the dwelling units. This is based on anecdotal information that this practice is more common than individual ventilation systems in high-rise buildings. It also provides variability across the mid- and high-rise analysis, which is important so that this analysis provides more realistic solutions for the high-rise multifamily building type. The selection of a DOAS does not match the Standard Design, which applies individual balanced fans for ventilation at all residential spaces, and results in a small compliance penalty.[1]

The analysis also assumed electric resistance cooking in the dwelling unit units to reflect the current market based on anecdotal information. Laundry was not addressed in this study. The building prototype assumes central laundry facilities and no laundry in the units.

2.2 Measure Analysis

EnergyPro software, using CBECC-Com as the simulation engine, was used to evaluate energy impacts and code compliance applying the 2019 Title 24 prescriptive standards as the benchmark. TDV is the energy metric used by Title 24 since 2005 to evaluate compliance. Although both the 2019 and 2022 compliance software were used for evaluation, the 2019 software was used for reporting compliance margins and the 2022 software, with the 2022 weather, was used for reporting site energy and utility bill impacts.

Using the 2019 baseline as the starting point, prospective energy efficiency measures were identified and modeled to determine the projected site energy (therm and kWh) and compliance impacts. Annual utility costs were calculated using hourly data output from CBECC-Com, and electricity and natural gas tariffs for each of the IOUs.

The Statewide Reach Codes Team selected measures for evaluation based on prior residential and nonresidential 2019 reach code analysis ((Statewide Reach Codes Team, 2019a), (Statewide Reach Codes Team, 2019b), (Statewide Reach Codes Team, 2020)) as well as experience with and outreach to architects, builders, and engineers and general knowledge of the relative acceptance of many measures. This analysis focuses on the residential dwelling units only. A prior study and report demonstrated the cost effectiveness of above code packages for nonresidential buildings (Statewide Reach Codes Team, 2019a).

2.2.1 Federal Preemption

The United States Department of Energy sets minimum efficiency standards for equipment and appliances that are federally regulated under the National Appliance Energy Conservation Act of 1975, including heating, cooling, and water heating equipment. Since state and local governments are prohibited from adopting policies that mandate higher minimum efficiencies than the federal standards require (federal preemption), the focus of this study is to identify and evaluate cost-effective packages that do not include high efficiency equipment. While this

[1] The compliance penalty is not reflected in the results in this analysis since the baseline and proposed designs both include a DOAS.

study is limited by federal preemption, in practice builders may use any package of compliant measures to achieve the performance goals, including high efficiency appliances. Often, these measures are the simplest and most affordable measures to increase energy performance.

2.2.2 Energy Efficiency Measures

Following are descriptions of each of the efficiency measures evaluated for the residential spaces under this analysis. Because not all of the measures described below were found to be cost-effective, and cost effectiveness varied by climate zone, not all measures are included in all packages and some of the measures listed are not included in any final package.

Improved Fenestration – Lower U-factor: Reduce window U-factor to 0.25 Btu/hour-ft^2-°F. The prescriptive maximum U-factor is 0.36 in all climates. This measure applies to all windows on floors two through ten.

Improved Fenestration – Lower SHGC: Reduce window solar heat gain coefficient (SHGC) to 0.22. The prescriptive maximum SHGC is 0.25 for fixed windows in all climates. The Statewide Reach Codes Team evaluated increased SHGC in heating dominated climates (Climate Zones 1, 3, 5, and 16) but results were better with a lower SHGC. This measure applies to all windows on floors two through ten.

Exterior Wall Insulation: Additional R-4 exterior continuous insulation on exterior walls. To meet the prescriptive wall requirements, it is assumed that exterior wall insulation is used in the base case, therefore this measure adds the additional R-value to existing exterior insulation. This measure applies to all walls on floors two through ten.

HERS Verification of Hot Water Pipe Insulation: The California Plumbing Code (CPC) requires pipe insulation on all hot water lines. This measure provides credit for HERS Rater verification of pipe insulation requirements according to the procedures outlined in the 2019 Reference Appendices RA3.6.3. (California Energy Commission, 2018b).

Low Pressure Drop Ducts: Upgrade the duct distribution system to reduce external static pressure and meet a maximum fan efficacy of 0.25 watts (W) per cubic feet per minute (cfm) operating at full speed. This may involve upsizing ductwork, reducing the total effective length of ducts, and/or selecting low pressure drop components, such as filters. This measure is applied to the ducted split system heat pumps serving the dwelling units.

Energy- or Heat- Recovery Ventilation: An energy- or heat-recovery ventilation (ERV/HRV) system installed on the central DOAS with 67 percent sensible recovery effectiveness and 1.0 W/cfm fan efficacy (total including both supply and return fans). The DOAS in the base case model also has a 1.0 W/cfm fan efficacy, so there is no fan efficacy credit or penalty evaluated for this measure.

Solar Thermal: Prescriptively, central water heating systems require a solar thermal system with a 20 percent solar fraction in Climates Zones 1 through 9 and 35 percent solar fraction in Climate Zones 10 through 16. This measure upgrades the prescriptive solar thermal system to meet a 50 percent solar fraction in all climates, assuming there is available roof space for the additional collectors.

2.2.3 Equipment Fuel Substitution Measures – Water Heating

Since the base case prototype model assumes individual heat pumps for space heating and all-electric appliances in the dwelling units, the central domestic hot water system is the only equipment serving the dwelling unit spaces to electrify in the all-electric design. The Statewide Reach Codes Team evaluated two configurations for electric heat pump water heaters (HPWHs) described below.

New functionality was added to CBECC-Com 2019.1.3 with the ability to model central HPWH systems. There are two primary system types: “Small, Integrated, Packaged System” and “Large Single Pass Primary”. The former allows for modeling 40- to 85-gallon residential HPWHs including Northwest Energy Efficiency Alliance rated units and is how the clustered approach referred to in this analysis is modeled. The latter models large central HPWHs and covers various product models over six manufacturers (at the time of writing this report). CBECC-Com 2019.1.3 also provides a “Solar Thermal Flexibility Credit” to allow for projects with electric central water heating to use a photovoltaic (PV) system to offset the energy use of the solar thermal system in the Standard Design base case. Under these conditions, PV’s impact on compliance margin is limited to the value of the solar thermal credit.

Central HPWH with Recirculation: Per Section 150.1(c)8C of 2019 Title 24, the Energy Commission made an executive determination outlining requirements of a prescriptive approach for central heat pump water heating systems in December 2019 (California Energy Commission, 2019b). Key aspects of the prescriptive approach are described below:

- The system must be configured with a design similar to what is presented in the schematic in Figure 2, copied from the executive determination document.
- HPWH must be a single-pass split system with the compressor located outdoors and be able to operate down to -20°F.
- The system must include either a solar thermal water heating system that meets the current prescriptive requirements or 0.1 direct current kilowatt (kW_{DC}) of PV system capacity per dwelling unit/dwelling unit.

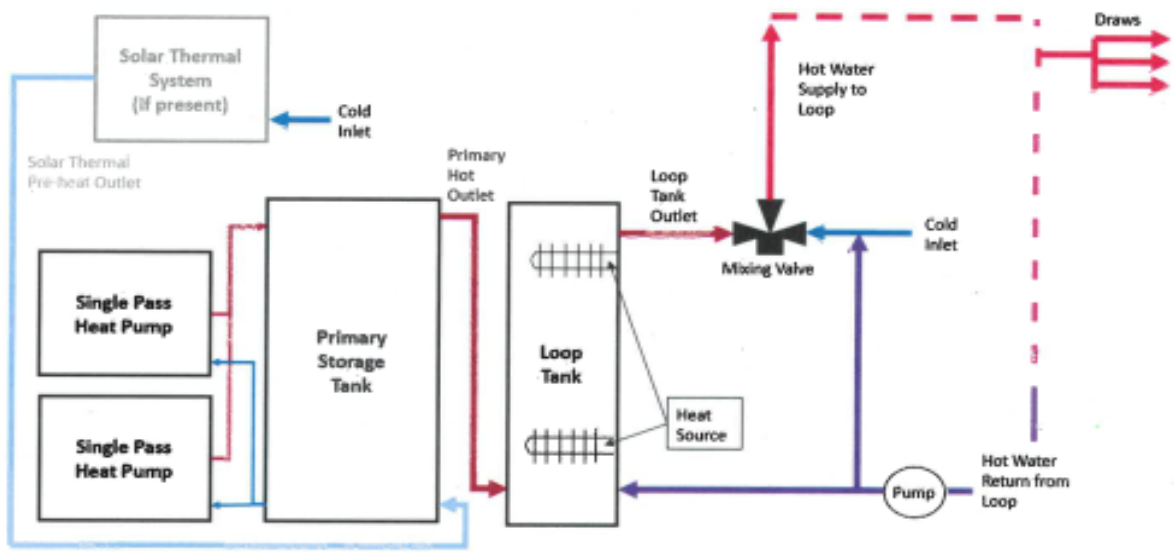

Figure 2: Prescriptive central HPWH system schematic.

Source: Energy Commission (California Energy Commission, 2019b).

For this configuration, the Statewide Reach Codes Team evaluated a central recirculating HPWH system using Sanden compressors that meet the prescriptive requirements. Based on the system sizing requirements, 19 Sanden units and 1,520 gallons of primary storage capacity are required for the 117-dwelling unit building. The system is modeled with the tanks located indoors in a conditioned zone and source air provided from outdoors with the Sanden units likely located on rooftops. The rooftop space required for the heat pump units and the prescriptive PV system (0.1 kW_{DC} per dwelling unit) will be similar or less than that required for the prescriptive solar thermal water heating system. The recirculation system is demand controlled meeting the requirements of the 2019 Reference Appendices RA4.4.13.

Clustered HPWH: This clustered design uses residential integrated storage HPWHs to serve more than one dwelling unit; four to five bedrooms on average for a total of 38 HPWHs in the 117- dwelling unit, 162-bed building. The water heaters are located in conditioned interior closets throughout the building and designed for short plumbing runs without using a hot water recirculation loop. A minimum efficiency 2.0 uniform energy factor (UEF) HPWH was used for this analysis (to avoid federal preemption). This approach has been selectively used in multifamily projects because of its reliance on lower cost, small capacity HPWH products. The clustered strategy is not a prescriptive option but is allowed in the performance path if the water heater serves no more than eight units. Since each water heater serves multiple dwelling units, the Standard Design includes a solar thermal water heating system and the project is penalized in compliance if a solar thermal or PV system is not included.

2.2.4 Renewable Energy

PV: There is no existing requirement for PV in the 2019 Title 24 nonresidential code for high-rise residential buildings (four or more stories). The PV sizing methodology was developed to offset a portion of annual residential electricity use and avoid oversizing which would violate net energy metering (NEM) rules. In all cases, PV is evaluated with the PV simulations within CBECC-Com using a standard module type, 180-degree azimuth, and 22-degree tilt. The analysis evaluated a PV system capacity equal to 0.1 and 0.2 kW_{DC} per dwelling unit. Assuming 15 W per ft^2 this requires 780 to 1,560 ft^2 of the 12,540 ft^2 rooftop. The benefit of the PV was applied to the dwelling units assuming virtual NEM.

2.2.5 Nonresidential and Common Area Spaces

Efficiency measure packages and electric equipment (for the all-electric analysis) found to be cost-effective in the nonresidential building reach code analysis were applied to the nonresidential spaces for evaluating performance relative to compliance, but the incremental costs and energy impacts of these measures on the nonresidential spaces were not included in this analysis. Refer to the nonresidential reach code study for more details (Statewide Reach Codes Team, 2019a).

2.3 Package Development

Three types of measure packages were evaluated for each climate zone to identify cost-effective combinations, as described below.

1. **Efficiency Packages**: These packages combine efficiency measures that do not trigger federal preemption including envelope, water heating distribution, and duct distribution efficiency measures.
2. **Fuel Substitution**: In addition to applying the efficiency measures these packages also use electric appliances in place of natural gas appliances. For the residential spaces, only water heating is converted from using natural gas to electricity.
    a. For water heating both a central design with recirculation and a clustered design are evaluated.
3. **Efficiency and PV Packages (with or without fuel substitution)**: In addition to applying efficiency measures these packages have a PV system to offset a portion of dwelling unit estimated electricity use.

2.4 Measure Cost

Measure costs were obtained from various sources, including prior reach code studies, past Title 24 Codes and Standards Enhancement (CASE) work (developed by the Statewide CASE Team), local contractors, internet searches, past projects, and technical reports.

2.4.1 Energy Efficiency and Renewable Measures

Table 2 summarizes the incremental cost assumptions for the residential measures evaluated in this study. Incremental costs represent the equipment, installation, replacement, and maintenance costs of the proposed measures relative to the base case. Replacement costs are applied to PV inverters and water heating equipment over the 30-year evaluation period. There is no assumed incremental maintenance on the envelope, HVAC, or water heating measures. Costs were estimated to reflect costs to the building owner. When costs were obtained from a source that did not already include builder overhead and profit, a markup of ten percent was added. All costs are provided as present value in 2020 (2020 PV$). Costs due to variations in heat pump capacity by climate zone were not accounted for in the analysis. While the efficiency measures will reduce required cooling and heating capacities, in most cases they will not be reduced enough to drop to the next nominal capacity system.

Table 2: Incremental Cost Details

Measure	Performance Level	Incremental Cost (2020 PV$)	Source & Notes
Non-Preempted Measures			
Window U-factor	0.25 vs 0.36	$27,342	$6.95/ft^2 window area based on analysis conducted for the 2019 and 2022 Title 24 code cycles (Statewide CASE Team, 2018).
Window SHGC	0.22 vs 0.25	$0	Data from CASE Report along with direct feedback from Statewide CASE Team that higher SHGC does not necessarily have any incremental cost impact (Statewide CASE Team, 2017b).
Exterior Wall Insulation	Add 1 inch	$8,497	$0.86/ft^2 based on adding 1 inch of exterior insulation on exterior walls with some level of existing exterior insulation. Costs are averaged from two sources ((Statewide CASE Team, 2014), (Statewide CASE Team, 2017a)) and for both expanded polystyrene (EPS) and polyisocyanurate products with a 10% mark-up added to account for cost increases since the time of the report.
HERS Verified Pipe Insulation	HERS verified pipe insulation vs no verification	$13,275	$83 per dwelling unit for a HERS Rater to conduct verification of pipe insulation based on feedback from HERS Raters.
Low Pressure Drop Duct Design	0.25 W/cfm vs 0.35 W/cfm	$16,824	$144 per dwelling unit. Costs assume 1.5 hours labor per multifamily dwelling unit. Labor rate of $96 per hour is from 2019 RSMeans for sheet metal workers and includes an average City Cost Index for labor for California cities.
ERV/HRV (on central DOAS)	67% sensible recovery effectiveness	$110,331	Based on costs from the Multifamily Indoor Air Quality 2022 CASE Report (Statewide CASE Team, 2020b).
Solar Thermal System	50% solar fraction vs prescriptive 20%-35%	$59,452 - $84,932	Costs based on 2022 multifamily solar thermal measure CASE proposal (Statewide CASE Team, 2020a) and include first cost of $70,727 and $8,834 present value for replacement/maintenance costs.
Renewable Energy (PV)			
PV System	0.1 and 0.2 kW_{DC} per dwelling unit	$3.17/$W_{DC}$	First costs are from Lawrence Berkeley National Laboratory's Tracking the Sun 2018 costs (Barbose et al., 2018) and represent costs for the first half of 2018 of $2.90/$W_{DC}$ for nonresidential systems ≤ 500 kW_{DC}. These costs were reduced by 16% for the solar investment tax credit, which is the average credit over years 2020-2022. Inverter replacement cost of $0.14/$W_{DC}$ present value includes replacements at year 11 at $0.15/$W_{DC}$ (nominal) and at year 21 at $0.12/$W_{DC}$ (nominal) per the 2019 PV CASE Report (California Energy Commission, 2017). System maintenance costs of $0.31/$W_{DC}$ present value assumes additional $0.02/$W_{DC}$ (nominal) annually per the 2019 PV CASE Report (California Energy Commission, 2017). 10% overhead and profit added to all costs.

2.4.2 Equipment Fuel Substitution Measures – Water Heating

The Statewide Reach Codes Team reached out to stakeholders to collect project cost information for central gas boilers and central recirculating and clustered HPWH designs. Project data sources included Association for Energy Affordability, Redwood Energy, Mithun, Ecotope, and the All-Electric Multifamily Compliance Pathway 2022 CASE Report (Statewide CASE Team, 2020a). Costs are presented in Table 3 and do not include PV system costs. The cases were evaluated with and without PV even though PV or solar thermal is prescriptively required as part of the electric central water heating prescriptive approach.

Table 3: Gas and Electric Water Heating Equipment Present Value (2020$) Costs over 30-Year Period of Analysis

	Central Gas Boiler (CZs 1-9)	Central Gas Boiler (CZs 10-16)	Central Recirculating HPWH	Clustered HPWH
System Quantity/Description	1 boiler recirculation		19 units, 1,547-gallon total	38 units, 80-gallon each
Total Equipment Cost	$131,270		$270,261	$153,409
Solar Thermal System	(20% solar fraction) $122,216	(35% solar fraction) $147,696	-	-
Total First Cost	$253,486	$278,966	$270,261	$153,409
Maintenance/Replacement Cost (PV)	$90,167	$90,167	$147,450	$98,467
Total Cost (NPV)	$343,653	$369,133	$417,710	$251,876
Incremental Cost CZ 1-9 (PV)	-	-	$74,057	($91,777)
Incremental Cost CZ 10-16 (PV)	-	-	$48,577	($117,257)

Source: Statewide CASE Team, 2020a.

Typical costs for the water heating systems are based on the following assumptions:

Central Gas Boiler: Based on the average of total estimated project costs from contractors for four multi-family projects ranging from 32 to 340 dwelling units and cost estimates for mid- and high-rise buildings from the All-Electric Multifamily Compliance Pathway 2022 CASE Report (Statewide CASE Team, 2020a). The cost per dwelling unit ranged from $547 to $2,089 and the average cost applied in this analysis was $1,122 per dwelling unit. Costs include installation of gas piping from the building meter to the water heater. Water heater lifetime is assumed to be 15 years and the net present value (NPV) replacement cost at year 15 is $84,257.

Central Recirculating HPWH: Based on average total installed project costs from four multi-family projects with Sanden HPWHs ranging from four to 16 Sanden units per project. The cost per Sanden HPWH ranged from $13,094 to $15,766 and the average cost applied in this analysis was $14,224 per HPWH. Based on the prescriptive system sizing requirements, 19 Sanden units are required for the 117-dwelling unit building, resulting in a total first cost of $270,261. Water heater lifetime is assumed to be 15 years. Because Sanden HPWHs are an emerging technology in the United States, it is expected that over time their costs will decrease and for replacement at year 15 the costs are assumed to have decreased by 15 percent.

Clustered HPWH: Based on costs from one project with RHEEM HPWHs used in a clustered design. Costs include water heater interior closet, electrical outlets, and increased breaker size and sub feed. Water heater based on 2.0 UEF 80-gallon appliance with 38 total HPWHs serving the building (one per four to five bedrooms). Water heater lifetime is assumed to be 15 years and the NPV replacement cost at year 15 is $98,467. While this has an impact on leasable floor area, the design impacts have been found to be minimal when addressed early in design and is equivalent to less than one percent of the residential floor area. This design assumes eight water heater closets per floor, at approximately 15 ft^2 per closet.

Solar Thermal: Based on system costs provided in the All-Electric Multifamily Compliance Pathway 2022 CASE Report (Statewide CASE Team, 2020a). First costs for materials for the 35 percent solar fraction case and the markup percentage reflect that presented in the CASE Report for the high-rise prototype. The labor costs and 20 percent solar fraction case costs are estimated based on detailed costs in the CASE Report. Replacement and maintenance costs assume replacement of the solar thermal tank at year 15 at $6,110 and glycol replacement of $1,300 each time at years 9, 18, and 27. The cost of the remaining useful life of the glycol at year 30 is deducted from the final cost. The CASE Report included costs for replacing the solar collectors at year 20. Collectors can have longer lifetimes up to 30 years if well maintained, therefore this analysis does not assume any replacement of the collectors over the 30-year analysis period. See Table 4 for details.

Table 4: Solar Thermal Detailed Costs over 30-Year Period of Analysis

Solar Fraction	20%	35%
Materials	$39,854	$57,450
Labor	$56,001	$58,390
Markup	27.5%	27.5%
First Cost	$122,216	$147,696
Replacement/Maintenance (2020 $PV)	$5,910	$5,910
Total Cost (2020 $PV)	**$128,126**	**$153,605**

Source: Statewide CASE Team, 2020a.

2.4.3 Natural Gas Infrastructure Costs

This analysis assumes that in an all-electric new construction project, natural gas would not be supplied to the building. Eliminating natural gas to the building would save costs associated with connecting a service line from the street main to the building, piping distribution within the building, and monthly meter customer charges from the utility. Incremental costs for natural gas infrastructure in the mixed-fuel building are presented in Table 5. Cost data for the plan review and service extension was estimated on a per building basis and then apportioned to the residential and nonresidential portions of the buildings based on annual gas consumption. For the base case prototype building 49 to 82 percent of estimated building annual gas use is attributed to the residential water heating system across all climate zones. A statewide average of 75 percent was calculated and applied to the costs in Table 5 based on housing starts provided by the Energy Commission for the 2019 Title 24 code development process. The meter costs were based on the service provided to the residential and nonresidential portion of the building separately. Following the table are descriptions of assumptions for each of the cost components. Costs for gas piping from the meter to the gas boilers are included in the central gas boiler costs above. Gas piping distribution costs were typically included in total project costs and could not be broken out in all cases.

Table 5: Natural Gas Infrastructure Cost Savings for All-Electric Building

Item	Source	Total	Nonresidential Portion	Residential Portion
Natural Gas Plan Review	(TRC, 2018)	$2,316	$588	$1,728
Service Extension[a]	(PG&E, 2019)	$4,600	$1,169	$3,431
Meter	(PG&E, 2019)	$7,200	$3,600	$3,600
Total First Cost		***$14,116***	***$5,357***	***$8,759***

[a] Service extension costs include 50 percent reduction assuming portion of the costs are passed on to gas customers.

Natural Gas Plan Review: Total costs are based on TRC's 2019 reach code analysis for Palo Alto (TRC, 2018) and then split between the residential and nonresidential spaces in the building proportionately according to annual gas consumption with 75 percent of the annual load is attributed to residential units on a statewide basis.
Service Extension: Service extension costs to the building were taken from a PG&E memo dated December 5, 2019 to Energy Commission staff. They include costs for trenching and assume nonresidential new construction within a developed area (see Appendix C – PG&E Gas Infrastructure Cost Memo). The total cost of $9,200 from the memo is reduced by 50 percent to account for the portion of the costs paid for by all customers due to application of Utility Gas Main Extensions rules[2]. The resultant cost is apportioned between the residential and nonresidential spaces in the building based on annual gas consumption of residential and nonresidential uses, with 75 percent of the annual natural gas use attributed to residential units on a statewide basis.
Meter: Cost per meter provided by PG&E for commercial meters (see Appendix C – PG&E Gas Infrastructure Cost Memo). Assume one meter for nonresidential boilers serving space heating and service water heating, and another for residential boilers serving domestic hot water.

2.5 Cost Effectiveness

Cost effectiveness was evaluated for all climate zones and is presented based on both TDV energy, using the Energy Commission's LCC methodology, and an On-Bill approach using residential customer utility rates. Both methodologies require estimating and quantifying the value of the energy impact associated with energy efficiency measures over the life of the measures (30 years) as compared to the prescriptive Title 24 requirements.

Additional analysis included evaluating the measures using both the 2019 and proposed 2022 TDV multipliers. The proposed 2022 weather files were also used to calculate site energy use and evaluate On-Bill energy performance. The 2022 weather files were updated in 2019 and are considered to better represent conditions now and in the future. They tend to increase cooling and reduce space heating energy use, based on recent warming trends throughout the state.

Cost effectiveness is presented using both lifecycle NPV savings and benefit-to-cost (B/C) ratio metrics, which represent the cost effectiveness of a measure over a 30-year lifetime taking into account discounting of future savings and costs.

- **NPV Savings:** PV benefits minus PV costs is reported as a cost-effectiveness metric. If the net savings of a measure or package is positive, it is considered cost-effective. Negative savings represent net costs. A measure that has negative energy cost benefits (energy cost increase) can still be cost-effective if the costs to implement the measure are more negative (i.e., material and maintenance cost savings).
- **B/C Ratio:** Ratio of the present value of all benefits to the present value of all costs over 30 years (PV benefits divided by PV costs). The criterion for cost effectiveness is a B/C ratio greater than one. A value of one indicates the NPV of the savings over the life of the measure is equivalent to the NPV of the lifetime incremental cost of that measure. A value greater than one represents a positive return on investment. The B/C ratio is calculated according to Equation 1.

Equation 1

$$Benefit - to - Cost\ Ratio = \frac{PV\ of\ lifetime\ benefit}{PV\ of\ lifetime\ cost}$$

[2] PG&E Rule 15: https://www.pge.com/tariffs/tm2/pdf/GAS_RULES_15.pdf

SoCalGas Rule 20: https://www.socalgas.com/regulatory/tariffs/tm2/pdf/20.pdf

SDG&E Rule 15: http://regarchive.sdge.com/tm2/pdf/GAS_GAS-RULES_GRULE15.pdf

Improving the efficiency of a project often requires an initial incremental investment. In most cases the benefit is represented by annual On-Bill utility or TDV savings, and the cost by incremental first cost and replacement costs. However, some packages result in initial construction cost savings (negative incremental cost), and either energy cost savings (positive benefits), or increased energy costs (negative benefits). In cases where both construction costs and energy-related savings are negative, the construction cost savings are treated as the 'benefit' while the increased energy costs are the 'cost.' In cases where a measure or package is cost-effective immediately (i.e. upfront construction cost savings and lifetime energy cost savings), B/C ratio cost effectiveness is represented by ">1". Because of these situations, NPV savings are also reported, which, in these cases, are positive values.

The lifetime costs or benefits are calculated according to Equation 2.

Equation 2

$$PV\ of\ lifetime\ cost\ or\ benefit = \sum_{t=0}^{n} \frac{(Annual\ cost\ or\ benefit)_t}{(1+r)^t}$$

Where:

- *n* = analysis term
- *r = discount rate*
- *t = year at which cost/benefit is incurred*

The following summarizes the assumptions applied in this analysis to both methodologies.

- Analysis term of 30-years
- Real discount rate of three percent (does not include inflation)

2.5.1 On-Bill Customer LCC

Residential utility rates were used to calculate utility costs for all cases and determine On-Bill customer cost effectiveness for the proposed packages. Utility costs of the nonresidential spaces were not evaluated in this study, only dwelling unit and water heating energy use. The Statewide Reach Codes Team obtained the recommended utility rates from the representative utility based on the assumption that the reach codes go into effect in 2020. Annual utility costs were calculated using hourly electricity and gas output from CBECC-Com and applying the utility tariffs summarized in Table 6. Appendix B – Utility Rate Schedules includes details on the utility rate schedules used for this study. The applicable residential time-of-use (TOU) rate was applied to all cases. For cases with PV generation, the approved NEM2 tariffs were applied along with minimum daily use billing and mandatory non-bypassable charges. For the PV cases annual electric production was always less than annual electricity consumption; and therefore, no credits for surplus generation were necessary. Future changes to the NEM tariffs are likely; however, there is a lot of uncertainty about what those changes will be and when they will become effective.

There are no master metered multifamily service electric tariffs available from the IOUs. Based on guidance from the IOUs, the residential electric TOU tariffs that apply to individually metered residential dwelling units were also used to calculate electricity costs for the central water heating systems. Baseline allowances included in the electric tariff were applied on a per unit basis for all-electric service.

Based on guidance from the IOUs, master metered multifamily service gas tariffs were used to calculate gas costs for the central water heating systems. The baseline quantities were applied on a per unit basis, as is defined in the schedules, and when available water heating only baseline values were used.

Utility rates were applied to each climate zone based on the predominant IOU serving the population of each zone according to Table 6. Climate Zones 10 and 14 are evaluated with both SCE/SoCalGas and SDG&E tariffs since each utility has customers within these climate zones. Climate Zone 5 is evaluated under both PG&E and SoCalGas natural gas rates. Two municipal utility rates were also evaluated, Sacramento Municipal Utility District (SMUD) in Climate Zone 12 and City of Palo Alto Utilities (CPAU) in Climate Zone 4.

Table 6: IOU Tariffs Applied Based on Climate Zone

Climate Zone	Electric/Gas Utility	Electricity (Dwelling Unit Use)	Electricity (Central Water Heating)	Natural Gas (Central Water Heating)[a]
1-5, 11-13, 16	PG&E	E-TOU-C	E-TOU-C	PG&E GM
5	PG&E/SoCalGas			SoCalGas GM-E
6, 8-10, 14,15	SCE/SoCalGas	TOU-D (Option 4-9)	TOU-D (Option 4-9)	
7, 10, 14	SDG&E	TOU-DR1	TOU-DR1	SDG&E GM
12	SMUD/PG&E	R-TOD (RT02)	GSN-T	PG&E GM
4	CPAU	E-1	E-2	G-2

[a] These rates are allowed assuming no gas is used in the dwelling units.

Utility rates are assumed to escalate over time, using assumptions from research conducted by Energy and Environmental Economics (E3) in the 2019 study Residential Building Electrification in California (Energy & Environmental Economics, 2019). Escalation of natural gas rates between 2019 and 2022 is based on the currently filed GRCs for PG&E, SoCalGas, and SDG&E. Consistent with the E3 study, gas rates are assumed to escalate at four percent per year above inflation from 2023 through 2025, which reflects historical rate increases between 2013 and 2018. Escalation of electricity rates from 2019 through 2025 is assumed to be two percent per year above inflation, based on electric utility estimates. After 2025 escalation rates for both natural gas and electric rates are assumed to drop to a more conservative one percent escalation per year above inflation for long-term rate trajectories beginning in 2026 through 2050. See Appendix B – Utility Rate Schedules for additional details.

2.5.2 TDV LCC

Cost effectiveness was also assessed using the Energy Commission's TDV LCC methodology. TDV is a normalized monetary format developed and used by the Energy Commission for comparing electricity and natural gas savings, and it considers the cost of electricity and natural gas consumed during different times of the day and year. Two versions of TDV were evaluated in this study: the 2019 TDV values used under current 2019 Title 24 for compliance and the 2022 TDV values recently developed and approved by the Energy Commission for the upcoming 2022 Title 24 cycle which will become effective January 1, 2023.

The Energy Commission adopted the TDV methodology to more accurately reflect the variations in the value of energy used (or saved) based on the mix of generation resources and demand on the grid at any given time, as well as impacts on retail energy costs. The 2022 TDV values reflect changes in the generation mix as well as the shift in the peak demand time from mid-afternoon toward early evenings.

The TDV values are based on long term discounted costs of 30 years for all residential measures. The CBECC-Com simulation software results are expressed in terms of TDV kBtu. The present value of the energy cost savings in dollars is calculated by multiplying the TDV kBtu savings by a NPV factor, also developed by the Energy Commission. The 30-year NPV factor is $0.154/TDV kBtu for nonresidential projects under both the 2019 and 2022 Title 24.

Like the customer B/C ratio, a TDV B/C ratio value of one indicates the savings over the life of the measure are equivalent to the incremental cost of that measure. A value greater than one represents a positive return on investment. The ratio is calculated according to Equation 3.

Equation 3

$$TDV\ Benefit - to - Cost\ Ratio = \frac{TDV\ energy\ savings\ *\ NPV\ factor}{PV\ of\ lifetime\ incremental\ cost}$$

2.5.2.1 2019 and 2022 TDV Differences

There were key changes to the 2022 TDV methodology as compared to the 2019 TDV. Major updates include the following and are further described in the final 2022 TDV methodology report (Energy & Environmental Economics, 2020).

- Updated weather files to reflect historical data from recent years.
- New load profiles representing building and transportation electrification and renewable generation.
- Addition of internalized cost streams to account for carbon emissions.
- Shaped retail rate adjustment partially scaled to hourly marginal cost of service.
- Addition of non-combustion emissions from methane and refrigerant leakage.

The impact of these key changes for electricity TDV are lower values during the mid-day that correspond with an abundance of solar production and a shift of the peak TDV to later in the day as a result of increasing levels of rooftop PV systems. However, the overall magnitude of the electricity 2022 TDV does not increase significantly relative to 2019 TDV. For natural gas TDV there is a large increase in magnitude with the 2022 TDV roughly 40 percent higher than in 2019. This is driven by the new retail rate forecast, increased fixed costs for maintaining the distribution system, and the new carbon cost component.

The updated 2022 weather files represent an updated dataset based on historical weather sampled from recent years (1998-2017) to reflect the impacts of climate change. Cooling loads increase significantly, particularly for the mild climate zones where cooling energy use was previously low. Heating loads decrease on average 30 percent across all climate zones. The weather files used for the 2019 code cycle had not been updated since the 2013 code cycle and represented data only up until 2009. The Energy Commission and the Statewide Reach Codes Team contend that the updated 2022 weather files better reflect changing climate conditions in California. Therefore, the 2022 files are used for all the analysis reported in this study.

2.6 GHG Emissions Reductions

Equivalent CO_2 emission reductions were calculated based on estimates from Zero Code reports available in CBECC-Com simulation software.[3] Electricity emissions vary by region and by hour of the year, accounting for time dependent energy use and carbon emissions based on source emissions, including renewable portfolio standard projections. Hourly profiles reflect Climate Zones 1 through 5 and 11 through 13 as a single region and Climate Zones 6 through 10 and 14 through 16 as another. For natural gas, a fixed factor of 11.7 pounds (lb) per therm is used. To compare the mixed-fuel and all-electric cases side-by-side, GHG emissions are presented as CO_2-equivalent (CO_2e) emissions per dwelling unit.

[3] More information at: https://zero-code.org/wp-content/uploads/2018/11/ZERO-Code-TSD-California.pdf

3 Results

The primary objective of this evaluation is to identify cost-effective, non-preempted performance targets for high-rise multifamily buildings, under both mixed-fuel and all-electric cases, to support the design of local ordinances requiring new high-rise residential buildings to exceed the minimum state requirements. The packages presented are representative examples of designs and measures that can be used to meet the requirements. In practice, a builder can use any combination of non-preempted or preempted compliant measures to meet the requirements.

This analysis evaluated a package of efficiency measures applied to a mixed-fuel design and a similar package for an all-electric design. Each design was evaluated using the predominant utility rates in all climate zones. PV was also added to the efficiency packages.

The following measures are included in at least one package:

- Lower SHGC fenestration
- Wall insulation
- Low pressure-drop HVAC distribution system
- HERS verified pipe insulation

The following measures were evaluated but were found to not be cost-effective in any of the climate zones and were not included in any of the packages:

- Solar thermal system with higher solar fraction than prescriptive requirements
- ERV/HRV System
- Lower U-factor fenestration

Table 7 describes the efficiency measures included in the mixed-fuel and all-electric packages.

Table 7: Measure Package Summary

	MEASURE SPECIFICATION			
Climate Zone	**Window SHGC**	**Add Exterior Wall Insulation (inch)**	**Fan Watt Draw (W/cfm)**	**HERS Pipe Insulation**
1		+ 1	0.25	No
2	0.22		0.25	No
3	0.22	+ 1 (all-electric only)	0.25	Yes (all-electric only)
4	0.22		0.25	No
5	0.22	+ 1 (all-electric only)	0.25	Yes (all-electric only)
6	0.22		0.25	No
7	0.22		0.25	No
8	0.22		0.25	No
9	0.22		0.25	No
10	0.22		0.25	No
11	0.22	+ 1	0.25	No
12	0.22	+ 1	0.25	No
13	0.22	+ 1	0.25	No
14	0.22	+ 1	0.25	No
15	0.22	+ 1	0.25	No
16	0.22	+ 1	0.25	No

Table 8 presents results for the mixed-fuel packages and Table 9 through Table 11 present results for the all-electric packages. Both mixed-fuel and all-electric results are relative to the mixed-fuel 2019 Title 24 prescriptive baseline model with in-unit heat pumps for heating and cooling and central gas water heating. B/C ratios for all packages are calculated according to the On-Bill, 2019 TDV, and 2022 TDV methodologies. The all-electric results are presented both without PV and with a PV system sized based on 0.1 and 0.2 kW_{DC} per dwelling unit. The mixed-fuel package was also evaluated with 0.1 kW_{DC} per dwelling unit and results are presented in Appendix D – Detailed Results - Mixed Fuel. Appendix E – Detailed Results - All-Electric provides detailed results for the all-electric packages.

Compliance margins for the mixed-fuel efficiency packages range from six to eight percent (except in Climate Zone 1), which meets the Title 24, Part 11 (CALGreen) Tier 1 energy performance requirement for high-rise residential buildings (minimum five percent compliance margin). The packages are cost-effective based on all metrics in Climate Zones 2 through 16.

The all-electric efficiency packages with central recirculating HPWH equipment meet minimum Title 24 requirements in all climate zones except 1 and 16, with compliance margins ranging from 0.1 to 4.7 percent. The all-electric packages result in natural gas savings and an increase in electricity use. The central recirculating case is not cost-effective On-Bill with higher lifecycle utility costs except in SMUD territory but is cost-effective based on 2022 TDV in all climates.

The clustered HPWH case only meets minimum Title 24 requirements in Climate Zones 4, 6 through 9, and 15. Even though the clustered HPWH is cost-effective in almost all climate zones, it is not code compliant in many and may not be used to support a local reach code in those zones. The package is cost-effective On-Bill everywhere except Climate Zones 1, 3, 5, and 16. The clustered approach has lower installed costs compared to the mixed fuel baseline but results in higher utility costs in all Climate Zones except 8, 9, 15, 4 (in CPAU territory), and 12 (in SMUD territory). The clustered HPWH case is cost-effective based on TDV in all climates.

The all-electric packages become cost-effective On-Bill when either 0.1 or 0.2 kW_{DC} of PV per dwelling unit is installed, except with the central HPWH with recirculation design in Climate Zone 1. The all-electric packages in Climate Zones 1 and 16 are not code compliant with PV and may not be used to support a local reach code in those climate zones.

Table 8: Mixed-Fuel Package Results: Efficiency Only (Savings/Cost Per Dwelling Unit)[a]

Climate Zone	Elec Utility	Gas Utility	Comp. Margin	Total Gas Savings (therm)	Total Electric Savings (kWh)	Utility Cost Savings (2020 PV$)	Incremental Cost (2020 PV$)	On-Bill		2019 TDV		2022 TDV	
								B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV
1	PGE	PGE	4.5%	0	39	$199	$216	0.9	($17)	0.6	($83)	0.8	($42)
2	PGE	PGE	6.5%	0	79	$570	$144	4.0	$426	3.0	$289	2.7	$247
3	PGE	PGE	6.7%	0	60	$420	$144	2.9	$276	2.3	$184	1.9	$131
4	PGE	PGE	7.2%	0	95	$678	$144	4.7	$534	3.2	$321	3.2	$313
4	CPAU	CPAU	7.2%	0	95	$394	$144	2.7	$250	3.2	$321	3.2	$313
5	PGE	PGE	6.8%	0	71	$484	$144	3.4	$340	2.3	$180	1.9	$122
5	PGE	SCG	6.8%	0	71	$484	$144	3.4	$340	2.3	$180	1.9	$122
6	SCE	SCG	7.8%	0	113	$619	$144	4.3	$475	3.4	$344	3.2	$315
7	SDGE	SDGE	8.1%	0	105	$789	$144	5.5	$645	3.4	$339	2.8	$264
8	SCE	SCG	7.8%	0	128	$728	$144	5.1	$585	3.9	$413	3.9	$421
9	SCE	SCG	7.6%	0	125	$695	$144	4.8	$551	4.2	$461	3.9	$413
10	SCE	SCG	7.5%	0	130	$623	$144	4.3	$479	4.2	$457	3.9	$415
10	SDGE	SDGE	7.5%	0	130	$972	$144	6.8	$828	4.2	$457	3.9	$415
11	PGE	PGE	7.7%	0	148	$897	$216	4.1	$681	3.7	$584	3.4	$523
12	PGE	PGE	7.5%	0	122	$736	$216	3.4	$519	3.1	$448	2.8	$397
12	SMUD	PGE	7.5%	0	122	$401	$216	1.9	$185	3.1	$448	2.8	$397
13	PGE	PGE	7.4%	0	152	$923	$216	4.3	$706	3.4	$523	3.5	$534
14	SCE	SCG	7.9%	0	152	$735	$216	3.4	$518	3.6	$556	3.5	$532
14	SDGE	SDGE	7.9%	0	152	$1,055	$216	4.9	$838	3.6	$556	3.5	$532
15	SCE	SCG	7.8%	0	213	$1,021	$216	4.7	$804	4.5	$768	4.4	$725
16	PGE	PGE	6.0%	0	115	$679	$216	3.1	$463	2.3	$279	2.1	$244

[a] Values in red indicate B/C ratios less than 1 or negative values.

Table 9: All-Electric Package Results: Central Recirculating vs Clustered HPWH Approach with Efficiency (Savings/Cost Per Dwelling Unit)[a, b]

				Central Recirculating						Clustered					
							B/C Ratio						B/C Ratio		
Climate Zone	Elec Utility	Gas Utility	Total Gas Savings (therm)	Comp Margin	Total Electric Savings (kWh)	Incremental Cost (2020 PV$)	On-Bill	2019 TDV	2022 TDV	Comp Margin	Total Electric Savings (kWh)	Incremental Cost (2020 PV$)	On-Bill	2019 TDV	2022 TDV
1	PGE	PGE	96	-4.6%	(671)	$775	0.0	0.0	2.1	-6.2%	(770)	($643)	0.6	1.9	>1
2	PGE	PGE	87	1.0%	(557)	$702	0.0	0.5	2.5	-0.8%	(648)	($715)	1.3	>1	>1
3	PGE	PGE	87	0.1%	(549)	$888	0.0	0.3	1.9	-1.9%	(642)	($529)	0.9	>1	>1
4	PGE	PGE	81	4.1%	(495)	$702	0.2	0.5	2.5	2.4%	(578)	($715)	2.3	>1	>1
4	CPAU	CPAU	81	4.1%	(495)	$702	0.6	0.5	2.5	2.4%	(578)	($715)	>1	>1	>1
5	PGE	PGE	87	0.2%	(536)	$888	0.0	0.3	1.7	-1.1%	(630)	($529)	1.0	>1	>1
5	PGE	SCG	87	0.2%	(536)	$888	0.0	0.3	1.7	-1.1%	(630)	($529)	0.6	>1	>1
6	SCE	SCG	78	3.4%	(447)	$702	0.6	0.7	2.4	0.6%	(532)	($715)	10.7	>1	>1
7	SDGE	SDGE	78	3.5%	(452)	$702	0.2	0.7	2.2	1.1%	(537)	($715)	1.8	>1	>1
8	SCE	SCG	76	4.6%	(416)	$702	0.7	0.9	2.7	1.4%	(492)	($715)	>1	>1	>1
9	SCE	SCG	76	4.2%	(428)	$702	0.7	0.9	2.7	1.9%	(503)	($715)	>1	>1	>1
10	SCE	SCG	63	1.5%	(422)	$484	0.0	0.4	2.5	-0.8%	(494)	($933)	2.2	>1	>1
10	SDGE	SDGE	63	1.5%	(422)	$484	0.0	0.4	2.5	-0.8%	(494)	($933)	1.5	>1	>1
11	PGE	PGE	65	2.0%	(434)	$557	0.0	0.7	2.4	-1.2%	(495)	($861)	2.0	>1	>1
12	PGE	PGE	68	1.4%	(474)	$557	0.0	0.5	2.2	-1.9%	(550)	($861)	1.2	10.9	>1
12	SMUD	PGE	68	1.4%	(474)	$557	1.5	0.5	2.2	-1.9%	(550)	($861)	>1	10.9	>1
13	PGE	PGE	63	1.7%	(411)	$557	0.0	0.6	2.4	-1.9%	(467)	($861)	2.4	7.1	>1
14	SCE	SCG	65	2.3%	(433)	$557	0.1	0.8	2.6	-0.7%	(498)	($861)	2.4	>1	>1
14	SDGE	SDGE	65	2.3%	(433)	$557	0.0	0.8	2.6	-0.7%	(498)	($861)	1.4	>1	>1
15	SCE	SCG	51	4.7%	(252)	$557	0.9	1.4	2.7	2.1%	(279)	($861)	>1	>1	>1
16	PGE	PGE	78	-7.5%	(622)	$557	0.0	0.0	1.3	-7.1%	(698)	($861)	0.7	1.3	>1

[a] Values in red indicate B/C ratios less than 1 or negative values. Values In grey indicate cases which are cost-effective but are not code compliant and cannot be used to support a reach code.

[b] ">1" indicates cases where there are both incremental measure cost savings and energy cost savings.

Table 10: All-Electric Central Recirculating HPWH Results: With and Without PV (Savings/Cost Per Dwelling Unit)[a, b]

			Comp Margin		No PV			0.1 kW_{DC}/dwelling unit			0.2 kW_{DC}/dwelling unit		
Climate Zone	Elec Utility	Gas Utility	No PV	With PV[b]	Total Electric Savings (kWh)	Incremental Cost (2020 PV$)	On-Bill B/C Ratio	Total Electric Savings (kWh)	Incremental Cost (2020 PV$)	On-Bill B/C Ratio	Total Electric Savings (kWh)	Incremental Cost (2020 PV$)	On-Bill B/C Ratio
1	PGE	PGE	-4.6%	-2.5%	(671)	$775	0.0	(538)	$1,091	0.2	(406)	$1,408	0.72
2	PGE	PGE	1.0%	3.0%	(557)	$702	0.0	(400)	$1,018	1.0	(242)	$1,335	1.54
3	PGE	PGE	0.1%	3.0%	(549)	$888	0.0	(386)	$1,205	0.8	(224)	$1,521	1.36
4	PGE	PGE	4.1%	6.1%	(495)	$702	0.2	(329)	$1,018	1.2	(163)	$1,335	1.75
4	CPAU	CPAU	4.1%	6.1%	(495)	$702	0.6	(329)	$1,018	1.1	(163)	$1,335	1.25
5	PGE	PGE	0.2%	2.3%	(536)	$888	0.0	(362)	$1,205	0.9	(188)	$1,521	1.48
5	PGE	SCG	0.2%	2.3%	(536)	$888	0.0	(362)	$1,205	0.7	(188)	$1,521	1.25
6	SCE	SCG	3.4%	5.7%	(447)	$702	0.6	(270)	$1,018	1.2	(94)	$1,335	1.60
7	SDGE	SDGE	3.5%	5.6%	(452)	$702	0.2	(288)	$1,018	1.3	(123)	$1,335	1.80
8	SCE	SCG	4.6%	6.6%	(416)	$702	0.7	(246)	$1,018	1.3	(75)	$1,335	1.64
9	SCE	SCG	4.2%	5.8%	(428)	$702	0.7	(250)	$1,018	1.2	(72)	$1,335	1.52
10	SCE	SCG	1.5%	5.7%	(422)	$484	0.0	(244)	$801	1.0	(67)	$1,117	1.36
10	SDGE	SDGE	1.5%	5.7%	(422)	$484	0.0	(244)	$801	1.3	(67)	$1,117	1.96
11	PGE	PGE	2.0%	6.7%	(434)	$557	0.0	(275)	$873	1.0	(116)	$1,190	1.46
12	PGE	PGE	1.4%	6.3%	(474)	$557	0.0	(311)	$873	0.8	(147)	$1,190	1.36
12	SMUD	PGE	1.4%	6.3%	(474)	$557	1.5	(311)	$873	1.5	(147)	$1,190	1.51
13	PGE	PGE	1.7%	6.8%	(411)	$557	0.0	(245)	$873	1.1	(80)	$1,190	1.56
14	SCE	SCG	2.3%	6.5%	(433)	$557	0.1	(242)	$873	1.0	(51)	$1,190	1.40
14	SDGE	SDGE	2.3%	6.5%	(433)	$557	0.0	(242)	$873	1.2	(51)	$1,190	1.90
15	SCE	SCG	4.7%	7.7%	(252)	$557	0.9	(75)	$873	1.4	102	$1,190	1.66
16	PGE	PGE	-7.5%	-3.2%	(622)	$557	0.0	(453)	$873	0.3	(283)	$1,190	1.03

[a] Values in red indicate B/C ratios less than 1 or negative values.

[b] 0.1 kW_{DC}/dwelling unit sufficient in all climate zones to achieve reported compliance margins except in Climate Zones 11-13 0.2 kW_{DC}/dwelling unit is necessary.

Table 11: All-Electric Clustered HPWH Results: With and Without PV (Savings/Cost Per Dwelling Unit)[a, b]

			Comp Margin		No PV			0.1 kW_{DC}/dwelling unit			0.2 kW_{DC}/dwelling unit		
Climate Zone	Elec Utility	Gas Utility	No PV	With PV[c]	Total Electric Savings (kWh)	Incremental Cost (2020 PV$)	On-Bill B/C Ratio	Total Electric Savings (kWh)	Incremental Cost (2020 PV$)	On-Bill B/C Ratio	Total Electric Savings (kWh)	Incremental Cost (2020 PV$)	On-Bill B/C Ratio
1	PGE	PGE	-6.2%	-4.1%	(770)	($643)	0.6	(637)	($326)	0.96	(504)	($10)	>1
2	PGE	PGE	-0.8%	1.2%	(648)	($715)	1.3	(490)	($399)	>1	(333)	($82)	>1
3	PGE	PGE	-1.9%	0.9%	(642)	($529)	0.9	(479)	($213)	>1	(317)	$104	14.67
4	PGE	PGE	2.4%	4.3%	(578)	($715)	2.3	(412)	($399)	>1	(246)	($82)	>1
4	CPAU	CPAU	2.4%	4.3%	(578)	($715)	>1	(412)	($399)	>1	(246)	($82)	>1
5	PGE	PGE	-1.1%	0.9%	(630)	($529)	1.0	(457)	($213)	>1	(283)	$104	16.38
5	PGE	SCG	-1.1%	0.9%	(630)	($529)	0.6	(457)	($213)	>1	(283)	$104	12.97
6	SCE	SCG	0.6%	2.9%	(532)	($715)	10.7	(355)	($399)	>1	(179)	($82)	>1
7	SDGE	SDGE	1.1%	3.1%	(537)	($715)	1.8	(372)	($399)	>1	(207)	($82)	>1
8	SCE	SCG	1.4%	3.5%	(492)	($715)	>1	(322)	($399)	>1	(151)	($82)	>1
9	SCE	SCG	1.9%	3.4%	(503)	($715)	>1	(325)	($399)	>1	(148)	($82)	>1
10	SCE	SCG	-0.8%	3.5%	(494)	($933)	2.2	(316)	($617)	>1	(139)	($300)	>1
10	SDGE	SDGE	-0.8%	3.5%	(494)	($933)	1.5	(316)	($617)	>1	(139)	($300)	>1
11	PGE	PGE	-1.2%	3.5%	(495)	($861)	2.0	(336)	($544)	>1	(177)	($228)	>1
12	PGE	PGE	-1.9%	3.0%	(550)	($861)	1.2	(387)	($544)	>1	(223)	($228)	>1
12	SMUD	PGE	-1.9%	3.0%	(550)	($861)	>1	(387)	($544)	>1	(223)	($228)	>1
13	PGE	PGE	-1.9%	3.3%	(467)	($861)	2.4	(301)	($544)	>1	(136)	($228)	>1
14	SCE	SCG	-0.7%	3.5%	(498)	($861)	2.4	(308)	($544)	>1	(117)	($228)	>1
14	SDGE	SDGE	-0.7%	3.5%	(498)	($861)	1.4	(308)	($544)	>1	(117)	($228)	>1
15	SCE	SCG	2.1%	5.1%	(279)	($861)	>1	(102)	($544)	>1	75	($228)	>1
16	PGE	PGE	-7.1%	-2.9%	(698)	($861)	0.7	(529)	($544)	2.70	(359)	($228)	>1

[a] Values in red indicate B/C ratios less than 1 or negative values. Values In grey indicate cases which are cost-effective but are not code compliant and cannot be used to support a reach code.

[b] ">1" indicates cases where there are both incremental measure cost savings and energy cost savings.

[c] 0.1 kW_{DC}/dwelling unit sufficient in all climate zones to achieve reported compliance margins except in Climate Zones 11-13 0.2 kW_{DC}/dwelling unit is necessary.

4 Conclusions and Summary

This report evaluated the feasibility and cost effectiveness of “above code” performance specifications for newly constructed high-rise multifamily buildings. The analysis included application of efficiency measures, electric appliances, and PV in all climate zones and found cost-effective packages across the state. For the building designs and climate zones where cost-effective packages were identified, the results of this analysis can be used by local jurisdictions to support the adoption of reach codes. Cost effectiveness was evaluated according to three metrics: On-Bill customer, 2019 TDV, and 2022 TDV LCC B/C ratio.

For mixed-fuel buildings, this analysis demonstrates that there are cost-effective efficiency packages based on at least one of the evaluated cost-effectiveness metrics that achieve a minimum five percent compliance margin in most climate zones. The exception is Climate Zone 1 where the package only resulted in a 4.5 percent compliance margin. Although the Climate Zone 1 package is not cost-effective based on either the 2019 TDV or the On-Bill methodologies, it is cost-effective based on 2022 TDV.

This study evaluated electrification of residential loads in new high-rise multifamily buildings. Based on typical construction across California, the base case condition incorporated all-electric appliances within the dwelling unit spaces. As a result, only central water heating was converted from natural gas to electric as part of this analysis. For all-electric buildings, this analysis demonstrates that there are cost-effective efficiency packages with a HPWH that are Title 24 compliant in all climate zones except Climate Zones 1 and 16.

The case with the central recirculating HPWH is cost-effective based on the 2022 TDV methodology in all climate zones. Additionally, in Climate Zone 15 it is cost-effective based on 2019 TDV and in Climate Zone 12 in SMUD territory it is cost-effective On-Bill. Utility cost savings were found in Climate Zones 2, 4, 5 (in PG&E territory), 6-9, 10 (in SCE territory), 12 (in SMUD territory), 14 (in SCE territory), and 15. This case (Table 9) demonstrates how the analysis results differ under the 2019 and 2022 TDV metrics. The B/C ratios are typically two to five times greater under 2022 than 2019 because of the higher relative gas versus electric TDV multipliers in 2022.When 0.1 to 0.2 kW_{DC} per dwelling unit is included, the package is cost-effective based on On-Bill in all climate zones except Climate Zone 1.

The central recirculating HPWH case is based on the Energy Commission’s approved prescriptive design and applies Sanden HPWHs, which are higher cost than other available products. As HPWHs gain market share, installed costs are anticipated to decrease as the labor force becomes more familiar with the technology, performance improvements are achieved, and available product options increase. It is also anticipated that modeling of central HPWHs will improve as results from field and lab testing inform the modeling algorithms. This will allow for more accurate modeling of system performance and modeling of other design strategies such as multi-pass HPWH systems.

The clustered HPWH case is cost-effective without PV On-Bill everywhere except Climate Zones 1, 3, 5 (in SoCalGas territory), and 16, although the package is not code compliant in numerous climate zones. It was found to have a much lower installed cost than the recirculating HPWH case but higher operating cost because federal minimum efficiency was assumed (2.0 UEF). When 0.1 to 0.2 kW_{DC} per dwelling unit is included, the package is cost-effective On-Bill in all climate zones, although still not code compliant in Climate Zone 1 or 16.

Table 12 summarizes compliance margin and cost-effectiveness results for the mixed-fuel and all-electric cases. Compliance margin is reported in the cells and cost effectiveness is indicated by the color of the cell according to the following:

- Cells highlighted in green depict cost-effective results using the On-Bill approach. In most cases results are also cost-effective based on TDV.
- Cells highlighted in blue depict cost-effective results using both the 2019 and 2022 TDV approach, but not On-Bill.
- Cells highlighted in yellow depict cost-effective results using the 2022 TDV approach only.
- Cells highlighted in red depict a package that was not cost-effective using any metric.
- Red text depicts a negative compliance margin.

For more detail on the results, please refer to Appendix D – Detailed Results - Mixed Fuel and Appendix E – Detailed Results - All-Electric.

Table 12: High-Rise Multifamily Summary of Compliance Margin and Cost Effectiveness

Climate Zone	Elec Utility	Gas Utility	Mixed Fuel (No PV)	Central Recirculating HPWH			Clustered HPWH		
				No PV	0.1 kW_{DC}/apt	0.2 kW_{DC}/apt	No PV	0.1 kW_{DC}/apt	0.2 kW_{DC}/apt
1	PGE	PGE	4.5%	-4.6%	-2.5%	-2.5%	-6.2%	-4.1%	-4.1%
2	PGE	PGE	6.5%	1.0%	3.0%	3.0%	-0.8%	1.2%	1.2%
3	PGE	PGE	6.7%	0.1%	3.0%	3.0%	-1.9%	0.9%	0.9%
4	PGE	PGE	7.2%	4.1%	6.1%	6.1%	2.4%	4.3%	4.3%
4	CPAU	CPAU	7.2%	4.1%	6.1%	6.1%	2.4%	4.3%	4.3%
5	PGE	PGE	6.8%	0.2%	2.3%	2.3%	-1.1%	0.9%	0.9%
5	PGE	SCG	6.8%	0.2%	2.3%	2.3%	-1.1%	0.9%	0.9%
6	SCE	SCG	7.8%	3.4%	5.7%	5.7%	0.6%	2.9%	2.9%
7	SDGE	SDGE	8.1%	3.5%	5.6%	5.6%	1.1%	3.1%	3.1%
8	SCE	SCG	7.8%	4.6%	6.6%	6.6%	1.4%	3.5%	3.5%
9	SCE	SCG	7.6%	4.2%	5.8%	5.8%	1.9%	3.4%	3.4%
10	SCE	SCG	7.5%	1.5%	5.7%	5.7%	-0.8%	3.5%	3.5%
10	SDGE	SDGE	7.5%	1.5%	5.7%	5.7%	-0.8%	3.5%	3.5%
11	PGE	PGE	7.7%	2.0%	2.0%	6.7%	-1.2%	-1.2%	3.5%
12	PGE	PGE	7.5%	1.4%	1.4%	6.3%	-1.9%	-1.9%	3.0%
12	SMUD	PGE	7.5%	1.4%	1.4%	6.3%	-1.9%	-1.9%	3.0%
13	PGE	PGE	7.4%	1.7%	1.7%	6.8%	-1.9%	-1.9%	3.3%
14	SCE	SCG	7.9%	2.3%	6.5%	6.5%	-0.7%	3.5%	3.5%
14	SDGE	SDGE	7.9%	2.3%	6.5%	6.5%	-0.7%	3.5%	3.5%
15	SCE	SCG	7.8%	4.7%	7.7%	7.7%	2.1%	5.1%	5.1%
16	PGE	PGE	6.0%	-7.5%	-7.5%	-3.2%	-7.1%	-7.1%	-2.9%

4.1 Additional conclusions

- This study found that electrification of central domestic hot water loads, in combination with efficiency measures, can result in an overall benefit to the consumer through lower utility bills, depending on the HPWH strategy and electricity and gas tariff. The all-electric results demonstrate a trend with On-Bill cost effectiveness across the different electric utilities. B/C ratios and NPV in SCE, SMUD, and CPAU territories are typically higher than the cases in PG&E and SDG&E territories. This indicates that rate design can play an important role in encouraging or discouraging electrification. Refer to Appendix D – Detailed Results - Mixed Fuel and Appendix E – Detailed Results - All-Electric for utility cost data.
- Two electric water heating scenarios were evaluated. The most appropriate HPWH design approach for any particular building will depend on many aspects including number and size of dwelling units, building layout, and first costs.
- In multifamily buildings with central water heating where multiple people or entities are responsible for the utility bills, utility impacts may not align. If tenants pay dwelling unit utility bills and the owner pays the water heating bill, the benefits of efficiency measures or PV serving the dwelling unit will benefit the tenant and savings would not directly impact any water heating electrification cost increases.
- This study did not evaluate federally preempted high efficiency appliances. Specifying high efficiency equipment is a viable approach to meeting Title 24 compliance and local ordinance requirements and is commonly used by project teams. Other studies have found that efficiency packages and electrification packages that employ high efficiency equipment can be quite cost-effective ((Statewide Reach Codes Team, 2019b), (Energy & Environmental Economics, 2019)).
- When PV capacity is added to the all-electric packages, all cases are cost-effective based on the On-Bill metric (except Climate Zone 1 with the central recirculating HPWH). In some cases, PV improves cost effectiveness, and in other cases it reduces it. The cost effectiveness of adding PV as an independent measure results in On-Bill B/C ratios between 2.4 and 3.5 for PG&E territory, 2.4 to 2.7 for SCE territory, and 3.5 to 3.8 for SDG&E territory. The B/C ratio is 1.9 and 1.5 in CPAU and SMUD territories, respectively. Adding PV in addition to the efficiency packages improves cost effectiveness where the B/C ratios for the efficiency measures alone are lower than the B/C ratios for PV alone, and vice versa where they are higher. Annual base case electricity costs and annual utility savings from PV are lower in SCE territory than in PG&E and SDG&E territories. This is due to lower off-peak rates and a bigger difference in peak versus off-peak rates for the TOU-D SCE electricity rate tariff. Most PV production occurs during off-peak times (4 pm to 9 pm peak period).

5 References

Barbose, Galen and Darghouth, Naim. 2018. Tracking the Sun. Installed Price Trends for Distributed Photovoltaic Systems in the United States – 2018 Edition. Lawrence Berkeley National Laboratory. September 2018. https://emp.lbl.gov/sites/default/files/tracking_the_sun_2018_edition_final_0.pdf

California Energy Commission. 2017. Rooftop Solar PV System. Measure number: 2019-Res-PV-D Prepared by Energy and Environmental Economics, Inc. https://efiling.energy.ca.gov/getdocument.aspx?tn=221366

California Energy Commission. 2018a. 2019 Building Energy Efficiency Standards for Residential and Nonresidential Buildings. CEC-400-2018-020-CMF. December 2018. California Energy Commission. https://www.energy.ca.gov/2018publications/CEC-400-2018-020/CEC-400-2018-020-CMF.pdf

California Energy Commission. 2018b. 2019 Reference Appendices. CEC-400-2018-021-CMF. December 2018. California Energy Commission. https://www.energy.ca.gov/2018publications/CEC-400-2018-021/CEC-400-2018-021-CMF.pdf

California Energy Commission. 2019a. 2019 Nonresidential Alternative Calculation Method Reference Manual. CEC-400-2019-006-CMF. May 2019. California Energy Commission. https://ww2.energy.ca.gov/2019publications/CEC-400-2019-006/CEC-400-2019-006-CMF.pdf

California Energy Commission. 2019b. Executive Director Determination Pursuant to Section 150.1(c)8C for Central Heat Pump Water Heating System. December 26, 2019. https://efiling.energy.ca.gov/GetDocument.aspx?tn=231318&DocumentContentId=63067

Energy & Environmental Economics. 2019. Residential Building Electrification in California. April 2019. https://www.ethree.com/wp-content/uploads/2019/04/E3_Residential_Building_Electrification_in_California_April_2019.pdf

Energy & Environmental Economics. 2020. Time Dependent valuation of Energy for Developing Building Efficiency Standards. 2022 Time Dependent Valuation (TDV) and Source Energy Metric Data Sources and Inputs. Prepared for the California Energy Commission. May 2020. https://efiling.energy.ca.gov/GetDocument.aspx?tn=233345&DocumentContentId=65837

Horii, B., E. Cutter, N. Kapur, J. Arent, and D. Conotyannis. 2014. "Time Dependent Valuation of Energy for Developing Building Energy Efficiency Standards." http://www.energy.ca.gov/title24/2016standards/prerulemaking/documents/2014-07-09_workshop/2017_TDV_Documents/

Statewide CASE Team. 2014. Codes and Standards Enhancement (CASE) Initiative Nonresidential Opaque Envelope. December 2014. https://title24stakeholders.com/wp-content/uploads/2019/02/2016-T24-CASE-Report-NR-Opaque-Envelope-Dec2014-V3.pdf

Statewide CASE Team. 2017a. Codes and Standards Enhancement (CASE) Initiative High Performance Walls – Final Report. September 2017. http://title24stakeholders.com/wp-content/uploads/2017/09/2019-T24-CASE-Report_HPW_Final_September-2017.pdf

Statewide CASE Team. 2017b. Codes and Standards Enhancement (CASE) Initiative Residential High Performance Windows & Doors – Final Report. August 2017. http://title24stakeholders.com/wp-content/uploads/2017/09/2019-T24-CASE-Report_Res-Windows-and-Doors_Final_September-2017.pdf

Statewide CASE Team. 2018. Energy Savings Potential and Cost-Effectiveness Analysis of High Efficiency Windows in California. Prepared by Frontier Energy. May 2018. https://www.etcc-ca.com/reports/energy-savings-potential-and-cost-effectiveness-analysis-high-efficiency-windows-california

Statewide CASE Team. 2020a. All-Electric Multifamily Compliance Pathway Final CASE Report (Updated). Prepared by TRC. November 2020. https://title24stakeholders.com/wp-content/uploads/2020/11/2022-T24-Final-CASE-Report_MF-All-Electric_updated.pdf

Statewide CASE Team. 2020b. Multifamily Indoor Air Quality Draft CASE Report. Prepared by TRC. https://title24stakeholders.com/wp-content/uploads/2018/10/MF-IAQ_Draft-CASE-Report_Statewide-CASE-Team.pdf

Statewide Reach Codes Team. 2019a. 2019 Nonresidential New Construction Reach Code Cost-Effectiveness Study. Prepared for Southern California Edison. Prepared by TRC. July 25, 2019. https://localenergycodes.com/download/801/file_path/fieldList/2019%20NR%20NC%20Cost%20Effectiveness%20Study-2019-07-25.pdf

Statewide Reach Codes Team. 2019b. 2019 Cost-Effectiveness Study: Low-Rise Residential New Construction. Prepared for Pacific Gas and Electric Company. Prepared by Frontier Energy. August 1, 2019. https://localenergycodes.com/download/800/file_path/fieldList/2019%20Res%20NC%20Reach%20Codes

Statewide Reach Codes Team. 2020. 2019 Mid-Rise New Construction Reach Code Cost-Effectiveness Study. Prepared for Pacific Gas and Electric Company. Prepared by Frontier Energy. June 22, 2020. https://localenergycodes.com/download/492/file_path/fieldList/2019%20Mid-rise%20NC%20Cost-Eff%20Report

TRC. 2018. City of Palo Alto 2019 Title 24 Energy Reach Code Cost-Effectiveness Analysis Draft. September 2018. https://cityofpaloalto.org/civicax/filebank/documents/66742

TRC. 2019. Multifamily Prototypes. June 7, 2019. Submitted to Southern California Edison. https://title24stakeholders.com/wp-content/uploads/2019/06/SCE-MFModeling_MultifamilyPrototypesReport_2019-06-07_clean.pdf

6 Appendices

6.1 Appendix A – Map of California Climate Zones

Climate zone geographical boundaries are depicted in Figure 3. The map in Figure 3 along with a zip-code search directory is available at: https://ww2.energy.ca.gov/maps/renewable/building_climate_zones.html.

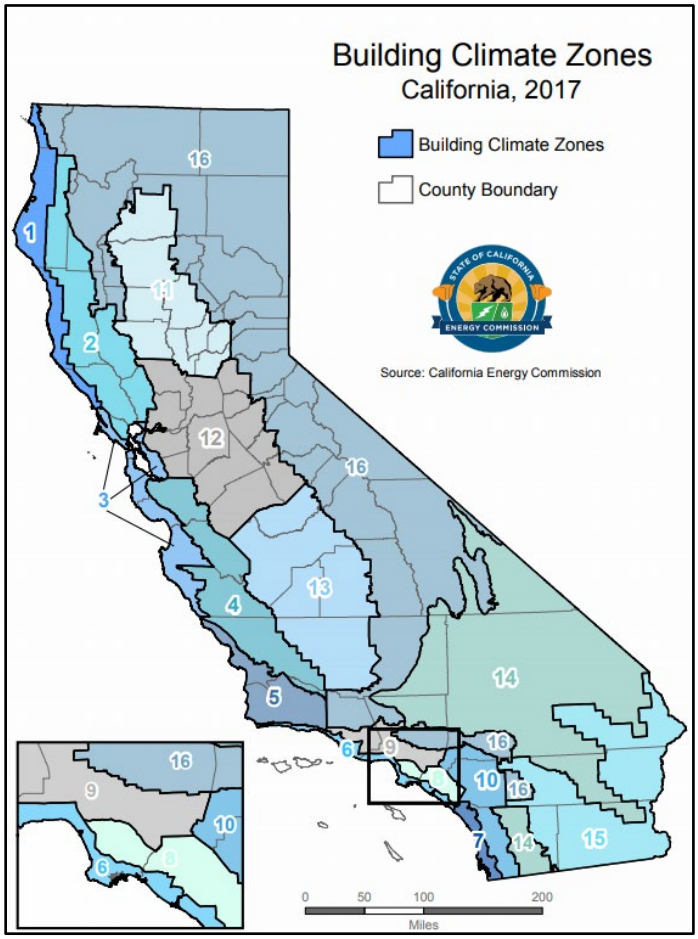

Figure 3: Map of California climate zones.

Source: Energy Commission.

6.2 Appendix B – Utility Rate Schedules

PG&E

The following pages provide details on the PG&E electricity and natural gas tariffs applied in this study. Table 13 describes the baseline territories that were assumed for each climate zone.

Table 13: PG&E Baseline Territory by Climate Zone

Climate Zone	Baseline Territory
1	V
2	X
3	T
4	X
5	T
11	R
12	S
13	R
16	Y

Source: PG&E.

The PG&E monthly gas rate in $/therm was applied on a monthly basis for the 12-month period ending April 2020 according to the rates shown in Table 14. Rates are based on historical data provided by PG&E.[4]

Table 14: PG&E Monthly Gas Rate ($/therm)

Month	Procurement Charge	Transportation Charge		Total Charge	
		Baseline	Excess	Baseline	Excess
Jan 2020	$0.45813	$0.99712	$1.59540	$1.45525	$2.05353
Feb 2020	$0.44791	$0.99712	$1.59540	$1.44503	$2.04331
Mar 2020	$0.35346	$1.13126	$1.64861	$1.48472	$2.00207
Apr 2020	$0.23856	$1.13126	$1.64861	$1.36982	$1.88717
May 2019	$0.21791	$0.99933	$1.59892	$1.21724	$1.81683
June 2019	$0.20648	$0.99933	$1.59892	$1.20581	$1.80540
July 2019	$0.28462	$0.99933	$1.59892	$1.28395	$1.88354
Aug 2019	$0.30094	$0.96652	$1.54643	$1.26746	$1.84737
Sept 2019	$0.25651	$0.96652	$1.54643	$1.22303	$1.80294
Oct 2019	$0.27403	$0.98932	$1.58292	$1.26335	$1.85695
Nov 2019	$0.33311	$0.96729	$1.54767	$1.30040	$1.88078
Dec 2019	$0.40178	$0.96729	$1.54767	$1.36907	$1.94945

Source: PG&E.

[4] The PG&E procurement and transportation charges were obtained from the following site: https://www.pge.com/tariffs/GRF.SHTML#RESGAShttps://www.pge.com/tariffs/GRF.SHTML#RESGAS

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Revised Cal. P.U.C. Sheet No. 35447-G
Cancelling Revised Cal. P.U.C. Sheet No. 34307-G

GAS SCHEDULE GM Sheet 3
MASTER-METERED MULTIFAMILY SERVICE

BASELINE QUANTITIES: The above rates are applicable only to residential use. PG&E may require the Customer to submit a completed "Declaration of Eligibility for Baseline Quantities for Residential Rates." The delivered quantities of gas shown below are billed at the rates for baseline use. As an exception, service under this schedule not used to supply space heating but used to supply water heating from a central source to residential dwelling units that are individually metered by PG&E for either gas or electricity will be billed using a baseline quantity of 0.5 therms per dwelling unit per day (Code W) in all baseline territories and in both seasons.

BASELINE QUANTITIES (Therms Per Day Per Dwelling Unit)

Baseline Territories **	Summer (April-October) Effective Apr. 1, 2020		Winter Off-Peak (Nov,Feb,Mar) Effective Nov. 1, 2019		Winter On-Peak (Dec, Jan) Effective Dec. 1, 2019		(T) | (T)
P	0.29	(R)	0.87	(R)	1.00	(I)	
Q	0.49	(R)	0.64	(R)	0.77	(I)	
R	0.33	(R)	0.84	(R)	1.19	(I)	
S	0.29	(R)	0.54	(R)	0.68	(I)	
T	0.49	(R)	0.94	(R)	1.06	(R)	
V	0.56		1.18	(R)	1.29	(I)	
W	0.23	(R)	0.61	(R)	0.87	(R)	
X	0.33	(R)	0.64	(R)	0.77	(I)	
Y	0.36		0.87	(R)	1.00	(I)	

SEASONAL CHANGES: The summer season is April-October, the winter off-peak season is November, February and March, and the winter on-peak season is December and January. Baseline quantities for bills that include the April 1, November 1 and December 1 seasonal changeover dates will be calculated by multiplying the applicable daily baseline quantity for each season by the number of days in each season for the billing period.

STANDARD MEDICAL QUANTITIES: Additional medical quantities (Code M) are available as provided in Rule 19.

RESIDENTIAL DWELLING UNITS: It is the responsibility of the Customer to advise PG&E within 15 days following any change in the number of residential dwelling units, mobile home spaces, and permanent-residence RV units receiving gas service.

CENTRAL BOILERS: Service to central boilers for water and/or space heating will be billed with monthly baseline quantities related to the number of dwelling units furnished such water and/or space heating.

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Revised Cal. P.U.C. Sheet No. 46539-E
Cancelling Revised Cal. P.U.C. Sheet No. 46325-E

ELECTRIC SCHEDULE E-TOU-C Sheet 2
RESIDENTIAL TIME-OF-USE (PEAK PRICING 4 - 9 p.m. EVERY DAY)

RATES:
(Cont'd.)

E-TOU-C TOTAL RATES

Total Energy Rates ($ per kWh)	PEAK		OFF-PEAK	
Summer				
Total Usage	$0.41333	(I)	$0.34989	(I)
Baseline Credit (Applied to Baseline Usage Only)	($0.08633)	(R)	($0.08633)	(R)
Winter				
Total Usage	$0.31624	(I)	$0.29891	(I)
Baseline Credit (Applied to Baseline Usage Only)	($0.08633)	(R)	($0.08633)	(R)
Delivery Minimum Bill Amount ($ per meter per day)	$0.32854			
California Climate Credit (per household, per semi-annual payment occurring in the April and October bill cycles)[†]	($35.73)			(T)

Total bundled service charges shown on customer's bills are unbundled according to the component rates shown below. Where the delivery minimum bill amount applies, the customer's bill will equal the sum of (1) the delivery minimum bill amount plus (2) for bundled service, the generation rate times the number of kWh used. For revenue accounting purposes, the revenues from the delivery minimum bill amount will be assigned to the Transmission, Transmission Rate Adjustments, Reliability Services, Public Purpose Programs, Nuclear Decommissioning, Competition Transition Charges, Energy Cost Recovery Amount, DWR Bond, and New System Generation Charges based on kWh usage times the corresponding unbundled rate component per kWh, with any residual revenue assigned to Distribution.

[†] Pursuant to D.20-04-027, distribution of the October 2020 California Climate Credit will be advanced (N)
and split to the May 2020 and June 2020 bill cycles, $17.87 and $17.86 respectively.. (N)

(Continued)

Advice	5661-E-B	*Issued by*	*Submitted*	April 28, 2020
Decision		***Robert S. Kenney***	*Effective*	May 1, 2020
		Vice President, Regulatory Affairs	*Resolution*	

Pacific Gas and Electric Company
U 39 San Francisco, California

	Revised	Cal. P.U.C. Sheet No.	46540-E
Cancelling	Revised	Cal. P.U.C. Sheet No.	46252-E

ELECTRIC SCHEDULE E-TOU-C Sheet 3
RESIDENTIAL TIME-OF-USE (PEAK PRICING 4 - 9 p.m. EVERY DAY)

RATES: (Cont'd.)

UNBUNDLING OF E-TOU-C TOTAL RATES

Energy Rates by Component ($ per kWh)	PEAK		OFF-PEAK	
Generation:				
Summer (all usage)	$0.16735	(R)	$0.11391	(R)
Winter (all usage)	$0.11859	(R)	$0.10356	(R)
Distribution:**				
Summer (all usage)	$0.12767	(I)	$0.11767	(I)
Winter (all usage)	$0.07935	(I)	$0.07705	(I)

Conservation Incentive Adjustment (Baseline Usage)	($0.03294)	(I)
Conservation Incentive Adjustment (Over Baseline Usage)	$0.05339	(I)
Transmission* (all usage)	$0.03595	
Transmission Rate Adjustments* (all usage)	$0.00314	
Reliability Services* (all usage)	($0.00066)	
Public Purpose Programs (all usage)	$0.01296	(I)
Nuclear Decommissioning (all usage)	$0.00101	(I)
Competition Transition Charges (all usage)	$0.00096	(R)
Energy Cost Recovery Amount (all usage)	$0.00005	(I)
DWR Bond (all usage)	$0.00580	
New System Generation Charge (all usage)**	$0.00571	(I)

* Transmission, Transmission Rate Adjustments and Reliability Service charges are combined for presentation on customer bills.
** Distribution and New System Generation Charges are combined for presentation on customer bills.

(Continued)

Advice	5661-E-B	*Issued by*	*Submitted*	April 28, 2020
Decision		***Robert S. Kenney***	*Effective*	May 1, 2020
		Vice President, Regulatory Affairs	*Resolution*	

Pacific Gas and Electric Company
U 39 San Francisco, California

Revised *Cal. P.U.C. Sheet No.* 46190-E
Cancelling Revised *Cal. P.U.C. Sheet No.* 43414-E

ELECTRIC SCHEDULE E-TOU-C Sheet 4 (T)
RESIDENTIAL TIME-OF-USE (PEAK PRICING 4 - 9 p.m. EVERY DAY)

SPECIAL CONDITIONS:

1. BASELINE (TIER 1) QUANTITIES: The following quantities of electricity are to be used to define usage eligible for the baseline credit (also see Rule 19 for additional allowances for medical needs):

BASELINE QUANTITIES (kWh PER DAY)

Baseline Territory*	Code B - Basic Quantities		Code H - All-Electric Quantities	
	Summer	Winter	Summer	Winter
	Tier I	Tier I	Tier I	Tier I
P	14.2	12.0	16.0	27.4
Q	10.3	12.0	8.9	27.4
R	18.6	11.3	20.9	28.1
S	15.8	11.1	18.7	24.9
T	6.8	8.2	7.5	13.6
V	7.5	8.8	10.9	16.9
W	20.2	10.7	23.6	20.0
X	10.3	10.5	8.9	15.4
Y	11.0	12.1	12.6	25.3
Z	6.2	8.1	7.0	16.5

2. TIME PERIODS FOR **E-TOU-C**: Times of the year and times of the day are defined as follows: (T)

Summer (service from June 1 through September 30):

Peak: 4:00 p.m. to 9:00 p.m. All days

Off-Peak: All other times

Winter (service from October 1 through May 31):

Peak: 4:00 p.m. to 9:00 p.m. All days

Off-Peak: All other times

* The applicable baseline territory is described in Part A of the Preliminary Statement

(Continued)

Advice	5759-E	*Issued by*	*Submitted*	February 14, 2020
Decision	D.19-07-004	***Robert S. Kenney***	*Effective*	March 1, 2020
		Vice President, Regulatory Affairs	*Resolution*	

SCE

The following pages provide details on are the SCE electricity tariffs applied in this study. Table 15 describes the baseline territories that were assumed for each climate zone.

Table 15: SCE Baseline Territory by Climate Zone

Climate Zone	Baseline Territory
6	6
8	8
9	9
10	10
14	14
15	15

Source: SCE.

Summer Daily Allocations (June through September)

Baseline Region Number	Daily kWh Allocation	All-Electric Allocation
5	17.2	17.9
6	11.4	8.8
8	12.6	9.8
9	16.5	12.4
10	18.9	15.8
13	22.0	24.6
14	18.7	18.3
15	46.4	24.1
16	14.4	13.5

Winter Daily Allocations (October through May)

Baseline Region Number	Daily kWh Allocation	All-Electric Allocation
5	18.7	29.1
6	11.3	13.0
8	10.6	12.7
9	12.3	14.3
10	12.5	17.0
13	12.6	24.3
14	12.0	21.3
15	9.9	18.2
16	12.6	23.1

Schedule TOU-D
TIME-OF-USE
DOMESTIC
(Continued)

Sheet 12 (T)

SPECIAL CONDITIONS

1. Applicable rate time periods are defined as follows:

Option 4-9 PM, Option 4-9 PM-CPP, Option PRIME, Option PRIME-CPP : (T)

TOU Period	Weekdays		Weekends and Holidays	
	Summer	Winter	Summer	Winter
On-Peak	4 p.m. - 9 p.m.	N/A	N/A	N/A
Mid-Peak	N/A	4 p.m. - 9 p.m.	4 p.m. - 9 p.m.	4 p.m. - 9 p.m.
Off-Peak	All other hours	9 p.m. - 8 a.m.	All other hours	9 p.m. - 8 a.m.
Super-Off-Peak	N/A	8 a.m. - 4 p.m.	N/A	8 a.m. - 4 p.m.
CPP Event Period	4 p.m. - 9 p.m.	4 p.m. - 9 p.m.	N/A	N/A

Schedule TOU-D
TIME-OF-USE
DOMESTIC
(Continued)

Sheet 2

RATES

Customers receiving service under this Schedule will be charged the applicable rates under Option 4-9 PM, Option 4-9 PM-CPP, Option 5-8 PM, Option 5-8 PM-CPP, Option PRIME, Option PRIME-CPP Option A, Option A-CPP, Option B, or Option B-CPP, as listed below. CPP Event Charges will apply to all energy usage during CPP Event Energy Charge periods and CPP Non-Event Energy Credits will apply as a reduction on CPP Non-Event Energy Credit Periods during Summer Season weekdays, 4:00 p.m. to 9:00 p.m., as described in Special Conditions 1 and 3, below:

		Delivery Service		
Option 4-9 PM / Option 4-9 PM-CPP		Total[1]	UG***	DWREC[3]
Energy Charge - $/kWh				
	Summer Season - On-Peak	0.21574 (I)	0.17870 (I)	(0.00007)
	Mid-Peak	0.21574 (I)	0.10434 (R)	(0.00007)
	Off-Peak	0.17099 (I)	0.07584 (R)	(0.00007)
	Winter Season - Mid-Peak	0.21574 (I)	0.12676 (R)	(0.00007)
	Off-Peak	0.17099 (I)	0.08874 (R)	(0.00007)
	Super-Off-Peak	0.16567 (I)	0.07025 (R)	(0.00007)
Baseline Credit**** - $/kWh		(0.07456) (R)	0.00000	
Basic Charge - $/day				
	Single-Family Residence	0.031		
	Multi-Family Residence	0.024		
Minimum Charge** - $/day				
	Single Family Residence	0.346		
	Multi-Family Residence	0.346		
Minimum Charge (Medical Baseline)** - $/day				
	Single Family Residence	0.173		
	Multi-Family Residence	0.173		
California Climate Credit[4]		(37.00) (I)		
California Alternate Rates for				
Energy Discount - %		100.00*		
Family Electric Rate Assistance Discount - %		100.00		
Option 4-9 PM-CPP				
CPP Event Energy Charge - $/kWh			0.80000	
Summer CPP Non-Event Credit				
On-Peak Energy Credit - $/kWh			(0.15170)	
Maximum Available Credit - $/kWh*****				
	Summer Season		(0.58504) (R)	

* Represents 100% of the discount percentage as shown in the applicable Special Condition of this Schedule.
** The Minimum Charge is applicable when the Delivery Service Energy Charge, plus the applicable Basic Charge is less than the Minimum Charge.
*** The ongoing Competition Transition Charge CTC of $0.00089 per kWh is recovered in the UG component of Generation. (I)
**** The Baseline Credit applies up to 100% of the Baseline Allocation, regardless of Time of Use. The Baseline Allocation is set forth in Preliminary Statement, Part H.
***** The Maximum Available Credit is the capped credit amount for CPP Customers dual participating in other demand response programs.
1 Total = Total Delivery Service rates are applicable to Bundled Service, Direct Access (DA) and Community Choice Aggregation Service (CCA Service) Customers, except DA and CCA Service Customers are not subject to the DWRBC rate component of this Schedule but instead pay the DWRBC as provided by Schedule DA-CRS or Schedule CCA-CRS.
2 Generation = The Gen rates are applicable only to Bundled Service Customers.
3 DWREC = Department of Water Resources (DWR) Energy Credit – For more information on the DWR Energy Credit, see the Billing Calculation Special Condition of this Schedule.
4 Applied on an equal basis, per household, semi-annually. See the Special Conditions of this Schedule for more information.

SoCalGas

Following are the SoCalGas natural gas tariffs applied in this study. Table 16 describes the baseline territories that were assumed for each climate zone.

Table 16: SoCalGas Baseline Territory by Climate Zone

Climate Zone	Baseline Territory
5	2
6	1
8	1
9	1
10	1
14	2
15	1

Source: SoCalGas.

The SoCalGas monthly gas rate in $/therm was applied on a monthly basis for the 12-month period ending April 2020 according to the rates shown in Table 17. Historical natural gas rate data were only available for SoCalGas' procurement charges.[5] To estimate total costs by month, the baseline and excess transmission charges were assumed to be consistence and applied for the entire year based on April 2020 costs.

Table 17: SoCalGas Monthly Gas Rate ($/therm)

Month	Procurement Charge	Transmission Charge		Total Charge	
		Baseline	Excess	Baseline	Excess
Jan 2020	$0.34730	$0.81742	$1.17186	$1.16472	$1.51916
Feb 2020	$0.28008	$0.81742	$1.17186	$1.09750	$1.45194
Mar 2020	$0.22108	$0.81742	$1.17186	$1.03850	$1.39294
Apr 2020	$0.20307	$0.81742	$1.17186	$1.02049	$1.37493
May 2019	$0.23790	$0.81742	$1.17186	$1.05532	$1.40976
June 2019	$0.24822	$0.81742	$1.17186	$1.06564	$1.42008
July 2019	$0.28475	$0.81742	$1.17186	$1.10217	$1.45661
Aug 2019	$0.27223	$0.81742	$1.17186	$1.08965	$1.44409
Sept 2019	$0.26162	$0.81742	$1.17186	$1.07904	$1.43348
Oct 2019	$0.30091	$0.81742	$1.17186	$1.11833	$1.47277
Nov 2019	$0.27563	$0.81742	$1.17186	$1.09305	$1.44749
Dec 2019	$0.38067	$0.81742	$1.17186	$1.19809	$1.55253

Source: SoCalGas.

[5] The SoCalGas procurement and transmission charges were obtained from the following site: https://www.socalgas.com/for-your-business/energy-market-services/gas-prices

SOUTHERN CALIFORNIA GAS COMPANY Revised CAL. P.U.C. SHEET NO. 57458-G
LOS ANGELES, CALIFORNIA CANCELING Revised CAL. P.U.C. SHEET NO. 57432-G

Schedule No. GM Sheet 2
MULTI-FAMILY SERVICE
(Includes GM-E, GM-C, GM-EC, GM-CC, GT-ME, GT-MC and all GMB Rates)
(Continued)

APPLICABILITY (Continued)

Multi-family Accommodations built prior to December 15, 1981 and currently served under this schedule may also be eligible for service under Schedule No. GS. If an eligible Multi-family Accommodation served under this schedule converts to an applicable submetered tariff, the tenant rental charges shall be revised for the duration of the lease to reflect removal of the energy related charges.

Eligibility for service hereunder is subject to verification by the Utility.

TERRITORY

Applicable throughout the service territory.

RATES

	GM/GT-M	GMB/GT-MB
Customer Charge, per meter, per day:	16.438¢	$16.357
For "Space Heating Only" customers, a daily Customer Charge applies during the winter period from November 1 through April 30[1]:	33.149¢	

SOUTHERN CALIFORNIA GAS COMPANY Revised CAL. P.U.C. SHEET NO. 57168-G
LOS ANGELES, CALIFORNIA CANCELING Revised CAL. P.U.C. SHEET NO. 41015-G

Schedule No. GM Sheet 5
MULTI-FAMILY SERVICE
(Includes GM-E, GM-C, GM-EC, GM-CC, GT-ME, GT-MC and all GMB Rates)
(Continued)

SPECIAL CONDITIONS (Continued)

3. (Continued)

Codes	Per Residence	Daily Therm Allowance for Climate Zones* 1	2	3
1	Space heating only			
	Summer	0.000	0.000	0.000
	Winter	1.210	1.343	2.470
2	Water heating and cooking	0.477	0.477	0.477
3	Cooking, water heating and space heating			
	Summer	0.473	0.473	0.473
	Winter	1.691	1.823	2.950
4	Cooking and space heating			
	Summer	0.088	0.088	0.088
	Winter	1.299	1.432	2.559
5	Cooking only	0.089	0.089	0.089
6	Water heating only	0.388	0.388	0.388
7	Water heating and space heating			
	Summer	0.385	0.385	0.385
	Winter	1.601	1.734	2.861

* Climate Zones are described in the Preliminary Statement.

4. Medical Baseline: Upon completion of an application and verification by a state-licensed physician, nurse practitioner, physician's assistant, or osteopath (Form No. 4859-E), an additional Baseline allowance of 0.822 therms per day will be provided for paraplegic, quadriplegic, or hemiplegic persons, those afflicted with multiple sclerosis or scleroderma, or persons being treated for a life threatening illness or who have a compromised immune system. T N

Where it is established that the energy required for a Life-Support Device, as defined in Rule No. 1, exceeds 0.822 therms per day, an additional uniform daily Baseline allowance will be provided. The amount of the additional allowance will be determined by the Utility from load and operating time data of the Life-Support Device.

5. Space Heating Only: Applies to customers who are using gas primarily for space heating, as determined by survey or under the presumption that customers who use less than 11 Ccf per month during each of the regular billing periods ending in August and September qualify for Heat Only billing.

(Continued)

(TO BE INSERTED BY UTILITY)
ADVICE LETTER NO. 5576-A
DECISION NO. 02-04-026

ISSUED BY
Dan Skopec
Vice President

(TO BE INSERTED BY CAL. PUC)
SUBMITTED Jan 31, 2020
EFFECTIVE Feb 27, 2020

SDG&E

Following are the SDG&E electricity and natural gas tariffs applied in this study. Table 18 describes the baseline territories that were assumed for each climate zone. All-Electric baseline allowances were applied.

Table 18: SDG&E Baseline Territory by Climate Zone

Climate Zone	Baseline Territory
7	Coastal
10	Inland
14	Mountain

Source: SDG&E.

The SDG&E monthly gas rate in $/therm was applied on a monthly basis for the 12-month period ending April 2020 according to the rates shown in Table 19. Historical natural gas rate data from SDG&E were reviewed to identify the procurement and transmission charges[6] used to calculate the monthly total gas rate.

Table 19: SDG&E Monthly Gas Rate ($/therm)

Month	Procurement Charge	Transmission Charge		Total Charge	
		Baseline	Excess	Baseline	Excess
Jan 2020	$0.34761	$1.36166	$1.59166	$1.70927	$1.93927
Feb 2020	$0.28035	$1.36166	$1.59166	$1.64201	$1.87201
Mar 2020	$0.22130	$1.36166	$1.59166	$1.58296	$1.81296
Apr 2020	$0.20327	$1.35946	$1.59125	$1.56273	$1.79452
May 2019	$0.23804	$1.06349	$1.25253	$1.30153	$1.49057
June 2019	$0.24838	$1.06349	$1.25253	$1.31187	$1.50091
July 2019	$0.28491	$1.06349	$1.25253	$1.34840	$1.53744
Aug 2019	$0.27239	$1.06349	$1.25253	$1.33588	$1.52492
Sept 2019	$0.26178	$1.06349	$1.25253	$1.32527	$1.51431
Oct 2019	$0.30109	$1.06349	$1.25253	$1.36458	$1.55362
Nov 2019	$0.27580	$1.06349	$1.25253	$1.33929	$1.52833
Dec 2019	$0.38090	$1.06349	$1.25253	$1.44439	$1.63343

Source: SDG&E.

[6] The SDG&E procurement and transmission charges were obtained from the following sets of documents:

http://regarchive.sdge.com/tm2/pdf/GAS_GAS-SCHEDS_GM_2020.pdf

http://regarchive.sdge.com/tm2/pdf/GAS_GAS-SCHEDS_GM_2019.pdf

RATES	GM	GM-C	GTC/GTCA[1]
Minimum Bill, per day[3]			
Non-CARE customers.....	$0.09863	$0.09863	$0.09863
CARE customers.....	$0.07890	$0.07890	$0.07890

Baseline Usage. The following quantities of gas are to be billed at the baseline rate for multi-family units. Usage in excess of applicable baseline usage will be billed at non-baseline rates.

	Daily Therm Allowance Per Residential Unit
Summer (May 1 to October 31, inclusive)	0.345
Winter (November 1 to April 30, inclusive)	1.082

SDGE

San Diego Gas & Electric Company
San Diego, California

Revised Cal. P.U.C. Sheet No. 33144-E
Canceling Revised Cal. P.U.C. Sheet No. 32930-E

Sheet 2

SCHEDULE TOU-DR1

RESIDENTIAL TIME-OF-USE

RATES

Total Rates:

Description – TOU DR1	UDC Total Rate		DWR-BC Rate	EECC Rate + DWR Credit		Total Rate	
Summer:							
On-Peak	0.22374	I	0.00580	0.29042	R	0.51996	R
Off-Peak	0.22374	I	0.00580	0.09305	R	0.32259	R
Super Off-Peak	0.22374	I	0.00580	0.04743	R	0.27697	R
Winter:							
On-Peak	0.25734	R	0.00580	0.07844	R	0.34158	R
Off-Peak	0.25734	R	0.00580	0.06961	R	0.33275	R
Super Off-Peak	0.25734	R	0.00580	0.05981	R	0.32295	R
Summer Baseline Adjustment Credit up to 130% of Baseline	(0.07506)	I				(0.07506)	I
Winter Baseline Adjustment Credit up to 130% of Baseline	(0.06833)	I				(0.06833)	I
Minimum Bill ($/day)	0.338					0.338	

Time Periods

All time periods listed are applicable to local time. The definition of time will be based upon the date service is rendered.

TOU Periods – Weekdays	Summer	Winter
On-Peak	4:00 p.m. – 9:00 p.m.	4:00 p.m. – 9:00 p.m.
Off-Peak	6:00 a.m. – 4:00 p.m.; 9:00 p.m. - midnight	6:00 a.m. – 4:00 p.m. Excluding 10:00 a.m. – 2:00 p.m. in March and April; 9:00 p.m. - midnight
Super Off-Peak	Midnight – 6:00 a.m.	Midnight – 6:00 a.m. 10:00 a.m. – 2:00 p.m. in March and April
TOU Period – Weekends and Holidays	Summer	Winter
On-Peak	4:00 p.m. – 9:00 p.m.	4:00 p.m. – 9:00 p.m.
Off-Peak	2:00 p.m. – 4:00 p.m.; 9:00 p.m. - midnight	2:00 p.m. – 4:00 p.m.; 9:00 p.m. - midnight
Super Off-Peak	Midnight – 2:00 p.m.	Midnight – 2:00 p.m.

Seasons:	Summer	June 1 – October 31
	Winter	November 1 – May 31

Baseline Usage: The following quantities of electricity are used to calculate the baseline adjustment credit.

	Baseline Allowance For Climatic Zones*			
	Coastal	Inland	Mountain	Desert
Basic Allowance				
Summer (June 1 to October 31)	9.0	10.4	13.6	15.9
Winter (November 1 to May 31)	9.2	9.6	12.9	10.9
All Electric**				
Summer (June 1 to October 31)	6.8	9.2	15,6	17.5
Winter (November 1 to May 31)	10.4	13.4	23.4	18.1

* Climatic Zones are shown on the Territory Served, Map No. 1.

** All Electric allowances are available upon application to those customers who have permanently installed space heating or who have electric water heating and receive no energy from another source.

SMUD

Following are the SMUD electricity tariffs applied in this study.

RTOD Rate Schedule

II. Firm Service Rates

A. Time-of-Day (5-8 p.m.) Rate	Rate Category RT02
Non-Summer Prices* – January 1 through May 31	
System Infrastructure Fixed Charge per month	$21.05
Electricity Usage Charge	
Peak $/kWh	$0.1388
Off-Peak $/kWh	$0.1006
Summer Prices - June 1 through September 30	
System Infrastructure Fixed Charge per month	$21.05
Electricity Usage Charge	
Peak $/kWh	$0.2941
Mid-Peak $/kWh	$0.1671
Off-Peak $/kWh	$0.1209
Non-Summer Prices* – October 1 through December 31	
System Infrastructure Fixed Charge per month	$21.70
Electricity Usage Charge	
Peak $/kWh	$0.1430
Off-Peak $/kWh	$0.1035

* Non-Summer Season includes Fall (Oct 1 – Nov 30), Winter (Dec 1 – Mar 31) and Spring (Apr 1 – May 31) periods.

Summer (Jun 1 - Sept 30)	Peak	Weekdays between 5:00 p.m. and 8:00 p.m.
	Mid-Peak	Weekdays between noon and midnight except during the Peak hours.
	Off-Peak	All other hours, including weekends and holidays[1].
Non-Summer (Oct 1 - May 31)	Peak	Weekdays between 5:00 p.m. and 8:00 p.m.
	Off-Peak	All other hours, including weekends and holidays[1].

GSN_T Rate Schedule:

II. Firm Service Rates

Rate Category	Nondemand GSN_T	Flat GFN	Demand GSS_T
Winter Season – January 1 through May 31			
System Infrastructure Fixed Charge - per month per meter	$21.15	$9.45	$25.75
Site Infrastructure Charge *(per 12 months max kW or contract capacity)*	n/a	n/a	$7.94
Electricity Usage Charge			
All day $/kWh	$0.1365	$0.1381	$0.1071
Summer Season - June 1 through September 30			
System Infrastructure Fixed Charge - per month per meter	$21.15	$9.45	$25.75
Site Infrastructure Charge *(per 12 months max kW or contract capacity)*	n/a	n/a	$7.94
Electricity Usage Charge			
On-peak $/kWh	$0.3151	$0.1381	$0.2733
Off-peak $/kWh	$0.1152	$0.1381	$0.0948

Rate Category	Nondemand GSN_T	Flat GFN	Demand GSS_T
Winter Season - October 1 through December 31			
System Infrastructure Fixed Charge - per month per meter	$21.80	$9.70	$26.50
Site Infrastructure Charge *(per 12 months max kW or contract capacity)*	n/a	n/a	$8.18
Electricity Usage Charge			
All day $/kWh	$0.1406	$0.1423	$0.1103

D. Billing Periods

1. **Winter (October 1 – May 31) All hours are off-peak.**

2. **Summer Time-of-Use Billing Periods (June 1 – September 30)**

On-Peak	Summer weekdays between 3:00 p.m. and 6:00 p.m.
Off-Peak	All other hours, including holidays shown below

CPAU

Following are the CPAU electricity and natural gas tariffs applied in this study.

E1 Rate Schedule:

RESIDENTIAL ELECTRIC SERVICE

UTILITY RATE SCHEDULE E-1

A. APPLICABILITY:

This Rate Schedule applies to separately metered single-family residential dwellings receiving Electric Service from the City of Palo Alto Utilities.

B. TERRITORY:

This rate schedule applies everywhere the City of Palo Alto provides Electric Service.

C. UNBUNDLED RATES:

Per kilowatt-hour (kWh)	Commodity	Distribution	Public Benefits	Total
Tier 1 usage	$0.08339	$0.04971	$0.00447	$0.13757
Tier 2 usage Any usage over Tier 1	0.11569	0.07351	0.00447	0.19367
Minimum Bill ($/day)				0.3283

E2 Rate Schedule:

RESIDENTIAL MASTER-METERED AND SMALL NON-RESIDENTIAL ELECTRIC SERVICE

UTILITY RATE SCHEDULE E-2

A. APPLICABILITY:

This Rate Schedule applies to the following Customers receiving Electric Service from the City of Palo Alto Utilities:

1. Small non-residential Customers receiving Non-Demand Metered Electric Service; and
2. Customers with Accounts at Master-Metered multi-family facilities.

B. TERRITORY:

This rate schedule applies everywhere the City of Palo Alto provides Electric Service.

C. UNBUNDLED RATES:

Per kilowatt-hour (kWh)	Commodity	Distribution	Public Benefits	Total
Summer Period	$0.11855	$0.08551	$0.00447	$0.20853
Winter Period	0.08502	0.05675	0.00447	0.14624
Minimum Bill ($/day)				0.8359

The CPAU monthly gas rate in $/therm was applied on a monthly basis for the 12-month period ending June 2020 according to the rates shown in Table 20.

Table 20: CPAU Monthly Gas Rate ($/therm)

Effective Date	Commodity Rate	Cap and Trade Compliance Charge	Transportation Charge	Carbon Offset Charge	G2 Total Volumetric Rate
1/1/20	$0.3289	0.033	0.09941	0.040	1.11151
2/1/20	0.2466	0.033	0.09941	0.040	1.02921
3/1/20	0.2416	0.033	0.09891	0.040	1.02371
4/1/20	0.2066	0.033	0.09891	0.040	0.98871
5/1/20	0.2258	0.033	0.09891	0.040	1.00791
6/1/20	0.2279	0.033	0.09891	0.040	1.01001
7/1/19	0.2471	0.033	0.11757	0.040	1.04787
8/1/19	0.2507	0.033	0.10066	0.040	1.03456
9/1/19	0.2461	0.033	0.10066	0.040	1.02996
10/1/19	0.2811	0.033	0.10288	0.040	1.06718
11/1/19	0.2923	0.033	0.10288	0.040	1.07838
12/1/19	0.3781	0.033	0.10288	0.040	1.16418

Source: CPAU.

RESIDENTIAL MASTER-METERED AND COMMERCIAL GAS SERVICE

UTILITY RATE SCHEDULE G-2

A. APPLICABILITY:

This schedule applies to the following Customers receiving Gas Service from the City of Palo Alto Utilities:

1. Commercial Customers who use less than 250,000 therms per year at one site.
2. Master-metered residential Customers in multi-family residential facilities.

B. TERRITORY:

This schedule applies anywhere the City of Palo Alto provides Gas Service.

C. UNBUNDLED RATES: Per Service

Monthly Service Charge: $104.95

Per Therm

Supply Charges:

1. Commodity (Monthly Market Based) ..... $0.10-$2.00
2. Cap and Trade Compliance Charges $0.00-0.25
3. Transportation Charge.....$0.00-$0.15
4. Carbon Offset Charge .....$0.00-$0.10

Distribution Charge: $0.6102

Escalation Assumptions

The average annual escalation rates in Table 21 were used in this study and are from E3's 2019 study Residential Building Electrification in California (Energy & Environmental Economics, 2019). These rates are applied to the 2019 rate schedules over a 30-year period beginning in 2020. SDG&E was not covered in the E3 study. The Statewide Reach Codes Team reviewed SDG&E's GRC filing and applied the same approach that E3 applied for PG&E and SoCalGas to arrive at average escalation rates between 2020 and 2022. The statewide electricity escalation rates were also applied to the analysis for SMUD and CPAU. PG&E gas escalation rates were applied to CPAU as the best available estimate since CPAU uses PG&E gas infrastructure.

Table 21: Real Utility Rate Escalation Rate Assumptions

Year	Statewide Electric Residential Average Rate Escalation (%/year, real)	Natural Gas Residential Core Rate Escalation (%/year, real)		
		PG&E	SoCalGas	SDG&E
2020	2.0%	1.48%	6.37%	5.00%
2021	2.0%	5.69%	4.12%	3.14%
2022	2.0%	1.11%	4.12%	2.94%
2023	2.0%	4.0%	4.0%	4.0%
2024	2.0%	4.0%	4.0%	4.0%
2025	2.0%	4.0%	4.0%	4.0%
2026	1.0%	1.0%	1.0%	1.0%
2027	1.0%	1.0%	1.0%	1.0%
2028	1.0%	1.0%	1.0%	1.0%
2029	1.0%	1.0%	1.0%	1.0%
2030	1.0%	1.0%	1.0%	1.0%
2031	1.0%	1.0%	1.0%	1.0%
2032	1.0%	1.0%	1.0%	1.0%
2033	1.0%	1.0%	1.0%	1.0%
2034	1.0%	1.0%	1.0%	1.0%
2035	1.0%	1.0%	1.0%	1.0%
2036	1.0%	1.0%	1.0%	1.0%
2037	1.0%	1.0%	1.0%	1.0%
2038	1.0%	1.0%	1.0%	1.0%
2039	1.0%	1.0%	1.0%	1.0%
2040	1.0%	1.0%	1.0%	1.0%
2041	1.0%	1.0%	1.0%	1.0%
2042	1.0%	1.0%	1.0%	1.0%
2043	1.0%	1.0%	1.0%	1.0%
2044	1.0%	1.0%	1.0%	1.0%
2045	1.0%	1.0%	1.0%	1.0%
2046	1.0%	1.0%	1.0%	1.0%
2047	1.0%	1.0%	1.0%	1.0%
2048	1.0%	1.0%	1.0%	1.0%
2049	1.0%	1.0%	1.0%	1.0%

Source: Energy & Environmental Economics, 2019.

6.3 Appendix C – PG&E Gas Infrastructure Cost Memo

Pacific Gas and Electric Company

Janice Berman
Director – Grid Edge
Pacific Gas and Electric Company
Mail Code B9F
P.O. Box 770000
San Francisco, CA 94177-00001

December 5, 2019

Energy Commission Staff:

On March 2, 2018, PG&E provided gas extension cost estimates for residential existing and new subdivisions (see attached memo). We have recently updated our estimates and are therefore providing an updated memo.

In addition to mainline and service extension costs, we are also providing estimates of the cost of gas meters for different building types including both residential and commercial customers. These estimates are based on PG&E historical jobs.

Developing gas extension cost estimates is complex and the actual costs are project dependent. Costs vary widely with location, terrain, distance to the nearest main, joint trenching, materials, number of dwellings per development, and several other site and job-specific conditions. For these reasons, it is not practical to come up with estimates that represent every case. Instead we are including estimates based on historical averages taken from projects within PG&E's territory. It is not recommended to compare specific project costs to these estimates as any number of factors could lead to higher or lower costs than these averages are representing.

We are also including estimates for in-house gas infrastructure costs and specific plan review costs. These estimates are from external sources, and are not based on PG&E data, but have been provided for the sake of completeness and for use in energy efficiency analysis.

To further anchor the estimates, several assumptions have been made:

1. It is assumed that during new construction, gas infrastructure will likely be joint trenched with electric infrastructure. As a result, the incremental cost of trenching associated with the gas infrastructure alone is minimal. Therefore, all mainline cost estimates exclude trench costs. Service extension cost estimates include both estimates with and without trench costs. In the case where new construction would require overhead electric and underground gas infrastructure, the estimates with trench costs included for service extensions should be utilized.

2. It is assumed that new construction in an existing subdivision would not generally require a mainline extension. In cases where a mainline extension would be required to an existing subdivision, the costs are highly dependent on the location, terrain, and distance to the nearest main.

Pacific Gas and Electric Company

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3. These estimates are for total costs. The cost estimates have not been reduced to account for the portion of the costs paid by all customers due to application of Rule 15[1] and Rule 16[2] allowances. Hence, costs to the specific customer may be lower than the estimates below, as the specific customer benefits from the Rule 15 and Rule 16 allowances.

Table 1: PG&E Gas Infrastructure Cost Estimates

	Existing Subdivision/Development	New Greenfield Subdivision/Development
Mainline Extension	N/A[3]	Single-Family $17/ft[4] Multi-Family $11/ft[4]
Service Extension (Typically 1" pipe from mainline to the meter)	$6750 per service/building[4] (excludes trench costs) $9200 per service/building[4] (includes trench costs)	$1300 per service/building[4] (includes mainline extension costs within the subdivision; excludes trench costs) $1850 per service/building[4] (includes mainline extension costs within the subdivision; includes trench costs)
Meter	Residential Single Family $300 per meter[5] Residential Multi-Family $300 per meter + $300 per meter manifold outlet[5] Small/Medium Commercial $3600 per meter[6]	Residential Single Family $300 per meter[5] Residential Multi-Family $300 per meter + $300 per meter manifold outlet[5] Small/Medium Commercial $3600 per meter[6]

[1] https://www.pge.com/tariffs/tm2/pdf/ELEC_RULES_15.pdf
[2] https://www.pge.com/tariffs/tm2/pdf/ELEC_RULES_16.pdf
[3] It is assumed that new construction in an existing subdivision would not require a main extension.
[4] Estimates based on PG&E jobs from Jan 2016 - Dec 2017 from PG&E's Service Planning team.
[5] Estimates from PG&E's Dedicated Estimating Team. For Multi-Family units, the costs of $300 per meter and $300 per meter manifold outlet should be combined for a total of $600 per meter.
[6] PG&E Marginal Customer Access Cost Estimates presented in the 2018 Gas Cost Allocation Proceedings (GCAP), A.17-09-006, Exhibit PG&E-2, Appendix A, Section A, Table A-1. The Average Connection Cost per Customer values were included in the MCAC workpaper that accompanied the GCAP testimony

Pacific Gas and Electric Company

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	Large Commercial $32,000 per meter[6]	Large Commercial $32,000 per meter[6]

Note: Service extension cost estimates for New Greenfield Subdivisions include mainline extension costs as well. Therefore, mainline cost estimates can be ignored for the purpose of estimating total project costs.

Table 2: Gas Infrastructure Cost Estimates from Other Sources

	Existing Subdivision/Development	New Greenfield Subdivision/Development
In-House Infrastructure	Single-Family $800[7] Multi-Family $600 per unit[7] Medium Office $600-4500[7,8] Medium Retail $10,000[8]	Single-Family $800[7] Multi-Family $600 per unit[7] Medium Office $600-4500[7,8] Medium Retail $10,000[8]
Plan Review (Will vary by city and often not a fixed fee)	Residential Palo Alto - $850[9] Nonresidential Palo Alto - $2316[9]	Residential Palo Alto - $850[9] Nonresidential Palo Alto - $2316[9]

Please let us know if there are any follow-up questions or clarifications.

Best regards,

[7] Frontier Energy, Inc., Misti Bruceri & Associates, LLC. 2019. "2019 Cost-effectiveness Study: Low Rise Residential New Construction." Available at: https://localenergycodes.com/content/performance-ordinances
[8] TRC, EnergySoft. 2019. "2019 Nonresidential New Construction Reach Code Cost Effectiveness Study." Available at: https://localenergycodes.com/content/performance-ordinances
[9] TRC. 2018. "City of Palo Alto 2019 Title 24 Energy Reach Code Cost Effectiveness Analysis Draft." Available at: http://cityofpaloalto.org/civicax/filebank/documents/66742

6.4 Appendix D – Detailed Results - Mixed Fuel

Table 22: Mixed-Fuel Efficiency Only Package Results (Savings/Cost Per Dwelling Unit)[a]

			Dwelling Units		Central Water Heating			Total			On-Bill		2019 TDV		2022 TDV	
Climate Zone	Elec Utility	Gas Utility	Elec Savings (kWh)	Year 1 Utility Cost Savings	Gas Savings (therm)	Elec Savings (kWh)	Year 1 Utility Cost Savings	GHG Savings (lb CO_2)	On-Bill Utility Savings (2020 PV$)	Inc. Cost (2020 PV$)	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV
1	PGE	PGE	39	$8	0.0	0	$0	26	$199	$216	0.9	($17)	0.6	($83)	0.8	($42)
2	PGE	PGE	79	$24	0.0	0	$0	45	$570	$144	4.0	$426	3.0	$289	2.7	$247
3	PGE	PGE	60	$18	0.0	0	$0	33	$420	$144	2.9	$276	2.3	$184	1.9	$131
4	PGE	PGE	95	$29	0.0	0	$0	54	$678	$144	4.7	$534	3.2	$321	3.2	$313
4	CPAU	CPAU	95	$17	0.0	0	$0	54	$394	$144	2.7	$250	3.2	$321	3.2	$313
5	PGE	PGE	71	$20	0.0	0	$0	39	$484	$144	3.4	$340	2.3	$180	1.9	$122
5	PGE	SCG	71	$20	0.0	0	$0	39	$484	$144	3.4	$340	2.3	$180	1.9	$122
6	SCE	SCG	113	$26	0.0	0	$0	62	$619	$144	4.3	$475	3.4	$344	3.2	$315
7	SDGE	SDGE	105	$33	0.0	0	$0	59	$789	$144	5.5	$645	3.4	$339	2.8	$264
8	SCE	SCG	128	$31	0.0	0	$0	72	$728	$144	5.1	$585	3.9	$413	3.9	$421
9	SCE	SCG	125	$29	0.0	0	$0	70	$695	$144	4.8	$551	4.2	$461	3.9	$413
10	SCE	SCG	130	$26	0.0	0	$0	73	$623	$144	4.3	$479	4.2	$457	3.9	$415
10	SDGE	SDGE	130	$41	0.0	0	$0	73	$972	$144	6.8	$828	4.2	$457	3.9	$415
11	PGE	PGE	148	$38	0.0	0	$0	91	$897	$216	4.1	$681	3.7	$584	3.4	$523
12	PGE	PGE	122	$31	0.0	0	$0	74	$736	$216	3.4	$519	3.1	$448	2.8	$397
12	SMUD	PGE	122	$17	0.0	0	$0	74	$401	$216	1.9	$185	3.1	$448	2.8	$397
13	PGE	PGE	152	$39	0.0	0	$0	93	$923	$216	4.3	$706	3.4	$523	3.5	$534
14	SCE	SCG	152	$31	0.0	0	$0	91	$735	$216	3.4	$518	3.6	$556	3.5	$532
14	SDGE	SDGE	152	$45	0.0	0	$0	91	$1,055	$216	4.9	$838	3.6	$556	3.5	$532
15	SCE	SCG	213	$43	0.0	0	$0	124	$1,021	$216	4.7	$804	4.5	$768	4.4	$725
16	PGE	PGE	115	$29	0.0	0	$0	73	$679	$216	3.1	$463	2.3	$279	2.1	$244

[a] Values in red indicate B/C ratios less than 1.

Table 23: Mixed-Fuel Efficiency + 0.1 kW_{DC} PV per Dwelling Unit Results (Savings/Cost Per Dwelling Unit)[a]

			Dwelling Units		Central Water Heating			Total			On-Bill		2019 TDV		2022 TDV	
Climate Zone	Elec Utility	Gas Utility	Elec Savings (kWh)	Year 1 Utility Cost Savings	Gas Savings (therm)	Elec Savings (kWh)	Year 1 Utility Cost Savings	GHG Savings (lb CO_2)	On-Bill Utility Savings (2020 PV$)	Inc. Cost (2020 PV$)	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV
1	PGE	PGE	172	$40	0.0	0	$0	81	$955	$533	1.8	$422	1.2	$93	1.0	$21
2	PGE	PGE	236	$67	0.0	0	$0	112	$1,597	$460	3.5	$1,137	2.2	$574	1.9	$417
3	PGE	PGE	222	$62	0.0	0	$0	102	$1,472	$460	3.2	$1,011	2.0	$455	1.6	$290
4	PGE	PGE	261	$74	0.0	0	$0	125	$1,762	$460	3.8	$1,302	2.4	$628	2.2	$538
4	CPAU	CPAU	261	$43	0.0	0	$0	125	$1,025	$460	2.2	$565	2.4	$628	2.2	$538
5	PGE	PGE	245	$67	0.0	0	$0	113	$1,596	$460	3.5	$1,136	2.1	$498	1.7	$312
5	PGE	SCG	245	$67	0.0	0	$0	113	$1,596	$460	3.5	$1,136	2.1	$498	1.7	$312
6	SCE	SCG	290	$63	0.0	0	$0	138	$1,489	$460	3.2	$1,029	2.4	$650	2.2	$558
7	SDGE	SDGE	270	$81	0.0	0	$0	130	$1,918	$460	4.2	$1,458	2.4	$664	2.0	$441
8	SCE	SCG	299	$66	0.0	0	$0	146	$1,573	$460	3.4	$1,113	2.6	$750	2.5	$712
9	SCE	SCG	303	$63	0.0	0	$0	147	$1,502	$460	3.3	$1,042	2.8	$807	2.5	$697
10	SCE	SCG	308	$58	0.0	0	$0	150	$1,376	$460	3.0	$916	2.7	$779	2.5	$682
10	SDGE	SDGE	308	$90	0.0	0	$0	150	$2,132	$460	4.6	$1,671	2.7	$779	2.5	$682
11	PGE	PGE	307	$76	0.0	0	$0	160	$1,800	$533	3.4	$1,267	2.7	$903	2.3	$695
12	PGE	PGE	286	$70	0.0	0	$0	144	$1,663	$533	3.1	$1,130	2.4	$755	2.1	$579
12	SMUD	PGE	286	$37	0.0	0	$0	144	$874	$533	1.6	$341	2.4	$755	2.1	$579
13	PGE	PGE	317	$78	0.0	0	$0	164	$1,858	$533	3.5	$1,325	2.5	$811	2.4	$729
14	SCE	SCG	343	$65	0.0	0	$0	172	$1,542	$533	2.9	$1,009	2.8	$980	2.6	$854
14	SDGE	SDGE	343	$95	0.0	0	$0	172	$2,247	$533	4.2	$1,714	2.8	$980	2.6	$854
15	SCE	SCG	390	$75	0.0	0	$0	199	$1,768	$533	3.3	$1,235	3.1	$1,123	2.8	$981
16	PGE	PGE	284	$69	0.0	0	$0	147	$1,641	$533	3.1	$1,108	2.1	$595	1.8	$428

[a] Values in red indicate B/C ratios less than 1 or negative values.

6.5 Appendix E – Detailed Results - All-Electric

Table 24: All-Electric Central Recirculating HPWH Efficiency Package Results (Savings/Cost Per Dwelling Unit)[a, b]

			Dwelling Units		Central Water Heating			Total			On-Bill		2019 TDV		2022 TDV	
Climate Zone	Elec Utility	Gas Utility	Elec Savings (kWh)	Year 1 Utility Cost Savings	Gas Savings (therm)	Elec Savings (kWh)	Year 1 Utility Cost Savings	GHG Savings (lb CO_2)	Utility Savings (2020 PV$)	Inc. Cost (2020 PV$)	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV
1	PGE	PGE	39	$8	95.7	(710)	($38)	838	($493)	$775	0.0	($1,268)	0.0	($744)	2.1	$850
2	PGE	PGE	78	$24	86.9	(635)	($32)	785	$5	$702	0.0	($697)	0.5	($371)	2.5	$1,067
3	PGE	PGE	70	$20	86.7	(618)	($29)	788	($33)	$888	0.0	($921)	0.3	($635)	1.9	$763
4	PGE	PGE	95	$29	81.4	(590)	($29)	750	$174	$702	0.2	($528)	0.5	($317)	2.5	$1,084
4	CPAU	CPAU	95	$17	81.4	(590)	($5)	750	$447	$702	0.6	($255)	0.5	($317)	2.5	$1,084
5	PGE	PGE	80	$22	86.7	(616)	($29)	792	$30	$888	0.0	($858)	0.3	($608)	1.7	$656
5	PGE	SCG	80	$22	86.7	(616)	($49)	792	($324)	$888	0.0	($1,212)	0.3	($608)	1.7	$656
6	SCE	SCG	113	$26	78.3	(560)	($21)	732	$399	$702	0.6	($303)	0.7	($214)	2.4	$960
7	SDGE	SDGE	105	$33	78.0	(558)	($37)	727	$174	$702	0.2	($528)	0.7	($237)	2.2	$810
8	SCE	SCG	128	$31	75.5	(544)	($21)	715	$501	$702	0.7	($201)	0.9	($65)	2.7	$1,174
9	SCE	SCG	125	$29	76.3	(552)	($21)	721	$463	$702	0.7	($239)	0.9	($64)	2.7	$1,217
10	SCE	SCG	130	$26	63.2	(552)	($36)	555	$10	$484	0.0	($474)	0.4	($279)	2.5	$745
10	SDGE	SDGE	130	$41	63.2	(552)	($55)	555	($116)	$484	0.0	($600)	0.4	($279)	2.5	$745
11	PGE	PGE	147	$38	64.8	(582)	($47)	580	($66)	$557	0.0	($623)	0.7	($150)	2.4	$767
12	PGE	PGE	122	$31	67.7	(596)	($48)	589	($238)	$557	0.0	($795)	0.5	($254)	2.2	$682
12	SMUD	PGE	122	$17	67.7	(596)	$12	589	$849	$557	1.5	$292	0.5	($254)	2.2	$682
13	PGE	PGE	152	$39	62.8	(562)	($45)	566	($9)	$557	0.0	($566)	0.6	($200)	2.4	$801
14	SCE	SCG	152	$31	65.3	(585)	($39)	581	$53	$557	0.1	($503)	0.8	($126)	2.6	$892
14	SDGE	SDGE	152	$44	65.3	(585)	($59)	581	($121)	$557	0.0	($678)	0.8	($126)	2.6	$892
15	SCE	SCG	213	$43	51.2	(465)	($31)	507	$481	$557	0.9	($76)	1.4	$239	2.7	$950
16	PGE	PGE	115	$29	77.8	(737)	($66)	642	($696)	$557	0.0	($1,252)	0.0	($997)	1.3	$170

[a] Values in red indicate B/C ratios less than 1 or negative values. Values In grey indicate cases which are cost-effective but are not code compliant and cannot be used to support a reach code.
[b] “>1” indicates cases where there are both incremental measure cost savings and energy cost savings.

Table 25: All-Electric Central Recirculating HPWH + 0.1 kW_{DC} PV per Dwelling Unit Results (Savings/Cost Per Dwelling Unit)[a, b]

			Dwelling Units		Central Water Heating			Total			On-Bill		2019 TDV		2022 TDV	
Climate Zone	Elec Utility	Gas Utility	Elec Savings (kWh)	Year 1 Utility Cost Savings	Gas Savings (therm)	Elec Savings (kWh)	Year 1 Utility Cost Savings	GHG Savings (lb CO_2)	On-Bill Utility Savings (2020 PV$)	Inc. Cost (2020 PV$)	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV
1	PGE	PGE	171	$40	95.7	(710)	($38)	894	$262	$1,091	0.2	($829)	0.5	($569)	1.8	$914
2	PGE	PGE	236	$67	86.9	(635)	($32)	852	$1,032	$1,018	1.0	$14	0.9	($87)	2.2	$1,237
3	PGE	PGE	232	$64	86.7	(618)	($29)	857	$1,019	$1,205	0.8	($185)	0.7	($364)	1.8	$922
4	PGE	PGE	261	$74	81.4	(590)	($29)	821	$1,258	$1,018	1.2	$239	1.0	($10)	2.3	$1,309
4	CPAU	CPAU	261	$43	81.4	(590)	($5)	821	$1,079	$1,018	1.1	$60	1.0	($10)	2.3	$1,309
5	PGE	PGE	254	$69	86.7	(616)	($29)	867	$1,142	$1,205	0.9	($62)	0.8	($290)	1.7	$847
5	PGE	SCG	254	$69	86.7	(616)	($49)	867	$789	$1,205	0.7	($416)	0.8	($290)	1.7	$847
6	SCE	SCG	290	$63	78.3	(560)	($21)	808	$1,269	$1,018	1.2	$251	1.1	$92	2.2	$1,203
7	SDGE	SDGE	270	$81	78.0	(558)	($37)	798	$1,303	$1,018	1.3	$284	1.1	$88	2.0	$987
8	SCE	SCG	299	$66	75.5	(544)	($21)	789	$1,345	$1,018	1.3	$327	1.3	$272	2.4	$1,465
9	SCE	SCG	303	$63	76.3	(552)	($21)	797	$1,270	$1,018	1.2	$251	1.3	$281	2.5	$1,501
10	SCE	SCG	308	$58	63.2	(552)	($36)	632	$763	$801	1.0	($37)	1.1	$43	2.3	$1,013
10	SDGE	SDGE	308	$90	63.2	(552)	($55)	632	$1,044	$801	1.3	$243	1.1	$43	2.3	$1,013
11	PGE	PGE	307	$76	64.8	(582)	($47)	648	$837	$873	1.0	($36)	1.2	$169	2.1	$939
12	PGE	PGE	285	$70	67.7	(596)	($48)	659	$690	$873	0.8	($184)	1.1	$53	2.0	$864
12	SMUD	PGE	285	$37	67.7	(596)	$12	659	$1,321	$873	1.5	$448	1.1	$53	2.0	$864
13	PGE	PGE	317	$78	62.8	(562)	($45)	637	$926	$873	1.1	$52	1.1	$87	2.1	$997
14	SCE	SCG	343	$65	65.3	(585)	($39)	663	$861	$873	1.0	($13)	1.3	$299	2.4	$1,214
14	SDGE	SDGE	343	$95	65.3	(585)	($59)	663	$1,071	$873	1.2	$198	1.3	$299	2.4	$1,214
15	SCE	SCG	390	$75	51.2	(465)	($31)	582	$1,228	$873	1.4	$354	1.7	$594	2.4	$1,206
16	PGE	PGE	284	$69	77.8	(737)	($66)	716	$266	$873	0.3	($607)	0.2	($681)	1.4	$353

[a] Values in red indicate B/C ratios less than 1 or negative values. Values In grey indicate cases which are cost-effective but are not code compliant and cannot be used to support a reach code.
[b] ">1" indicates cases where there are both incremental measure cost savings and energy cost savings.

Table 26: All-Electric Central Recirculating HPWH + 0.2 kW_{DC} PV per Dwelling Unit Results (Savings/Cost Per Dwelling Unit)[a, b]

			Dwelling Units		Central Water Heating			Total			On-Bill		2019 TDV		2022 TDV	
Climate Zone	Elec Utility	Gas Utility	Elec Savings (kWh)	Year 1 Utility Cost Savings	Gas Savings (therm)	Elec Savings (kWh)	Year 1 Utility Cost Savings	GHG Savings (lb CO_2)	On-Bill Utility Savings (2020 PV$)	Inc. Cost (2020 PV$)	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV
1	PGE	PGE	304	$72	95.7	(710)	($38)	949	$1,018	$1,408	0.72	($390)	0.7	($393)	1.7	$977
2	PGE	PGE	393	$111	86.9	(635)	($32)	920	$2,060	$1,335	1.54	$725	1.1	$197	2.1	$1,407
3	PGE	PGE	395	$109	86.7	(618)	($29)	926	$2,071	$1,521	1.36	$550	0.9	($93)	1.7	$1,080
4	PGE	PGE	427	$120	81.4	(590)	($29)	892	$2,342	$1,335	1.75	$1,007	1.2	$297	2.1	$1,534
4	CPAU	CPAU	427	$68	81.4	(590)	($5)	892	$1,669	$1,335	1.25	$334	1.2	$297	2.1	$1,534
5	PGE	PGE	428	$116	86.7	(616)	($29)	941	$2,255	$1,521	1.48	$734	1.0	$27	1.7	$1,037
5	PGE	SCG	428	$116	86.7	(616)	($49)	941	$1,901	$1,521	1.25	$380	1.0	$27	1.7	$1,037
6	SCE	SCG	466	$100	78.3	(560)	($21)	884	$2,140	$1,335	1.60	$805	1.3	$397	2.1	$1,446
7	SDGE	SDGE	435	$127	78.0	(558)	($37)	869	$2,404	$1,335	1.80	$1,069	1.3	$414	1.9	$1,164
8	SCE	SCG	470	$102	75.5	(544)	($21)	863	$2,190	$1,335	1.64	$855	1.5	$609	2.3	$1,755
9	SCE	SCG	480	$95	76.3	(552)	($21)	874	$2,027	$1,335	1.52	$692	1.5	$627	2.3	$1,785
10	SCE	SCG	485	$90	63.2	(552)	($36)	708	$1,517	$1,117	1.36	$400	1.3	$365	2.1	$1,280
10	SDGE	SDGE	485	$138	63.2	(552)	($55)	708	$2,184	$1,117	1.96	$1,067	1.3	$365	2.1	$1,280
11	PGE	PGE	466	$114	64.8	(582)	($47)	717	$1,740	$1,190	1.46	$550	1.4	$488	1.9	$1,111
12	PGE	PGE	449	$109	67.7	(596)	($48)	729	$1,617	$1,190	1.36	$427	1.3	$361	1.9	$1,046
12	SMUD	PGE	449	$57	67.7	(596)	$12	729	$1,793	$1,190	1.51	$604	1.3	$361	1.9	$1,046
13	PGE	PGE	482	$118	62.8	(562)	($45)	708	$1,861	$1,190	1.56	$671	1.3	$375	2.0	$1,192
14	SCE	SCG	534	$99	65.3	(585)	($39)	744	$1,668	$1,190	1.40	$478	1.6	$723	2.3	$1,537
14	SDGE	SDGE	534	$145	65.3	(585)	($59)	744	$2,263	$1,190	1.90	$1,073	1.6	$723	2.3	$1,537
15	SCE	SCG	567	$106	51.2	(465)	($31)	657	$1,975	$1,190	1.66	$785	1.8	$949	2.2	$1,463
16	PGE	PGE	454	$110	77.8	(737)	($66)	789	$1,228	$1,190	1.03	$38	0.7	($366)	1.5	$537

[a] Values in red indicate B/C ratios less than 1 or negative values. Values In grey indicate cases which are cost-effective but are not code compliant and cannot be used to support a reach code.
[b] “>1” indicates cases where there are both incremental measure cost savings and energy cost savings.

Table 27: All-Electric Clustered HPWH Efficiency Only Package Results (Savings/Cost Per Dwelling Unit)[a, b]

			Dwelling Units		Central Water Heating			Total			On-Bill		2019 TDV		2022 TDV	
Climate Zone	Elec Utility	Gas Utility	Elec Savings (kWh)	Year 1 Utility Cost Savings	Gas Savings (therm)	Elec Savings (kWh)	Year 1 Utility Cost Savings	GHG Savings (lb CO_2)	On-Bill Utility Savings (2020 PV$)	Inc. Cost (2020 PV$)	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV
1	PGE	PGE	39	$8	95.7	(809)	($64)	838	($1,096)	($643)	0.6	($453)	1.9	$297	>1	$1,793
2	PGE	PGE	78	$24	86.9	(726)	($55)	785	($535)	($715)	1.3	$180	>1	$843	>1	$2,069
3	PGE	PGE	70	$20	86.7	(711)	($53)	788	($583)	($529)	0.9	($54)	>1	$542	>1	$1,786
4	PGE	PGE	95	$29	81.4	(673)	($50)	750	($317)	($715)	2.3	$399	>1	$908	>1	$2,025
4	CPAU	CPAU	95	$17	81.4	(673)	($19)	750	$97	($715)	>1	$813	>1	$908	>1	$2,025
5	PGE	PGE	80	$22	86.7	(711)	($53)	792	($527)	($529)	1.0	$2	>1	$539	>1	$1,782
5	PGE	SCG	80	$22	86.7	(711)	($73)	792	($881)	($529)	0.6	($352)	>1	$539	>1	$1,782
6	SCE	SCG	113	$26	78.3	(645)	($41)	732	($67)	($715)	10.7	$649	>1	$928	>1	$2,042
7	SDGE	SDGE	105	$33	78.0	(642)	($61)	727	($388)	($715)	1.8	$328	>1	$947	>1	$2,080
8	SCE	SCG	128	$31	75.5	(620)	($39)	715	$71	($715)	>1	$786	>1	$994	>1	$2,123
9	SCE	SCG	125	$29	76.3	(628)	($40)	721	$26	($715)	>1	$742	>1	$1,062	>1	$2,202
10	SCE	SCG	130	$26	63.2	(624)	($53)	555	($415)	($933)	2.2	$518	>1	$936	>1	$1,832
10	SDGE	SDGE	130	$41	63.2	(624)	($77)	555	($621)	($933)	1.5	$313	>1	$936	>1	$1,832
11	PGE	PGE	147	$38	64.8	(643)	($63)	580	($439)	($861)	2.0	$421	>1	$884	>1	$1,926
12	PGE	PGE	122	$31	67.7	(672)	($67)	589	($691)	($861)	1.2	$170	10.9	$781	>1	$1,896
12	SMUD	PGE	122	$17	67.7	(672)	($2)	589	$515	($861)	>1	$1,375	10.9	$781	>1	$1,896
13	PGE	PGE	152	$39	62.8	(618)	($60)	566	($354)	($861)	2.4	$506	7.1	$740	>1	$1,954
14	SCE	SCG	152	$31	65.3	(650)	($56)	581	($363)	($861)	2.4	$498	>1	$942	>1	$1,863
14	SDGE	SDGE	152	$44	65.3	(650)	($80)	581	($610)	($861)	1.4	$250	>1	$942	>1	$1,863
15	SCE	SCG	213	$43	51.2	(492)	($42)	507	$201	($861)	>1	$1,062	>1	$1,288	>1	$2,068
16	PGE	PGE	115	$29	77.8	(813)	($85)	642	($1,163)	($861)	0.7	($302)	1.3	$189	>1	$1,462

[a] Values in red indicate B/C ratios less than 1 or negative values. Values In grey indicate cases which are cost-effective but are not code compliant and cannot be used to support a reach code.
[b] ">1" indicates cases where there are both incremental measure cost savings and energy cost savings.

Table 28: All-Electric Clustered HPWH + 0.1 kW_{DC} PV per Dwelling Unit Results (Savings/Cost Per Dwelling Unit)[a, b]

			Dwelling Units	Central Water Heating	Total	On-Bill	2019 TDV	2022 TDV

Climate Zone	Elec Utility	Gas Utility	Elec Savings (kWh)	Year 1 Utility Cost Savings	Gas Savings (therm)	Elec Savings (kWh)	Year 1 Utility Cost Savings	GHG Savings (lb CO_2)	On-Bill Utility Savings (2020 PV$)	Inc. Cost (2020 PV$)	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV
1	PGE	PGE	171	$32	95.7	(809)	($64)	894	-$341	($326)	0.96	($14)	>1	$472	>1	$1,856
2	PGE	PGE	236	$43	86.9	(726)	($55)	852	$492	($399)	>1	$891	>1	$1,127	>1	$2,239
3	PGE	PGE	232	$46	86.7	(711)	($53)	857	$469	($213)	>1	$682	>1	$814	>1	$1,945
4	PGE	PGE	261	$46	81.4	(673)	($50)	821	$768	($399)	>1	$1,166	>1	$1,215	>1	$2,250
4	CPAU	CPAU	261	$27	81.4	(673)	($19)	821	$729	($399)	>1	$1,128	>1	$1,215	>1	$2,250
5	PGE	PGE	254	$49	86.7	(711)	($53)	867	$585	($213)	>1	$798	>1	$856	>1	$1,973
5	PGE	SCG	254	$49	86.7	(711)	($73)	867	$232	($213)	>1	$445	>1	$856	>1	$1,973
6	SCE	SCG	290	$37	78.3	(645)	($41)	808	$803	($399)	>1	$1,202	>1	$1,233	>1	$2,285
7	SDGE	SDGE	270	$48	78.0	(642)	($61)	798	$742	($399)	>1	$1,141	>1	$1,273	>1	$2,256
8	SCE	SCG	299	$36	75.5	(620)	($39)	789	$915	($399)	>1	$1,314	>1	$1,331	>1	$2,414
9	SCE	SCG	303	$34	76.3	(628)	($40)	797	$833	($399)	>1	$1,232	>1	$1,407	>1	$2,486
10	SCE	SCG	308	$32	63.2	(624)	($53)	632	$338	($617)	>1	$955	>1	$1,258	>1	$2,100
10	SDGE	SDGE	308	$49	63.2	(624)	($77)	632	$539	($617)	>1	$1,156	>1	$1,258	>1	$2,100
11	PGE	PGE	307	$38	64.8	(643)	($63)	648	$464	($544)	>1	$1,008	>1	$1,203	>1	$2,098
12	PGE	PGE	285	$39	67.7	(672)	($67)	659	$237	($544)	>1	$781	>1	$1,089	>1	$2,078
12	SMUD	PGE	285	$20	67.7	(672)	($2)	659	$987	($544)	>1	$1,531	>1	$1,089	>1	$2,078
13	PGE	PGE	317	$39	62.8	(618)	($60)	637	$581	($544)	>1	$1,125	>1	$1,027	>1	$2,149
14	SCE	SCG	343	$34	65.3	(650)	($56)	663	$445	($544)	>1	$989	>1	$1,366	>1	$2,185
14	SDGE	SDGE	343	$50	65.3	(650)	($80)	663	$582	($544)	>1	$1,126	>1	$1,366	>1	$2,185
15	SCE	SCG	390	$32	51.2	(492)	($42)	582	$948	($544)	>1	$1,492	>1	$1,643	>1	$2,324
16	PGE	PGE	284	$41	77.8	(813)	($85)	716	-$201	($544)	2.7	$343	13.6	$504	>1	$1,645

[a] Values in red indicate B/C ratios less than 1 or negative values. Values In grey indicate cases which are cost-effective but are not code compliant and cannot be used to support a reach code.
[b] ">1" indicates cases where there are both incremental measure cost savings and energy cost savings.

Table 29: All-Electric Clustered HPWH + 0.2 kW_{DC} PV per Dwelling Unit Results (Savings/Cost Per Dwelling Unit)[a, b]

			Dwelling Units		Central Water Heating			Total			On-Bill		2019 TDV		2022 TDV	
Climate Zone	Elec Utility	Gas Utility	Elec Savings (kWh)	Year 1 Utility Cost Savings	Gas Savings (therm)	Elec Savings (kWh)	Year 1 Utility Cost Savings	GHG Savings (lb CO_2)	On-Bill Utility Savings (2020 PV$)	Inc. Cost (2020 PV$)	B/C Ratio	NPV	B/C Ratio	NPV	B/C Ratio	NPV
1	PGE	PGE	304	$64	95.7	(809)	($64)	949	$415	($10)	>1	$425	>1	$648	>1	$1,919
2	PGE	PGE	393	$87	86.9	(726)	($55)	920	$1,520	($82)	>1	$1,602	>1	$1,411	>1	$2,410
3	PGE	PGE	395	$91	86.7	(711)	($53)	926	$1,521	$104	14.7	$1,417	11.5	$1,085	21.3	$2,104
4	PGE	PGE	427	$92	81.4	(673)	($50)	892	$1,852	($82)	>1	$1,934	>1	$1,523	>1	$2,474
4	CPAU	CPAU	427	$52	81.4	(673)	($19)	892	$1,319	($82)	>1	$1,401	>1	$1,523	>1	$2,474
5	PGE	PGE	428	$96	86.7	(711)	($53)	941	$1,698	$104	16.4	$1,594	12.3	$1,173	21.9	$2,163
5	PGE	SCG	428	$96	86.7	(711)	($73)	941	$1,344	$104	13.0	$1,241	12.3	$1,173	21.9	$2,163
6	SCE	SCG	466	$74	78.3	(645)	($41)	884	$1,674	($82)	>1	$1,756	>1	$1,539	>1	$2,528
7	SDGE	SDGE	435	$94	78.0	(642)	($61)	869	$1,842	($82)	>1	$1,925	>1	$1,598	>1	$2,433
8	SCE	SCG	470	$71	75.5	(620)	($39)	863	$1,760	($82)	>1	$1,842	>1	$1,668	>1	$2,705
9	SCE	SCG	480	$66	76.3	(628)	($40)	874	$1,590	($82)	>1	$1,673	>1	$1,752	>1	$2,771
10	SCE	SCG	485	$64	63.2	(624)	($53)	708	$1,092	($300)	>1	$1,392	>1	$1,580	>1	$2,368
10	SDGE	SDGE	485	$97	63.2	(624)	($77)	708	$1,680	($300)	>1	$1,980	>1	$1,580	>1	$2,368
11	PGE	PGE	466	$76	64.8	(643)	($63)	717	$1,367	($228)	>1	$1,594	>1	$1,521	>1	$2,270
12	PGE	PGE	449	$78	67.7	(672)	($67)	729	$1,164	($228)	>1	$1,392	>1	$1,396	>1	$2,260
12	SMUD	PGE	449	$40	67.7	(672)	($2)	729	$1,459	($228)	>1	$1,687	>1	$1,396	>1	$2,260
13	PGE	PGE	482	$79	62.8	(618)	($60)	708	$1,516	($228)	>1	$1,743	>1	$1,315	>1	$2,344
14	SCE	SCG	534	$68	65.3	(650)	($56)	744	$1,252	($228)	>1	$1,480	>1	$1,791	>1	$2,507
14	SDGE	SDGE	534	$101	65.3	(650)	($80)	744	$1,774	($228)	>1	$2,002	>1	$1,791	>1	$2,507
15	SCE	SCG	567	$63	51.2	(492)	($42)	657	$1,695	($228)	>1	$1,923	>1	$1,998	>1	$2,580
16	PGE	PGE	454	$81	77.8	(813)	($85)	789	$760	($228)	>1	$988	>1	$820	>1	$1,829

[a] Values in red indicate B/C ratios less than 1 or negative values. Values In grey indicate cases which are cost-effective but are not code compliant and cannot be used to support a reach code.
[b] “>1” indicates cases where there are both incremental measure cost savings and energy cost savings.

CALIFORNIA ENERGY CODES & STANDARDS

A STATEWIDE UTILITY PROGRAM

Title 24, Parts 6 and 11
Local Energy Efficiency Ordinances

2019 Nonresidential New Construction Reach Code Cost Effectiveness Study

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Last Modified: July 25, 2019

SDGE A Sempra Energy utility SoCalGas A Sempra Energy utility SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company PG&E Pacific Gas and Electric Company

LEGAL NOTICE

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1 Introduction

The California Building Energy Efficiency Standards Title 24, Part 6 (Title 24) (CEC, 2019) is maintained and updated every three years by two state agencies: the California Energy Commission (the Energy Commission) and the Building Standards Commission (BSC). In addition to enforcing the code, local jurisdictions have the authority to adopt local energy efficiency ordinances—or reach codes—that exceed the minimum standards defined by Title 24 (as established by Public Resources Code Section 25402.1(h)2 and Section 10-106 of the Building Energy Efficiency Standards). Local jurisdictions must demonstrate that the requirements of the proposed ordinance are cost-effective and do not result in buildings consuming more energy than is permitted by Title 24. In addition, the jurisdiction must obtain approval from the Energy Commission and file the ordinance with the BSC for the ordinance to be legally enforceable. This report was developed in coordination with the California Statewide Investor Owned Utilities (IOUs) Codes and Standards Program, key consultants, and engaged cities—collectively known as the Reach Code Team.

This report documents cost-effective combinations of measures that exceed the minimum state requirements for design in newly-constructed nonresidential buildings. Buildings specifically examined include medium office, medium retail, and small hotels. Measures include energy efficiency, solar photovoltaics (PV), and battery storage. In addition, the report includes a comparison between a baseline mixed-fuel design and all-electric design for each occupancy type.

The Reach Code team analyzed the following seven packages as compared to 2019 code compliant mixed-fuel design baseline:

- **Package 1A – Mixed-Fuel + Energy Efficiency (EE):** Mixed-fuel design with energy efficiency measures and federal minimum appliance efficiencies.
- **Package 1B – Mixed-Fuel + EE + PV + Battery (B)**: Same as Package 1A, plus solar PV and batteries.
- **Package 1C – Mixed-fuel + High Efficiency (HE)**: Baseline code-minimum building with high efficiency appliances, triggering federal preemption. The intent of this package is to assess the standalone contribution that high efficiency appliances would make toward achieving high performance thresholds.
- **Package 2 – All-Electric Federal Code-Minimum Reference**: All-electric design with federal code minimum appliance efficiency. No solar PV or battery.
- **Package 3A – All-Electric + EE**: Package 2 all-electric design with energy efficiency measures and federal minimum appliance efficiencies.
- **Package 3B – All-Electric + EE + PV + B**: Same as Package 3A, plus solar PV and batteries.
- **Package 3C – All-Electric + HE**: All-electric design with high efficiency appliances, triggering federal preemption.

Figure 1 summarizes the baseline and measure packages. Please refer to *Section 3* for more details on the measure descriptions.

Figure 1. Measure Category and Package Overview

Measure Category	Report Section	Mixed Fuel				All-Electric			
		Baseline	1A	1B	1C	2	3A	3B	3C
		Fed Code Minimum Efficiency	EE	EE+ PV + B	HE	Fed Code Minimum Efficiency	EE	EE+ PV + B	HE
Energy Efficiency Measures	3.1		X	X			X	X	
Solar PV + Battery	3.2			X				X	
All-Electric Measures	3.3					X	X	X	X
Preemptive Appliance Measures	3.4				X				X

The team separately developed cost effectiveness results for PV-only and PV+Battery packages, excluding any efficiency measures. For these packages, the PV is modeled as a "minimal" size of 3 kW and a larger size based on the available roof area and electric load of the building. PV sizes are combined with two sizes of battery storage for both mixed fuel and all electric buildings to form eight different package combinations as outlined below:

- **Mixed-Fuel + 3 kW PV Only**
- **Mixed-Fuel + 3 kW PV + 5 kWh Battery**
- **Mixed-Fuel + PV Only:** PV sized per the roof size of the building, or to offset the annual electricity consumption, whichever is smaller
- **Mixed-Fuel + PV + 50 kWh Battery:** PV sized per the roof size of the building, or to offset the annual electricity consumption, whichever is smaller, along with 50 kWh battery
- **All-Electric + 3 kW PV Only**
- **All-Electric + 3 kW PV + 5 kWh Battery**
- **All-Electric + PV Only:** PV sized per the roof size of the building, or to offset the annual electricity consumption, whichever is smaller
- **All-Electric + PV + 50 kWh Battery:** PV sized per the roof size of the building, or to offset the annual electricity consumption, whichever is smaller, along with 50 kWh battery.

Each of the eight packages are evaluated against a baseline model designed as per 2019 Title 24 Part 6 requirements. The Standards baseline for all occupancies in this report is a mixed-fuel design.

The Department of Energy (DOE) sets minimum efficiency standards for equipment and appliances that are federally regulated under the National Appliance Energy Conservation Act (NAECA), including heating, cooling, and water heating equipment.[1] Since state and local governments are prohibited from adopting

[1] https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=8de751f141aaa1c1c9833b36156faf67&mc=true&n=pt10.3.431&r=PART&ty=HTML#se10.3.431_197

higher minimum efficiencies than the federal standards require, the focus of this study is to identify and evaluate cost-effective packages that do not include high efficiency equipment. However, because high efficiency appliances are often the easiest and most affordable measures to increase energy performance, this study provides an analysis of high efficiency appliances for informational purposes. While federal preemption would limit a reach code, in practice, builders may install any package of compliant measures to achieve the performance requirements, including higher efficiency appliances that are federally regulated.

2 Methodology and Assumptions

With input from several stakeholders, the Reach Codes team selected three building types—medium office, medium retail, and small hotel—to represent a predominant segment of nonresidential new construction in the state.

This analysis used both on-bill and time dependent valuation of energy (TDV) based approaches to evaluate cost-effectiveness. Both methodologies require estimating and quantifying the energy savings associated with energy efficiency measures, as well as quantifying the costs associated with the measures. The main difference between the methodologies is the valuation of energy and thus the cost savings of reduced or avoided energy use. TDV was developed by the Energy Commission to reflect the time dependent value of energy including long-term projected costs of energy such as the cost of providing energy during peak periods of demand and other societal costs including projected costs for carbon emissions. With the TDV approach, electricity used (or saved) during peak periods has a much higher value than electricity used (or saved) during off-peak periods.[2]

The Reach Code Team performed energy simulations using EnergyPro 8.0 software for 2019 Title 24 code compliance analysis, which uses CBECC-Com 2019.1.0 for the calculation engine. The baseline prototype models in all climate zones have been designed to have compliance margins as close as possible to 0 to reflect a prescriptively-built building.[3]

2.1 Building Prototypes

The DOE provides building prototype models which, when modified to comply with 2019 Title 24 requirements, can be used to evaluate the cost effectiveness of efficiency measures. These prototypes have historically been used by the California Energy Commission to assess potential code enhancements. The Reach Code Team performed analysis on a medium office, a medium retail, and a small hotel prototype.

Water heating includes both service water heating (SWH) for office and retail buildings and domestic hot water for hotels. In this report, water heating or SWH is used to refer to both. The Standard Design HVAC and SWH systems are based on the system maps included in the 2019 Nonresidential Alternate

[2] Horii, B., E. Cutter, N. Kapur, J. Arent, and D. Conotyannis. 2014. "Time Dependent Valuation of Energy for Developing Building Energy Efficiency Standards." Available at: http://www.energy.ca.gov/title24/2016standards/prerulemaking/documents/2014-07-09_workshop/2017_TDV_Documents

[3] EnergySoft and TRC were able to develop most baseline prototypes to achieve a compliance margin of less than +/-1 percent except for few models that were at +/- 6 percent. This indicates these prototypes are not exactly prescriptive according to compliance software calculations. To calculate incremental impacts, TRC conservatively compared the package results to that of the proposed design of baseline prototypes (not the standard design).

Calculation Method Reference Manual.[4] The Standard Design is the baseline for all nonresidential projects and assumes a mixed-fuel design using natural gas as the space heating source in all cases. Baseline HVAC and SWH system characteristics are described below and in Figure 2:

- The baseline medium office HVAC design package includes two gas hot water boilers, three packaged rooftop units (one for each floor), and variable air volume (VAV) terminal boxes with hot water reheat coils. The SWH design includes one 8.75 kW electric resistance hot water heater with a 30-gallon storage tank.
- The baseline medium retail HVAC design includes five single zone packaged rooftop units (variable flow and constant flow depending on the zone) with gas furnaces for heating. The SWH design includes one 8.75 kW electric resistance hot water heater with a 30-gallon storage tank.
- The small hotel has two baseline equipment systems, one for the nonresidential spaces and one for the guest rooms.
  - The nonresidential HVAC design includes two gas hot water boilers, four packaged rooftop units and twelve VAV terminal boxes with hot water reheat coils. The SWH design include a small electric resistance water heater with 30-gallon storage tank.
  - The residential HVAC design includes one single zone air conditioner (AC) unit with gas furnace for each guest room and the water heating design includes one central gas water heater with a recirculation pump for all guest rooms.

Figure 2. Prototype Characteristics Summary

	Medium Office	Medium Retail	Small Hotel
Conditioned Floor Area	53,628	24,691	42,552
Number of Stories	3	1	4
Number of Guest Rooms	0	0	78
Window-to-Wall Area Ratio	0.33	0.07	0.11
Baseline HVAC System	Packaged DX VAV with gas furnaces + VAV terminal units with hot water reheat. Central gas hot water boilers	Single zone packaged DX units with gas furnaces	Nonresidential: Packaged DX VAV with hot water coil + VAV terminal units with hot water reheat. Central gas hot water boilers. Residential: Single zone DX AC unit with gas furnaces
Baseline Water Heating System	30-gallon electric resistance water heater	30-gallon electric resistance water heater	Nonresidential: 30-gallon electric resistance water heater Residential: Central gas water heater with recirculation loop

[4] Nonresidential Alternative Calculation Method Reference Manual For the 2019 Building Energy Efficiency Standards. Available at: https://www.energy.ca.gov/2019publications/CEC-400-2019-006/CEC-400-2019-006-CMF.pdf

2.2 Cost Effectiveness

The Reach Code Team analyzed the cost effectiveness of the packages by applying them to building prototypes (as applicable) using the life cycle cost methodology, which is approved and used by the Energy Commission to establish cost effective building energy standards (Title 24, Part 6).[5]

Per Energy Commission's methodology, the Reach Code Team assessed the incremental costs of the energy efficiency measure packages and compared them to the energy cost savings over the measure life of 15 years. Incremental costs represent the equipment, installation, replacements, and maintenance costs of the proposed measure relative to the 2019 Title 24 Standards minimum requirements. The energy savings benefits are estimated using both TDV of energy and typical utility rates for each building type:

- **Time Dependent Valuation:** TDV is a normalized monetary format developed and used by the Energy Commission for comparing electricity and natural gas savings, and it considers the cost of electricity and natural gas consumed during different times of the day and year. Simulation outputs are translated to TDV savings benefits using 2019 TDV multipliers and 15-year discounted costs for the nonresidential measure packages.
- **Utility bill impacts (On-bill):** Utility energy costs are estimated by applying appropriate IOU rates to estimated annual electricity and natural gas consumption. The energy bill savings are calculated as the difference in utility costs between the baseline and proposed package over a 15-year duration accounting for discount rate and energy cost escalation.

In coordination with the IOU rate team, and rate experts at a few electric publicly owned utilities (POUs), the Reach Code Team used the current nonresidential utility rates publicly available at the time of analysis to analyze the cost effectiveness for each proposed package. The utility tariffs, summarized in Figure 3, were determined based on the annual load profile of each prototype, and the most prevalent rate in each territory. For some prototypes there are multiple options for rates because of the varying load profiles of mixed-fuel buildings versus all-electric buildings. Tariffs were integrated in EnergyPro software to be applied to the hourly electricity and gas outputs. The Reach Code Team did not attempt to compare or test a variety of tariffs to determine their impact on cost effectiveness.

The currently available and applicable time-of–use (TOU) nonresidential rates are applied to both the base and proposed cases with PV systems.[6] Any annual electricity production in excess of annual electricity consumption is credited at the applicable wholesale rate based on the approved NEM tariffs for that utility. For a more detailed breakdown of the rates selected refer to *Appendix 6.4 Utility Rate Schedules*. Note that most utility time-of-use rates will be updated in the near future, which can affect cost effectiveness results. For example, Pacific Gas and Electric Company (PG&E) will introduce new rates for new service connections in late 2019, and existing accounts will be automatically rolled over to new rates in November 2020.

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[5] Architectural Energy Corporation (January 2011) Life-Cycle Cost Methodology. California Energy Commission. Available at: http://www.energy.ca.gov/title24/2013standards/prerulemaking/documents/general_cec_documents/2011-01-14_LCC_Methodology_2013.pdf

[6] Under NEM rulings by the CPUC (D-16-01-144, 1/28/16), all new PV customers shall be in an approved TOU rate structure. As of March 2016, all new PG&E net energy metering (NEM) customers are enrolled in a time-of-use rate. (http://www.pge.com/en/myhome/saveenergymoney/plans/tou/index.page?).

Figure 3. Utility Tariffs used based on Climate Zone

Climate Zones	Electric / Gas Utility	Electricity (Time-of-use)	Natural Gas
IOUs			
1-5,11-13,16	PG&E	A-1/A-10	G-NR1
5	PG&E / Southern California Gas Company	A-1/A-10	G-10 (GN-10)
6,8-10,14,15	SCE / Southern California Gas Company	TOU-GS-1/TOU-GS-2/TOU-GS-3	G-10 (GN-10)
7,10,14	San Diego Gas and Electric Company (SDG&E)	A-1/A-10	GN-3
Electric POUs			
4	City of Palo Alto (CPAU)	E-2	n/a
12	Sacramento Municipal Utility District (SMUD)	GS	n/a
6,7,8,16	Los Angeles Department of Water and Power (LADWP)	A-2 (B)	n/a

The Reach Code Team obtained measure costs through interviews with contractors and California distributors and review of online sources, such as Home Depot and RS Means. Taxes and contractor markups were added as appropriate. Maintenance costs were not included because there is no assumed maintenance on the envelope measures. For HVAC and SWH measures the study assumes there are no additional maintenance cost for a more efficient version of the same system type as the baseline. Replacement costs for inverters were included for PV systems, but the useful life all other equipment exceeds the study period.

The Reach Code Team compared the energy benefits with incremental measure cost data to determine cost effectiveness for each measure package. The calculation is performed for a duration of 15 years for all nonresidential prototypes with a 3 percent discount rate and fuel escalation rates based on the most recent General Rate Case filings and historical escalation rates.[7] Cost effectiveness is presented using net present value and benefit-to-cost ratio metrics.

- **Net Present Value (NPV)**: The Reach Code Team uses net savings (NPV benefits *minus* NPV costs) as the cost effectiveness metric. If the net savings of a measure or package is positive, it is considered cost effective. Negative savings represent net costs. A measure that has negative energy cost benefits (energy cost increase) can still be cost effective if the costs to implement the measure are more negative (i.e., material and maintenance cost savings).
- **Benefit-to-Cost Ratio (B/C)**: Ratio of the present value of all benefits to the present value of all costs over 15 years (NPV benefits *divided by* NPV costs). The criteria for cost effectiveness is a B/C greater than 1.0. A value of one indicates the savings over the life of the measure are equivalent to the incremental cost of that measure.

[7] 2019 TDV Methodology Report, California Energy Commission, Docket number: 16-BSTD-06 https://efiling.energy.ca.gov/GetDocument.aspx?tn=216062

There are several special circumstances to consider when reviewing these results:

- Improving the efficiency of a project often requires an initial incremental investment. However, some packages result in initial construction cost savings (negative incremental cost), and either energy cost savings (positive benefits), or increased energy costs (negative benefits). Typically, utility bill savings are categorized as a 'benefit' while incremental construction costs are treated as 'costs.' In cases where both construction costs are negative and utility bill savings are negative, the construction cost savings are treated as the 'benefit' while the utility bill negative savings are the 'cost.'
- In cases where a measure package is cost effective immediately (i.e., there are upfront cost savings and lifetime energy cost savings), cost effectiveness is represented by ">1".
- The B/C ratios sometimes appear very high even though the cost numbers are not very high (for example, an upfront cost of $1 but on-bill savings of $200 over 30 years would equate to a B/C ratio of 200). NPV is also displayed to clarify these potentially confusing conclusions – in the example, the NPV would be equal to a modest $199.

3 Measure Description and Cost

Using the 2019 Title 24 code baseline as the starting point, The Reach Code Team identified potential measure packages to determine the projected energy (therm and kWh) and compliance impacts. The Reach Code Team developed an initial measure list based on experience with designers and contractors along with general knowledge of the relative acceptance and preferences of many measures, as well as their incremental costs.

The measures are categorized into energy efficiency, solar PV and battery, all-electric, and preempted high efficiency measures in subsections below.

3.1 Energy Efficiency Measures

This section describes all the energy efficiency measures considered for this analysis to develop a non-preempted, cost-effective efficiency measure package. The Reach Code Team assessed the cost-effectiveness of measures for all climate zones individually and found that the packages did not need to vary by climate zone, with the exception of a solar heat gain coefficient measure in hotels, as described in more detail below. The measures were developed based on reviews of proposed 2022 Title 24 codes and standards enhancement measures, as well as ASHRAE 90.1 and ASHRAE 189.1 Standards. Please refer to *Appendix Section 6.86.7* for a list of efficiency measures that were considered but not implemented.

Figure 4 provides a summary of the cost of each measure and the applicability of each measure to the prototype buildings.

3.1.1 Envelope

- **Modify Solar Heat Gain Coefficient (SHGC) fenestration**
  - Office and Retail - All Climate Zones: reduce window SHGC from the prescriptive value of 0.25 to 0.22
  - Hotel
    - Climate zones 1, 2, 3, 5, and 16: Increase the SHGC for all nonresidential spaces from the prescriptive value of 0.25 to 0.45 in both common and guest room spaces.
    - Climate zones 4, and 6-15: Reduce window SHGC from the prescriptive value of 0.25 to 0.22, only for common spaces.

  In all cases, the fenestration visible transmittance and U-factor remain at prescriptive values.
- **Fenestration as a function of orientation**: Limit the amount of fenestration area as a function of orientation. East-facing and west-facing windows are each limited to one-half of the average amount of north-facing and south-facing windows.

3.1.2 HVAC and SWH

- **Drain water heat recovery (DWHR)**: Add shower drain heat recovery in hotel guest rooms. DWHR captures waste heat from a shower drain line and uses it to preheat hot water. Note that this measure cannot currently be modeled on hotel/motel spaces, and the Reach Code Team integrated estimated savings outside of modeling software based on SWH savings in residential scenarios. Please see *Appendix Section 6.3* for details on energy savings analysis.
- **VAV box minimum flow**: Reduce VAV box minimum airflows from the current T24 prescriptive requirement of 20 percent of maximum (design) airflow to the T24 zone ventilation minimums.
- **Economizers on small capacity systems**: Require economizers and staged fan control in units with cooling capacity ≥ 33,000 Btu/hr and ≤ 54,000 Btu/hr, which matches the requirement in the 2018 International Green Construction Code and adopts ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1. This measure reduces the T24 prescriptive threshold on air handling units that are required to have economizers, which is > 54,000 Btu/hr.
- **Solar thermal hot water:** For all-electric hotel only, add solar thermal water heating to supply the following portions of the water heating load, measured in solar savings fraction (SSF):
  - 20 percent SSF in CZs 2, 3, and 5-9
  - 25 percent in CZ4
  - 35 percent SSF in CZs 1 and 10-16.

3.1.3 Lighting

- **Interior lighting reduced lighting power density (LPD)**: Reduce LPD by 15 percent for Medium Office, 10 percent for Medium Retail and by 10 percent for the nonresidential areas of the Small Hotel.
- **Institutional tuning**: Limit the maximum output or maximum power draw of lighting to 85 percent of full light output or full power draw.
- **Daylight dimming plus off**: Turn daylight-controlled lights completely off when the daylight available in the daylit zone is greater than 150 percent of the illuminance received from the general lighting system at full power. There is no associated cost with this measure, as the 2019 T24 Standards already require multilevel lighting and daylight sensors in primary and secondary daylit spaces. This measure is simply a revised control strategy and does not increase the number of sensors required or labor to install and program a sensor.
- **Occupant sensing in open plan offices**: In an open plan office area greater than 250 ft^2, control lighting based on occupant sensing controls. Two workstations per occupancy sensor.

Details on the applicability and impact of each measure by building type and by space function can be found in *Appendices 6.2*. The appendix also includes the resulting LPD that is modeled as the proposed by building type and by space function.

Figure 4. Energy Efficiency Measures - Specification and Cost

Measure	Baseline T24 Requirement	Measure Applicability ● Included in Packages 1A, 1B, 3A, 3C – Not applicable				Incremental Cost	Sources & Notes
				Small Hotel			
		Med Office	Med Retail	Guest rooms	Comm Spaces		
Envelope							
Modify SHGC Fenestration	SHGC of 0.25	●	●	●	●	$1.60 /ft^2 window for SHGC decreases, $0/ft^2 for SHGC increases	Costs from one manufacturer.
Fenestration as a Function of Orientation	Limit on total window area and west-facing window area as a function of wall area.	●	–	–	–	$0	No additional cost associated with the measure which is a design consideration not an equipment cost.
HVAC and SHW							
Drain Water Heat Recovery	No heat recovery required	–	–	●	–	$841 /unit	Assume 1 heat recovery unit for every 3 guestrooms. Costs from three manufacturers.
VAV Box Minimum Flow	20 percent of maximum (design) airflow	●	–	–	●	$0	No additional cost associated with the measure which is a design consideration not an equipment cost.
Economizers on Small Capacity Systems	Economizers required for units > 54,000 Btu/hr	–	●	–	–	$2,857 /unit	Costs from one manufacturer's representative and one mechanical contractor.

Measure	Baseline T24 Requirement	Measure Applicability ● Included in Packages 1A, 1B, 3A, 3C – Not applicable				Incremental Cost	Sources & Notes
				Small Hotel			
		Med Office	Med Retail	Guest rooms	Comm Spaces		
Solar Thermal Hot Water	For central heat pump water heaters, there is no prescriptive baseline requirement.	–	–	● (electric only)	–	$33/therm-yr	Installed costs reported in the California Solar Initiative Thermal Program Database, 2015-present.[8] Costs include tank and were only available for gas backup systems. Costs are reduced by 19 percent per federal income tax credit average through 2022.
Lighting							
Interior Lighting Reduced LPD	Per Area Category Method, varies by Primary Function Area. Office area 0.60 – 0.70 W/ft^2 depending on area of space. Hotel function area 0.85 W/ft^2. Retail Merchandise Sales 1.00 W/ft^2	●	●	–	●	$0	Industry report on LED pricing analysis shows that costs are not correlated with efficacy.[9]

[8] http://www.csithermalstats.org/download.html

[9] http://calmac.org/publications/LED_Pricing_Analysis_Report_-_Revised_1.19.2018_Final.pdf

Measure	Baseline T24 Requirement	Measure Applicability ● Included in Packages 1A, 1B, 3A, 3C – Not applicable				Incremental Cost	Sources & Notes
				Small Hotel			
		Med Office	Med Retail	Guest rooms	Comm Spaces		
Institutional Tuning	No requirement, but Power Adjustment Factor (PAF) credit of 0.10 available for luminaires in non-daylit areas and 0.05 for luminaires in daylit areas[10]	●	●	–	●	$0.06/ft^2	Industry report on institutional tuning[11]
Daylight Dimming Plus Off	No requirement, but PAF credit of 0.10 available.	●	–	–	–	$0	Given the amount of lighting controls already required, this measure is no additional cost.
Occupant Sensing in Open Plan Offices	No requirement, but PAF credit of 0.30 available.	●	–	–	–	$189 /sensor; $74 /powered relay; $108 /secondary relay	2 workstations per sensor; 1 fixture per workstation; 4 workstations per master relay; 120 ft^2/workstation in open office area, which is 53% of total floor area of the medium office

[10] Power Adjustment Factors allow designers to tradeoff increased lighting power densities for more efficient designs. In this study, PAF-related measures assume that the more efficient design is incorporated without a tradeoff for increased lighting power density.

[11] https://slipstreaminc.org/sites/default/files/2018-12/task-tuning-report-mndoc-2015.pdf

3.2 Solar Photovoltaics and Battery Measures

This section describes the PV and battery measures considered for this analysis. The Reach Code Team estimated the required PV sizes for each building prototype for the efficiency measure packages and the stand alone PV and battery options.

3.2.1 Solar Photovoltaics

2019 Title 24 requires nonresidential buildings to reserve at least 15 percent of the roof area as a "solar zone," but does not include any requirements or compliance credits for the installation of photovoltaic systems. The Reach Code Team analyzed a range of PV system sizes to determine cost effectiveness. To determine upper end of potential PV system size, the Reach Code Team assumed a PV generation capacity of either

- 15 W/ft^2 covering 50 percent of the roof area, or
- Enough to nearly offset the annual energy consumption.

The medium office and small hotel prototypes had small roof areas compared to their annual electricity demand, thus the PV system capacity at 50 percent of the roof area was less than the estimated annual usage. The medium office and small hotel had a 135 kW and 80 kW array, respectively. The medium retail building has a substantially large roof area that would accommodate a PV array that generates more than the annual electricity load of the building. The PV array for the medium retail building was sized at 110 kW to not exceed the annual electricity consumption of the building when accounting for the minimum annual energy demand across climate zones with efficiency packages.

The modeling software for nonresidential buildings does not allow auto-sizing of PV based on a desired percent offset of electricity use. Moreover, the PV size is also constrained by the availability of roof area. Hence, a common size of PV is modeled for all the packages including all electric design. Figure 5 through Figure 7 below demonstrate the percent of electricity offset by PV for both mixed fuel and all electric buildings over their respective federal minimum design package.

Figure 5. Medium Office – Annual Percent kWh Offset with 135 kW Array

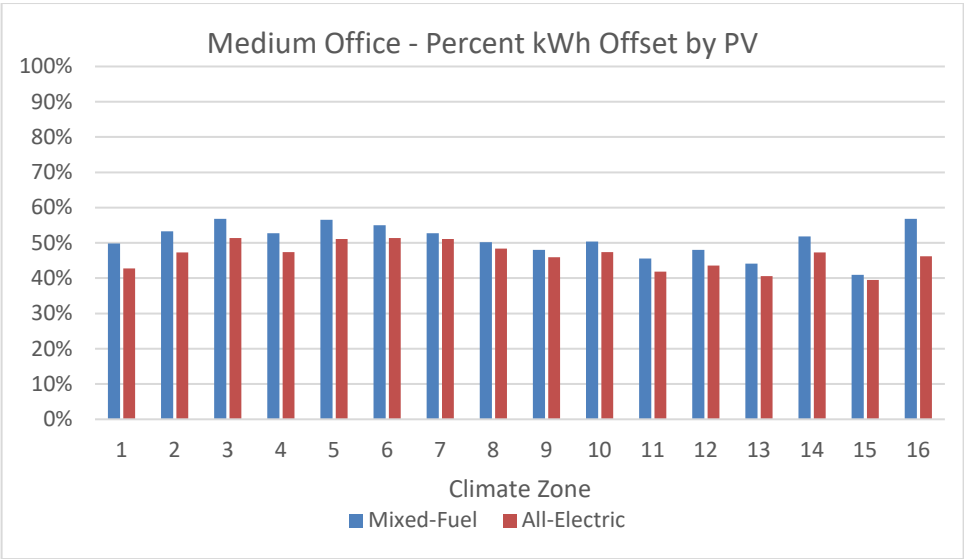


Figure 6. Medium Retail – Annual Percent kWh Offset with 110 kW Array

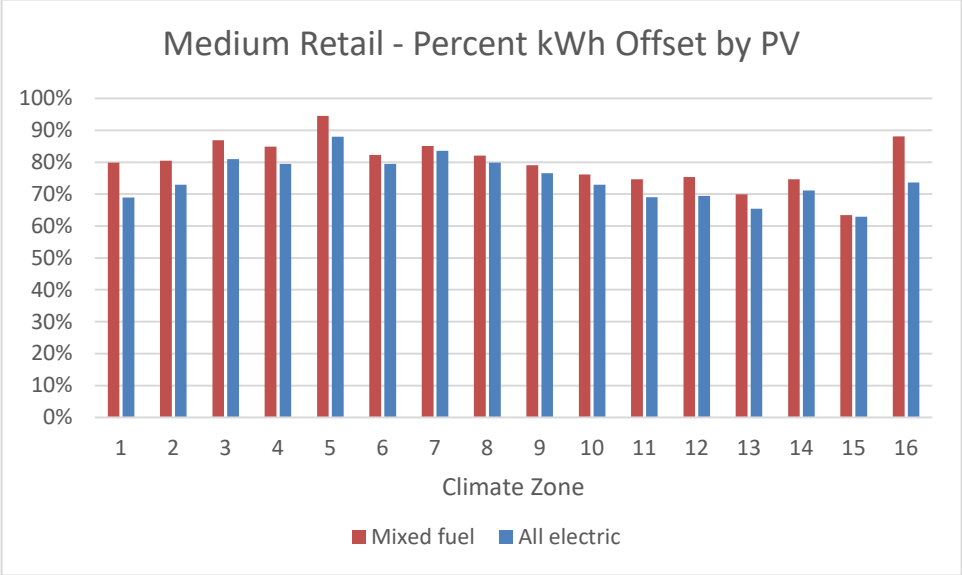
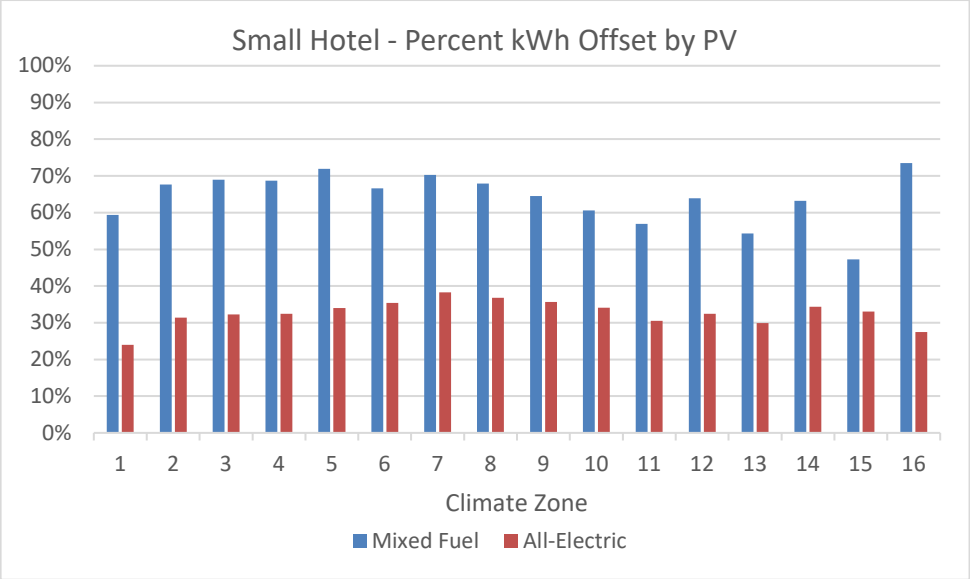


Figure 7. Small Hotel – Annual Percent kWh Offset with 80 kW Array



The costs for PV include first cost to purchase and install the system, inverter replacement costs, and annual maintenance costs. A summary of the medium office costs and sources is given in Figure 8. Upfront solar PV system costs are reduced by the federal income tax credit (ITC), approximately 19 percent due to a phased reduction in the credit through the year 2022.[12]

[12] The federal credit drops to 26% in 2020, and 22% in 2021 before dropping permanently to 10% for commercial projects and 0% for residential projects in 2022. More information on federal Investment Tax Credits available at: https://www.seia.org/initiatives/solar-investment-tax-credit-itc

Figure 8. Medium Office Upfront PV Costs

	Unit Cost	Cost	Useful Life (yrs.)	Source
Solar PV System	$2.30 / Wdc	$310,500	30	National Renewable Energy Laboratory (NREL) Q1 2016[13]
Inverter Replacement	$0.15 / Wdc	$20,250	10	E3 Rooftop Solar PV System Report[14]
Maintenance Costs	$0.02 / Wdc	$2,700	1	

PV energy output is built into CBECC-Com and is based on NREL's PVWatts calculator, which includes long term performance degradation estimates.[15]

3.2.2 Battery Storage

This measure includes installation of batteries to allow energy generated through PV to be stored and used later, providing additional energy cost benefits. This report does not focus on optimizing battery sizes or controls for each prototype and climate zone, though the Reach Code Team ran test simulations to assess the impact of battery sizes on TDV savings and found diminishing returns as the battery size increased.

The team set battery control to the Time of Use Control (TOU) method, which assumes batteries are charged anytime PV generation is greater than the building load but discharges to the electric grid beginning during the highest priced hours of the day (the "First Hour of the Summer Peak"). Because there is no default hour available in CBECC-Com, the team applied the default hour available in CBECC-Res to start discharging (hour 19 in CZs 2, 4, and 8-15, and hour 20 in other CZs). This control option is most reflective of the current products on the market. While this control strategy is being used in the analysis, there would be no mandate on the control strategy used in practice.

The current simulation software has approximations of how performance characteristics change with environmental conditions, charge/discharge rates, and degradation with age and use. More information is on the software battery control capabilities and associated qualification requirements are available in the Residential Alternative Calculation Method Reference Manual and the 2019 Reference Appendices for the 2019 Title 24 Standards.[16,17]

The Reach Code Team used costs of $558 kWh based on a 2018 IOU Codes and Standards Program report, assuming a replacement is necessary in year 15.[18] Batteries are also eligible for the ITC if they are installed at the same time as the renewable generation source and at least 75 percent of the energy used to charge

[13] Available at: https://www.nrel.gov/docs/fy16osti/66532.pdf

[14] Available at: https://efiling.energy.ca.gov/getdocument.aspx?tn=221366

[15] More information available at: https://pvwatts.nrel.gov/downloads/pvwattsv5.pdf

[16] Battery controls are discussed in Sections 2.1.5.4 and Appendix D of the Residential Alternative Calculation Method Reference Manual, available here: https://ww2.energy.ca.gov/2019publications/CEC-400-2019-005/CEC-400-2019-005-CMF.pdf

[17] Qualification Requirements for Battery Storage Systems are available in JA12 of the 2019 Reference Appendices: https://ww2.energy.ca.gov/2018publications/CEC-400-2018-021/CEC-400-2018-021-CMF.pdf

[18] Available at: http://localenergycodes.com/download/430/file_path/fieldList/PV%20Plus%20Battery%20Storage%20Report

the battery comes from a renewable source. Thus, the Reach Code Team also applied a 19 percent cost reduction to battery costs.

3.2.3 PV-only and PV+Battery Packages

The Reach Code Team analyzed solar PV and battery storage only, without other efficiency measures in both mixed-fuel and all-electric building designs. Two different sizes of solar PV and battery storage were analyzed.

- **Small PV Size**: 3 kW, assumed to be the minimal PV system considered for installation in a nonresidential building.
- **Large PV Size**: PV capacity equal to 15 W/ft^2 over 50 percent of the roof area, or sized to nearly offset annual electricity consumption, as described in Section 3.2.1.
- **Small Battery Size:** 5 kWh, assumed to be the minimal battery system considered for installation in a nonresidential building, and representative of smaller products currently available on the market.
- **Large Battery Size:** 50 kWh, assumed to be a substantially large size for a nonresidential setting. Generally, the reach code team found diminishing on-bill and TDV benefits as the battery size increased.

As described in Section 1 and Section 4.4, each PV size was run as a standalone measure. When packaged with a battery measure, the small PV size was paired with the small battery size, and the large PV size was paired with the large battery size.

3.3 All Electric Measures

The Reach Code Team investigated the cost and performance impacts and associated infrastructure costs associated with changing the baseline HVAC and water heating systems to all-electric equipment. This includes heat pump space heating, electric resistance reheat coils, electric water heater with storage tank, heat pump water heating, increasing electrical capacity, and eliminating natural gas connections that would have been present in mixed-fuel new construction. The Reach Code Team selected electric systems that would be installed instead of gas-fueled systems in each prototype.

3.3.1 HVAC and Water Heating

The nonresidential standards use a mixed-fuel baseline for the Standard Design systems. In most nonresidential occupancies, the baseline is natural gas space heating. Hotel/motels and high-rise residential occupancies also assume natural gas baseline water heating systems for the guest rooms and dwelling units. In the all-electric scenario, gas equipment serving these end-uses is replaced with electric equipment, as described in Figure 9.

Figure 9. All-Electric HVAC and Water Heating Characteristics Summary.

		Medium Office	Medium Retail	Small Hotel
HVAC System	Baseline	Packaged DX + VAV with HW reheat. Central **gas** boilers.	Single zone packaged DX with **gas** furnaces	NonRes: Packaged DX + VAV with HW reheat. Central **gas** boilers. Res: Single zone DX AC unit with **gas** furnaces
	Proposed All-Electric	Packaged DX + VAV with electric **resistance** reheat.	Single zone packaged **heat pumps**	NonRes: Packaged DX + VAV with electric **resistance** reheat Res: Single zone **heat pumps**
Water Heating System	Baseline	Electric **resistance** with storage	Electric **resistance** with storage	NonRes: **Electric** resistance storage Res: Central **gas** storage with recirculation
	Proposed All-Electric	Electric **resistance** with storage	Electric **resistance** with storage	NonRes: Electric **resistance** storage Res: Individual **heat pumps**

The Reach Code Team received cost data for baseline mixed-fuel equipment as well as electric equipment from an experienced mechanical contractor in the San Francisco Bay Area. The total construction cost includes equipment and material, labor, subcontractors (for example, HVAC and SHW control systems), and contractor overhead.

3.3.1.1 Medium Office

The baseline HVAC system includes two gas hot water boilers, three packaged rooftop units, and VAV hot water reheat boxes. The SHW design includes one 8.75 kW electric resistance hot water heater with a 30-gallon storage tank.

For the medium office all-electric HVAC design, the Reach Code Team investigated several potential all-electric design options, including variable refrigerant flow, packaged heat pumps, and variable volume and temperature systems. After seeking feedback from the design community, the Reach Code Team determined that the most feasible all-electric HVAC system, given the software modeling constraints is a VAV system with an electric resistance reheat instead of hot water reheat coil. A parallel fan-powered box (PFPB) implementation of electric resistance reheat would further improve efficiency due to reducing ventilation requirements, but an accurate implementation of PFPBs is not currently available in compliance software.

Note that the actual natural gas consumption for the VAV hot water reheat baseline may be higher than the current simulation results due to a combination of boiler and hot water distribution losses. A recent research study shows that the total losses can account for as high as 80 percent of the boiler energy use.[19]

[19] Raftery, P., A. Geronazzo, H. Cheng, and G. Paliaga. 2018. Quantifying energy losses in hot water reheat systems. Energy and Buildings, 179: 183-199. November. https://doi.org/10.1016/j.enbuild.2018.09.020. Retrieved from https://escholarship.org/uc/item/3qs8f8qx

If these losses are considered savings for the electric resistance reheat (which has zero associated distribution loss) may be higher.

The all-electric SHW system remains the same electric resistance water heater as the baseline and has no associated incremental costs.

Cost data for medium office designs are presented in Figure 10. The all-electric HVAC system presents cost savings compared to the hot water reheat system from elimination of the hot water boiler and associated hot water piping distribution. CZ10 and CZ15 all-electric design costs are slightly higher because they require larger size rooftop heat pumps than the other climate zones.

Figure 10. Medium Office HVAC System Costs

Climate Zone	Mixed Fuel Baseline	All Electric System	Incremental cost for All-Electric
CZ01	$1,202,538	$1,106,432	$(96,106)
CZ02	$1,261,531	$1,178,983	$(82,548)
CZ03	$1,205,172	$1,113,989	$(91,183)
CZ04	$1,283,300	$1,205,434	$(77,865)
CZ05	$1,207,345	$1,113,989	$(93,356)
CZ06	$1,216,377	$1,131,371	$(85,006)
CZ07	$1,227,932	$1,148,754	$(79,178)
CZ08	$1,250,564	$1,172,937	$(77,626)
CZ09	$1,268,320	$1,196,365	$(71,955)
CZ10	$1,313,580	$1,256,825	$(56,755)
CZ11	$1,294,145	$1,221,305	$(72,840)
CZ12	$1,274,317	$1,197,121	$(77,196)
CZ13	$1,292,884	$1,221,305	$(71,579)
CZ14	$1,286,245	$1,212,236	$(74,009)
CZ15	$1,357,023	$1,311,994	$(45,029)
CZ16	$1,295,766	$1,222,817	$(72,949)

3.3.1.2 Medium Retail

The baseline HVAC system includes five packaged single zone rooftop ACs with gas furnaces. Based on fan control requirements in section 140.4(m), units with cooling capacity ≥ 65,000 Btu/h have variable air volume fans, while smaller units have constant volume fans. The SHW design includes one 8.75 kW electric resistance hot water heater with a 30-gallon storage tank.

For the medium retail all-electric HVAC design, the Reach Code Team assumed packaged heat pumps instead of the packaged ACs. The all-electric SHW system remains the same electric resistance water heater as the baseline and has no associated incremental costs.

Cost data for medium retail designs are presented in Figure 11. Costs for rooftop air-conditioning systems are very similar to rooftop heat pump systems.

Figure 11. Medium Retail HVAC System Costs

Climate Zone	Mixed Fuel Baseline	All Electric System	Incremental cost for All-Electric
CZ01	$328,312	$333,291	$4,978
CZ02	$373,139	$373,702	$563
CZ03	$322,849	$326,764	$3,915
CZ04	$329,900	$335,031	$5,131
CZ05	$359,888	$362,408	$2,520
CZ06	$335,728	$341,992	$6,265
CZ07	$345,544	$349,808	$4,265
CZ08	$368,687	$369,792	$1,104
CZ09	$415,155	$411,069	$(4,087)
CZ10	$345,993	$346,748	$755
CZ11	$418,721	$414,546	$(4,175)
CZ12	$405,110	$400,632	$(4,477)
CZ13	$376,003	$375,872	$(131)
CZ14	$405,381	$406,752	$1,371
CZ15	$429,123	$427,606	$(1,517)
CZ16	$401,892	$404,147	$2,256

3.3.1.3 Small Hotel

The small hotel has two different baseline equipment systems, one for the nonresidential spaces and one for the guest rooms. The nonresidential HVAC system includes two gas hot water boilers, four packaged rooftop units and twelve VAV terminal boxes with hot water reheat coil. The SHW design includes a small electric water heater with storage tank. The residential HVAC design includes one single zone AC unit with gas furnace for each guest room and the water heating design includes one central gas storage water heater with a recirculation pump for all guest rooms.

For the small hotel all-electric design, the Reach Code Team assumed the nonresidential HVAC system to be packaged heat pumps with electric resistance VAV terminal units, and the SHW system to remain a small electric resistance water heater.

For the guest room all-electric HVAC system, the analysis used a single zone (packaged terminal) heat pump and a central heat pump water heater serving all guest rooms. Central heat pump water heating with recirculation serving guest rooms cannot yet be modeled in CBECC-Com, and energy impacts were modeled by simulating individual heat pump water heaters in each guest room. The reach code team believes this is a conservative assumption, since individual heat pump water heaters will have much higher tank standby losses. The Reach Code Team attained costs for central heat pump water heating installation including storage tanks and controls and used these costs in the study.

Cost data for small hotel designs are presented in Figure 12. The all-electric design presents substantial cost savings because there is no hot water plant or piping distribution system serving the nonresidential spaces, as well as the lower cost of packaged terminal heat pumps serving the residential spaces compared to split DX/furnace systems with individual flues.

Figure 12. Small Hotel HVAC and Water Heating System Costs

Climate Zone	Mixed Fuel Baseline	All Electric System	Incremental cost for All-Electric
CZ01	$2,337,531	$1,057,178	$(1,280,353)
CZ02	$2,328,121	$1,046,795	$(1,281,326)
CZ03	$2,294,053	$1,010,455	$(1,283,598)
CZ04	$2,302,108	$1,018,675	$(1,283,433)
CZ05	$2,298,700	$1,015,214	$(1,283,486)
CZ06	$2,295,380	$1,011,753	$(1,283,627)
CZ07	$2,308,004	$1,026,029	$(1,281,975)
CZ08	$2,333,662	$1,053,717	$(1,279,946)
CZ09	$2,312,099	$1,030,355	$(1,281,744)
CZ10	$2,354,093	$1,075,348	$(1,278,745)
CZ11	$2,347,980	$1,068,426	$(1,279,554)
CZ12	$2,328,654	$1,047,660	$(1,280,994)
CZ13	$2,348,225	$1,068,858	$(1,279,367)
CZ14	$2,345,988	$1,066,263	$(1,279,725)
CZ15	$2,357,086	$1,079,241	$(1,277,845)
CZ16	$2,304,094	$1,019,973	$(1,284,121)

3.3.2 Infrastructure Impacts

Electric heating appliances and equipment often require a larger electrical connection than an equivalent natural gas appliance because of the higher voltage and amperage necessary to electrically generate heat. Thus, many buildings may require larger electrical capacity than a comparable building with natural gas appliances. This includes:

- Electric resistance VAV space heating in the medium office and common area spaces of the small hotel.
- Heat pump water heating for the guest room spaces of the small hotel.

3.3.2.1 Electrical Panel Sizing and Wiring

This section details the additional electrical panel sizing and wiring required for all-electric measures. In an all-electric new construction scenario, heat pumps replace packaged DX units which are paired with either a gas furnace or a hot water coil (supplied by a gas boiler). The electrical requirements of the replacement heat pump would be the same as the packaged DX unit it replaces, as the electrical requirements would be driven by the cooling capacity, which would remain the same between the two units.

VAV terminal units with hot water reheat coils that are replaced with electric resistance reheat coils require additional electrical infrastructure. In the case of electric resistance coils, the Reach Code Team assumed that on average, a VAV terminal unit serves around 900 ft^2 of conditioned space and has a heating capacity of 5 kW (15 $kBtu/hr/ft^2$). The incremental electrical infrastructure costs were determined based on RS Means. Calculations for the medium office shown in Figure 13 include the cost to add electrical panels as well as the cost to add electrical lines to each VAV terminal unit electric resistance coil in the medium office prototype. Additionally, the Reach Code Team subtracted the electrical infrastructure costs associated with hot water pumps required in the mixed fuel baseline, which are not required in the all-electric measures.

The Reach Code Team calculated costs to increase electrical capacity for heat pump water heaters in the small hotel similarly.

Figure 13. Medium Office Electrical Infrastructure Costs for All-Electric Design

A	-	No. VAV Boxes	60
B	-	VAV box heating capacity (watts)	4,748
C	-	No. hot water pumps	2
D	-	Hot water pump power (watts)	398
E	-	Voltage	208
F	(AxB - CxD)/E	Panel ampacity required	1,366
G	F/400	Number of 400-amp panels required	4
H	-	Cost per 400-amp panel	$3,100
I	GxH	Total panel cost	$12,400
J	-	Total electrical line length required (ft)	4,320
K	-	Cost per linear foot of electrical line	$3.62
L	JxK	Total electrical line cost	$15,402
	I + L	**Total electrical infrastructure incremental cost**	**$27,802**

3.3.2.2 Natural Gas

This analysis assumes that in an all-electric new construction scenario natural gas would not be supplied to the site. Eliminating natural gas in new construction would save costs associated with connecting a service line from the street main to the building, piping distribution within the building, and monthly connection charges by the utility.

The Reach Code Team determined that for a new construction building with natural gas piping, there is a service line (branch connection) from the natural gas main to the building meter. In the medium office prototype, natural gas piping is routed to the boiler. The Reach Code Team assumed that the boiler is on the first floor, and that 30 feet of piping is required from the connection to the main to the boiler. The Reach Code Team assumed 1” corrugated stainless steel tubing (CSST) material is used for the plumbing distribution. The Reach Code Team included costs for a natural gas plan review, service extension, and a gas meter, as shown in Figure 14 below. The natural gas plan review cost is based on information received from the City of Palo Alto Utilities. The meter costs are from PG&E and include both material and labor. The service extension costs are based on guidance from PG&E, who noted that the cost range is highly varied and that there is no “typical” cost, with costs being highly dependent on length of extension, terrain, whether the building is in a developed or undeveloped area, and number of buildings to be served. While an actual service extension cost is highly uncertain, the team believes the costs assumed in this analysis are within a reasonable range based on a sample range of costs provided by PG&E. These costs assume development in a previously developed area.

Figure 14. Natural Gas Infrastructure Cost Savings for All-Electric Prototypes

Cost Type	Medium Office	Medium Retail	Small Hotel
Natural Gas Plan Review	$2,316	$2,316	$2,316
Service Extension	$13,000	$13,000	$13,000
Meter	$3,000	$3,000	$3,000
Plumbing Distribution	$633	$9,711	$37,704
Total Cost	**$18,949**	**$28,027**	**$56,020**

3.4 Preempted High Efficiency Appliances

The Reach Code Team developed a package of high efficiency (HE) space and water heating appliances based on commonly available products for both the mixed-fuel and all-electric scenarios. This package assesses the standalone contribution that high efficiency measures would make toward achieving high performance thresholds. The Reach Code Team reviewed the Air Conditioning, Heating, and Refrigeration Institute (AHRI) certified product database to estimate appropriate efficiencies.[20]

The Reach Code Team determined the efficiency increases to be appropriate based on equipment type, summarized in Figure 15, with cost premiums attained from a Bay Area mechanical contractor. The ranges in efficiency are indicative of varying federal standard requirements based on equipment size.

Figure 15. High Efficiency Appliance Assumptions

	Federal Minimum Efficiency	Preempted Efficiency	Cost Premium for HE Appliance
Gas space heating and water heating	80-82%	90-95%	10-15%
Large packaged rooftop cooling	9.8-12 EER 11.4-12.9 IEER	10.5-13 EER 15-15.5 IEER	10-15%
Single zone heat pump space heating	7.7 HSPF 3.2 COP	10 HSPF 3.5 COP	6-15%
Heat pump water heating	2.0 UEF	3.3 UEF	None (market does not carry 2.0 UEF)

3.5 Greenhouse Gas Emissions

The analysis uses the greenhouse gas (GHG) emissions estimates from Zero Code reports available in CBECC-Com.[21] Zero Code uses 8760 hourly multipliers accounting for time dependent energy use and carbon emissions based on source emissions, including renewable portfolio standard projections. Fugitive

[20] Available at: https://www.ahridirectory.org/Search/SearchHome?ReturnUrl=%2f

[21] More information available at: https://zero-code.org/wp-content/uploads/2018/11/ZERO-Code-TSD-California.pdf

emissions are not included. There are two strings of multipliers – one for Northern California climate zones, and another for Southern California climate zones.[22]

4 Results

The Reach Code Team evaluated cost effectiveness of the following measure packages over a 2019 mixed-fuel code compliant baseline for all climate zones, as detailed in Sections 4.1 -- 4.3 and reiterated in Figure 16:

- **Package 1A – Mixed-Fuel + EE:** Mixed-fuel design with energy efficiency measures and federal minimum appliance efficiencies.
- **Package 1B – Mixed-Fuel + EE + PV + B**: Same as Package 1A, plus solar PV and batteries.
- **Package 1C – Mixed-fuel + HE**: Alternative design with high efficiency appliances, triggering federal preemption.
- **Package 2 – All-Electric Federal Code-Minimum Reference**: All-electric design with federal code minimum appliance efficiency. No solar PV or battery.
- **Package 3A – All-Electric + EE**: All-electric design with energy efficiency measures and federal minimum appliance efficiencies.
- **Package 3B – All-Electric + EE + PV + B**: Same as Package 3A, plus solar PV and batteries.
- **Package 3C – All-Electric + HE**: All-electric design with high efficiency appliances, triggering federal preemption.

Figure 16. Package Summary

Package	Fuel Type		Energy Efficiency Measures	PV & Battery (PV + B)	High Efficiency Appliances (HE)
	Mixed Fuel	All-Electric			
Mixed-Fuel Code Minimum Baseline	X				
1A – Mixed-Fuel + EE	X		X		
1B – Mixed-Fuel + EE + PV + B	X		X	X	
1C – Mixed-fuel + HE	X				X
2 – All-Electric Federal Code-Minimum Reference		X			
3A – All-Electric + EE		X	X		
3B – All-Electric + EE + PV + B		X	X	X	
3C – All-Electric + HE		X			X

[22] CBECC-Com documentation does not state which climate zones fall under which region. CBECC-Res multipliers are the same for CZs 1-5 and 11-13 (presumed to be Northern California), while there is another set of multipliers for CZs 6-10 and 14-16 (assumed to be Southern California).

Section 4.4 presents the results of the PV-only and PV+Battery analysis.

The TDV and on-bill based cost effectiveness results are presented in terms of B/C ratio and NPV in this section. What constitutes a 'benefit' or a 'cost' varies with the scenarios because both energy savings and incremental construction costs may be negative depending on the package. Typically, utility bill savings are categorized as a 'benefit' while incremental construction costs are treated as 'costs.' In cases where both construction costs are negative and utility bill savings are negative, the construction cost savings are treated as the 'benefit' while the utility bill negative savings are as the 'cost.'

Overarching factors to keep in mind when reviewing the results include:

- To pass the Energy Commission's application process, local reach codes must both be cost effective and exceed the energy performance budget using TDV (i.e., have a positive compliance margin). To emphasize these two important factors, the figures in this Section highlight in green the modeling results that have **either** a positive compliance margin or are cost effective. This will allow readers to identify whether a scenario is fully or partially supportive of a reach code, and the opportunities/challenges that the scenario presents. Conversely, Section 4.4 only highlights results that **both** have a positive compliance margin and are cost effective, to allow readers to identify reach code-ready scenarios.
  - **Note:** Compliance margin represents the proportion of energy usage that is saved compared to the baseline, measured on a TDV basis.
- The Energy Commission does not currently allow compliance credit for either solar PV or battery storage. Thus, the compliance margins in Packages 1A are the same as 1B, and Package 3A is the same as 3B. However, The Reach Code Team did include the impact of solar PV and battery when calculating TDV cost-effectiveness.
- When performance modeling residential buildings, the Energy Commission allows the Standard Design to be electric if the Proposed Design is electric, which removes TDV-related penalties and associated negative compliance margins. This essentially allows for a compliance pathway for all-electric residential buildings. Nonresidential buildings are not treated in the same way and are compared to a mixed-fuel standard design.
- Results do not include an analysis and comparison of utility rates. As mentioned in *Section 2.2*, The Reach Code Team coordinated with utilities to select tariffs for each prototype given the annual energy demand profile and the most prevalent rates in each utility territory. The Reach Code Team did not compare a variety of tariffs to determine their impact on cost effectiveness. Note that most utility time-of-use rates are continuously updated, which can affect cost effectiveness results.
- As a point of comparison, mixed-fuel baseline energy figures are provided in *Appendix 6.5*.

4.1 Cost Effectiveness Results – Medium Office

Figure 17 through Figure 23 contain the cost-effectiveness findings for the Medium Office packages. Notable findings for each package include:

- **1A – Mixed-Fuel + EE:** Packages achieve +12 to +20 percent compliance margins depending on climate zone. All packages are cost effective in all climate zones using the TDV approach. All packages are cost effective using the On-Bill approach except for LADWP territory.

- **1B – Mixed-Fuel + EE + PV + B:** All packages are cost effective using the On-Bill and TDV approaches, except On-Bill in LADWP territory. When compared to 1A, the B/C ratio changes depending on the utility and climate zone (some increase while others decrease). However, NPV savings are increased across the board, suggesting that larger investments yield larger returns.
- **1C – Mixed-Fuel + HE:** Packages achieve +3 to +5 percent compliance margins depending on climate zone, but no packages were cost effective. The incremental costs of a high efficiency condensing boiler compared to a non-condensing boiler contributes to 26-47% of total incremental cost depending on boiler size. Benefits of condensing boiler efficiency come from resetting hot water return temperature as boiler efficiency increases at lower hot water temperature. However, hot water temperature reset control cannot currently be implemented in the software. In addition, the natural gas energy cost constitutes no more than 5% of total cost for 15 climate zones, so improving boiler efficiency has limited contribution to reduction of total energy cost.
- **2 – All-Electric Federal Code-Minimum Reference:**
  - Packages achieve between -27 percent and +1 percent compliance margins depending on climate zone. This is likely because the modeled system is electric resistance, and TDV values electricity consumption more heavily than natural gas. This all-electric design without other efficiency measures does not comply with the Energy Commission's TDV performance budget.
  - All incremental costs are negative due to the elimination of natural gas infrastructure.
  - Packages achieve utility cost savings and are cost effective using the On-Bill approach in CZs 6-10 and 14-15. Packages do not achieve savings and are not cost effective using the On-Bill approach in most of PG&E territory (CZs 1,2,4, 11-13, and 16). Packages achieve savings and are cost effective using TDV in all climate zones except CZ16.
- **3A – All-Electric + EE:** Packages achieve positive compliance margins except -15 percent in CZ16, which has a higher space heating load than other climate zones. All packages are cost effective in all climate zones except CZ16.
- **3B – All-Electric + EE + PV + B:** Packages achieve positive compliance margins except -15 percent in CZ16. All packages are cost-effective from a TDV perspective in all climate zones. All packages are cost effective from an On-Bill perspective in all climate zones except in CZ 2 and CZ 16 in LADWP territory.
- **3C – All-Electric + HE:** Packages achieve between -26 percent and +2 percent compliance margins depending on climate zone. The only packages that are cost effective and with a positive compliance margin are in CZs 7-9 and 15. As described in Package 1C results, space heating is a relatively low proportion of energy costs in most climate zones, limiting the costs gains for higher efficiency equipment.

Figure 17. Cost Effectiveness for Medium Office Package 1A – Mixed-Fuel + EE

CZ	Utility	Elec Savings (kWh)	Gas Savings (therms)	GHG Reduc-tions (mtons)	Comp-liance Margin	Incremental Package Cost	Lifecycle Utility Cost Savings	$TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Package 1A: Mixed Fuel + EE												
CZ01	PG&E	34,421	-808	4.5	18%	$66,649	$125,902	$71,307	1.9	1.1	$59,253	$4,658
CZ02	PG&E	40,985	-505	8.1	17%	$66,649	$163,655	$99,181	2.5	1.5	$97,005	$32,532
CZ03	PG&E	36,266	-463	7.0	20%	$66,649	$141,897	$84,051	2.1	1.3	$75,248	$17,401
CZ04	PG&E	40,590	-547	7.7	14%	$66,649	$162,139	$95,410	2.4	1.4	$95,489	$28,761
CZ04-2	CPAU	40,590	-547	7.7	14%	$66,649	$85,537	$95,410	1.3	1.4	$18,887	$28,761
CZ05	PG&E	38,888	-499	7.4	18%	$66,649	$154,044	$91,115	2.3	1.4	$87,395	$24,465
CZ05-2	SCG	38,888	-499	7.4	18%	$66,649	$156,315	$91,115	2.3	1.4	$89,665	$24,465
CZ06	SCE	39,579	-305	8.7	20%	$66,649	$86,390	$100,469	1.3	1.5	$19,741	$33,820
CZ06-2	LADWP	39,579	-305	8.7	20%	$66,649	$51,828	$100,469	0.8	1.5	($14,821)	$33,820
CZ07	SDG&E	41,817	-6	11.3	20%	$66,649	$204,394	$112,497	3.1	1.7	$137,745	$45,848
CZ08	SCE	41,637	-60	10.8	18%	$66,649	$89,783	$113,786	1.3	1.7	$23,134	$47,137
CZ08-2	LADWP	41,637	-60	10.8	18%	$66,649	$54,876	$113,786	0.8	1.7	($11,773)	$47,137
CZ09	SCE	42,539	-210	10.1	16%	$66,649	$95,636	$115,647	1.4	1.7	$28,987	$48,998
CZ09-2	LADWP	42,539	-210	10.1	16%	$66,649	$58,168	$115,647	0.9	1.7	($8,481)	$48,998
CZ10	SDG&E	41,857	-216	9.8	17%	$66,649	$210,303	$108,726	3.2	1.6	$143,654	$42,077
CZ10-2	SCE	41,857	-216	9.8	17%	$66,649	$92,736	$108,726	1.4	1.6	$26,087	$42,077
CZ11	PG&E	42,523	-390	9.1	13%	$66,649	$166,951	$104,001	2.5	1.6	$100,301	$37,352
CZ12	PG&E	41,521	-466	8.4	14%	$66,649	$161,594	$100,135	2.4	1.5	$94,945	$33,486
CZ12-2	SMUD	41,521	-466	8.4	14%	$66,649	$71,734	$100,135	1.1	1.5	$5,085	$33,486
CZ13	PG&E	42,898	-434	9.0	13%	$66,649	$169,107	$99,992	2.5	1.5	$102,457	$33,343
CZ14	SDG&E	42,224	-441	8.6	14%	$66,649	$211,529	$106,913	3.2	1.6	$144,880	$40,264
CZ14-2	SCE	42,224	-441	8.6	14%	$66,649	$95,809	$106,913	1.4	1.6	$29,160	$40,264
CZ15	SCE	45,723	-147	11.2	12%	$66,649	$102,714	$118,034	1.5	1.8	$36,065	$51,384
CZ16	PG&E	37,758	-736	5.8	14%	$66,649	$145,947	$79,755	2.2	1.2	$79,297	$13,106
CZ16-2	LADWP	37,758	-736	5.8	14%	$66,649	$40,115	$79,755	0.6	1.2	($26,534)	$13,106

Figure 18. Cost Effectiveness for Medium Office Package 1B – Mixed-Fuel + EE + PV + B

CZ	Utility	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (mtons)	Comp-liance Margin (%)	Incremental Package Cost	Lifecycle Energy Cost Savings	$-TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Mixed Fuel + PV + Battery												
CZ01	PG&E	211,225	-808	39.9	18%	$397,405	$645,010	$454,284	1.6	1.1	$247,605	$56,879
CZ02	PG&E	255,787	-505	50.6	17%	$397,405	$819,307	$573,033	2.1	1.4	$421,902	$175,628
CZ03	PG&E	245,421	-463	48.8	20%	$397,405	$777,156	$536,330	2.0	1.3	$379,751	$138,925
CZ04	PG&E	267,612	-547	52.7	14%	$397,405	$836,221	$597,471	2.1	1.5	$438,816	$200,066
CZ04-2	CPAU	267,612	-547	52.7	14%	$397,405	$621,879	$597,471	1.6	1.5	$224,474	$200,066
CZ05	PG&E	264,581	-499	52.5	18%	$397,405	$897,216	$578,856	2.3	1.5	$499,811	$181,451
CZ05-2	SCG	264,581	-499	52.5	18%	$397,405	$899,487	$578,856	2.3	1.5	$502,082	$181,451
CZ06	SCE	257,474	-305	52.1	20%	$397,405	$484,229	$594,416	1.2	1.5	$86,824	$197,011
CZ06-2	LA	257,474	-305	52.1	20%	$397,405	$282,360	$594,416	0.7	1.5	($115,045)	$197,011
CZ07	SDG&E	264,530	-6	55.7	20%	$397,405	$817,528	$610,548	2.1	1.5	$420,123	$213,143
CZ08	SCE	258,348	-60	54.0	18%	$397,405	$479,073	$625,249	1.2	1.6	$81,668	$227,844
CZ08-2	LA	258,348	-60	54.0	18%	$397,405	$275,704	$625,249	0.7	1.6	($121,701)	$227,844
CZ09	SCE	262,085	-210	54.3	16%	$397,405	$480,241	$622,528	1.2	1.6	$82,836	$225,123
CZ09-2	LA	262,085	-210	54.3	16%	$397,405	$282,209	$622,528	0.7	1.6	($115,196)	$225,123
CZ10	SDG&E	258,548	-216	53.4	17%	$397,405	$839,931	$595,323	2.1	1.5	$442,526	$197,918
CZ10-2	SCE	258,548	-216	53.4	17%	$397,405	$485,523	$595,323	1.2	1.5	$88,118	$197,918
CZ11	PG&E	253,623	-390	50.9	13%	$397,405	$826,076	$585,682	2.1	1.5	$428,671	$188,277
CZ12	PG&E	252,868	-466	50.3	14%	$397,405	$802,715	$582,866	2.0	1.5	$405,310	$185,461
CZ12-2	SMUD	252,868	-466	50.3	14%	$397,405	$415,597	$582,866	1.0	1.5	$18,192	$185,461
CZ13	PG&E	250,915	-434	50.4	13%	$397,405	$806,401	$573,606	2.0	1.4	$408,996	$176,201
CZ14	SDG&E	283,684	-441	56.4	14%	$397,405	$874,753	$676,271	2.2	1.7	$477,348	$278,866
CZ14-2	SCE	283,684	-441	56.4	14%	$397,405	$493,888	$676,271	1.2	1.7	$96,483	$278,866
CZ15	SCE	274,771	-147	56.0	12%	$397,405	$476,327	$640,379	1.2	1.6	$78,922	$242,974
CZ16	PG&E	266,490	-736	51.8	14%	$397,405	$842,205	$575,563	2.1	1.4	$444,800	$178,158
CZ16-2	LA	266,490	-736	51.8	14%	$397,405	$260,372	$575,563	0.7	1.4	($137,033)	$178,158

Figure 19. Cost Effectiveness for Medium Office Package 1C – Mixed-Fuel + HE

CZ	Utility	Elec Savings (kWh)	Gas Savings (therms)	GHG Reductions (mtons)	Comp-liance Margin	Incremental Package Cost	Lifecycle Utility Cost Savings	$TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Package 1C: Mixed Fuel + HE												
CZ01	PG&E	288	688	4.1	3%	$61,253	$18,656	$12,314	0.3	0.2	($42,597)	($48,939)
CZ02	PG&E	3,795	550	4.3	4%	$68,937	$36,683	$24,676	0.5	0.4	($32,254)	($44,261)
CZ03	PG&E	1,241	439	2.9	3%	$57,529	$20,150	$11,885	0.4	0.2	($37,379)	($45,644)
CZ04	PG&E	5,599	529	4.7	5%	$72,074	$44,915	$30,928	0.6	0.4	($27,158)	($41,145)
CZ04-2	CPAU	5,599	529	4.7	5%	$72,074	$24,175	$30,928	0.3	0.4	($47,898)	($41,145)
CZ05	PG&E	3,470	453	3.6	4%	$60,330	$35,072	$18,232	0.6	0.3	($25,258)	($42,097)
CZ05-2	SCG	3,470	453	3.6	4%	$60,330	$32,777	$18,232	0.5	0.3	($27,553)	($42,097)
CZ06	SCE	3,374	298	2.6	3%	$55,594	$19,446	$16,132	0.3	0.3	($36,148)	($39,462)
CZ06-2	LADWP	3,374	298	2.6	3%	$55,594	$13,450	$16,132	0.2	0.3	($42,145)	($39,462)
CZ07	SDG&E	5,257	140	2.3	4%	$54,111	$41,086	$19,903	0.8	0.4	($13,025)	($34,208)
CZ08	SCE	5,921	176	2.7	4%	$60,497	$22,210	$24,055	0.4	0.4	($38,287)	($36,442)
CZ08-2	LADWP	5,921	176	2.7	4%	$60,497	$14,064	$24,055	0.2	0.4	($46,434)	($36,442)
CZ09	SCE	7,560	224	3.5	4%	$61,311	$28,576	$31,835	0.5	0.5	($32,735)	($29,476)
CZ09-2	LADWP	7,560	224	3.5	4%	$61,311	$18,262	$31,835	0.3	0.5	($43,049)	($29,476)
CZ10	SDG&E	5,786	288	3.2	4%	$62,685	$50,717	$24,628	0.8	0.4	($11,968)	($38,057)
CZ10-2	SCE	5,786	288	3.2	4%	$62,685	$24,575	$24,628	0.4	0.4	($38,110)	($38,057)
CZ11	PG&E	8,128	441	4.9	5%	$71,101	$54,188	$37,849	0.8	0.5	($16,912)	($33,252)
CZ12	PG&E	6,503	478	4.7	5%	$68,329	$47,329	$34,556	0.7	0.5	($20,999)	($33,773)
CZ12-2	SMUD	6,503	478	4.7	5%	$68,329	$24,003	$34,556	0.4	0.5	($44,325)	($33,773)
CZ13	PG&E	8,398	432	5.0	5%	$69,474	$51,347	$37,229	0.7	0.5	($18,128)	($32,246)
CZ14	SDG&E	7,927	470	5.0	5%	$69,463	$62,744	$37,133	0.9	0.5	($6,718)	($32,329)
CZ14-2	SCE	7,927	470	5.0	5%	$69,463	$32,517	$37,133	0.5	0.5	($36,946)	($32,329)
CZ15	SCE	15,140	219	5.5	5%	$66,702	$43,773	$52,359	0.7	0.8	($22,929)	($14,344)
CZ16	PG&E	3,111	912	6.3	5%	$71,765	$36,002	$24,914	0.5	0.3	($35,763)	($46,851)
CZ16-2	LADWP	3,111	912	6.3	5%	$71,765	$23,057	$24,914	0.3	0.3	($48,708)	($46,851)

Figure 20. Cost Effectiveness for Medium Office Package 2 – All-Electric Federal Code Minimum

CZ	Utility	Elec Savings (kWh)	Gas Savings (therms)	GHG Reductions (mtons)	Comp-liance Margin	Incremental Package Cost*	Lifecycle Utility Cost Savings	$TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Package 2: All-Electric Federal Code Minimum												
CZ01	PG&E	-53,657	4967	10.1	-15%	($87,253)	($98,237)	($58,420)	0.9	1.5	($10,984)	$28,833
CZ02	PG&E	-49,684	3868	5.0	-7%	($73,695)	($101,605)	($41,429)	0.7	1.8	($27,910)	$32,266
CZ03	PG&E	-35,886	3142	5.6	-7%	($82,330)	($57,345)	($29,592)	1.4	2.8	$24,986	$52,738
CZ04	PG&E	-48,829	3759	4.7	-6%	($69,012)	($90,527)	($40,570)	0.8	1.7	($21,515)	$28,443
CZ04-2	CPAU	-48,829	3759	4.7	-6%	($69,012)	($19,995)	($40,570)	3.5	1.7	$49,018	$28,443
CZ05	PG&E	-40,531	3240	4.5	-8%	($84,503)	($63,663)	($39,997)	1.3	2.1	$20,840	$44,506
CZ06	SCE	-26,174	2117	3.1	-4%	($76,153)	$24,908	($20,571)	>1	3.7	$101,061	$55,581
CZ06-2	LADWP	-26,174	2117	3.1	-4%	($76,153)	$26,366	($20,571)	>1	3.7	$102,518	$55,581
CZ07	SDG&E	-12,902	950	0.9	-2%	($70,325)	$46,879	($11,407)	>1	6.2	$117,204	$58,918
CZ08	SCE	-15,680	1219	1.5	-2%	($68,774)	$17,859	($12,648)	>1	5.4	$86,633	$56,125
CZ08-2	LADWP	-15,680	1219	1.5	-2%	($68,774)	$18,603	($12,648)	>1	5.4	$87,376	$56,125
CZ09	SCE	-19,767	1605	2.4	-2%	($63,102)	$20,920	($14,462)	>1	4.4	$84,022	$48,640
CZ09-2	LADWP	-19,767	1605	2.4	-2%	($63,102)	$21,929	($14,462)	>1	4.4	$85,030	$48,640
CZ10	SDG&E	-27,414	2053	2.2	-4%	($47,902)	$38,918	($23,339)	>1	2.1	$86,820	$24,562
CZ10-2	SCE	-27,414	2053	2.2	-4%	($47,902)	$20,765	($23,339)	>1	2.1	$68,666	$24,562
CZ11	PG&E	-40,156	3062	3.6	-4%	($63,987)	($72,791)	($32,837)	0.9	1.9	($8,804)	$31,150
CZ12	PG&E	-43,411	3327	4.1	-5%	($68,343)	($85,856)	($35,463)	0.8	1.9	($17,512)	$32,880
CZ12-2	SMUD	-43,411	3327	4.1	-5%	($68,343)	($5,109)	($35,463)	13.4	1.9	$63,234	$32,880
CZ13	PG&E	-39,649	3063	3.8	-4%	($62,726)	($70,705)	($32,408)	0.9	1.9	($7,980)	$30,318
CZ14	SDG&E	-44,322	3266	3.4	-5%	($65,156)	$6,043	($38,422)	>1	1.7	$71,199	$26,735
CZ14-2	SCE	-44,322	3266	3.4	-5%	($65,156)	$4,798	($38,422)	>1	1.7	$69,954	$26,735
CZ15	SCE	-19,917	1537	1.8	-2%	($36,176)	$12,822	($15,464)	>1	2.3	$48,998	$20,711
CZ16	PG&E	-94,062	6185	5.6	-27%	($64,096)	($212,158)	($150,871)	0.3	0.4	($148,062)	($86,775)
CZ16-2	LADWP	-94,062	6185	5.6	-27%	($64,096)	$1,493	($150,871)	>1	0.4	$65,589	($86,775)

*The Incremental Package Cost is equal to the sum of the incremental HVAC and water heating equipment costs from Figure 10, the electrical infrastructure incremental cost of $27,802 (see section 3.3.2.1), and the natural gas infrastructure incremental costs of $(18,949) (see section 3.3.2.2).

Figure 21. Cost Effectiveness for Medium Office Package 3A – All-Electric + EE

CZ	Utility	Elec Savings (kWh)	Gas Savings (therms)	GHG Reductions (mtons)	Comp-liance Margin	Incremental Package Cost	Lifecycle Utility Cost Savings	$TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Package 3A: All-Electric + EE												
CZ01	PG&E	-19,115	4967	19.4	7%	($20,604)	$20,630	$28,112	>1	>1	$41,234	$48,716
CZ02	PG&E	-11,811	3868	15.2	10%	($7,046)	$39,260	$58,563	>1	>1	$46,306	$65,609
CZ03	PG&E	2,530	3142	16.2	16%	($15,681)	$85,241	$68,682	>1	>1	$100,922	$84,363
CZ04	PG&E	-10,839	3759	14.8	9%	($2,363)	$59,432	$58,420	>1	>1	$61,795	$60,783
CZ04-2	CPAU	-10,839	3759	14.8	9%	($2,363)	$70,680	$58,420	>1	>1	$73,043	$60,783
CZ05	PG&E	-2,316	3240	14.6	12%	($17,854)	$85,380	$58,802	>1	>1	$103,234	$76,656
CZ06	SCE	15,399	2117	14.3	18%	($9,503)	$114,962	$89,921	>1	>1	$124,466	$99,425
CZ06-2	LADWP	15,399	2117	14.3	18%	($9,503)	$82,389	$89,921	>1	>1	$91,893	$99,425
CZ07	SDG&E	33,318	950	13.8	20%	($3,676)	$256,704	$111,399	>1	>1	$260,380	$115,076
CZ08	SCE	30,231	1219	14.2	18%	($2,124)	$110,144	$111,781	>1	>1	$112,268	$113,906
CZ08-2	LADWP	30,231	1219	14.2	18%	($2,124)	$76,069	$111,781	>1	>1	$78,194	$113,906
CZ09	SCE	24,283	1605	14.3	15%	$3,547	$119,824	$108,249	33.8	30.5	$116,277	$104,702
CZ09-2	LADWP	24,283	1605	14.3	15%	$3,547	$83,549	$108,249	23.6	30.5	$80,001	$104,702
CZ10	SDG&E	12,344	2053	12.6	13%	$18,748	$230,553	$82,905	12.3	4.4	$211,806	$64,158
CZ10-2	SCE	12,344	2053	12.6	13%	$18,748	$105,898	$82,905	5.6	4.4	$87,150	$64,158
CZ11	PG&E	929	3062	14.5	10%	$2,662	$85,988	$75,030	32.3	28.2	$83,326	$72,368
CZ12	PG&E	-3,419	3327	14.8	10%	($1,694)	$68,866	$69,589	>1	>1	$70,560	$71,283
CZ12-2	SMUD	-3,419	3327	14.8	10%	($1,694)	$71,761	$69,589	>1	>1	$73,455	$71,283
CZ13	PG&E	1,398	3063	14.8	9%	$3,923	$89,799	$71,307	22.9	18.2	$85,875	$67,384
CZ14	SDG&E	-5,469	3266	13.5	9%	$1,493	$206,840	$69,016	138.6	46.2	$205,347	$67,523
CZ14-2	SCE	-5,469	3266	13.5	9%	$1,493	$94,143	$69,016	63.1	46.2	$92,650	$67,523
CZ15	SCE	25,375	1537	13.7	10%	$30,474	$114,909	$104,335	3.8	3.4	$84,435	$73,862
CZ16	PG&E	-65,877	6185	12.7	-15%	$2,553	($91,477)	($85,673)	-35.8	-33.6	($94,030)	($88,226)
CZ16-2	LADWP	-65,877	6185	12.7	-15%	$2,553	$72,780	($85,673)	28.5	-33.6	$70,227	($88,226)

Figure 22. Cost Effectiveness for Medium Office Package 3B – All-Electric + EE + PV + B

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (mtons)	Compliance Margin (%)	Incremental Package Cost	Lifecycle Energy Cost Savings	$-TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
All-Electric + PV + B												
CZ01	PG&E	157,733	4967	54.9	7%	$310,152	$518,421	$410,946	1.7	1.3	$208,269	$100,794
CZ02	PG&E	203,026	3868	57.8	10%	$323,710	$692,336	$532,273	2.1	1.6	$368,626	$208,563
CZ03	PG&E	211,706	3142	58.0	16%	$315,075	$708,235	$520,866	2.2	1.7	$393,160	$205,791
CZ04	PG&E	216,204	3759	59.9	9%	$328,393	$741,382	$560,576	2.3	1.7	$412,989	$232,183
CZ04-2	CPAU	216,204	3759	59.9	9%	$328,393	$607,074	$560,576	1.8	1.7	$278,681	$232,183
CZ05	PG&E	223,399	3240	59.8	12%	$312,902	$799,992	$546,592	2.6	1.7	$487,090	$233,690
CZ06	SCE	233,299	2117	57.7	18%	$321,252	$509,969	$583,963	1.6	1.8	$188,716	$262,711
CZ06-2	LA	233,299	2117	57.7	18%	$321,252	$311,931	$583,963	1.0	1.8	($9,322)	$262,711
CZ07	SDG&E	256,034	950	58.3	20%	$327,079	$870,156	$609,498	2.7	1.9	$543,076	$282,419
CZ08	SCE	246,944	1219	57.4	18%	$328,631	$499,506	$623,292	1.5	1.9	$170,874	$294,661
CZ08-2	LA	246,944	1219	57.4	18%	$328,631	$296,991	$623,292	0.9	1.9	($31,640)	$294,661
CZ09	SCE	243,838	1605	58.5	15%	$334,303	$504,498	$615,178	1.5	1.8	$170,195	$280,875
CZ09-2	LA	243,838	1605	58.5	15%	$334,303	$307,626	$615,178	0.9	1.8	($26,677)	$280,875
CZ10	SDG&E	229,044	2053	56.2	13%	$349,503	$851,810	$569,549	2.4	1.6	$502,306	$220,046
CZ10-2	SCE	229,044	2053	56.2	13%	$349,503	$491,383	$569,549	1.4	1.6	$141,880	$220,046
CZ11	PG&E	212,047	3062	56.4	10%	$333,418	$743,403	$556,758	2.2	1.7	$409,985	$223,340
CZ12	PG&E	207,955	3327	56.7	10%	$329,062	$713,054	$552,415	2.2	1.7	$383,993	$223,353
CZ12-2	SMUD	207,955	3327	56.7	10%	$329,062	$414,371	$552,415	1.3	1.7	$85,310	$223,353
CZ13	PG&E	209,431	3063	56.3	9%	$334,679	$728,822	$544,969	2.2	1.6	$394,143	$210,289
CZ14	SDG&E	236,002	3266	61.3	9%	$332,249	$865,181	$638,517	2.6	1.9	$532,933	$306,269
CZ14-2	SCE	236,002	3266	61.3	9%	$332,249	$488,163	$638,517	1.5	1.9	$155,914	$306,269
CZ15	SCE	254,426	1537	58.5	10%	$361,229	$487,715	$626,728	1.4	1.7	$126,486	$265,499
CZ16	PG&E	162,915	6185	58.6	-15%	$333,309	$580,353	$406,746	1.7	1.2	$247,044	$73,437
CZ16-2	LA	162,915	6185	58.6	-15%	$333,309	$290,566	$406,746	0.9	1.2	($42,742)	$73,437

Figure 23. Cost Effectiveness for Medium Office Package 3C – All-Electric + HE

CZ	Utility	Elec Savings (kWh)	Gas Savings (therms)	GHG Reductions (mtons)	Comp-liance Margin	Incremental Package Cost	Lifecycle Utility Cost Savings	$TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Package 3C: All-Electric + HE												
CZ01	PG&E	-53,390	4967	10.2	-14%	($43,987)	($93,740)	($57,752)	0.5	0.8	($49,753)	($13,765)
CZ02	PG&E	-45,916	3868	6.1	-5%	($22,722)	($77,212)	($26,394)	0.3	0.9	($54,490)	($3,672)
CZ03	PG&E	-34,656	3142	6.0	-6%	($38,261)	($45,796)	($25,153)	0.8	1.5	($7,535)	$13,108
CZ04	PG&E	-43,248	3759	6.3	-3%	($15,229)	($56,932)	($18,996)	0.3	0.8	($41,703)	($3,767)
CZ04-2	CPAU	-43,248	3759	6.3	-3%	($15,229)	($5,298)	($18,996)	2.9	0.8	$9,932	($3,767)
CZ05	PG&E	-37,068	3240	5.4	-6%	($40,434)	($38,330)	($29,544)	1.1	1.4	$2,104	$10,890
CZ06	SCE	-22,805	2117	4.0	-2%	($30,237)	$39,812	($9,594)	>1	3.2	$70,050	$20,644
CZ06-2	LADWP	-22,805	2117	4.0	-2%	($30,237)	$35,414	($9,594)	>1	3.2	$65,651	$20,644
CZ07	SDG&E	-7,646	950	2.5	1%	($22,564)	$86,159	$6,062	>1	>1	$108,722	$28,625
CZ08	SCE	-9,761	1219	3.2	1%	($18,443)	$37,375	$8,305	>1	>1	$55,818	$26,748
CZ08-2	LADWP	-9,761	1219	3.2	1%	($18,443)	$29,973	$8,305	>1	>1	$48,416	$26,748
CZ09	SCE	-12,211	1605	4.5	2%	($10,282)	$46,335	$13,364	>1	>1	$56,617	$23,646
CZ09-2	LADWP	-12,211	1605	4.5	2%	($10,282)	$37,030	$13,364	>1	>1	$47,313	$23,646
CZ10	SDG&E	-21,642	2053	3.7	-1%	$11,340	$84,901	($3,818)	7.5	-0.3	$73,561	($15,158)
CZ10-2	SCE	-21,642	2053	3.7	-1%	$11,340	$40,659	($3,818)	3.6	-0.3	$29,319	($15,158)
CZ11	PG&E	-32,052	3062	5.9	0%	($8,519)	($29,013)	($3,007)	0.3	2.8	($20,495)	$5,512
CZ12	PG&E	-36,926	3327	6.0	-1%	($15,443)	($48,955)	($9,546)	0.3	1.6	($33,511)	$5,898
CZ12-2	SMUD	-36,926	3327	6.0	-1%	($15,443)	$9,916	($9,546)	>1	1.6	$25,359	$5,898
CZ13	PG&E	-31,253	3063	6.3	0%	($7,257)	($27,782)	($3,055)	0.3	2.4	($20,525)	$4,202
CZ14	SDG&E	-36,402	3266	5.7	-1%	($10,651)	$61,605	($9,832)	>1	1.1	$72,256	$819
CZ14-2	SCE	-36,402	3266	5.7	-1%	($10,651)	$30,625	($9,832)	>1	1.1	$41,276	$819
CZ15	SCE	-4,775	1537	6.0	3%	$28,927	$52,955	$32,790	1.8	1.1	$24,028	$3,863
CZ16	PG&E	-90,949	6185	6.5	-26%	($8,467)	($194,115)	($142,041)	0.0	0.1	($185,648)	($133,574)
CZ16-2	LADWP	-90,949	6185	6.5	-26%	($8,467)	$37,127	($142,041)	>1	0.1	$45,594	($133,574)

4.2 Cost Effectiveness Results – Medium Retail

Figure 24 through Figure 30 contain the cost-effectiveness findings for the Medium Retail packages. Notable findings for each package include:

- **1A – Mixed-Fuel + EE:**
  - Packages achieve +9% to +18% compliance margins depending on climate zone, and all packages are cost effective in all climate zones.
  - Incremental package costs vary across climate zones because of the HVAC system size in some climate zones are small enough (<54 kBtu/h) to have the economizers measure applied.
  - B/C ratios are high compared to other prototypes because the measures applied are primarily low-cost lighting measures. This suggests room for the inclusion of other energy efficiency measures with lower cost-effectiveness to achieve even higher compliance margins for a cost effective package.
- **1B – Mixed-Fuel + EE + PV + B:** All packages are cost effective using both the On-Bill and TDV approach, except On-Bill in LADWP territory. Adding PV and battery to the efficiency packages reduces the B/C ratio but increases overall NPV savings.
- **1C – Mixed-fuel + HE:** Packages achieve +1 to +4% compliance margins depending on climate zone, and packages are cost effective in all climate zones except CZs 1, 3 and 5 using the TDV approach.
- **2 – All-Electric Federal Code-Minimum Reference:**
  - Packages achieve between -12% and +1% compliance margins depending on climate zone.
  - Packages achieve positive savings using both the On-Bill and TDV approaches in CZs 6-10 and 14-15. Packages do not achieve On-Bill or TDV savings in most of PG&E territory (CZs 1, 2, 4, 5, 12-13, and 16).
  - Packages are cost effective in all climate zones except CZ16.
  - All incremental costs are negative primarily due to elimination of natural gas infrastructure.
- **3A – All-Electric + EE:** Packages achieve between +3% and +16% compliance margins depending on climate zone. All packages are cost effective in all climate zones.
- **3B – All-Electric + EE + PV + B:** All packages are cost effective using both the On-Bill and TDV approaches, except On-Bill in LADWP territory. Adding PV and Battery to the efficiency package reduces the B/C ratio but increases overall NPV savings.
- **3C – All-Electric + HE:** Packages achieve between -8% and +5% compliance margins depending on climate zone, and packages are cost effective using both On-Bill and TDV approaches in all CZs except CZs 1 and 16.

Figure 24. Cost Effectiveness for Medium Retail Package 1A – Mixed-Fuel + EE

CZ	Utility	Elec Savings (kWh)	Gas Savings (therms)	GHG Reductions (mtons)	Comp-liance Margin	Incremental Package Cost	Lifecycle Utility Cost Savings	$TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Package 1A: Mixed Fuel + EE												
CZ01	PG&E	15,210	1209	11.10	18%	$2,712	$68,358	$60,189	25.2	22.2	$65,646	$57,478
CZ02	PG&E	18,885	613	8.73	13%	$5,569	$76,260	$59,135	13.7	10.6	$70,691	$53,566
CZ03	PG&E	18,772	462	7.87	16%	$5,569	$66,813	$57,135	12.0	10.3	$61,244	$51,566
CZ04	PG&E	19,100	439	7.84	14%	$5,569	$75,989	$58,036	13.6	10.4	$70,420	$52,467
CZ04-2	CPAU	19,100	439	7.84	14%	$5,569	$51,556	$58,036	9.3	10.4	$45,987	$52,467
CZ05	PG&E	17,955	415	7.41	16%	$5,569	$63,182	$55,003	11.3	9.9	$57,613	$49,435
CZ05-2	SCG	17,955	415	7.41	16%	$5,569	$61,810	$55,003	11.1	9.9	$56,241	$49,435
CZ06	SCE	12,375	347	5.54	10%	$2,712	$31,990	$41,401	11.8	15.3	$29,278	$38,689
CZ06-2	LADWP	12,375	347	5.54	10%	$2,712	$21,667	$41,401	8.0	15.3	$18,956	$38,689
CZ07	SDG&E	17,170	136	5.65	13%	$5,569	$73,479	$49,883	13.2	9.0	$67,910	$44,314
CZ08	SCE	12,284	283	5.15	10%	$2,712	$30,130	$41,115	11.1	15.2	$27,419	$38,403
CZ08-2	LADWP	12,284	283	5.15	10%	$2,712	$20,243	$41,115	7.5	15.2	$17,531	$38,403
CZ09	SCE	13,473	302	5.51	10%	$5,569	$32,663	$46,126	5.9	8.3	$27,094	$40,557
CZ09-2	LADWP	13,473	302	5.51	10%	$5,569	$22,435	$46,126	4.0	8.3	$16,866	$40,557
CZ10	SDG&E	19,873	267	6.99	12%	$5,569	$83,319	$58,322	15.0	10.5	$77,751	$52,753
CZ10-2	SCE	19,873	267	6.99	12%	$5,569	$39,917	$58,322	7.2	10.5	$34,348	$52,753
CZ11	PG&E	21,120	578	9.14	13%	$5,569	$86,663	$67,485	15.6	12.1	$81,095	$61,916
CZ12	PG&E	20,370	562	8.85	13%	$5,569	$81,028	$64,409	14.6	11.6	$75,459	$58,840
CZ12-2	SMUD	20,370	562	8.85	13%	$5,569	$44,991	$64,409	8.1	11.6	$39,422	$58,840
CZ13	PG&E	22,115	620	9.98	15%	$2,712	$109,484	$83,109	40.4	30.6	$106,772	$80,398
CZ14	SDG&E	25,579	406	9.38	13%	$2,712	$116,354	$80,055	42.9	29.5	$113,643	$77,343
CZ14-2	SCE	26,327	383	9.42	13%	$2,712	$57,290	$83,065	21.1	30.6	$54,578	$80,354
CZ15	SCE	26,433	169	8.35	12%	$2,712	$57,152	$79,506	21.1	29.3	$54,440	$76,794
CZ16	PG&E	15,975	752	8.72	13%	$2,712	$72,427	$55,025	26.7	20.3	$69,715	$52,314
CZ16-2	LADWP	15,975	752	8.72	13%	$2,712	$31,906	$55,025	11.8	20.3	$29,194	$52,314

Figure 25. Cost Effectiveness for Medium Retail Package 1B – Mixed-Fuel + EE + PV + B

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Compliance Margin (%)	Incremental Package Cost	Lifecycle Energy Cost Savings	$-TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Mixed Fuel + PV + Battery												
CZ01	PG&E	158,584	1209	40.79	18%	$277,383	$509,092	$383,683	1.8	1.4	$231,709	$106,300
CZ02	PG&E	189,400	613	43.75	13%	$280,240	$590,043	$465,474	2.1	1.7	$309,803	$185,234
CZ03	PG&E	191,016	462	43.52	16%	$280,240	$578,465	$452,795	2.1	1.6	$298,224	$172,554
CZ04	PG&E	195,014	439	44.14	14%	$280,240	$605,369	$480,989	2.2	1.7	$325,129	$200,748
CZ04-2	CPAU	195,014	439	44.14	14%	$280,240	$451,933	$480,989	1.6	1.7	$171,693	$200,748
CZ05	PG&E	196,654	415	44.30	16%	$280,240	$589,771	$464,749	2.1	1.7	$309,530	$184,509
CZ05-2	SCG	196,654	415	44.30	16%	$280,240	$588,407	$464,749	2.1	1.7	$308,167	$184,509
CZ06	SCE	185,903	347	41.61	10%	$277,383	$322,495	$456,596	1.2	1.6	$45,111	$179,213
CZ06-2	LA	185,903	347	41.61	10%	$277,383	$191,428	$456,596	0.7	1.6	($85,955)	$179,213
CZ07	SDG&E	197,650	136	43.24	13%	$280,240	$496,786	$477,582	1.8	1.7	$216,545	$197,342
CZ08	SCE	187,869	283	41.48	10%	$277,383	$326,810	$478,132	1.2	1.7	$49,427	$200,749
CZ08-2	LA	187,869	283	41.48	10%	$277,383	$190,379	$478,132	0.7	1.7	($87,004)	$200,749
CZ09	SCE	191,399	302	42.32	10%	$280,240	$334,869	$472,770	1.2	1.7	$54,629	$192,530
CZ09-2	LA	191,399	302	42.32	10%	$280,240	$201,759	$472,770	0.7	1.7	($78,481)	$192,530
CZ10	SDG&E	200,033	267	44.01	12%	$280,240	$547,741	$472,880	2.0	1.7	$267,501	$192,640
CZ10-2	SCE	200,033	267	44.01	12%	$280,240	$340,822	$472,880	1.2	1.7	$60,582	$192,640
CZ11	PG&E	192,846	578	44.07	13%	$280,240	$582,969	$490,855	2.1	1.8	$302,728	$210,615
CZ12	PG&E	191,720	562	43.70	13%	$280,240	$586,836	$485,076	2.1	1.7	$306,596	$204,836
CZ12-2	SMUD	191,720	562	43.70	13%	$280,240	$319,513	$485,076	1.1	1.7	$39,273	$204,836
CZ13	PG&E	195,031	620	45.19	15%	$277,383	$605,608	$486,285	2.2	1.8	$328,225	$208,901
CZ14	SDG&E	217,183	406	47.86	13%	$277,383	$559,148	$534,915	2.0	1.9	$281,765	$257,532
CZ14-2	SCE	217,927	383	47.91	14%	$277,383	$354,757	$538,058	1.3	1.9	$77,373	$260,674
CZ15	SCE	208,662	169	44.51	12%	$277,383	$338,772	$496,107	1.2	1.8	$61,389	$218,724
CZ16	PG&E	210,242	752	48.76	13%	$277,383	$608,779	$490,262	2.2	1.8	$331,395	$212,879
CZ16-2	LA	210,242	752	48.76	13%	$277,383	$207,160	$490,262	0.7	1.8	($70,223)	$212,879

Figure 26. Cost Effectiveness for Medium Retail Package 1C – Mixed-Fuel + HE

CZ	Utility	Elec Savings (kWh)	Gas Savings (therms)	GHG Reductions (mtons)	Comp-liance Margin	Incremental Package Cost	Lifecycle Utility Cost Savings	$TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Package 1C: Mixed Fuel + HE												
CZ01	PG&E	57	346	2.04	2%	$9,006	$6,301	$6,065	0.7	0.7	($2,705)	($2,941)
CZ02	PG&E	2,288	229	2.01	3%	$9,726	$23,016	$13,998	2.4	1.4	$13,291	$4,273
CZ03	PG&E	1,087	171	1.31	2%	$9,063	$6,782	$7,186	0.7	0.8	($2,282)	($1,877)
CZ04	PG&E	1,862	159	1.46	3%	$9,004	$17,891	$10,878	2.0	1.2	$8,887	$1,874
CZ04-2	CPAU	1,862	159	1.46	3%	$9,004	$7,821	$10,878	0.9	1.2	($1,182)	$1,874
CZ05	PG&E	664	162	1.11	1%	$9,454	$5,119	$4,725	0.5	0.5	($4,335)	($4,729)
CZ05-2	SCG	664	162	1.11	1%	$9,454	$4,558	$4,725	0.5	0.5	($4,896)	($4,729)
CZ06	SCE	2,648	90	1.24	3%	$8,943	$11,646	$11,427	1.3	1.3	$2,703	$2,484
CZ06-2	LADWP	2,648	90	1.24	3%	$8,943	$7,329	$11,427	0.8	1.3	($1,614)	$2,484
CZ07	SDG&E	2,376	49	0.95	2%	$9,194	$20,103	$9,779	2.2	1.1	$10,909	$585
CZ08	SCE	2,822	72	1.20	3%	$9,645	$11,989	$12,877	1.2	1.3	$2,344	$3,233
CZ08-2	LADWP	2,822	72	1.20	3%	$9,645	$7,427	$12,877	0.8	1.3	($2,218)	$3,233
CZ09	SCE	4,206	88	1.73	4%	$10,446	$16,856	$18,745	1.6	1.8	$6,410	$8,299
CZ09-2	LADWP	4,206	88	1.73	4%	$10,446	$10,604	$18,745	1.0	1.8	$158	$8,299
CZ10	SDG&E	4,226	119	1.88	4%	$9,514	$36,412	$19,008	3.8	2.0	$26,898	$9,494
CZ10-2	SCE	4,226	119	1.88	4%	$9,514	$17,094	$19,008	1.8	2.0	$7,580	$9,494
CZ11	PG&E	4,188	225	2.56	4%	$10,479	$31,872	$22,393	3.0	2.1	$21,392	$11,913
CZ12	PG&E	3,675	214	2.34	4%	$10,409	$29,653	$20,525	2.8	2.0	$19,243	$10,115
CZ12-2	SMUD	3,675	214	2.34	4%	$10,409	$12,823	$20,525	1.2	2.0	$2,414	$10,115
CZ13	PG&E	4,818	180	2.46	4%	$9,809	$34,149	$23,623	3.5	2.4	$24,340	$13,814
CZ14	SDG&E	6,439	153	2.71	4%	$12,103	$44,705	$26,348	3.7	2.2	$32,601	$14,245
CZ14-2	SCE	6,439	153	2.71	4%	$12,103	$22,032	$26,348	1.8	2.2	$9,929	$14,245
CZ15	SCE	8,802	48	2.76	5%	$12,534	$25,706	$31,402	2.1	2.5	$13,171	$18,868
CZ16	PG&E	2,316	390	2.97	3%	$11,999	$22,663	$13,888	1.9	1.2	$10,665	$1,890
CZ16-2	LADWP	2,316	390	2.97	3%	$11,999	$11,921	$13,888	1.0	1.2	($78)	$1,890

Figure 27. Cost Effectiveness for Medium Retail Package 2 – All-Electric Federal Code Minimum

CZ	Utility	Elec Savings (kWh)	Gas Savings (therms)	GHG Reductions (mtons)	Comp-liance Margin	Incremental Package Cost*	Lifecycle Utility Cost Savings	$TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Package 2: All-Electric Federal Code Minimum												
CZ01	PG&E	-29,155	3893	13.85	-4.1%	($23,048)	($8,333)	($13,910)	2.8	1.7	$14,715	$9,138
CZ02	PG&E	-21,786	2448	7.49	-1.0%	($27,464)	($16,476)	($4,483)	1.7	6.1	$10,987	$22,981
CZ03	PG&E	-14,583	1868	6.26	-0.4%	($24,111)	$263	($1,450)	>1	16.6	$24,374	$22,661
CZ04	PG&E	-14,186	1706	5.30	-0.1%	($22,896)	($8,753)	($220)	2.6	104.2	$14,143	$22,676
CZ04-2	CPAU	-14,186	1706	5.30	-0.1%	($22,896)	$12,493	($220)	>1	104.2	$35,389	$22,676
CZ05	PG&E	-14,334	1746	5.47	-1.2%	($25,507)	($1,567)	($4,197)	16.3	6.1	$23,940	$21,309
CZ06	SCE	-7,527	1002	3.32	0.5%	($21,762)	$18,590	$1,868	>1	>1	$40,351	$23,630
CZ06-2	LADWP	-7,527	1002	3.32	0.5%	($21,762)	$19,309	$1,868	>1	>1	$41,071	$23,630
CZ07	SDG&E	-3,812	522	1.76	0.3%	($23,762)	$54,345	$1,318	>1	>1	$78,107	$25,080
CZ08	SCE	-5,805	793	2.70	0.4%	($26,922)	$16,735	$1,846	>1	>1	$43,658	$28,768
CZ08-2	LADWP	-5,805	793	2.70	0.4%	($26,922)	$17,130	$1,846	>1	>1	$44,052	$28,768
CZ09	SCE	-7,241	970	3.32	0.4%	($32,113)	$18,582	$1,978	>1	>1	$50,695	$34,091
CZ09-2	LADWP	-7,241	970	3.32	0.4%	($32,113)	$19,089	$1,978	>1	>1	$51,202	$34,091
CZ10	SDG&E	-10,336	1262	3.99	0.1%	($27,272)	$54,453	$505	>1	>1	$81,724	$27,777
CZ10-2	SCE	-10,336	1262	3.99	0.1%	($27,272)	$20,996	$505	>1	>1	$48,268	$27,777
CZ11	PG&E	-19,251	2415	7.95	0.5%	($32,202)	($7,951)	$2,615	4.1	>1	$24,251	$34,817
CZ12	PG&E	-19,471	2309	7.28	-0.1%	($32,504)	($14,153)	($461)	2.3	70.4	$18,351	$32,042
CZ12-2	SMUD	-19,471	2309	7.28	-0.1%	($32,504)	$12,939	($461)	>1	70.4	$45,443	$32,042
CZ13	PG&E	-16,819	1983	6.15	-0.4%	($28,158)	($10,575)	($2,022)	2.7	13.9	$17,582	$26,136
CZ14	SDG&E	-13,208	1672	5.44	0.7%	($26,656)	$41,117	$4,461	>1	>1	$67,772	$31,117
CZ14-2	SCE	-13,208	1672	5.44	0.7%	($26,656)	$18,467	$4,461	>1	>1	$45,123	$31,117
CZ15	SCE	-2,463	518	2.14	0.9%	($29,544)	$16,796	$5,823	>1	>1	$46,339	$35,367
CZ16	PG&E	-41,418	4304	13.23	-12.2%	($25,771)	($49,862)	($52,542)	0.5	0.5	($24,091)	($26,771)
CZ16-2	LADWP	-41,418	4304	13.23	-12.2%	($25,771)	$39,319	($52,542)	>1	0.5	$65,090	($26,771)

* The Incremental Package Cost is the addition of the incremental HVAC and water heating equipment costs from Figure 11 and the natural gas infrastructure incremental cost savings of $28,027 (see section 3.3.2.2).

Figure 28. Cost Effectiveness for Medium Retail Package 3A – All-Electric + EE

CZ	Utility	Elec Savings (kWh)	Gas Savings (therms)	GHG Reductions (mtons)	Comp-liance Margin	Incremental Package Cost	Lifecycle Utility Cost Savings	$TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Package 3A: All-Electric + EE												
CZ01	PG&E	-5,478	3893	20.64	15%	($20,336)	$63,593	$51,224	>1	>1	$83,929	$71,560
CZ02	PG&E	2,843	2448	14.58	13%	($21,895)	$74,997	$56,893	>1	>1	$96,892	$78,788
CZ03	PG&E	7,791	1868	12.73	16%	($18,542)	$68,968	$56,586	>1	>1	$87,511	$75,128
CZ04	PG&E	8,572	1706	11.89	14%	($17,327)	$81,957	$57,904	>1	>1	$99,284	$75,231
CZ04-2	CPAU	8,572	1706	11.89	14%	($17,327)	$63,082	$57,904	>1	>1	$80,408	$75,231
CZ05	PG&E	6,973	1746	11.68	15%	($19,938)	$63,677	$51,949	>1	>1	$83,615	$71,887
CZ06	SCE	7,431	1002	7.72	11%	($19,050)	$47,072	$42,610	>1	>1	$66,122	$61,660
CZ06-2	LADWP	7,431	1002	7.72	11%	($19,050)	$37,078	$42,610	>1	>1	$56,128	$61,660
CZ07	SDG&E	14,350	522	6.98	13%	($18,193)	$127,461	$50,828	>1	>1	$145,654	$69,021
CZ08	SCE	8,524	793	6.90	10%	($24,210)	$43,679	$42,258	>1	>1	$67,890	$66,468
CZ08-2	LADWP	8,524	793	6.90	10%	($24,210)	$34,038	$42,258	>1	>1	$58,248	$66,468
CZ09	SCE	8,403	970	7.81	10%	($26,545)	$47,819	$47,356	>1	>1	$74,364	$73,901
CZ09-2	LADWP	8,403	970	7.81	10%	($26,545)	$37,934	$47,356	>1	>1	$64,478	$73,901
CZ10	SDG&E	11,737	1262	10.23	12%	($21,703)	$137,436	$58,761	>1	>1	$159,139	$80,464
CZ10-2	SCE	11,737	1262	10.23	12%	($21,703)	$58,257	$58,761	>1	>1	$79,959	$80,464
CZ11	PG&E	5,892	2415	15.13	12%	($26,633)	$85,256	$65,859	>1	>1	$111,889	$92,492
CZ12	PG&E	5,548	2309	14.46	12%	($26,935)	$80,631	$63,903	>1	>1	$107,566	$90,838
CZ12-2	SMUD	5,548	2309	14.46	12%	($26,935)	$59,311	$63,903	>1	>1	$86,246	$90,838
CZ13	PG&E	10,184	1983	14.15	14%	($25,446)	$110,105	$80,604	>1	>1	$135,551	$106,050
CZ14	SDG&E	16,583	1672	13.83	15%	($23,944)	$171,200	$88,471	>1	>1	$195,145	$112,415
CZ14-2	SCE	16,583	1672	13.83	15%	($23,944)	$656,178	$159,604	>1	>1	$680,122	$183,548
CZ15	SCE	23,642	518	9.44	12%	($26,832)	$65,573	$76,781	>1	>1	$92,404	$103,612
CZ16	PG&E	-18,232	4304	19.80	3%	($23,059)	$38,796	$14,152	>1	>1	$61,855	$37,211
CZ16-2	LADWP	-18,232	4304	19.80	3%	($23,059)	$67,793	$14,152	>1	>1	$90,852	$37,211

Figure 29. Cost Effectiveness for Medium Retail Package 3B – All-Electric + EE + PV + B

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Compliance Margin (%)	Incremental Package Cost	Lifecycle Energy Cost Savings	$-TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
All-Electric + PV + B												
CZ01	PG&E	137,956	3893	50.51	15%	$254,335	$510,831	$374,432	2.0	1.5	$256,496	$120,097
CZ02	PG&E	173,387	2448	49.87	13%	$252,777	$590,112	$463,431	2.3	1.8	$337,336	$210,654
CZ03	PG&E	180,055	1868	48.55	16%	$256,129	$585,861	$452,399	2.3	1.8	$329,732	$196,270
CZ04	PG&E	184,499	1706	48.38	14%	$257,345	$608,814	$481,011	2.4	1.9	$351,470	$223,666
CZ04-2	CPAU	184,499	1706	48.38	14%	$257,345	$465,690	$481,011	1.8	1.9	$208,345	$223,666
CZ05	PG&E	185,690	1746	48.84	15%	$254,734	$600,933	$461,804	2.4	1.8	$346,199	$207,071
CZ06	SCE	180,968	1002	43.91	11%	$255,621	$335,909	$457,959	1.3	1.8	$80,288	$202,337
CZ06-2	LADWP	180,968	1002	43.91	11%	$255,621	$206,021	$457,959	0.8	1.8	($49,601)	$202,337
CZ07	SDG&E	194,837	522	44.67	13%	$256,478	$550,714	$478,637	2.1	1.9	$294,236	$222,159
CZ08	SCE	184,120	793	43.32	10%	$250,461	$340,301	$479,406	1.4	1.9	$89,840	$228,945
CZ08-2	LADWP	184,120	793	43.32	10%	$250,461	$203,813	$479,406	0.8	1.9	($46,648)	$228,945
CZ09	SCE	186,346	970	44.77	10%	$248,127	$349,524	$474,176	1.4	1.9	$101,397	$226,049
CZ09-2	LADWP	186,346	970	44.77	10%	$248,127	$216,654	$474,176	0.9	1.9	($31,473)	$226,049
CZ10	SDG&E	191,923	1262	47.46	12%	$252,969	$593,514	$473,605	2.3	1.9	$340,545	$220,636
CZ10-2	SCE	191,923	1262	47.46	12%	$252,969	$356,958	$473,605	1.4	1.9	$103,989	$220,636
CZ11	PG&E	177,639	2415	50.26	12%	$248,039	$585,689	$489,317	2.4	2.0	$337,650	$241,278
CZ12	PG&E	176,919	2309	49.46	12%	$247,736	$591,104	$484,702	2.4	2.0	$343,368	$236,966
CZ12-2	SMUD	176,919	2309	49.46	12%	$247,736	$335,286	$484,702	1.4	2.0	$87,550	$236,966
CZ13	PG&E	183,129	1983	49.48	14%	$249,226	$608,560	$483,670	2.4	1.9	$359,334	$234,444
CZ14	SDG&E	208,183	1672	52.54	15%	$250,727	$593,232	$544,079	2.4	2.2	$342,505	$293,351
CZ14-2	SCE	264,589	1672	80.97	15%	$250,727	$656,178	$580,403	2.6	2.3	$405,450	$329,676
CZ15	SCE	205,869	518	45.67	12%	$247,840	$347,125	$493,339	1.4	2.0	$99,285	$245,499
CZ16	PG&E	176,114	4304	60.13	3%	$251,612	$567,822	$446,795	2.3	1.8	$316,210	$195,183
CZ16-2	LADWP	176,114	4304	60.13	3%	$251,612	$241,757	$446,795	1.0	1.8	($9,856)	$195,183

Figure 30. Cost Effectiveness for Medium Retail Package 3C – All-Electric + HE

CZ	Utility	Elec Savings (kWh)	Gas Savings (therms)	GHG Reductions (mtons)	Comp-liance Margin	Incremental Package Cost	Lifecycle Utility Cost Savings	$TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Package 3C: All-Electric + HE												
CZ01	PG&E	-26,199	3893	14.76	-2%	($587)	$369	($5,757)	>1	0.1	$956	($5,170)
CZ02	PG&E	-16,989	2448	8.95	3%	($4,211)	$12,323	$11,251	>1	>1	$16,534	$15,463
CZ03	PG&E	-11,703	1868	7.15	2%	($2,213)	$9,159	$6,944	>1	>1	$11,372	$9,157
CZ04	PG&E	-10,675	1706	6.37	3%	($316)	$14,317	$11,383	>1	>1	$14,633	$11,700
CZ04-2	CPAU	-10,675	1706	6.37	3%	($316)	$20,599	$11,383	>1	>1	$20,915	$11,700
CZ05	PG&E	-11,969	1746	6.19	1%	($2,298)	$5,592	$1,824	>1	>1	$7,890	$4,122
CZ06	SCE	-3,919	1002	4.35	3%	$1,418	$29,751	$13,734	21.0	9.7	$28,333	$12,316
CZ06-2	LADWP	-3,919	1002	4.35	3%	$1,418	$25,891	$13,734	18.3	9.7	$24,473	$12,316
CZ07	SDG&E	-955	522	2.59	3%	($710)	$74,518	$11,229	>1	>1	$75,227	$11,939
CZ08	SCE	-2,224	793	3.74	4%	($3,719)	$28,067	$15,075	>1	>1	$31,785	$18,793
CZ08-2	LADWP	-2,224	793	3.74	4%	($3,719)	$23,848	$15,075	>1	>1	$27,566	$18,793
CZ09	SCE	-2,089	970	4.84	4%	($8,268)	$34,648	$21,162	>1	>1	$42,916	$29,430
CZ09-2	LADWP	-2,089	970	4.84	4%	($8,268)	$28,837	$21,162	>1	>1	$37,105	$29,430
CZ10	SDG&E	-4,868	1262	5.58	4%	($5,222)	$91,136	$20,041	>1	>1	$96,358	$25,263
CZ10-2	SCE	-4,868	1262	5.58	4%	($5,222)	$37,200	$20,041	>1	>1	$42,422	$25,263
CZ11	PG&E	-12,651	2415	9.95	5%	($8,217)	$29,015	$26,172	>1	>1	$37,232	$34,389
CZ12	PG&E	-13,479	2309	9.10	4%	($9,239)	$20,839	$21,228	>1	>1	$30,078	$30,466
CZ12-2	SMUD	-13,479	2309	9.10	4%	($9,239)	$26,507	$21,228	>1	>1	$35,746	$30,466
CZ13	PG&E	-9,935	1983	8.23	4%	($4,975)	$30,123	$24,063	>1	>1	$35,097	$29,037
CZ14	SDG&E	-5,407	1672	7.71	5%	$121	$88,669	$31,029	732.5	256.3	$88,547	$30,908
CZ14-2	SCE	-5,407	1672	7.71	5%	$121	$40,709	$31,029	336.3	256.3	$40,588	$30,908
CZ15	SCE	6,782	518	4.77	6%	($2,508)	$42,238	$37,379	>1	>1	$44,745	$39,887
CZ16	PG&E	-35,297	4304	15.03	-8%	$1,102	($21,384)	($33,754)	-19.4	-30.6	($22,486)	($34,856)
CZ16-2	LADWP	-35,297	4304	15.03	-8%	$1,102	$48,625	($33,754)	44.1	-30.6	$47,523	($34,856)

4.3 Cost Effectiveness Results – Small Hotel

The following issues must be considered when reviewing the Small Hotel results:

- The Small Hotel is a mix of residential and nonresidential space types, which results in different occupancy and load profiles than the office and retail prototypes.
- A potential laundry load has not been examined for the Small Hotel. The Reach Code Team attempted to characterize and apply the energy use intensity of laundry loads in hotels but did not find readily available data for use. Thus, cost effectiveness including laundry systems has not been examined.
- Contrary to the office and retail prototypes, the Small Hotel baseline water heater is a central gas storage type. Current compliance software cannot model central heat pump water heater systems with recirculation serving guest rooms.[23] The only modeling option for heat pump water heating is individual water heaters at each guest room even though this is a very uncommon configuration. TRC modeled individual heat pump water heaters but as a proxy for central heat pump water heating performance, but integrated costs associated with tank and controls for central heat pump water heating into cost effectiveness calculations.
- Assuming central heat pump water heating also enabled the inclusion of a solar hot water thermal collection system, which was a key efficiency measure to achieving compliance in nearly all climate zones.

Figure 31 through Figure 37 contain the cost-effectiveness findings for the Small Hotel packages. Notable findings for each package include:

- **1A – Mixed-Fuel + EE:**
  - Packages achieve +3 to +10% compliance margins depending on climate zone.
  - Packages are cost effective using either the On-Bill or TDV approach in all CZs except 12 (using SMUD rates), 14 (using SCE rates), and 15 (with SCE rates).
  - The hotel is primarily guest rooms with a smaller proportion of nonresidential space. Thus, the inexpensive VAV minimum flow measure and lighting measures that have been applied to the entirety of the Medium Office and Medium Retail prototypes have a relatively small impact in the Small Hotel.[24]
- **1B – Mixed-Fuel + EE + PV + B:** Packages are cost effective using either the On-Bill or TDV approach in all CZs. Solar PV generally increases cost effectiveness compared to efficiency-only, particularly when using an NPV metric.
- **1C – Mixed-Fuel + HE:** Packages achieve +2 to +5% compliance margins depending on climate zone. The package is cost effective using the On-Bill approach in a minority of climate zones, and cost effective using TDV approach only in CZ15.

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[23] The IOUs and CEC are actively working on including central heat pump water heater modeling with recirculation systems in early 2020.

[24] Title 24 requires that hotel/motel guest room lighting design comply with the residential lighting standards, which are all mandatory and are not awarded compliance credit for improved efficacy.

- **2 – All-Electric Federal Code-Minimum Reference:**
  - This all-electric design does not comply with the Energy Commission's TDV performance budget. Packages achieve between -50% and -4% compliance margins depending on climate zone. This may be because the modeled HW system is constrained to having an artificially low efficiency to avoid triggering federal pre-emption, and the heat pump space heating systems must operate overnight when operation is less efficient.
  - All packages are cost effective in all climate zones.
- **3A – All-Electric + EE:** Packages achieve positive compliance margins in all CZs ranging from 0% to +17%, except CZ16 which had a -18% compliance margin. All packages are cost effective in all climate zones. The improved degree of cost effectiveness outcomes in Package 3A compared to Package 1A appear to be due to the significant incremental package cost savings.
- **3B – All-Electric + EE + PV + B:** All packages are cost effective. Packages improve in B/C ratio when compared to 3A and increase in magnitude of overall NPV savings. PV appears to be more cost-effective with higher building electricity loads.
- **3C – All-Electric + HE:**
  - Packages do not comply with Title 24 in all CZs except CZ15 which resulted in a +0.04% compliance margin.
  - All packages are cost effective.

Figure 31. Cost Effectiveness for Small Hotel Package 1A – Mixed-Fuel + EE

CZ	Utility	Elec Savings (kWh)	Gas Savings (therms)	GHG Reductions (mtons)	Comp-liance Margin	Incremental Package Cost	Lifecycle Utility Cost Savings	$TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Package 1A: Mixed Fuel + EE												
CZ01	PG&E	3,855	1288	5.65	9%	$20,971	$34,339	$36,874	1.6	1.8	$13,368	$15,903
CZ02	PG&E	3,802	976	3.91	7%	$20,971	$26,312	$29,353	1.3	1.4	$5,341	$8,381
CZ03	PG&E	4,153	1046	4.48	10%	$20,971	$31,172	$35,915	1.5	1.7	$10,201	$14,944
CZ04	PG&E	5,007	395	0.85	6%	$21,824	$24,449	$24,270	1.1	1.1	$2,625	$2,446
CZ04-2	CPAU	4,916	422	0.98	6%	$21,824	$18,713	$24,306	0.9	1.1	($3,111)	$2,483
CZ05	PG&E	3,530	1018	4.13	9%	$20,971	$28,782	$34,448	1.4	1.6	$7,810	$13,477
CZ05-2	SCG	3,530	1018	4.13	9%	$20,971	$23,028	$34,448	1.1	1.6	$2,057	$13,477
CZ06	SCE	5,137	418	1.16	8%	$21,824	$16,001	$26,934	0.7	1.2	($5,823)	$5,110
CZ06-2	LADWP	5,137	418	1.16	8%	$21,824	$11,706	$26,934	0.5	1.2	($10,118)	$5,110
CZ07	SDG&E	5,352	424	1.31	8%	$21,824	$26,699	$27,975	1.2	1.3	$4,876	$6,152
CZ08	SCE	5,151	419	1.21	7%	$21,824	$15,931	$23,576	0.7	1.1	($5,893)	$1,752
CZ08-2	LADWP	5,151	419	1.21	7%	$21,824	$11,643	$23,576	0.5	1.1	($10,180)	$1,752
CZ09	SCE	5,229	406	1.16	6%	$21,824	$15,837	$22,365	0.7	1.0	($5,987)	$541
CZ09-2	LADWP	5,229	406	1.16	6%	$21,824	$11,632	$22,365	0.5	1.0	($10,192)	$541
CZ10	SDG&E	4,607	342	0.92	5%	$21,824	$25,506	$22,219	1.2	1.0	$3,683	$396
CZ10-2	SCE	4,607	342	0.92	5%	$21,824	$13,868	$22,219	0.6	1.0	($7,956)	$396
CZ11	PG&E	4,801	325	0.87	4%	$21,824	$22,936	$19,503	1.1	0.9	$1,112	($2,321)
CZ12	PG&E	5,276	327	0.90	5%	$21,824	$22,356	$21,305	1.0	0.98	$532	($519)
CZ12-2	SMUD	5,276	327	0.90	5%	$21,824	$15,106	$21,305	0.7	0.98	($6,717)	($519)
CZ13	PG&E	4,975	310	0.87	4%	$21,824	$23,594	$19,378	1.1	0.9	$1,770	($2,445)
CZ14	SDG&E	4,884	370	0.82	4%	$21,824	$24,894	$21,035	1.1	0.96	$3,070	($789)
CZ14-2	SCE	4,884	370	0.82	4%	$21,824	$14,351	$21,035	0.7	0.96	($7,473)	($789)
CZ15	SCE	5,187	278	1.23	3%	$21,824	$13,645	$18,089	0.6	0.8	($8,178)	($3,735)
CZ16	PG&E	2,992	1197	4.95	6%	$20,971	$27,813	$30,869	1.3	1.5	$6,842	$9,898
CZ16-2	LADWP	2,992	1197	4.95	6%	$20,971	$19,782	$30,869	0.9	1.5	($1,190)	$9,898

Figure 32. Cost Effectiveness for Small Hotel Package 1B – Mixed-Fuel + EE + PV + B

CZ	Utility	Elec Savings (kWh)	Gas Savings (therms)	GHG Reductions (mtons)	Comp-liance Margin	Incremental Package Cost	Lifecycle Utility Cost Savings	$TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Package 1B: Mixed Fuel + EE + PV + B												
CZ01	PG&E	107,694	1288	28.73	9%	$228,341	$366,509	$295,731	1.6	1.3	$138,168	$67,390
CZ02	PG&E	130,144	976	31.14	7%	$228,341	$359,248	$336,575	1.6	1.5	$130,907	$108,233
CZ03	PG&E	129,107	1046	31.57	10%	$228,341	$430,737	$335,758	1.9	1.5	$202,396	$107,416
CZ04	PG&E	132,648	395	28.46	6%	$229,194	$355,406	$338,455	1.6	1.5	$126,212	$109,262
CZ04-2	CPAU	132,556	422	28.59	6%	$229,194	$322,698	$338,492	1.4	1.5	$93,504	$109,298
CZ05	PG&E	136,318	1018	32.73	9%	$228,341	$452,611	$352,342	2.0	1.5	$224,269	$124,001
CZ05-2	SCG	136,318	1018	32.73	9%	$228,341	$446,858	$352,342	2.0	1.5	$218,516	$124,001
CZ06	SCE	131,051	418	28.47	8%	$229,194	$217,728	$336,843	0.9	1.5	($11,466)	$107,649
CZ06-2	LADWP	131,051	418	28.47	8%	$229,194	$131,052	$336,843	0.6	1.5	($98,142)	$107,649
CZ07	SDG&E	136,359	424	29.63	8%	$229,194	$306,088	$345,378	1.3	1.5	$76,894	$116,184
CZ08	SCE	132,539	419	28.85	7%	$229,194	$227,297	$353,013	1.0	1.5	($1,897)	$123,819
CZ08-2	LADWP	132,539	419	28.85	7%	$229,194	$134,739	$353,013	0.6	1.5	($94,455)	$123,819
CZ09	SCE	131,422	406	28.82	6%	$229,194	$230,791	$343,665	1.0	1.5	$1,597	$114,471
CZ09-2	LADWP	131,422	406	28.82	6%	$229,194	$136,024	$343,665	0.6	1.5	($93,170)	$114,471
CZ10	SDG&E	134,146	342	29.05	5%	$229,194	$339,612	$342,574	1.5	1.5	$110,418	$113,380
CZ10-2	SCE	134,146	342	29.05	5%	$229,194	$226,244	$342,574	1.0	1.5	($2,949)	$113,380
CZ11	PG&E	128,916	325	27.62	4%	$229,194	$352,831	$337,208	1.5	1.5	$123,637	$108,014
CZ12	PG&E	131,226	327	28.04	5%	$229,194	$425,029	$338,026	1.9	1.5	$195,835	$108,832
CZ12-2	SMUD	131,226	327	28.04	5%	$229,194	$213,176	$338,026	0.9	1.5	($16,018)	$108,832
CZ13	PG&E	127,258	310	27.33	4%	$229,194	$351,244	$324,217	1.5	1.4	$122,050	$95,023
CZ14	SDG&E	147,017	370	30.96	4%	$229,194	$861,445	$217,675	3.8	0.9	$632,251	($11,518)
CZ14-2	SCE	147,017	370	30.96	4%	$229,194	$244,100	$381,164	1.1	1.7	$14,906	$151,970
CZ15	SCE	137,180	278	29.12	3%	$229,194	$225,054	$348,320	1.0	1.5	($4,140)	$119,127
CZ16	PG&E	141,478	1197	34.60	6%	$228,341	$377,465	$357,241	1.7	1.6	$149,124	$128,899
CZ16-2	LADWP	141,478	1197	34.60	6%	$228,341	$136,563	$357,241	0.6	1.6	($91,778)	$128,899

Figure 33. Cost Effectiveness for Small Hotel Package 1C – Mixed-Fuel + HE

CZ	Utility	Elec Savings (kWh)	Gas Savings (therms)	GHG Reductions (mtons)	Comp-liance Margin	Incremental Package Cost	Lifecycle Utility Cost Savings	$TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Package 1C: Mixed Fuel + HE												
CZ01	PG&E	10	632	3.76	2%	$22,839	$11,015	$10,218	0.5	0.4	($11,823)	($12,621)
CZ02	PG&E	981	402	2.69	3%	$23,092	$16,255	$11,808	0.7	0.5	($6,837)	($11,284)
CZ03	PG&E	81	383	2.30	2%	$20,510	$7,066	$6,850	0.3	0.3	($13,444)	($13,660)
CZ04	PG&E	161	373	2.26	2%	$22,164	$8,593	$7,645	0.4	0.3	($13,571)	($14,519)
CZ04-2	CPAU	161	373	2.26	2%	$22,164	$7,097	$7,645	0.3	0.3	($15,067)	($14,519)
CZ05	PG&E	154	361	2.19	2%	$21,418	$6,897	$6,585	0.3	0.3	($14,521)	($14,833)
CZ05-2	SCG	154	361	2.19	2%	$21,418	$4,786	$6,585	0.2	0.3	($16,632)	($14,833)
CZ06	SCE	237	201	1.27	2%	$20,941	$3,789	$4,882	0.2	0.2	($17,152)	($16,059)
CZ06-2	LADWP	237	201	1.27	2%	$20,941	$3,219	$4,882	0.2	0.2	($17,722)	($16,059)
CZ07	SDG&E	1,117	158	1.28	2%	$19,625	$13,771	$7,342	0.7	0.4	($5,854)	($12,283)
CZ08	SCE	1,302	169	1.39	2%	$20,678	$8,378	$8,591	0.4	0.4	($12,300)	($12,088)
CZ08-2	LADWP	1,302	169	1.39	2%	$20,678	$5,802	$8,591	0.3	0.4	($14,877)	($12,088)
CZ09	SCE	1,733	178	1.56	3%	$20,052	$10,489	$11,164	0.5	0.6	($9,563)	($8,888)
CZ09-2	LADWP	1,733	178	1.56	3%	$20,052	$7,307	$11,164	0.4	0.6	($12,745)	($8,888)
CZ10	SDG&E	3,170	220	2.29	4%	$22,682	$35,195	$19,149	1.6	0.8	$12,513	($3,533)
CZ10-2	SCE	3,170	220	2.29	4%	$22,682	$16,701	$19,149	0.7	0.8	($5,981)	($3,533)
CZ11	PG&E	3,343	323	2.96	4%	$23,344	$27,633	$20,966	1.2	0.9	$4,288	($2,379)
CZ12	PG&E	1,724	320	2.44	4%	$22,302	$11,597	$15,592	0.5	0.7	($10,705)	($6,710)
CZ12-2	SMUD	1,724	320	2.44	4%	$22,302	$11,156	$15,592	0.5	0.7	($11,146)	($6,710)
CZ13	PG&E	3,083	316	2.81	3%	$22,882	$23,950	$17,068	1.0	0.7	$1,068	($5,814)
CZ14	SDG&E	3,714	312	2.99	4%	$23,299	$35,301	$21,155	1.5	0.9	$12,002	($2,144)
CZ14-2	SCE	3,714	312	2.99	4%	$23,299	$18,460	$21,155	0.8	0.9	($4,839)	($2,144)
CZ15	SCE	8,684	97	3.21	5%	$20,945	$26,738	$31,600	1.3	1.5	$5,792	$10,655
CZ16	PG&E	836	700	4.42	3%	$24,616	$18,608	$14,494	0.8	0.6	($6,007)	($10,121)
CZ16-2	LADWP	836	700	4.42	3%	$24,616	$15,237	$14,494	0.6	0.6	($9,378)	($10,121)

Figure 34. Cost Effectiveness for Small Hotel Package 2 – All-Electric Federal Code Minimum

CZ	Utility	Elec Savings (kWh)	Gas Savings (therms)	GHG Reductions (mtons)	Comp-liance Margin	Incremental Package Cost*	Lifecycle Utility Cost Savings	$TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Package 2: All-Electric Federal Code Minimum												
CZ01	PG&E	-159,802	16917	53.92	-28%	($1,296,784)	($582,762)	($115,161)	2.2	11.3	$714,022	$1,181,623
CZ02	PG&E	-118,739	12677	40.00	-12%	($1,297,757)	($245,434)	($51,620)	5.3	25.1	$1,052,322	$1,246,137
CZ03	PG&E	-110,595	12322	40.48	-14%	($1,300,029)	($326,633)	($51,166)	4.0	25.4	$973,396	$1,248,863
CZ04	PG&E	-113,404	11927	36.59	-13%	($1,299,864)	($225,307)	($53,134)	5.8	24.5	$1,074,556	$1,246,730
CZ04-2	CPAU	-113,404	11927	36.59	-13%	($1,299,864)	($17,768)	($53,134)	73.2	24.5	$1,282,096	$1,246,730
CZ05	PG&E	-108,605	11960	38.34	-15%	($1,299,917)	($350,585)	($54,685)	3.7	23.8	$949,332	$1,245,232
CZ06	SCE	-78,293	8912	29.36	-5%	($1,300,058)	($61,534)	($28,043)	21.1	46.4	$1,238,524	$1,272,015
CZ06-2	LA	-78,293	8912	29.36	-5%	($1,300,058)	$43,200	($28,043)	>1	46.4	$1,343,258	$1,272,015
CZ07	SDG&E	-69,819	8188	28.04	-7%	($1,298,406)	($137,638)	($23,199)	9.4	56.0	$1,160,768	$1,275,207
CZ08	SCE	-71,914	8353	28.21	-6%	($1,296,376)	($53,524)	($22,820)	24.2	56.8	$1,242,852	$1,273,556
CZ08-2	LA	-71,914	8353	28.21	-6%	($1,296,376)	$42,841	($22,820)	>1	56.8	$1,339,217	$1,273,556
CZ09	SCE	-72,262	8402	28.38	-6%	($1,298,174)	($44,979)	($21,950)	28.9	59.1	$1,253,196	$1,276,224
CZ09-2	LA	-72,262	8402	28.38	-6%	($1,298,174)	$46,679	($21,950)	>1	59.1	$1,344,853	$1,276,224
CZ10	SDG&E	-80,062	8418	26.22	-8%	($1,295,176)	($172,513)	($36,179)	7.5	35.8	$1,122,663	$1,258,997
CZ10-2	SCE	-80,062	8418	26.22	-8%	($1,295,176)	($63,974)	($36,179)	20.2	35.8	$1,231,202	$1,258,997
CZ11	PG&E	-99,484	10252	30.99	-10%	($1,295,985)	($186,037)	($49,387)	7.0	26.2	$1,109,948	$1,246,598
CZ12	PG&E	-99,472	10403	32.08	-10%	($1,297,425)	($340,801)	($45,565)	3.8	28.5	$956,624	$1,251,860
CZ12-2	SMUD	-99,067	10403	32.21	-10%	($1,297,425)	$5,794	($44,354)	>1	29.3	$1,303,219	$1,253,071
CZ13	PG&E	-96,829	10029	30.60	-10%	($1,295,797)	($184,332)	($50,333)	7.0	25.7	$1,111,465	$1,245,464
CZ14	SDG&E	-101,398	10056	29.68	-11%	($1,296,156)	($325,928)	($56,578)	4.0	22.9	$970,228	$1,239,578
CZ14-2	SCE	-101,398	10056	29.68	-11%	($1,296,156)	($121,662)	($56,578)	10.7	22.9	$1,174,494	$1,239,578
CZ15	SCE	-49,853	5579	18.07	-4%	($1,294,276)	$209	($21,420)	>1	60.4	$1,294,485	$1,272,856
CZ16	PG&E	-216,708	17599	41.89	-50%	($1,300,552)	($645,705)	($239,178)	2.0	5.4	$654,847	$1,061,374
CZ16-2	LA	-216,708	17599	41.89	-50%	($1,300,552)	$30,974	($239,178)	>1	5.4	$1,331,526	$1,061,374

* The Incremental Package Cost is the addition of the incremental HVAC and water heating equipment costs from Figure 12, the electrical infrastructure incremental cost of $26,800 (see section 3.3.2.1), and the natural gas infrastructure incremental cost savings of $56,020 (see section 3.3.2.2).

Figure 35. Cost Effectiveness for Small Hotel Package 3A – All-Electric + EE

CZ	Utility	Elec Savings (kWh)	Gas Savings (therms)	GHG Reductions (mtons)	Comp-liance Margin	Incremental Package Cost	Lifecycle Utility Cost Savings	$TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Package 3A: All-Electric + EE												
CZ01	PG&E	-113,259	16917	62.38	1.3%	($1,251,544)	($200,367)	$5,460	6.2	>1	$1,051,177	$1,257,005
CZ02	PG&E	-90,033	12677	45.46	4%	($1,265,064)	($108,075)	$15,685	11.7	>1	$1,156,989	$1,280,749
CZ03	PG&E	-83,892	12322	45.93	6%	($1,267,509)	($198,234)	$20,729	6.4	>1	$1,069,274	$1,288,237
CZ04	PG&E	-91,197	11927	40.36	0.2%	($1,263,932)	($112,892)	$703	11.2	>1	$1,151,041	$1,264,635
CZ04-2	CPAU	-90,981	11927	40.42	0.2%	($1,263,932)	$32,557	$918	>1	>1	$1,296,489	$1,264,850
CZ05	PG&E	-82,491	11960	43.62	5%	($1,267,355)	($221,492)	$18,488	5.7	>1	$1,045,863	$1,285,843
CZ06	SCE	-61,523	8912	32.45	7%	($1,267,916)	($33,475)	$15,142	37.9	>1	$1,234,441	$1,283,057
CZ06-2	LADWP	-61,523	8912	32.45	7%	($1,267,916)	$57,215	$15,142	>1	>1	$1,325,130	$1,283,057
CZ07	SDG&E	-53,308	8188	31.22	7%	($1,266,354)	($81,338)	$22,516	15.6	>1	$1,185,015	$1,288,870
CZ08	SCE	-55,452	8353	31.33	3%	($1,264,408)	($23,893)	$9,391	52.9	>1	$1,240,515	$1,273,800
CZ08-2	LADWP	-55,452	8353	31.33	3%	($1,264,408)	$57,058	$9,391	>1	>1	$1,321,466	$1,273,800
CZ09	SCE	-55,887	8402	31.40	2%	($1,266,302)	($19,887)	$9,110	63.7	>1	$1,246,415	$1,275,412
CZ09-2	LADWP	-55,887	8402	31.40	2%	($1,266,302)	$60,441	$9,110	>1	>1	$1,326,743	$1,275,412
CZ10	SDG&E	-60,239	8418	29.96	2%	($1,256,002)	($126,072)	$7,365	10.0	>1	$1,129,930	$1,263,367
CZ10-2	SCE	-60,239	8418	29.96	2%	($1,256,002)	($33,061)	$7,365	38.0	>1	$1,222,940	$1,263,367
CZ11	PG&E	-77,307	10252	35.12	1%	($1,256,149)	($80,187)	$3,114	15.7	>1	$1,175,962	$1,259,263
CZ12	PG&E	-75,098	10403	36.73	2%	($1,256,824)	($234,275)	$9,048	5.4	>1	$1,022,550	$1,265,872
CZ12-2	SMUD	-75,098	10403	36.73	2%	($1,256,824)	$54,941	$9,048	>1	>1	$1,311,765	$1,265,872
CZ13	PG&E	-75,052	10029	34.72	0.3%	($1,256,109)	($79,378)	$1,260	15.8	>1	$1,176,731	$1,257,369
CZ14	SDG&E	-76,375	10056	34.28	0.1%	($1,255,704)	($170,975)	$543	7.3	>1	$1,084,729	$1,256,247
CZ14-2	SCE	-76,375	10056	34.28	0.1%	($1,255,704)	($34,418)	$543	36.5	>1	$1,221,286	$1,256,247
CZ15	SCE	-33,722	5579	21.43	2%	($1,257,835)	$26,030	$12,262	>1	>1	$1,283,864	$1,270,097
CZ16	PG&E	-139,676	17599	55.25	-14%	($1,255,364)	($197,174)	($66,650)	6.4	18.8	$1,058,190	$1,188,714
CZ16-2	LADWP	-139,676	17599	55.25	-14%	($1,255,364)	$165,789	($66,650)	>1	18.8	$1,421,153	$1,188,714

Figure 36. Cost Effectiveness for Small Hotel Package 3B – All-Electric + EE + PV + B

CZ	Utility	Elec Savings (kWh)	Gas Savings (therms)	GHG Reductions (mtons)	Comp-liance Margin	Incremental Package Cost	Lifecycle Utility Cost Savings	$TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Package 3B: All-Electric + EE + PV + B												
CZ01	PG&E	-8,900	16917	87.15	1%	($1,044,174)	$90,964	$324,376	>1	>1	$1,135,139	$1,368,551
CZ02	PG&E	36,491	12677	73.03	4%	($1,057,694)	$242,514	$313,711	>1	>1	$1,300,208	$1,371,405
CZ03	PG&E	41,239	12322	73.43	6%	($1,060,139)	$155,868	$308,385	>1	>1	$1,216,007	$1,368,524
CZ04	PG&E	36,628	11927	69.70	0.2%	($1,056,562)	$240,799	$308,682	>1	>1	$1,297,361	$1,365,244
CZ04-2	CPAU	36,844	11927	69.76	0.2%	($1,056,562)	$336,813	$418,836	>1	>1	$1,393,375	$1,475,398
CZ05	PG&E	36,365	11960	73.11	5%	($1,059,985)	$119,173	$317,952	>1	>1	$1,179,158	$1,377,937
CZ06	SCE	64,476	8912	60.47	7%	($1,060,545)	$156,327	$311,730	>1	>1	$1,216,872	$1,372,275
CZ06-2	LADWP	64,476	8912	60.47	7%	($1,060,545)	$180,648	$311,730	>1	>1	$1,241,193	$1,372,275
CZ07	SDG&E	77,715	8188	60.45	7%	($1,058,983)	$197,711	$330,458	>1	>1	$1,256,694	$1,389,441
CZ08	SCE	71,990	8353	59.49	3%	($1,057,038)	$165,393	$320,814	>1	>1	$1,222,432	$1,377,852
CZ08-2	LADWP	71,990	8353	60.24	3%	($1,057,038)	$180,367	$443,809	>1	>1	$1,237,405	$1,500,847
CZ09	SCE	70,465	8402	59.29	2%	($1,058,932)	$175,602	$301,459	>1	>1	$1,234,534	$1,360,391
CZ09-2	LADWP	70,465	8402	59.29	2%	($1,058,932)	$183,220	$301,459	>1	>1	$1,242,152	$1,360,391
CZ10	SDG&E	69,581	8418	58.04	2%	($1,048,632)	$161,513	$294,530	>1	>1	$1,210,145	$1,343,162
CZ10-2	SCE	69,581	8418	58.04	2%	($1,048,632)	$164,837	$294,530	>1	>1	$1,213,469	$1,343,162
CZ11	PG&E	47,260	10252	61.57	1%	($1,048,779)	$253,717	$286,797	>1	>1	$1,302,496	$1,335,576
CZ12	PG&E	51,115	10403	64.07	2%	($1,049,454)	$104,523	$305,446	>1	>1	$1,153,977	$1,354,900
CZ12-2	SMUD	51,115	10403	64.99	2%	($1,049,454)	$253,197	$430,977	>1	>1	$1,302,651	$1,480,431
CZ13	PG&E	47,757	10029	60.77	0.3%	($1,048,739)	$251,663	$281,877	>1	>1	$1,300,402	$1,330,616
CZ14	SDG&E	66,084	10056	64.54	0.1%	($1,048,334)	$148,510	$334,938	>1	>1	$1,196,844	$1,383,272
CZ14-2	SCE	66,084	10056	64.54	0.1%	($1,048,334)	$185,018	$334,938	>1	>1	$1,233,352	$1,383,272
CZ15	SCE	98,755	5579	49.04	2.1%	($1,050,465)	$233,308	$311,121	>1	>1	$1,283,772	$1,361,585
CZ16	PG&E	-873	17599	84.99	-14%	($1,047,994)	$191,994	$240,724	>1	>1	$1,239,987	$1,288,718
CZ16-2	LADWP	-873	17599	84.99	-14%	($1,047,994)	$291,279	$240,724	>1	>1	$1,339,273	$1,288,718

Figure 37. Cost Effectiveness for Small Hotel Package 3C – All-Electric + HE

CZ	Utility	Elec Savings (kWh)	Gas Savings (therms)	GHG Reductions (mtons)	Comp-liance Margin	Incremental Package Cost	Lifecycle Utility Cost Savings	$TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Package 3C: All-Electric + HE												
CZ01	PG&E	-154,840	16917	56.24	-24%	($1,281,338)	($606,619)	($101,272)	2.1	12.7	$674,719	$1,180,066
CZ02	PG&E	-118,284	12677	41.18	-11%	($1,283,243)	($395,641)	($44,505)	3.2	28.8	$887,602	$1,238,738
CZ03	PG&E	-113,413	12322	40.80	-14%	($1,288,782)	($522,458)	($51,582)	2.5	25.0	$766,324	$1,237,200
CZ04	PG&E	-115,928	11927	37.09	-13%	($1,287,878)	($383,177)	($53,285)	3.4	24.2	$904,701	$1,234,593
CZ04-2	CPAU	-115,928	11927	37.09	-13%	($1,287,878)	($24,170)	($53,285)	53.3	24.2	$1,263,708	$1,234,593
CZ05	PG&E	-111,075	11960	38.75	-15%	($1,288,242)	($530,740)	($56,124)	2.4	23.0	$757,502	$1,232,119
CZ06	SCE	-83,000	8912	29.41	-15%	($1,288,695)	($154,625)	($32,244)	8.3	40.0	$1,134,069	$1,256,451
CZ06-2	LADWP	-83,000	8912	29.41	-15%	($1,288,695)	($17,626)	($32,244)	73.1	40.0	$1,271,068	$1,256,451
CZ07	SDG&E	-73,823	8188	28.32	-7%	($1,285,759)	($268,207)	($24,069)	4.8	53.4	$1,017,552	$1,261,690
CZ08	SCE	-75,573	8353	28.56	-6%	($1,281,241)	($157,393)	($21,912)	8.1	58.5	$1,123,848	$1,259,329
CZ08-2	LADWP	-75,573	8353	28.56	-6%	($1,281,241)	($18,502)	($21,912)	69.2	58.5	$1,262,739	$1,259,329
CZ09	SCE	-74,790	8402	29.04	-4%	($1,285,139)	($138,746)	($16,992)	9.3	75.6	$1,146,393	$1,268,147
CZ09-2	LADWP	-74,790	8402	29.04	-4%	($1,285,139)	($6,344)	($16,992)	202.6	75.6	$1,278,794	$1,268,147
CZ10	SDG&E	-80,248	8418	27.57	-5%	($1,278,097)	($235,479)	($24,107)	5.4	53.0	$1,042,617	$1,253,990
CZ10-2	SCE	-80,248	8418	27.57	-5%	($1,278,097)	($123,371)	($24,107)	10.4	53.0	$1,154,726	$1,253,990
CZ11	PG&E	-98,041	10252	32.73	-7%	($1,279,528)	($278,242)	($35,158)	4.6	36.4	$1,001,286	$1,244,370
CZ12	PG&E	-100,080	10403	33.24	-9%	($1,282,834)	($480,347)	($38,715)	2.7	33.1	$802,487	$1,244,119
CZ12-2	SMUD	-100,080	10403	33.24	-9%	($1,282,834)	($23,362)	($38,715)	54.9	33.1	$1,259,472	$1,244,119
CZ13	PG&E	-94,607	10029	32.47	-7%	($1,279,301)	($276,944)	$244,552	4.6	>1	$1,002,357	$1,523,853
CZ14	SDG&E	-97,959	10056	31.91	-7%	($1,279,893)	($302,123)	($37,769)	4.2	33.9	$977,770	$1,242,124
CZ14-2	SCE	-97,959	10056	31.91	-7%	($1,279,893)	($129,082)	($37,769)	9.9	33.9	$1,150,811	$1,242,124
CZ15	SCE	-45,226	5579	20.17	0.04%	($1,276,847)	($6,533)	$227	195.4	>1	$1,270,314	$1,277,074
CZ16	PG&E	-198,840	17599	47.73	-39%	($1,288,450)	($605,601)	($185,438)	2.1	6.9	$682,848	$1,103,011
CZ16-2	LADWP	-198,840	17599	47.73	-39%	($1,288,450)	$40,268	($185,438)	>1	6.9	$1,328,718	$1,103,011

4.4 Cost Effectiveness Results – PV-only and PV+Battery

The Reach Code Team ran packages of PV-only and PV+Battery measures, without any additional efficiency measures, to assess cost effectiveness on top of the mixed-fuel baseline building and the all-electric federal code minimum reference (Package 2 in Sections 4.1 – 4.3).

Jurisdictions interested in adopting PV-only reach codes should reference the mixed-fuel cost effectiveness results because a mixed-fuel building is the baseline for the nonresidential prototypes analyzed in this study. PV or PV+Battery packages are added to all-electric federal code minimum reference which (in many scenarios) do not have a positive compliance margin compared to the mixed-fuel baseline model, and are solely provided for informational purposes. Jurisdictions interested in reach codes requiring all-electric+PV or all-electric+PV+battery should reference package 3B results in Sections 4.1 – 4.3.[25]

Each of the following eight packages were evaluated against a mixed fuel baseline designed as per 2019 Title 24 Part 6 requirements.

- **Mixed-Fuel + 3 kW PV Only:**
- **Mixed-Fuel + 3 kW PV + 5 kWh battery**
- **Mixed-Fuel + PV Only**: PV sized per the roof size of the building, or to offset the annual electricity consumption, whichever is smaller
- **Mixed-Fuel + PV + 50 kWh Battery:** PV sized per the roof size of the building, or to offset the annual electricity consumption, whichever is smaller, along with 50 kWh battery
- **All-Electric + 3 kW PV Only**
- **All-Electric + 3 kW PV + 5 kWh Battery**
- **All-Electric + PV Only**: PV sized per the roof size of the building, or to offset the annual electricity consumption, whichever is smaller
- **All-Electric + PV + 50 kWh Battery:** PV sized per the roof size of the building, or to offset the annual electricity consumption, whichever is smaller, along with 50 kWh battery

Figure 38 through Figure 40 summarize the on-bill and TDV B/C ratios for each prototype for the two PV only packages and the two PV plus battery packages. Compliance margins are 0 percent for all mixed-fuel packages. For all-electric packages, compliance margins are equal to those found in Package 2 for each prototype in Sections 4.1 – 4.3. The compliance margins are not impacted by renewables and battery storage measures and hence not shown in the tables. These figures are formatted in the following way:

- Cells highlighted in green have a B/C ratio greater than 1 and are cost-effective. The shade of green gets darker as cost effectiveness increases.
- Cells not highlighted have a B/C ratio less than one and are not cost effective.

[25] Because this study shows that the addition of battery generally reduces cost effectiveness, removing a battery measure would only increase cost effectiveness. Thus, a jurisdiction can apply the EE+PV+Battery cost effectiveness findings to support EE+PV reach codes, because EE+PV would still remain cost effective without a battery.

Please see Appendix 6.7 for results in full detail. Generally, for mixed-fuel packages across all prototypes, all climate zones were proven to have cost effective outcomes using TDV except in CZ1 with a 3 kW PV + 5 kWh Battery scenario. Most climate zones also had On-Bill cost effectiveness. The addition of a battery slightly reduces cost effectiveness.

In all-electric packages, the results for most climate zones were found cost effective using both TDV and On-Bill approaches with larger PV systems or PV+Battery systems. Most 3 kW PV systems were also found to be cost effective except in some scenarios analyzing the Medium Office using the On-Bill method. CZ16 results continue to show challenges being cost effective with all electric buildings, likely due to the high heating loads in this climate. The addition of a battery slightly reduces the cost effectiveness for all-electric buildings with PV.

Figure 38. Cost Effectiveness for Medium Office - PV and Battery

		Mixed Fuel								All-Electric							
	PV	3kW		3kW		135kW		135kW		3kW		3kW		135kW		135kW	
	Battery	0		5kWh		0		50kWh		0		5kWh		0		50kWh	
CZ	Utility	On-Bill	TDV	On-Bill	TDV	On-Bill	TDV	On-Bill	TDV	On-Bill	TDV	On-Bill	TDV	On-Bill	TDV	On-Bill	TDV
CZ01	PG&E	2.8	1.5	1.7	0.9	1.7	1.3	1.6	1.2	0.9	1.6	0.9	1.6	2.5	2.0	2.1	1.7
CZ02	PG&E	3.7	1.9	2.1	1.1	2.2	1.6	2.0	1.4	0.8	2.2	0.9	2.6	3.2	2.4	2.7	2.1
CZ03	PG&E	3.7	1.8	2.2	1.0	2.1	1.5	1.9	1.4	1.9	3.9	2.0	4.0	3.4	2.5	2.9	2.2
CZ04	PG&E	3.6	2.0	2.1	1.2	2.3	1.6	2.1	1.5	0.9	2.1	1.1	2.7	3.3	2.5	2.9	2.2
CZ04-2	CPAU	2.1	2.0	1.3	1.2	1.8	1.6	1.6	1.5	7.7	2.1	9.8	2.7	2.9	2.5	2.5	2.2
CZ05	PG&E	4.2	1.9	2.4	1.1	2.5	1.6	2.3	1.5	1.8	2.7	1.9	2.7	4.0	2.7	3.4	2.3
CZ05-2	SCG	4.2	1.9	2.4	1.1	2.5	1.6	2.3	1.5	>1	>1	>1	>1	>1	3.0	9.4	2.6
CZ06	SCE	2.0	2.0	1.2	1.1	1.3	1.6	1.2	1.5	>1	7.2	>1	8.2	2.4	2.7	2.1	2.3
CZ06-2	LA	1.2	2.0	0.7	1.1	0.8	1.6	0.7	1.5	>1	7.2	>1	8.2	1.5	2.7	1.3	2.3
CZ07	SDG&E	3.2	2.0	1.9	1.2	2.1	1.6	1.9	1.5	>1	>1	>1	>1	3.7	2.7	3.2	2.3
CZ08	SCE	1.9	2.0	1.1	1.2	1.3	1.7	1.2	1.5	>1	>1	>1	>1	2.2	2.7	1.9	2.4
CZ08-2	LA	1.2	2.0	0.7	1.2	0.7	1.7	0.7	1.5	>1	>1	>1	>1	1.3	2.7	1.1	2.4
CZ09	SCE	1.9	2.0	1.1	1.2	1.3	1.7	1.2	1.5	>1	>1	>1	>1	2.2	2.6	1.9	2.3
CZ09-2	LA	1.1	2.0	0.7	1.2	0.7	1.7	0.7	1.5	>1	>1	>1	>1	1.3	2.6	1.2	2.3
CZ10	SDG&E	3.8	1.9	2.2	1.1	2.1	1.6	1.9	1.5	>1	3.3	>1	6.3	3.3	2.3	2.9	2.0
CZ10-2	SCE	2.1	1.9	1.2	1.1	1.3	1.6	1.2	1.5	>1	3.3	>1	6.3	2.0	2.3	1.8	2.0
CZ11	PG&E	3.6	1.9	2.1	1.1	2.2	1.6	2.0	1.5	1.1	2.6	1.5	3.6	3.2	2.4	2.8	2.1
CZ12	PG&E	3.5	1.9	2.1	1.1	2.2	1.6	2.0	1.5	0.9	2.5	1.2	3.2	3.1	2.4	2.7	2.1
CZ12-2	SMUD	1.4	1.9	0.8	1.1	1.1	1.6	1.04	1.5	>1	2.5	>1	3.2	1.9	2.4	1.6	2.1
CZ13	PG&E	3.5	1.8	2.0	1.1	2.2	1.5	2.0	1.4	1.1	2.5	1.5	3.6	3.1	2.3	2.7	2.0
CZ14	SDG&E	3.4	2.3	2.0	1.3	2.2	1.9	2.0	1.7	>1	2.3	>1	3.1	3.6	2.8	3.2	2.5
CZ14-2	SCE	1.9	2.3	1.1	1.3	1.3	1.9	1.2	1.7	>1	2.3	>1	3.1	2.2	2.8	1.9	2.5
CZ15	SCE	1.8	2.1	1.1	1.2	1.2	1.7	1.1	1.6	>1	7.5	>1	>1	1.8	2.4	1.6	2.1
CZ16	PG&E	3.9	2.0	2.3	1.1	2.3	1.6	2.1	1.5	0.3	0.4	0.4	0.6	2.5	1.8	2.2	1.6
CZ16-2	LA	1.2	2.0	0.7	1.1	0.7	1.6	0.7	1.5	>1	0.4	>1	0.6	1.3	1.8	1.2	1.6

Figure 39. Cost Effectiveness for Medium Retail - PV and Battery

		Mixed Fuel								All-Electric							
	PV	3kW		3kW		90 kW		90 kW		3kW		3kW		90 kW		90 kW	
	Battery	0		5kWh		0		50kWh		0		5kWh		0		50kWh	
CZ	Utility	On-Bill	TDV	On-Bill	TDV	On-Bill	TDV	On-Bill	TDV	On-Bill	TDV	On-Bill	TDV	On-Bill	TDV	On-Bill	TDV
CZ01	PG&E	2.3	1.5	1.3	0.9	1.8	1.3	1.6	1.2	>1	3.0	>1	2.7	2.5	1.6	2.2	1.5
CZ02	PG&E	3.2	1.8	1.9	1.1	1.9	1.5	1.8	1.5	>1	>1	>1	>1	2.7	2.1	2.3	1.9
CZ03	PG&E	2.7	1.8	1.6	1.1	2.2	1.5	2.0	1.4	>1	>1	>1	>1	3.0	2.1	2.6	1.9
CZ04	PG&E	3.3	1.9	1.9	1.1	2.0	1.6	1.9	1.5	>1	>1	>1	>1	2.7	2.1	2.5	2.0
CZ04-2	CPAU	2.1	1.9	1.2	1.1	1.7	1.6	1.5	1.5	>1	>1	>1	>1	2.4	2.1	2.1	2.0
CZ05	PG&E	2.8	1.9	1.6	1.1	2.3	1.6	2.0	1.5	>1	>1	>1	>1	3.2	2.1	2.7	2.0
CZ05-2	SCG	2.8	1.9	1.6	1.1	2.3	1.6	2.0	1.5	>1	>1	>1	>1	3.7	1.9	3.2	1.6
CZ06	SCE	2.0	1.9	1.2	1.1	1.2	1.6	1.1	1.5	>1	>1	>1	>1	1.7	2.2	1.5	2.0
CZ06-2	LA	1.3	1.9	0.7	1.1	0.7	1.6	0.6	1.5	>1	>1	>1	>1	1.01	2.2	0.9	2.0
CZ07	SDG&E	4.0	2.0	2.4	1.2	1.5	1.6	1.6	1.6	>1	>1	>1	>1	2.4	2.3	2.3	2.1
CZ08	SCE	2.1	2.0	1.2	1.2	1.2	1.7	1.1	1.6	>1	>1	>1	>1	1.7	2.4	1.5	2.1
CZ08-2	LA	1.3	2.0	0.8	1.2	0.7	1.7	0.6	1.6	>1	>1	>1	>1	1.01	2.4	0.9	2.1
CZ09	SCE	2.0	2.0	1.2	1.2	1.2	1.7	1.1	1.5	>1	>1	>1	>1	1.8	2.4	1.6	2.1
CZ09-2	LA	1.2	2.0	0.7	1.2	0.7	1.7	0.7	1.5	>1	>1	>1	>1	1.1	2.4	0.99	2.1
CZ10	SDG&E	3.8	2.0	2.2	1.2	1.7	1.6	1.7	1.5	>1	>1	>1	>1	2.6	2.3	2.5	2.0
CZ10-2	SCE	2.0	2.0	1.2	1.2	1.2	1.6	1.1	1.5	>1	>1	>1	>1	1.8	2.3	1.6	2.0
CZ11	PG&E	2.8	1.9	1.6	1.1	1.9	1.6	1.8	1.5	>1	>1	>1	>1	2.7	2.3	2.5	2.1
CZ12	PG&E	3.0	1.9	1.7	1.1	1.9	1.6	1.8	1.5	>1	>1	>1	>1	2.7	2.3	2.5	2.1
CZ12-2	SMUD	1.5	1.9	0.9	1.1	1.1	1.6	0.997	1.5	>1	>1	>1	>1	1.7	2.3	1.4	2.1
CZ13	PG&E	3.0	1.9	1.7	1.1	1.9	1.6	1.8	1.4	>1	>1	>1	>1	2.7	2.2	2.4	1.9
CZ14	SDG&E	3.5	2.2	2.1	1.3	1.6	1.8	1.5	1.6	>1	>1	>1	>1	2.5	2.6	2.2	2.2
CZ14-2	SCE	1.8	2.2	1.1	1.3	1.2	1.8	1.1	1.6	>1	>1	>1	>1	1.7	2.6	1.5	2.2
CZ15	SCE	1.9	2.0	1.1	1.2	1.1	1.7	1.02	1.5	>1	>1	>1	>1	1.7	2.4	1.5	2.1
CZ16	PG&E	3.7	2.0	2.1	1.2	2.1	1.7	1.9	1.6	0.6	0.5	0.5	0.4	2.7	2.0	2.3	1.8
CZ16-2	LA	1.3	2.0	0.7	1.2	0.7	1.7	0.6	1.6	>1	0.5	>1	0.4	1.2	2.0	1.0	1.8

Figure 40. Cost Effectiveness for Small Hotel - PV and Battery

		Mixed Fuel								All-Electric							
	PV	3kW		3kW		80kW		80kW		3kW		3kW		80kW		80kW	
	Battery	0		5kWh		0		50kWh		0		5kWh		0		50kWh	
CZ	Utility	On-Bill	TDV	On-Bill	TDV	On-Bill	TDV	On-Bill	TDV	On-Bill	TDV	On-Bill	TDV	On-Bill	TDV	On-Bill	TDV
CZ01	PG&E	2.3	1.5	1.3	0.9	1.9	1.2	1.6	1.1	2.3	>1	2.3	>1	4.8	>1	4.7	>1
CZ02	PG&E	2.3	1.9	1.3	1.1	1.8	1.5	1.6	1.4	5.6	>1	5.6	>1	>1	>1	>1	>1
CZ03	PG&E	2.7	1.8	1.6	1.05	2.3	1.5	1.9	1.4	4.2	>1	4.2	>1	>1	>1	>1	>1
CZ04	PG&E	2.4	1.9	1.4	1.1	1.8	1.6	1.6	1.5	6.2	>1	6.2	>1	>1	>1	>1	>1
CZ04-2	CPAU	2.1	1.9	1.2	1.1	1.7	1.6	1.5	1.5	>1	>1	>1	>1	>1	>1	>1	>1
CZ05	PG&E	2.9	1.9	1.7	1.1	2.4	1.6	2.0	1.5	3.9	>1	3.9	>1	>1	>1	>1	>1
CZ05-2	SCG	2.9	1.9	1.7	1.1	2.4	1.6	2.0	1.5	>1	>1	>1	>1	>1	>1	>1	>1
CZ06	SCE	1.8	1.9	1.1	1.1	1.1	1.6	0.9	1.4	>1	>1	>1	>1	>1	>1	>1	>1
CZ06-2	LA	1.1	1.9	0.7	1.1	0.7	1.6	0.6	1.4	>1	>1	>1	>1	>1	>1	>1	>1
CZ07	SDG&E	2.6	2.0	1.5	1.1	1.4	1.6	1.3	1.5	>1	>1	>1	>1	>1	>1	>1	>1
CZ08	SCE	1.9	2.0	1.1	1.2	1.2	1.7	1.0	1.5	>1	>1	>1	>1	>1	>1	>1	>1
CZ08-2	LA	1.2	2.0	0.7	1.2	0.7	1.7	0.6	1.5	>1	>1	>1	>1	>1	>1	>1	>1
CZ09	SCE	1.9	1.9	1.1	1.1	1.2	1.6	0.997	1.4	>1	>1	>1	>1	>1	>1	>1	>1
CZ09-2	LA	1.1	1.9	0.7	1.1	0.7	1.6	0.6	1.4	>1	>1	>1	>1	>1	>1	>1	>1
CZ10	SDG&E	2.9	1.9	1.7	1.1	1.5	1.6	1.4	1.4	8.2	>1	8.2	>1	>1	>1	>1	>1
CZ10-2	SCE	1.7	1.9	0.99	1.1	1.2	1.6	0.99	1.4	>1	>1	>1	>1	>1	>1	>1	>1
CZ11	PG&E	2.6	1.9	1.5	1.1	1.8	1.6	1.5	1.4	7.6	>1	7.6	>1	>1	>1	>1	>1
CZ12	PG&E	2.7	1.9	1.6	1.1	2.3	1.6	1.9	1.4	4.0	>1	4.0	>1	>1	>1	>1	>1
CZ12-2	SMUD	1.4	1.9	0.8	1.1	1.1	1.6	0.95	1.4	>1	>1	>1	>1	>1	>1	>1	>1
CZ13	PG&E	2.6	1.8	1.5	1.1	1.8	1.5	1.5	1.4	7.7	>1	7.7	>1	>1	>1	>1	>1
CZ14	SDG&E	3.0	2.2	1.7	1.3	1.7	1.8	1.5	1.6	4.2	>1	4.2	>1	>1	>1	>1	>1
CZ14-2	SCE	1.8	2.2	1.1	1.3	1.3	1.8	1.1	1.6	>1	>1	>1	>1	>1	>1	>1	>1
CZ15	SCE	1.7	2.0	1.002	1.2	1.2	1.7	1.003	1.4	>1	>1	>1	>1	>1	>1	>1	>1
CZ16	PG&E	2.7	2.0	1.6	1.2	1.9	1.6	1.7	1.5	2.1	5.7	2.1	5.6	5.8	>1	5.8	>1
CZ16-2	LA	1.02	2.0	0.6	1.2	0.6	1.6	0.6	1.5	>1	5.7	>1	5.6	>1	>1	>1	>1

5 Summary, Conclusions, and Further Considerations

The Reach Codes Team developed packages of energy efficiency measures as well as packages combining energy efficiency with PV generation and battery storage systems, simulated them in building modeling software, and gathered costs to determine the cost effectiveness of multiple scenarios. The Reach Codes team coordinated assumptions with multiple utilities, cities, and building community experts to develop a set of assumptions considered reasonable in the current market. Changing assumptions, such as the period of analysis, measure selection, cost assumptions, energy escalation rates, or utility tariffs are likely to change results.

5.1 Summary

Figure 41 through Figure 43 summarize results for each prototype and depict the compliance margins achieved for each climate zone and package. Because local reach codes must both exceed the Energy Commission performance budget (i.e., have a positive compliance margin) and be cost-effective, the Reach Code Team highlighted cells meeting these two requirements to help clarify the upper boundary for potential reach code policies:

- Cells highlighted in green depict a positive compliance margin <u>and</u> cost-effective results using <u>both</u> On-Bill and TDV approaches.
- Cells highlighted in yellow depict a positive compliance <u>and</u> cost-effective results using <u>either</u> the On-Bill or TDV approach.
- Cells not highlighted either depict a negative compliance margin <u>or</u> a package that was not cost effective using <u>either</u> the On-Bill or TDV approach.

For more detail on the results in the Figures, please refer to *Section 4 Results*. As described in Section 4.4, PV-only and PV+Battery packages in the mixed-fuel building were found to be cost effective across all prototypes, climate zones, and packages using the TDV approach, and results are not reiterated in the following figures.

Figure 41. Medium Office Summary of Compliance Margin and Cost Effectiveness

CZ	Utility	Mixed Fuel			All Electric			
		EE	EE + PV + B	HE	Fed Code	EE	EE + PV + B	HE
CZ01	PG&E	18%	18%	3%	-15%	7%	7%	-14%
CZ02	PG&E	17%	17%	4%	-7%	10%	10%	-5%
CZ03	PG&E	20%	20%	3%	-7%	16%	16%	-6%
CZ04	PG&E	14%	14%	5%	-6%	9%	9%	-3%
CZ04-2	CPAU	14%	14%	5%	-6%	9%	9%	-3%
CZ05	PG&E	18%	18%	4%	-8%	12%	12%	-6%
CZ05-2	SCG	18%	18%	4%	NA	NA	NA	NA
CZ06	SCE	20%	20%	3%	-4%	18%	18%	-2%
CZ06-2	LADWP	20%	20%	3%	-4%	18%	18%	-2%
CZ07	SDG&E	20%	20%	4%	-2%	20%	20%	1%
CZ08	SCE	18%	18%	4%	-2%	18%	18%	1%
CZ08-2	LADWP	18%	18%	4%	-2%	18%	18%	1%
CZ09	SCE	16%	16%	4%	-2%	15%	15%	2%
CZ09-2	LADWP	16%	16%	4%	-2%	15%	15%	2%
CZ10	SDG&E	17%	17%	4%	-4%	13%	13%	-1%
CZ10-2	SCE	17%	17%	4%	-4%	13%	13%	-1%
CZ11	PG&E	13%	13%	5%	-4%	10%	10%	0%
CZ12	PG&E	14%	14%	5%	-5%	10%	10%	-1%
CZ12-2	SMUD	14%	14%	5%	-5%	10%	10%	-1%
CZ13	PG&E	13%	13%	5%	-4%	9%	9%	0%
CZ14	SDG&E	14%	14%	5%	-5%	9%	9%	-1%
CZ14-2	SCE	14%	14%	5%	-5%	9%	9%	-1%
CZ15	SCE	12%	12%	5%	-2%	10%	10%	3%
CZ16	PG&E	14%	14%	5%	-27%	-15%	-15%	-26%
CZ16-2	LADWP	14%	14%	5%	-27%	-15%	-15%	-26%

Figure 42. Medium Retail Summary of Compliance Margin and Cost Effectiveness

CZ	Utility	Mixed Fuel			All Electric			
		EE	EE + PV + B	HE	Fed Code	EE	EE + PV + B	HE
CZ01	PG&E	18%	18%	2%	-4.1%	15%	15%	-2%
CZ02	PG&E	13%	13%	3%	-1.0%	13%	13%	3%
CZ03	PG&E	16%	16%	2%	-0.4%	16%	16%	2%
CZ04	PG&E	14%	14%	3%	-0.1%	14%	14%	3%
CZ04-2	CPAU	14%	14%	3%	-0.1%	14%	14%	3%
CZ05	PG&E	16%	16%	1%	-1.2%	15%	15%	1%
CZ05-2	SCG	16%	16%	1%	NA	NA	NA	NA
CZ06	SCE	10%	10%	3%	0.5%	11%	11%	3%
CZ06-2	LADWP	10%	10%	3%	0.5%	11%	11%	3%
CZ07	SDG&E	13%	13%	2%	0.3%	13%	13%	3%
CZ08	SCE	10%	10%	3%	0.4%	10%	10%	4%
CZ08-2	LADWP	10%	10%	3%	0.4%	10%	10%	4%
CZ09	SCE	10%	10%	4%	0.4%	10%	10%	4%
CZ09-2	LADWP	10%	10%	4%	0.4%	10%	10%	4%
CZ10	SDG&E	12%	12%	4%	0.1%	12%	12%	4%
CZ10-2	SCE	12%	12%	4%	0.1%	12%	12%	4%
CZ11	PG&E	13%	13%	4%	0.5%	12%	12%	5%
CZ12	PG&E	13%	13%	4%	-0.1%	12%	12%	4%
CZ12-2	SMUD	13%	13%	4%	-0.1%	12%	12%	4%
CZ13	PG&E	15%	15%	4%	-0.4%	14%	14%	4%
CZ14	SDG&E	13%	13%	4%	0.7%	15%	15%	5%
CZ14-2	SCE	13%	13%	4%	0.7%	15%	15%	5%
CZ15	SCE	12%	12%	5%	0.9%	12%	12%	6%
CZ16	PG&E	13%	13%	3%	-12.2%	3%	3%	-8%
CZ16-2	LADWP	13%	13%	3%	-12.2%	3%	3%	-8%

Figure 43. Small Hotel Summary of Compliance Margin and Cost Effectiveness

CZ	Utility	Mixed Fuel			All Electric			
		EE	EE + PV + B	HE	Fed Code	EE	EE + PV + B	HE
CZ01	PG&E	9%	9%	2%	-28%	1%	1%	-24%
CZ02	PG&E	7%	7%	3%	-12%	4%	4%	-11%
CZ03	PG&E	10%	10%	2%	-14%	6%	6%	-14%
CZ04	PG&E	6%	6%	2%	-13%	0.2%	0.2%	-13%
CZ04-2	CPAU	6%	6%	2%	-13%	0.2%	0.2%	-13%
CZ05	PG&E	9%	9%	2%	-15%	5%	5%	-15%
CZ05-2	SCG	9%	9%	2%	NA	NA	NA	NA
CZ06	SCE	8%	8%	2%	-5%	7%	7%	-15%
CZ06-2	LADWP	8%	8%	2%	-5%	7%	7%	-15%
CZ07	SDG&E	8%	8%	2%	-7%	7%	7%	-7%
CZ08	SCE	7%	7%	2%	-6%	3%	3%	-6%
CZ08-2	LADWP	7%	7%	2%	-6%	3%	3%	-6%
CZ09	SCE	6%	6%	3%	-6%	2%	2%	-4%
CZ09-2	LADWP	6%	6%	3%	-6%	2%	2%	-4%
CZ10	SDG&E	5%	5%	4%	-8%	2%	2%	-5%
CZ10-2	SCE	5%	5%	4%	-8%	2%	2%	-5%
CZ11	PG&E	4%	4%	4%	-10%	1%	1%	-7%
CZ12	PG&E	5%	5%	4%	-10%	2%	2%	-9%
CZ12-2	SMUD	5%	5%	4%	-10%	2%	2%	-9%
CZ13	PG&E	4%	4%	3%	-10%	0.3%	0.3%	-7%
CZ14	SDG&E	4%	4%	4%	-11%	0.1%	0.1%	-7%
CZ14-2	SCE	4%	4%	4%	-11%	0.1%	0.1%	-7%
CZ15	SCE	3%	3%	5%	-4%	2%	2%	0.04%
CZ16	PG&E	6%	6%	3%	-50%	-14%	-14%	-39%
CZ16-2	LADWP	6%	6%	3%	-50%	-14%	-14%	-39%

5.2 Conclusions and Further Considerations

Findings are specific to the scenarios analyzed under this specific methodology, and largely pertain to office, retail, and hotel-type occupancies. Nonresidential buildings constitute a wide variety of occupancy profiles and process loads, making findings challenging to generalize across multiple building types.

Findings indicate the following overall conclusions:

1. This study assumed that electrifying space heating and service water heating could eliminate natural gas infrastructure alone, because these were the only gas end-uses included the prototypes. Avoiding the installation of natural gas infrastructure results in significant cost savings and is a primary factor toward cost-effective outcomes in all-electric designs, even with necessary increases in electrical capacity.
2. There is ample opportunity for cost effective energy efficiency improvements, as demonstrated by the compliance margins achieved in many of the efficiency-only and efficiency + PV packages. Though much of the energy savings are attributable to lighting measures, efficiency measures selected for these prototypes are confined to the building systems that can be modeled. There is

likely further opportunity for energy savings through measures that cannot be currently demonstrated in compliance software, such as high-performance control sequences or variable speed parallel fan powered boxes.

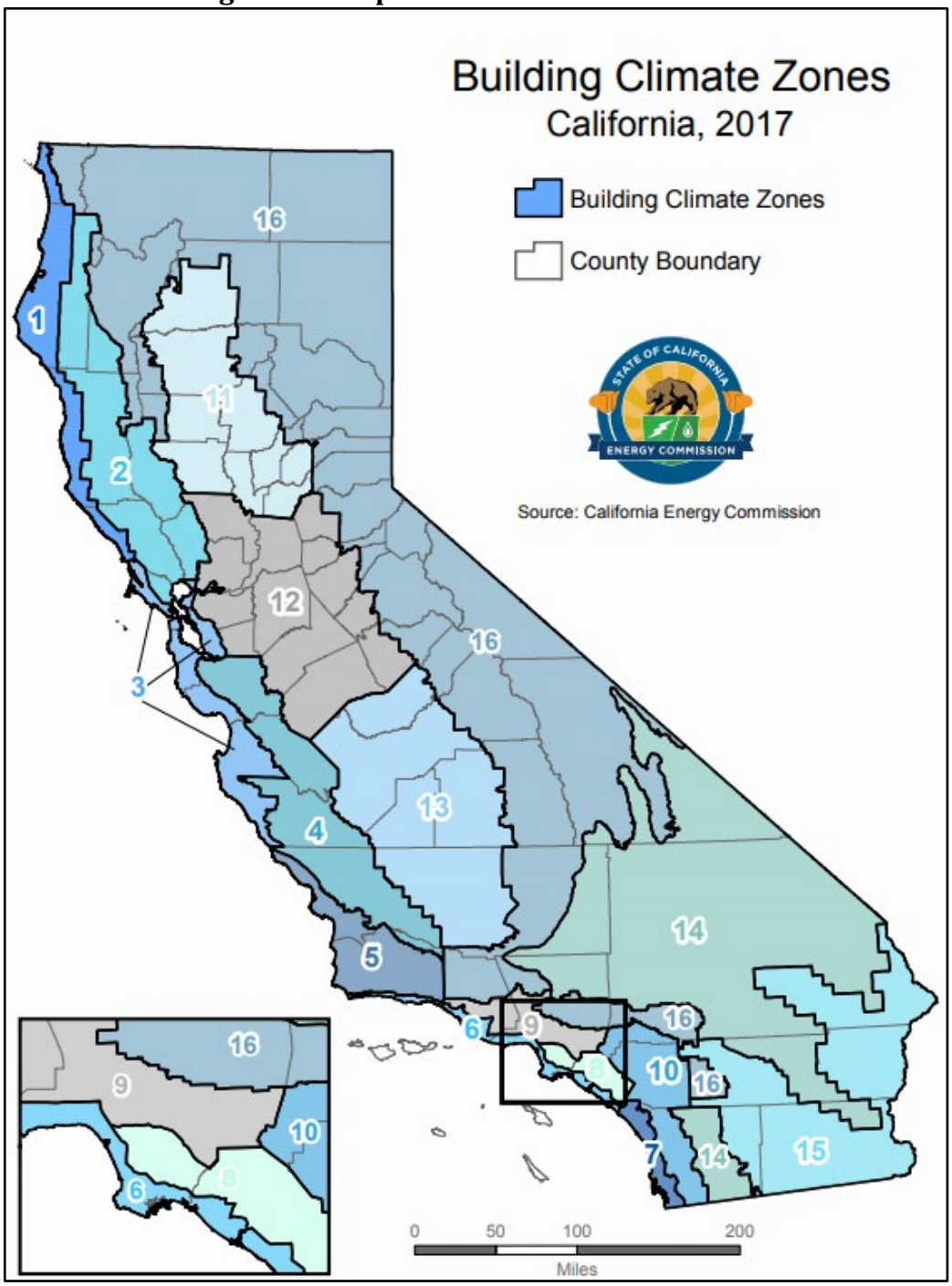
3. High efficiency appliances triggering federal preemption do not achieve as high compliance margins as the other efficiency measures analyzed in this study. Cost effectiveness appears to be dependent on the system type and building type. Nonetheless, specifying high efficiency equipment will always be a key feature in integrated design.
4. Regarding the Small Hotel prototype:
    a. The Small Hotel presents a challenging prototype to cost-effectively exceed the state's energy performance budget without efficiency measures. The Reach Code Team is uncertain of the precision of the results due to the inability to directly model either drain water heat recovery or a central heat pump water heater with a recirculation loop.
    b. Hotel results may be applicable to high-rise (4 or more stories) multifamily buildings. Both hotel and multifamily buildings have the same or similar mandatory and prescriptive compliance options for hot water systems, lighting, and envelope. Furthermore, the Alternate Calculation Method Reference Manual specifies the same baseline HVAC system for both building types.
    c. Hotel compliance margins were the lowest among the three building types analyzed, and thus the most conservative performance thresholds applicable to other nonresidential buildings not analyzed in this study. As stated previously, the varying occupancy and energy profiles of nonresidential buildings makes challenging to directly apply these results across all buildings.
5. Many all-electric and solar PV packages demonstrated greater GHG reductions than their mixed-fuel counterparts, contrary to TDV-based performance, suggesting a misalignment among the TDV metric and California's long-term GHG-reduction goals. The Energy Commission has indicated that they are aware of this issue and are seeking to address it.
6. Changes to the Nonresidential Alternative Calculation Method (ACM) Reference Manual can drastically impact results. Two examples include:
    a. When performance modeling residential buildings, the Standard Design is electric if the Proposed Design is electric, which removes TDV-related penalties and associated negative compliance margins. This essentially allows for a compliance pathway for all-electric residential buildings. If nonresidential buildings were treated in the same way, all-electric cost effectiveness using the TDV approach would improve.
    b. The baseline mixed-fuel system for a hotel includes a furnace in each guest room, which carries substantial plumbing costs and labor costs for assembly. A change in the baseline system would lead to different base case costs and different cost effectiveness outcomes.
7. All-electric federal code-minimum packages appear to be cost effective, largely due to avoided natural gas infrastructure, but in most cases do not comply with the Energy Commission's minimum performance budget (as described in item 7a above). For most cases it appears that adding cost-effective efficiency measures achieves compliance. All-electric nonresidential projects can leverage the initial cost savings of avoiding natural gas infrastructure by adding energy efficiency measures that would not be cost effective independently.

6 Appendices

6.1 Map of California Climate Zones

Climate zone geographical boundaries are depicted in Figure 44. The map in Figure 44 along with a zip-code search directory is available at:
https://ww2.energy.ca.gov/maps/renewable/building_climate_zones.html

Figure 44. Map of California Climate Zones



6.2 Lighting Efficiency Measures

Figure 45 details the applicability and impact of each lighting efficiency measure by prototype and space function and includes the resulting LPD that is modeled as the proposed by building type and by space function.

Figure 45. Impact of Lighting Measures on Proposed LPDs by Space Function

	Baseline	Impact				Modeled Proposed
Space Function	LPD (W/ft2)	Interior Lighting Reduced LPD	Institutional Tuning	Daylight Dimming Plus OFF	Occupant Sensing in Open Office Plan	LPD (W/ft^2)
Medium Office						
Office Area (Open plan office) - Interior	0.65	15%	10%	-	17%	0.429
Office Area (Open plan office) - Perimeter	0.65	15%	5%	10%	30%	0.368
Medium Retail						
Commercial/Industrial Storage (Warehouse)	0.45	10%	5%	-	-	0.386
Main Entry Lobby	0.85	10%	5%	-	-	0.729
Retail Sales Area (Retail Merchandise Sales)	0.95	5%	5%	-	-	0.857
Small Hotel						
Commercial/Industrial Storage (Warehouse)	0.45	10%	5%	-	-	0.386
Convention, Conference, Multipurpose, and Meeting	0.85	10%	5%	-	-	0.729
Corridor Area	0.60	10%	5%	-	-	0.514
Exercise/Fitness Center and Gymnasium Areas	0.50	10%	-	-	-	0.450
Laundry Area	0.45	10%	-	-	-	0.405
Lounge, Breakroom, or Waiting Area	0.65	10%	5%	-	-	0.557
Mechanical	0.40	10%	-	-	-	0.360
Office Area (>250 ft^2)	0.65	10%	5%	-	-	0.557

6.3 Drain Water Heat Recovery Measure Analysis

To support potential DWHR savings in the Small Hotel prototype, the Reach Code Team modeled the drain water heat recovery measure in CBECC-Res 2019 in the all-electric and mixed fuel 6,960 ft2 prototype residential buildings. The Reach Code Team assumed one heat recovery device for every three showers assuming unequal flow to the shower. Based on specifications from three different drain water heat recovery device manufacturers for device effectiveness in hotel applications, the team assumed a heat recovery efficiency of 50 percent.

The Reach Code Team modeled mixed fuel and all-electric residential prototype buildings both with and without heat recovery in each climate zone. Based on these model results, the Reach Code Team determined the percentage savings of domestic water heating energy in terms of gas, electricity, and TDV for mixed fuel and all-electric, in each climate zone. The Reach Code Team then applied the savings

percentages to the Small Hotel prototype domestic water heating energy in both the mixed-fuel and all-electric to determine energy savings for the drain water heat recovery measure in the Small Hotel. The Reach Code Team applied volumetric energy rates to estimate on-bill cost impacts from this measure.

6.4 Utility Rate Schedules

The Reach Codes Team used the IOU and POU rates depicted in Figure 46 to determine the On-Bill savings for each prototype.

Figure 46. Utility Tariffs Analyzed Based on Climate Zone – Detailed View

Climate Zones	Electric / Gas Utility	Electricity (Time-of-use)			Natural Gas
		Medium Office	Medium Retail	Small Hotel	All Prototypes
CZ01	PG&E	A-10	A-1	A-1 or A-10	G-NR1
CZ02	PG&E	A-10	A-10	A-1 or A-10	G-NR1
CZ03	PG&E	A-10	A-1 or A-10	A-1 or A-10	G-NR1
CZ04	PG&E	A-10	A-10	A-1 or A-10	G-NR1
CZ04-2	CPAU/PG&E	E-2	E-2	E-2	G-NR1
CZ05	PG&E	A-10	A-1	A-1 or A-10	G-NR1
CZ05-2	PG&E/SCG	A-10	A-1	A-1 or A-10	G-10 (GN-10)
CZ06	SCE/SCG	TOU-GS-2	TOU-GS-2	TOU-GS-2 or TOU-GS-3	G-10 (GN-10)
CZ06	LADWP/SCG	TOU-GS-2	TOU-GS-2	TOU-GS-2 or TOU-GS-3	G-10 (GN-10)
CZ07	SDG&E	AL-TOU+EECC (AL-TOU)	AL-TOU+EECC (AL-TOU)	AL-TOU+EECC (AL-TOU)	GN-3
CZ08	SCE/SCG	TOU-GS-2	TOU-GS-2	TOU-GS-2 or TOU-GS-3	G-10 (GN-10)
CZ08-2	LADWP/SCG	A-2 (B)	A-2 (B)	A-2 (B)	G-10 (GN-10)
CZ09	SCE/SCG	TOU-GS-2	TOU-GS-2	TOU-GS-2 or TOU-GS-3	G-10 (GN-10)
CZ09-2	LADWP/SCG	A-2 (B)	A-2 (B)	A-2 (B)	G-10 (GN-10)
CZ10	SCE/SCG	TOU-GS-2	TOU-GS-2	TOU-GS-2	G-10 (GN-10)
CZ10-2	SDG&E	AL-TOU+EECC (AL-TOU)	AL-TOU+EECC (AL-TOU)	AL-TOU+EECC (AL-TOU)	GN-3
CZ11	PG&E	A-10	A-10	A-10	G-NR1
CZ12	PG&E	A-10	A-10	A-1 or A-10	G-NR1
CZ12-2	SMUD/PG&E	GS	GS	GS	G-NR1
CZ13	PG&E	A-10	A-10	A-10	G-NR1
CZ14	SCE/SCG	TOU-GS-3	TOU-GS-3	TOU-GS-3	G-10 (GN-10)
CZ14-2	SDG&E	AL-TOU+EECC (AL-TOU)	AL-TOU+EECC (AL-TOU)	AL-TOU+EECC (AL-TOU)	GN-3
CZ15	SCE/SCG	TOU-GS-3	TOU-GS-2	TOU-GS-2	G-10 (GN-10)
CZ16	PG&E	A-10	A-10	A-1 or A-10	G-NR1
CZ16-2	LADWP/SCG	A-2 (B)	A-2 (B)	A-2 (B)	G-10 (GN-10)

6.5 Mixed Fuel Baseline Energy Figures

Figures 47 to 49 show the annual electricity and natural gas consumption and cost, compliance TDV, and GHG emissions for each prototype under the mixed fuel design baseline.

Figure 47. Medium Office – Mixed Fuel Baseline

Climate Zone	Utility	Electricity Consumption (kWh)	Natural Gas Consumption (Therms)	Electricity Cost	Natural Gas Cost	Compliance TDV	GHG Emissions (lbs)
Medium Office Mixed Fuel Baseline							
CZ01	PG&E	358,455	4,967	$109,507	$6,506	84	266,893
CZ02	PG&E	404,865	3,868	$130,575	$5,256	122	282,762
CZ03	PG&E	370,147	3,142	$116,478	$4,349	88	251,759
CZ04	PG&E	431,722	3,759	$140,916	$5,144	141	299,993
CZ04-2	CPAU	431,722	3,759	$75,363	$5,144	141	299,993
CZ05	PG&E	400,750	3,240	$131,277	$4,481	106	269,768
CZ05-2	SCG	400,750	3,240	$131,277	$3,683	106	269,768
CZ06	SCE	397,441	2,117	$74,516	$2,718	105	253,571
CZ06-2	LA	397,441	2,117	$44,311	$2,718	105	253,571
CZ07	SDG&E	422,130	950	$164,991	$4,429	118	257,324
CZ08	SCE	431,207	1,219	$79,181	$1,820	132	265,179
CZ08-2	LA	431,207	1,219	$46,750	$1,820	132	265,179
CZ09	SCE	456,487	1,605	$86,190	$2,196	155	287,269
CZ09-2	LA	456,487	1,605	$51,111	$2,196	155	287,269
CZ10	SDG&E	431,337	2,053	$173,713	$5,390	130	272,289
CZ10-2	SCE	431,337	2,053	$80,636	$2,603	130	272,289
CZ11	PG&E	464,676	3,062	$150,520	$4,333	163	310,307
CZ12	PG&E	441,720	3,327	$142,902	$4,647	152	299,824
CZ12-2	SMUD	441,720	3,327	$65,707	$4,647	152	299,824
CZ13	PG&E	471,540	3,063	$150,919	$4,345	161	316,228
CZ14	SDG&E	467,320	3,266	$185,812	$6,448	165	314,258
CZ14-2	SCE	467,320	3,266	$92,071	$3,579	165	314,258
CZ15	SCE	559,655	1,537	$105,388	$2,058	211	347,545
CZ16	PG&E	405,269	6,185	$127,201	$8,056	116	312,684
CZ16-2	LA	405,269	6,185	$43,115	$8,056	116	312,684

Figure 48. Medium Retail – Mixed Fuel Baseline

Climate Zone	Utility	Electricity Consumption (kWh)	Natural Gas Consumption (Therms)	Electricity Cost	Natural Gas Cost	Compliance TDV	GHG Emissions (lbs)
Medium Retail Mixed Fuel Baseline							
CZ01	PG&E	184,234	3,893	$43,188	$5,247	155	156,972
CZ02	PG&E	214,022	2,448	$70,420	$3,572	202	157,236
CZ03	PG&E	199,827	1,868	$47,032	$2,871	165	140,558
CZ04	PG&E	208,704	1,706	$66,980	$2,681	187	143,966
CZ04-2	CPAU	208,704	1,706	$36,037	$2,681	187	143,966
CZ05	PG&E	195,864	1,746	$45,983	$2,697	155	135,849
CZ05-2	SCG	195,864	1,746	$45,983	$2,342	155	135,849
CZ06	SCE	211,123	1,002	$36,585	$1,591	183	135,557
CZ06-2	LA	211,123	1,002	$21,341	$1,591	183	135,557
CZ07	SDG&E	211,808	522	$75,486	$4,055	178	130,436
CZ08	SCE	212,141	793	$36,758	$1,373	190	133,999
CZ08-2	LA	212,141	793	$21,436	$1,373	190	133,999
CZ09	SCE	227,340	970	$40,083	$1,560	218	146,680
CZ09-2	LA	227,340	970	$23,487	$1,560	218	146,680
CZ10	SDG&E	235,465	1,262	$87,730	$4,700	228	154,572
CZ10-2	SCE	235,465	1,262	$41,000	$1,853	228	154,572
CZ11	PG&E	234,560	2,415	$76,670	$3,547	244	170,232
CZ12	PG&E	228,958	2,309	$75,084	$3,426	234	165,133
CZ12-2	SMUD	228,958	2,309	$32,300	$3,426	234	165,133
CZ13	PG&E	242,927	1,983	$81,995	$3,034	258	170,345
CZ14	SDG&E	264,589	1,672	$97,581	$5,059	277	178,507
CZ14-2	SCE	264,589	1,672	$46,217	$2,172	277	178,507
CZ15	SCE	290,060	518	$50,299	$1,083	300	179,423
CZ16	PG&E	212,204	4,304	$67,684	$5,815	197	180,630
CZ16-2	LA	212,204	4,304	$20,783	$5,815	197	180,630

Figure 49. Small Hotel – Mixed Fuel Baseline

Climate Zone	Utility	Electricity Consumption (kWh)	Natural Gas Consumption (Therms)	Electricity Cost	Natural Gas Cost	Compliance TDV	GHG Emissions (lbs)
Small Hotel Mixed Fuel Baseline							
CZ01	PG&E	177,734	16,936	40,778	20,465	110	340,491
CZ02	PG&E	189,319	12,696	53,396	15,664	110	293,056
CZ03	PG&E	183,772	12,341	42,325	15,210	98	284,217
CZ04	PG&E	187,482	11,945	52,118	14,806	106	281,851
CZ04-2	CPAU	187,482	11,945	32,176	14,806	106	281,851
CZ05	PG&E	187,150	11,979	43,182	14,733	98	281,183
CZ05-2	SCG	187,150	11,979	43,182	10,869	98	281,183
CZ06	SCE	191,764	8,931	28,036	8,437	98	244,664
CZ06-2	LA	191,764	8,931	16,636	8,437	98	244,664
CZ07	SDG&E	189,174	8,207	58,203	10,752	90	233,884
CZ08	SCE	190,503	8,372	27,823	7,991	94	236,544
CZ08-2	LA	190,503	8,372	16,555	7,991	94	236,544
CZ09	SCE	198,204	8,421	30,262	8,030	103	242,296
CZ09-2	LA	198,204	8,421	17,951	8,030	103	242,296
CZ10	SDG&E	215,364	8,437	71,713	10,926	122	255,622
CZ10-2	SCE	215,364	8,437	33,736	8,043	122	255,622
CZ11	PG&E	219,852	10,271	63,724	12,882	131	282,232
CZ12	PG&E	199,499	10,422	46,245	13,022	115	270,262
CZ12-2	SMUD	199,499	10,422	26,872	13,022	115	270,262
CZ13	PG&E	226,925	10,048	65,559	12,629	132	284,007
CZ14	SDG&E	226,104	10,075	73,621	12,167	134	283,287
CZ14-2	SCE	226,104	10,075	35,187	9,350	134	283,287
CZ15	SCE	280,595	5,598	42,852	5,777	152	260,378
CZ16	PG&E	191,231	17,618	51,644	21,581	127	358,590
CZ16-2	LA	191,231	17,618	16,029	21,581	127	358,590

6.6 Hotel TDV Cost Effectiveness with Propane Baseline

The Reach Codes Team further analyzed TDV cost effectiveness of the all-electric packages with a mixed-fuel design baseline using propane instead of natural gas. Results for each package are shown in Figure 50. through Figure 53. below.

All electric models compared to a propane baseline have positive compliance margins in all climate zones when compared to results using a natural gas baseline. Compliance margin improvement is roughly 30 percent, which also leads to improved cost effectiveness for the all-electric packages. These outcomes are likely due to the TDV penalty associated with propane when compared to natural gas.

Across packages, TDV cost effectiveness with a propane baseline follows similar trends as the natural gas baseline. Adding efficiency measures increased compliance margins by 3 to 10 percent depending on climate zone, while adding high efficiency HVAC and SHW equipment alone increased compliance margins by smaller margins of about 2 to 4 percent compared to the All-Electric package.

Figure 50. TDV Cost Effectiveness for Small Hotel, Propane Baseline – Package 2 All-Electric Federal Code Minimum

Climate Zone	Compliance Margin (%)	Incremental Package Cost	$-TDV Savings	B/C Ratio (TDV)	NPV (TDV)
CZ01	-4%	($1,271,869)	($28,346)	44.9	$1,243,523
CZ02	27%	($1,272,841)	$170,263	>1	$1,443,104
CZ03	-3%	($1,275,114)	($16,425)	77.6	$1,258,689
CZ04	26%	($1,274,949)	$155,466	>1	$1,430,414
CZ05	27%	($1,275,002)	$154,709	>1	$1,429,710
CZ06	17%	($1,275,143)	$126,212	>1	$1,401,355
CZ07	25%	($1,273,490)	$117,621	>1	$1,391,111
CZ08	24%	($1,271,461)	$122,087	>1	$1,393,548
CZ09	23%	($1,273,259)	$123,525	>1	$1,396,784
CZ10	18%	($1,270,261)	$109,522	>1	$1,379,783
CZ11	19%	($1,271,070)	$129,428	>1	$1,400,498
CZ12	-4%	($1,272,510)	($26,302)	48.4	$1,246,208
CZ13	18%	($1,270,882)	$124,357	>1	$1,395,239
CZ14	17%	($1,271,241)	$117,621	>1	$1,388,861
CZ15	-7%	($1,269,361)	($45,338)	28.0	$1,224,023
CZ16	9%	($1,275,637)	$68,272	>1	$1,343,908

Figure 51. TDV Cost Effectiveness for Small Hotel, Propane Baseline – Package 3A (All-Electric + EE)

Climate Zone	Compliance Margin (%)	Incremental Package Cost	$-TDV Savings	B/C Ratio (TDV)	NPV (TDV)
CZ01	35%	($1,250,898)	$252,831	>1	$1,503,729
CZ02	34%	($1,251,870)	$217,238	>1	$1,469,108
CZ03	37%	($1,254,142)	$218,642	>1	$1,472,784
CZ04	31%	($1,250,769)	$191,393	>1	$1,442,162
CZ05	36%	($1,254,031)	$208,773	>1	$1,462,804
CZ06	25%	($1,250,964)	$159,714	>1	$1,410,677
CZ07	32%	($1,249,311)	$154,111	>1	$1,403,422
CZ08	29%	($1,247,282)	$146,536	>1	$1,393,818
CZ09	27%	($1,249,080)	$146,671	>1	$1,395,751
CZ10	22%	($1,246,081)	$134,477	>1	$1,380,559
CZ11	23%	($1,246,891)	$157,138	>1	$1,404,029
CZ12	27%	($1,248,330)	$167,945	>1	$1,416,276
CZ13	22%	($1,246,703)	$149,270	>1	$1,395,973
CZ14	21%	($1,247,061)	$145,269	>1	$1,392,331
CZ15	14%	($1,245,182)	$93,647	>1	$1,338,829
CZ16	20%	($1,254,665)	$154,035	>1	$1,408,701

Figure 52. TDV Cost Effectiveness for Small Hotel, Propane Baseline – Package 3B (All-Electric + EE + PV)

Climate Zone	Compliance Margin (%)	Incremental Package Cost	$-TDV Savings	B/C Ratio (TDV)	NPV (TDV)
CZ01	35%	($1,043,528)	$511,688	>1	$1,555,215
CZ02	34%	($1,044,500)	$524,460	>1	$1,568,960
CZ03	37%	($1,046,772)	$518,485	>1	$1,565,257
CZ04	31%	($1,043,399)	$505,579	>1	$1,548,978
CZ05	36%	($1,046,660)	$526,668	>1	$1,573,328
CZ06	25%	($1,043,594)	$469,623	>1	$1,513,216
CZ07	32%	($1,041,941)	$471,513	>1	$1,513,454
CZ08	29%	($1,039,912)	$475,973	>1	$1,515,885
CZ09	27%	($1,041,710)	$467,971	>1	$1,509,681
CZ10	22%	($1,038,711)	$454,832	>1	$1,493,543
CZ11	23%	($1,039,521)	$474,844	>1	$1,514,364
CZ12	27%	($1,040,960)	$484,667	>1	$1,525,627
CZ13	22%	($1,039,333)	$454,108	>1	$1,493,441
CZ14	21%	($1,039,691)	$505,398	>1	$1,545,090
CZ15	14%	($1,037,811)	$423,879	>1	$1,461,691
CZ16	20%	($1,047,295)	$480,407	>1	$1,527,702

Figure 53. TDV Cost Effectiveness for Small Hotel, Propane Baseline – Package 3C (All Electric + HE)

Climate Zone	Compliance Margin (%)	Incremental Package Cost	$-TDV Savings	B/C Ratio (TDV)	NPV (TDV)
CZ01	27%	($1,256,423)	$194,975	>1	$1,451,398
CZ02	28%	($1,258,328)	$177,378	>1	$1,435,706
CZ03	28%	($1,263,867)	$164,094	>1	$1,427,961
CZ04	26%	($1,262,963)	$155,314	>1	$1,418,277
CZ05	26%	($1,263,327)	$153,271	>1	$1,416,598
CZ06	17%	($1,263,779)	$122,011	>1	$1,385,790
CZ07	24%	($1,260,844)	$116,751	>1	$1,377,594
CZ08	25%	($1,256,326)	$122,995	>1	$1,379,321
CZ09	24%	($1,260,223)	$128,482	>1	$1,388,706
CZ10	20%	($1,253,181)	$121,595	>1	$1,374,776
CZ11	21%	($1,254,613)	$143,658	>1	$1,398,271
CZ12	23%	($1,257,919)	$142,901	>1	$1,400,820
CZ13	21%	($1,254,386)	$138,625	>1	$1,393,011
CZ14	20%	($1,254,978)	$136,430	>1	$1,391,407
CZ15	14%	($1,251,932)	$96,087	>1	$1,348,019
CZ16	15%	($1,263,534)	$122,011	>1	$1,385,545

6.7 PV-only and PV+Battery-only Cost Effectiveness Results Details

The Reach Code Tea evaluated cost effectiveness of installing a PV system and battery storage in six different measure combinations over a 2019 code-compliant baseline for all climate zones. The baseline for all nonresidential buildings is a mixed-fuel design.

All mixed fuel models are compliant with 2019 Title24, whereas all electric models can show negative compliance. The compliance margin is the same as that of their respective federal minimum design and is not affected by addition of solar PV or battery. These scenarios evaluate the cost effectiveness of PV and/or battery measure individually. The climate zones where all-electric design is not compliant will have the flexibility to ramp up the efficiency of appliance or add another measure to be code compliant, as per package 1B and 3B in main body of the report. The large negative lifecycle costs in all electric packages are due to lower all-electric HVAC system costs and avoided natural gas infrastructure costs. This is commonly applied across all climate zones and packages over any additional costs for PV and battery.

6.7.1 Cost Effectiveness Results – Medium Office

Figure 54 through Figure 61 contain the cost-effectiveness findings for the Medium Office packages. Notable findings for each package include:

- **Mixed-Fuel + 3 kW PV Only:** All packages are cost effective using the On-Bill and TDV approaches.
- **Mixed-Fuel + 3 kW PV + 5 kWh Battery:** The packages are mostly cost effective on a TDV basis except in CZ1. As compared to the 3 kW PV only package, battery reduces cost effectiveness. This package is not cost effective for LADWP and SMUD territories using an On-Bill approach.
- **Mixed-Fuel + PV only:** The packages are less cost effective as compared to 3 kW PV packages in most climate zones. In areas served by LADWP, the B/C ratio is narrowly less than 1 and not cost effective.
- **Mixed-Fuel + PV + 50 kWh Battery:** The packages are cost effective in all climate zones except for in the areas served by LADWP. On-Bill and TDV B/C ratios are slightly lower compared to the PV only package.
- **All-Electric + 3 kW PV:** Packages are on-bill cost effective in ten of sixteen climate zones. Climate zones 1,2,4,12, and 16 were not found to be cost-effective from an on-bill perspective. These zones are within PG&E's service area. Packages are cost effective using TDV in all climate zones except CZ16.
- **All-Electric + 3 kW PV + 5 kWh Battery**: Packages are slightly more cost effective than the previous minimal PV only package. Packages are on-bill cost effective in most climate zones except for 1,2 and 16 from an on-bill perspective. These zones are within PG&E's service area. Packages are cost effective using TDV in all climate zones except CZ16.
- **All-Electric + PV only:** All packages are cost effective and achieve savings using the On-Bill and TDV approaches.

- **All-Electric + PV + 50 kWh Battery**: All packages are cost effective and achieve savings using the On-Bill and TDV approaches. On-Bill and TDV B/C ratios are slightly lower compared to the PV only package.

Figure 54. Cost Effectiveness for Medium Office - Mixed Fuel + 3kW PV

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	Lifecycle $- TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Mixed Fuel + 3kW PV											
CZ01	PG&E	3,941	0	0.8	$5,566	$15,743	$8,448	2.8	1.5	$10,177	$2,882
CZ02	PG&E	4,785	0	0.9	$5,566	$20,372	$10,500	3.7	1.9	$14,806	$4,934
CZ03	PG&E	4,660	0	0.9	$5,566	$20,603	$9,975	3.7	1.8	$15,037	$4,409
CZ04	PG&E	5,056	0	1.0	$5,566	$20,235	$11,073	3.6	2.0	$14,669	$5,507
CZ04-2	CPAU	5,056	0	1.0	$5,566	$11,945	$11,073	2.1	2.0	$6,379	$5,507
CZ05	PG&E	5,027	0	1.0	$5,566	$23,159	$10,834	4.2	1.9	$17,593	$5,268
CZ06	SCE	4,853	0	0.9	$5,566	$10,968	$10,930	2.0	2.0	$5,402	$5,364
CZ06-2	LADWP	4,853	0	0.9	$5,566	$6,575	$10,930	1.2	2.0	$1,009	$5,364
CZ07	SDG&E	4,960	0	1.0	$5,566	$17,904	$11,025	3.2	2.0	$12,338	$5,459
CZ08	SCE	4,826	0	0.9	$5,566	$10,768	$11,359	1.9	2.0	$5,202	$5,793
CZ08-2	LADWP	4,826	0	0.9	$5,566	$6,503	$11,359	1.2	2.0	$937	$5,793
CZ09	SCE	4,889	0	1.0	$5,566	$10,622	$11,216	1.9	2.0	$5,056	$5,650
CZ09-2	LADWP	4,889	0	1.0	$5,566	$6,217	$11,216	1.1	2.0	$651	$5,650
CZ10	SDG&E	4,826	0	0.9	$5,566	$21,280	$10,787	3.8	1.9	$15,714	$5,221
CZ10-2	SCE	4,826	0	0.9	$5,566	$11,598	$10,787	2.1	1.9	$6,032	$5,221
CZ11	PG&E	4,701	0	0.9	$5,566	$19,869	$10,644	3.6	1.9	$14,303	$5,078
CZ12	PG&E	4,707	0	0.9	$5,566	$19,643	$10,644	3.5	1.9	$14,077	$5,078
CZ12-2	SMUD	4,707	0	0.9	$5,566	$8,005	$10,644	1.4	1.9	$2,439	$5,078
CZ13	PG&E	4,633	0	0.9	$5,566	$19,231	$10,262	3.5	1.8	$13,665	$4,696
CZ14	SDG&E	5,377	0	1.0	$5,566	$18,789	$12,600	3.4	2.3	$13,223	$7,034
CZ14-2	SCE	5,377	0	1.0	$5,566	$10,512	$12,600	1.9	2.3	$4,946	$7,034
CZ15	SCE	5,099	0	1.0	$5,566	$10,109	$11,550	1.8	2.1	$4,543	$5,984
CZ16	PG&E	5,096	0	1.0	$5,566	$21,836	$10,882	3.9	2.0	$16,270	$5,316
CZ16-2	LADWP	5,096	0	1.0	$5,566	$6,501	$10,882	1.2	2.0	$935	$5,316

Figure 55. Cost Effectiveness for Medium Office – Mixed Fuel + 3kW PV + 5 kWh Battery

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	$-TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Mixed Fuel + 3kW PV + 5kWh Battery											
CZ01	PG&E	3,941	0	0.8	$9,520	$15,743	$8,448	1.7	0.9	$6,223	($1,072)
CZ02	PG&E	4,785	0	0.9	$9,520	$20,372	$10,500	2.1	1.1	$10,852	$980
CZ03	PG&E	4,660	0	0.9	$9,520	$20,603	$9,975	2.2	1.0	$11,083	$455
CZ04	PG&E	5,056	0	1.0	$9,520	$20,235	$11,073	2.1	1.2	$10,714	$1,553
CZ04-2	CPAU	5,056	0	1.0	$9,520	$11,945	$11,073	1.3	1.2	$2,425	$1,553
CZ05	PG&E	5,027	0	1.0	$9,520	$23,159	$10,834	2.4	1.1	$13,639	$1,314
CZ06	SCE	4,853	0	0.9	$9,520	$10,968	$10,930	1.2	1.1	$1,448	$1,410
CZ06-2	LADWP	4,853	0	0.9	$9,520	$6,575	$10,930	0.7	1.1	($2,945)	$1,410
CZ07	SDG&E	4,960	0	1.0	$9,520	$17,904	$11,025	1.9	1.2	$8,384	$1,505
CZ08	SCE	4,826	0	0.9	$9,520	$10,768	$11,359	1.1	1.2	$1,248	$1,839
CZ08-2	LADWP	4,826	0	0.9	$9,520	$6,503	$11,359	0.7	1.2	($3,017)	$1,839
CZ09	SCE	4,889	0	1.0	$9,520	$10,622	$11,216	1.1	1.2	$1,102	$1,696
CZ09-2	LADWP	4,889	0	1.0	$9,520	$6,217	$11,216	0.7	1.2	($3,303)	$1,696
CZ10	SDG&E	4,826	0	0.9	$9,520	$21,280	$10,787	2.2	1.1	$11,760	$1,267
CZ10-2	SCE	4,826	0	0.9	$9,520	$11,598	$10,787	1.2	1.1	$2,078	$1,267
CZ11	PG&E	4,701	0	0.9	$9,520	$19,869	$10,644	2.1	1.1	$10,349	$1,123
CZ12	PG&E	4,707	0	0.9	$9,520	$19,643	$10,644	2.1	1.1	$10,123	$1,123
CZ12-2	SMUD	4,707	0	0.9	$9,520	$8,005	$10,644	0.8	1.1	($1,515)	$1,123
CZ13	PG&E	4,633	0	0.9	$9,520	$19,231	$10,262	2.0	1.1	$9,711	$742
CZ14	SDG&E	5,377	0	1.0	$9,520	$18,789	$12,600	2.0	1.3	$9,269	$3,080
CZ14-2	SCE	5,377	0	1.0	$9,520	$10,512	$12,600	1.1	1.3	$992	$3,080
CZ15	SCE	5,099	0	1.0	$9,520	$10,109	$11,550	1.1	1.2	$589	$2,030
CZ16	PG&E	5,096	0	1.0	$9,520	$21,836	$10,882	2.3	1.1	$12,316	$1,362
CZ16-2	LADWP	5,096	0	1.0	$9,520	$6,501	$10,882	0.7	1.1	($3,019)	$1,362

Figure 56. Cost Effectiveness for Medium Office – Mixed Fuel + 135kW PV

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	Lifecycle TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Mixed Fuel +135kW PV											
CZ01	PG&E	177,340	0	34.3	$302,856	$526,352	$380,399	1.7	1.3	$223,497	$77,544
CZ02	PG&E	215,311	0	41.5	$302,856	$666,050	$471,705	2.2	1.6	$363,194	$168,849
CZ03	PG&E	209,717	0	40.7	$302,856	$645,010	$449,797	2.1	1.5	$342,154	$146,942
CZ04	PG&E	227,535	0	44.0	$302,856	$686,434	$497,431	2.3	1.6	$383,578	$194,575
CZ04-2	CPAU	227,535	0	44.0	$302,856	$537,521	$497,431	1.8	1.6	$234,665	$194,575
CZ05	PG&E	226,195	0	44.1	$302,856	$753,230	$486,596	2.5	1.6	$450,374	$183,741
CZ06	SCE	218,387	0	42.3	$302,856	$401,645	$492,515	1.3	1.6	$98,789	$189,659
CZ06-2	LADWP	218,387	0	42.3	$302,856	$233,909	$492,515	0.8	1.6	($68,947)	$189,659
CZ07	SDG&E	223,185	0	43.3	$302,856	$623,078	$496,667	2.1	1.6	$320,223	$193,811
CZ08	SCE	217,171	0	42.0	$302,856	$389,435	$510,270	1.3	1.7	$86,579	$207,414
CZ08-2	LADWP	217,171	0	42.0	$302,856	$222,066	$510,270	0.7	1.7	($80,790)	$207,414
CZ09	SCE	220,010	0	43.2	$302,856	$387,977	$505,783	1.3	1.7	$85,122	$202,928
CZ09-2	LADWP	220,010	0	43.2	$302,856	$226,516	$505,783	0.7	1.7	($76,340)	$202,928
CZ10	SDG&E	217,148	0	42.5	$302,856	$632,726	$485,451	2.1	1.6	$329,870	$182,595
CZ10-2	SCE	217,148	0	42.5	$302,856	$394,884	$485,451	1.3	1.6	$92,028	$182,595
CZ11	PG&E	211,556	0	40.9	$302,856	$671,691	$478,912	2.2	1.6	$368,835	$176,056
CZ12	PG&E	211,824	0	40.9	$302,856	$653,242	$478,101	2.2	1.6	$350,386	$175,245
CZ12-2	SMUD	211,824	0	40.9	$302,856	$345,255	$478,101	1.1	1.6	$42,399	$175,245
CZ13	PG&E	208,465	0	40.5	$302,856	$651,952	$462,732	2.2	1.5	$349,096	$159,876
CZ14	SDG&E	241,965	0	46.7	$302,856	$659,487	$566,351	2.2	1.9	$356,632	$263,496
CZ14-2	SCE	241,965	0	46.7	$302,856	$401,712	$566,351	1.3	1.9	$98,856	$263,496
CZ15	SCE	229,456	0	43.9	$302,856	$378,095	$520,102	1.2	1.7	$75,239	$217,246
CZ16	PG&E	229,317	0	44.8	$302,856	$707,095	$489,508	2.3	1.6	$404,239	$186,652
CZ16-2	LADWP	229,317	0	44.8	$302,856	$223,057	$489,508	0.7	1.6	($79,799)	$186,652

Figure 57. Cost Effectiveness for Medium Office – Mixed Fuel + 135kW PV + 50 kWh Battery

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	Lifecycle TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Mixed Fuel + 135kW PV + 50 kWh Battery											
CZ01	PG&E	176,903	0	35.3	$330,756	$525,948	$381,450	1.6	1.2	$195,192	$50,694
CZ02	PG&E	214,861	0	42.6	$330,756	$665,864	$472,898	2.0	1.4	$335,108	$142,142
CZ03	PG&E	209,255	0	41.8	$330,756	$644,170	$451,611	1.9	1.4	$313,414	$120,855
CZ04	PG&E	227,076	0	45.0	$330,756	$685,605	$502,108	2.1	1.5	$354,849	$171,352
CZ04-2	CPAU	227,076	0	45.0	$330,756	$536,463	$502,108	1.6	1.5	$205,707	$171,352
CZ05	PG&E	225,752	0	45.1	$330,756	$753,558	$487,742	2.3	1.5	$422,803	$156,986
CZ06	SCE	217,939	0	43.4	$330,756	$401,356	$494,042	1.2	1.5	$70,601	$163,286
CZ06-2	LADWP	217,939	0	43.4	$330,756	$233,673	$494,042	0.7	1.5	($97,083)	$163,286
CZ07	SDG&E	222,746	0	44.4	$330,756	$628,383	$498,147	1.9	1.5	$297,627	$167,391
CZ08	SCE	216,724	0	43.1	$330,756	$389,184	$511,511	1.2	1.5	$58,428	$180,755
CZ08-2	LADWP	216,724	0	43.1	$330,756	$221,839	$511,511	0.7	1.5	($108,917)	$180,755
CZ09	SCE	219,563	0	44.2	$330,756	$387,728	$506,929	1.2	1.5	$56,972	$176,173
CZ09-2	LADWP	219,563	0	44.2	$330,756	$226,303	$506,929	0.7	1.5	($104,453)	$176,173
CZ10	SDG&E	216,700	0	43.5	$330,756	$638,040	$486,644	1.9	1.5	$307,284	$155,888
CZ10-2	SCE	216,700	0	43.5	$330,756	$394,633	$486,644	1.2	1.5	$63,877	$155,888
CZ11	PG&E	211,129	0	41.9	$330,756	$670,932	$481,298	2.0	1.5	$340,177	$150,543
CZ12	PG&E	211,386	0	41.9	$330,756	$652,465	$482,826	2.0	1.5	$321,709	$152,070
CZ12-2	SMUD	211,386	0	41.9	$330,756	$344,668	$482,826	1.0	1.5	$13,913	$152,070
CZ13	PG&E	208,045	0	41.5	$330,756	$651,191	$473,280	2.0	1.4	$320,435	$142,524
CZ14	SDG&E	241,502	0	47.7	$330,756	$672,601	$569,454	2.0	1.7	$341,846	$238,698
CZ14-2	SCE	241,502	0	47.7	$330,756	$401,450	$569,454	1.2	1.7	$70,694	$238,698
CZ15	SCE	229,062	0	44.8	$330,756	$377,827	$521,963	1.1	1.6	$47,071	$191,208
CZ16	PG&E	228,825	0	45.9	$330,756	$706,201	$496,190	2.1	1.5	$375,445	$165,434
CZ16-2	LADWP	228,825	0	45.9	$330,756	$222,802	$496,190	0.7	1.5	($107,953)	$165,434

Figure 58. Cost Effectiveness for Medium Office– All-Electric + 3kW PV

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	Lifecycle TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
All-Electric + 3kW PV											
CZ01	PG&E	-49,716	4967	10.9	($80,523)	($84,765)	($49,972)	0.9	1.6	($4,242)	$30,551
CZ02	PG&E	-44,899	3868	6.0	($66,965)	($83,115)	($30,928)	0.8	2.2	($16,150)	$36,037
CZ03	PG&E	-31,226	3142	6.5	($75,600)	($39,441)	($19,617)	1.9	3.9	$36,159	$55,983
CZ04	PG&E	-43,772	3759	5.7	($62,282)	($70,999)	($29,496)	0.9	2.1	($8,717)	$32,786
CZ04-2	CPAU	-43,772	3759	5.7	($62,282)	($8,050)	($29,496)	7.7	2.1	$54,232	$32,786
CZ05	PG&E	-35,504	3240	5.5	($77,773)	($42,559)	($29,162)	1.8	2.7	$35,214	$48,611
CZ06	SCE	-21,321	2117	4.0	($69,422)	$35,862	($9,641)	>1	7.2	$105,284	$59,781
CZ06-2	LADWP	-21,321	2117	4.0	($69,422)	$32,936	($9,641)	>1	7.2	$102,358	$59,781
CZ07	SDG&E	-7,943	950	1.9	($63,595)	$64,781	($382)	>1	166.6	$128,376	$63,214
CZ08	SCE	-10,854	1219	2.5	($62,043)	$28,651	($1,289)	>1	48.1	$90,694	$60,755
CZ08-2	LADWP	-10,854	1219	2.5	($62,043)	$25,122	($1,289)	>1	48.1	$87,165	$60,755
CZ09	SCE	-14,878	1605	3.3	($56,372)	$31,542	($3,246)	>1	17.4	$87,913	$53,126
CZ09-2	LADWP	-14,878	1605	3.3	($56,372)	$28,145	($3,246)	>1	17.4	$84,517	$53,126
CZ10	SDG&E	-22,588	2053	3.1	($41,171)	$59,752	($12,553)	>1	3.3	$100,924	$28,619
CZ10-2	SCE	-22,588	2053	3.1	($41,171)	$32,039	($12,553)	>1	3.3	$73,211	$28,619
CZ11	PG&E	-35,455	3062	4.5	($57,257)	($53,776)	($22,194)	1.1	2.6	$3,481	$35,063
CZ12	PG&E	-38,704	3327	5.0	($61,613)	($66,808)	($24,819)	0.9	2.5	($5,195)	$36,794
CZ12-2	SMUD	-38,704	3327	5.0	($61,613)	$2,897	($24,819)	>1	2.5	$64,510	$36,794
CZ13	PG&E	-35,016	3063	4.7	($55,996)	($52,159)	($22,146)	1.1	2.5	$3,836	$33,849
CZ14	SDG&E	-38,945	3266	4.5	($58,426)	$24,867	($25,821)	>1	2.3	$83,293	$32,605
CZ14-2	SCE	-38,945	3266	4.5	($58,426)	$15,338	($25,821)	>1	2.3	$73,764	$32,605
CZ15	SCE	-14,818	1537	2.8	($29,445)	$22,852	($3,914)	>1	7.5	$52,298	$25,532
CZ16	PG&E	-88,966	6185	6.6	($57,366)	($193,368)	($139,989)	0.3	0.4	($136,002)	($82,623)
CZ16-2	LADWP	-88,966	6185	6.6	($57,366)	$36,354	($139,989)	>1	0.4	$93,720	($82,623)

Figure 59. Cost Effectiveness for Medium Office – All-Electric + 3kW PV + 5 kWh Battery

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	$-TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
All-Electric + 3kW PV + 5 kWh Battery											
CZ01	PG&E	-49,716	4967	10.9	($78,897)	($84,765)	($49,972)	0.9	1.6	($5,868)	$28,925
CZ02	PG&E	-44,899	3868	6.0	($78,897)	($83,115)	($30,928)	0.9	2.6	($4,218)	$47,969
CZ03	PG&E	-31,226	3142	6.5	($78,897)	($39,441)	($19,617)	2.0	4.0	$39,456	$59,280
CZ04	PG&E	-43,772	3759	5.7	($78,897)	($70,999)	($29,496)	1.1	2.7	$7,898	$49,400
CZ04-2	CPAU	-43,772	3759	5.7	($78,897)	($8,050)	($29,496)	9.8	2.7	$70,847	$49,400
CZ05	PG&E	-35,504	3240	5.5	($78,897)	($42,559)	($29,162)	1.9	2.7	$36,338	$49,735
CZ06	SCE	-21,321	2117	4.0	($78,897)	$35,862	($9,641)	>1	8.2	$114,759	$69,256
CZ06-2	LADWP	-21,321	2117	4.0	($78,897)	$32,936	($9,641)	>1	8.2	$111,833	$69,256
CZ07	SDG&E	-7,943	950	1.9	($78,897)	$64,781	($382)	>1	206.6	$143,678	$78,515
CZ08	SCE	-10,854	1219	2.5	($78,897)	$28,651	($1,289)	>1	61.2	$107,548	$77,608
CZ08-2	LADWP	-10,854	1219	2.5	($78,897)	$25,122	($1,289)	>1	61.2	$104,019	$77,608
CZ09	SCE	-14,878	1605	3.3	($78,897)	$31,542	($3,246)	>1	24.3	$110,439	$75,651
CZ09-2	LADWP	-14,878	1605	3.3	($78,897)	$28,145	($3,246)	>1	24.3	$107,042	$75,651
CZ10	SDG&E	-22,588	2053	3.1	($78,897)	$59,752	($12,553)	>1	6.3	$138,649	$66,344
CZ10-2	SCE	-22,588	2053	3.1	($78,897)	$32,039	($12,553)	>1	6.3	$110,936	$66,344
CZ11	PG&E	-35,455	3062	4.5	($78,897)	($53,776)	($22,194)	1.5	3.6	$25,121	$56,703
CZ12	PG&E	-38,704	3327	5.0	($78,897)	($66,808)	($24,819)	1.2	3.2	$12,089	$54,078
CZ12-2	SMUD	-38,704	3327	5.0	($78,897)	$2,897	($24,819)	>1	3.2	$81,794	$54,078
CZ13	PG&E	-35,016	3063	4.7	($78,897)	($52,159)	($22,146)	1.5	3.6	$26,738	$56,751
CZ14	SDG&E	-38,945	3266	4.5	($78,897)	$24,867	($25,821)	>1	3.1	$103,764	$53,076
CZ14-2	SCE	-38,945	3266	4.5	($78,897)	$15,338	($25,821)	>1	3.1	$94,235	$53,076
CZ15	SCE	-14,818	1537	2.8	($78,897)	$22,852	($3,914)	>1	20.2	$101,749	$74,983
CZ16	PG&E	-88,966	6185	6.6	($78,897)	($193,368)	($139,989)	0.4	0.6	($114,472)	($61,092)
CZ16-2	LADWP	-88,966	6185	6.6	($78,897)	$36,354	($139,989)	>1	0.6	$115,250	($61,092)

Figure 60. Cost Effectiveness for Medium Office – All-Electric + 135kW PV

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	Lifecycle TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
All-Electric + 135kW PV											
CZ01	PG&E	123,683	4967	44.5	$163,217	$405,731	$321,979	2.5	2.0	$242,514	$158,762
CZ02	PG&E	165,627	3868	46.6	$176,775	$562,528	$430,276	3.2	2.4	$385,753	$253,501
CZ03	PG&E	173,831	3142	46.3	$168,140	$575,864	$420,205	3.4	2.5	$407,725	$252,066
CZ04	PG&E	178,706	3759	48.7	$181,458	$601,431	$456,861	3.3	2.5	$419,973	$275,403
CZ04-2	CPAU	178,706	3759	48.7	$181,458	$517,526	$456,861	2.9	2.5	$336,069	$275,403
CZ05	PG&E	185,664	3240	48.6	$165,967	$664,842	$446,600	4.0	2.7	$498,875	$280,633
CZ06	SCE	192,214	2117	45.3	$174,317	$423,657	$471,944	2.4	2.7	$249,340	$297,626
CZ06-2	LADWP	192,214	2117	45.3	$174,317	$259,270	$471,944	1.5	2.7	$84,953	$297,626
CZ07	SDG&E	210,282	950	44.3	$180,145	$669,979	$485,260	3.7	2.7	$489,834	$305,115
CZ08	SCE	201,491	1219	43.5	$181,696	$407,277	$497,622	2.2	2.7	$225,580	$315,925
CZ08-2	LADWP	201,491	1219	43.5	$181,696	$240,657	$497,622	1.3	2.7	$58,960	$315,925
CZ09	SCE	200,242	1605	45.6	$187,368	$408,922	$491,322	2.2	2.6	$221,554	$303,953
CZ09-2	LADWP	200,242	1605	45.6	$187,368	$248,452	$491,322	1.3	2.6	$61,084	$303,953
CZ10	SDG&E	189,734	2053	44.7	$202,568	$667,551	$462,111	3.3	2.3	$464,982	$259,543
CZ10-2	SCE	189,734	2053	44.7	$202,568	$412,659	$462,111	2.0	2.3	$210,091	$259,543
CZ11	PG&E	171,399	3062	44.5	$186,483	$597,807	$446,074	3.2	2.4	$411,324	$259,592
CZ12	PG&E	168,413	3327	45.0	$182,127	$571,758	$442,638	3.1	2.4	$389,632	$260,511
CZ12-2	SMUD	168,413	3327	45.0	$182,127	$343,602	$442,638	1.9	2.4	$161,475	$260,511
CZ13	PG&E	168,817	3063	44.3	$187,744	$581,964	$430,324	3.1	2.3	$394,220	$242,580
CZ14	SDG&E	197,643	3266	50.1	$185,314	$667,762	$527,930	3.6	2.8	$482,449	$342,616
CZ14-2	SCE	197,643	3266	50.1	$185,314	$408,424	$527,930	2.2	2.8	$223,110	$342,616
CZ15	SCE	209,539	1537	45.7	$214,294	$390,267	$504,638	1.8	2.4	$175,972	$290,343
CZ16	PG&E	135,255	6185	50.4	$186,374	$470,199	$338,637	2.5	1.8	$283,825	$152,263
CZ16-2	LADWP	135,255	6185	50.4	$186,374	$250,807	$338,637	1.3	1.8	$64,433	$152,263

Figure 61. Cost Effectiveness for Medium Office – All-Electric + 135kW PV + 50 kWh Battery

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	Lifecycle TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
All-Electric + 135kW PV + 50 kWh Battery											
CZ01	PG&E	123,280	4967	45.4	$191,117	$404,994	$323,077	2.1	1.7	$213,877	$131,960
CZ02	PG&E	165,200	3868	47.7	$204,675	$561,747	$431,469	2.7	2.1	$357,072	$226,795
CZ03	PG&E	173,384	3142	47.4	$196,040	$575,043	$422,019	2.9	2.2	$379,003	$225,979
CZ04	PG&E	178,259	3759	49.8	$209,358	$600,621	$461,634	2.9	2.2	$391,263	$252,276
CZ04-2	CPAU	178,259	3759	49.8	$209,358	$516,495	$461,634	2.5	2.2	$307,137	$252,276
CZ05	PG&E	185,229	3240	49.7	$193,867	$664,046	$447,793	3.4	2.3	$470,179	$253,926
CZ06	SCE	191,767	2117	46.5	$202,217	$423,369	$473,519	2.1	2.3	$221,152	$271,301
CZ06-2	LADWP	191,767	2117	46.5	$202,217	$259,033	$473,519	1.3	2.3	$56,816	$271,301
CZ07	SDG&E	209,848	950	45.4	$208,045	$675,307	$486,787	3.2	2.3	$467,262	$278,743
CZ08	SCE	201,047	1219	44.7	$209,596	$407,027	$498,910	1.9	2.4	$197,430	$289,314
CZ08-2	LADWP	201,047	1219	44.7	$209,596	$240,432	$498,910	1.1	2.4	$30,835	$289,314
CZ09	SCE	199,802	1605	46.6	$215,268	$408,676	$492,515	1.9	2.3	$193,408	$277,246
CZ09-2	LADWP	199,802	1605	46.6	$215,268	$248,242	$492,515	1.2	2.3	$32,974	$277,246
CZ10	SDG&E	189,293	2053	45.7	$230,468	$672,867	$463,352	2.9	2.0	$442,399	$232,884
CZ10-2	SCE	189,293	2053	45.7	$230,468	$412,412	$463,352	1.8	2.0	$181,944	$232,884
CZ11	PG&E	170,987	3062	45.5	$214,383	$597,062	$448,509	2.8	2.1	$382,680	$234,126
CZ12	PG&E	167,995	3327	46.0	$210,027	$571,002	$447,411	2.7	2.1	$360,975	$237,384
CZ12-2	SMUD	167,995	3327	46.0	$210,027	$343,043	$447,411	1.6	2.1	$133,017	$237,384
CZ13	PG&E	168,408	3063	45.3	$215,644	$581,225	$440,920	2.7	2.0	$365,580	$225,275
CZ14	SDG&E	197,188	3266	51.2	$213,214	$680,893	$531,080	3.2	2.5	$467,679	$317,866
CZ14-2	SCE	197,188	3266	51.2	$213,214	$408,166	$531,080	1.9	2.5	$194,952	$317,866
CZ15	SCE	209,148	1537	46.6	$242,194	$390,000	$506,499	1.6	2.1	$147,806	$264,305
CZ16	PG&E	134,809	6185	51.4	$214,274	$469,378	$341,978	2.2	1.6	$255,105	$127,704
CZ16-2	LADWP	134,809	6185	51.4	$214,274	$250,580	$341,978	1.2	1.6	$36,306	$127,704

6.7.2 Cost Effectiveness Results – Medium Retail

Figure 62 through Figure 69 contain the cost-effectiveness findings for the Medium Retail packages. Notable findings for each package include:

- **Mixed-Fuel + 3 kW PV:** Packages are cost effective and achieve savings for all climate zones using the On-Bill and TDV approaches.
- **Mixed-Fuel + 3 kW PV + 5 kWh Battery:** The packages are less cost effective as compared to the 3 kW PV only package and not cost effective for LADWP and SMUD service area.
- **Mixed-Fuel + PV only:** Packages achieve positive energy cost savings and are cost effective using the On-Bill approach for all climate zones except for LADWP territory (CZs 6, 8, 9 and 16). Packages achieve positive savings and are cost effective using the TDV approach for all climate zones.
- **Mixed Fuel + PV + 5 kWh Battery:** Adding battery slightly reduces On-Bill B/C ratios but is still cost effective for all climate zones except for LADWP territory. Packages achieve savings and cost effective using the TDV approach for all climate zones.
- **All-Electric + 3 kW PV:** Packages are cost effective using the On-Bill and TDV approach for all climate zones except for CZ16 under PG&E service.
- **All-Electric + 3 kW PV + 5 kWh Battery**: Similar to minimal PV only package, adding battery is cost effective as well using the On-Bill and TDV approach for all climate zones except for CZ16 under PG&E service.
- **All-Electric + PV only:** Packages are cost effective and achieve savings in all climate zones for both the On-Bill and TDV approaches
- **All-Electric + PV + 50 kWh Battery**: Adding battery slightly reduces B/C ratios for both the On-Bill and TDV approaches. Packages are not cost effective for all climate zones except CZ6, CZ8 and CZ9 under LADWP service area.

Figure 62. Cost Effectiveness for Medium Retail – Mixed-Fuel + 3kW PV

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	Lifecycle TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Mixed Fuel + 3kW PV											
CZ01	PG&E	3,941	0	0.76	$5,566	$12,616	$8,460	2.3	1.5	$7,050	$2,894
CZ02	PG&E	4,685	0	0.91	$5,566	$17,635	$10,262	3.2	1.8	$12,069	$4,696
CZ03	PG&E	4,733	0	0.92	$5,566	$15,146	$10,152	2.7	1.8	$9,580	$4,586
CZ04	PG&E	4,834	0	0.94	$5,566	$18,519	$10,614	3.3	1.9	$12,953	$5,048
CZ04-2	CPAU	4,834	0	0.94	$5,566	$11,507	$10,614	2.1	1.9	$5,941	$5,048
CZ05	PG&E	4,910	0	0.95	$5,566	$15,641	$10,548	2.8	1.9	$10,075	$4,982
CZ06	SCE	4,769	0	0.93	$5,566	$11,374	$10,724	2.0	1.9	$5,808	$5,158
CZ06-2	LA	4,769	0	0.93	$5,566	$7,069	$10,724	1.3	1.9	$1,503	$5,158
CZ07	SDG&E	4,960	0	0.96	$5,566	$22,452	$11,031	4.0	2.0	$16,886	$5,465
CZ08	SCE	4,826	0	0.93	$5,566	$11,838	$11,339	2.1	2.0	$6,272	$5,773
CZ08-2	LA	4,826	0	0.93	$5,566	$7,342	$11,339	1.3	2.0	$1,776	$5,773
CZ09	SCE	4,889	0	0.96	$5,566	$11,187	$11,229	2.0	2.0	$5,621	$5,663
CZ09-2	LA	4,889	0	0.96	$5,566	$6,728	$11,229	1.2	2.0	$1,162	$5,663
CZ10	SDG&E	4,948	0	0.97	$5,566	$20,999	$10,987	3.8	2.0	$15,433	$5,421
CZ10-2	SCE	4,948	0	0.97	$5,566	$11,384	$10,987	2.0	2.0	$5,818	$5,421
CZ11	PG&E	4,718	0	0.91	$5,566	$15,381	$10,680	2.8	1.9	$9,815	$5,114
CZ12	PG&E	4,707	0	0.91	$5,566	$16,442	$10,614	3.0	1.9	$10,876	$5,048
CZ12-2	SMUD	4,707	0	0.91	$5,566	$8,247	$10,614	1.5	1.9	$2,681	$5,048
CZ13	PG&E	4,750	0	0.92	$5,566	$16,638	$10,592	3.0	1.9	$11,072	$5,026
CZ14	SDG&E	5,258	0	1.01	$5,566	$19,576	$12,218	3.5	2.2	$14,010	$6,652
CZ14-2	SCE	5,258	0	1.01	$5,566	$10,227	$12,218	1.8	2.2	$4,661	$6,652
CZ15	SCE	4,997	0	0.96	$5,566	$10,476	$11,339	1.9	2.0	$4,910	$5,773
CZ16	PG&E	5,336	0	1.04	$5,566	$20,418	$11,361	3.7	2.0	$14,852	$5,795
CZ16-2	LA	5,336	0	1.04	$5,566	$6,987	$11,361	1.3	2.0	$1,421	$5,795

Figure 63. Cost Effectiveness for Medium Retail – Mixed Fuel + 3kW PV + 5 kWh Battery

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	$-TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Mixed Fuel + 3kW PV + 5 kWh Battery											
CZ01	PG&E	3,941	0	0.76	$9,520	$12,616	$8,460	1.3	0.9	$3,096	($1,060)
CZ02	PG&E	4,685	0	0.91	$9,520	$17,635	$10,262	1.9	1.1	$8,115	$742
CZ03	PG&E	4,733	0	0.92	$9,520	$15,146	$10,152	1.6	1.1	$5,626	$632
CZ04	PG&E	4,834	0	0.94	$9,520	$18,519	$10,614	1.9	1.1	$8,999	$1,094
CZ04-2	CPAU	4,834	0	0.94	$9,520	$11,507	$10,614	1.2	1.1	$1,987	$1,094
CZ05	PG&E	4,910	0	0.95	$9,520	$15,641	$10,548	1.6	1.1	$6,120	$1,028
CZ05-2	SCG	4,910	0	0.95	$9,520	$15,641	$10,548	1.6	1.1	$6,120	$1,028
CZ06	SCE	4,769	0	0.93	$9,520	$11,374	$10,724	1.2	1.1	$1,854	$1,204
CZ06-2	LA	4,769	0	0.93	$9,520	$7,069	$10,724	0.7	1.1	($2,452)	$1,204
CZ07	SDG&E	4,960	0	0.96	$9,520	$22,452	$11,031	2.4	1.2	$12,932	$1,511
CZ08	SCE	4,826	0	0.93	$9,520	$11,838	$11,339	1.2	1.2	$2,317	$1,819
CZ08-2	LA	4,826	0	0.93	$9,520	$7,342	$11,339	0.8	1.2	($2,178)	$1,819
CZ09	SCE	4,889	0	0.96	$9,520	$11,187	$11,229	1.2	1.2	$1,667	$1,709
CZ09-2	LA	4,889	0	0.96	$9,520	$6,728	$11,229	0.7	1.2	($2,792)	$1,709
CZ10	SDG&E	4,948	0	0.97	$9,520	$20,999	$10,987	2.2	1.2	$11,479	$1,467
CZ10-2	SCE	4,948	0	0.97	$9,520	$11,384	$10,987	1.2	1.2	$1,863	$1,467
CZ11	PG&E	4,718	0	0.91	$9,520	$15,381	$10,680	1.6	1.1	$5,861	$1,160
CZ12	PG&E	4,707	0	0.91	$9,520	$16,442	$10,614	1.7	1.1	$6,922	$1,094
CZ12-2	SMUD	4,707	0	0.91	$9,520	$8,247	$10,614	0.9	1.1	($1,273)	$1,094
CZ13	PG&E	4,750	0	0.92	$9,520	$16,638	$10,592	1.7	1.1	$7,117	$1,072
CZ14	SDG&E	5,258	0	1.01	$9,520	$19,576	$12,218	2.1	1.3	$10,056	$2,698
CZ14-2	SCE	5,258	0	1.01	$9,520	$10,227	$12,218	1.1	1.3	$707	$2,698
CZ15	SCE	4,997	0	0.96	$9,520	$10,476	$11,339	1.1	1.2	$956	$1,819
CZ16	PG&E	5,336	0	1.04	$9,520	$20,418	$11,361	2.1	1.2	$10,898	$1,841
CZ16-2	LA	5,336	0	1.04	$9,520	$6,987	$11,361	0.7	1.2	($2,533)	$1,841

Figure 64. Cost Effectiveness for Medium Retail – Mixed-Fuel + 110kW PV

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	Lifecycle TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Mixed Fuel + 110kW PV											
CZ01	PG&E	144,499	0	27.97	$201,904	$454,462	$309,935	2.3	1.5	$252,558	$108,031
CZ02	PG&E	171,790	0	33.31	$201,904	$477,584	$376,300	2.4	1.9	$275,681	$174,396
CZ03	PG&E	173,534	0	33.55	$201,904	$538,530	$372,146	2.7	1.8	$336,626	$170,243
CZ04	PG&E	177,229	0	34.42	$201,904	$489,934	$389,067	2.4	1.9	$288,030	$187,163
CZ04-2	CPAU	177,229	0	34.42	$201,904	$418,173	$389,067	2.1	1.9	$216,269	$187,163
CZ05	PG&E	180,044	0	34.84	$201,904	$556,787	$386,958	2.8	1.9	$354,883	$185,054
CZ06	SCE	174,855	0	33.92	$201,904	$288,188	$393,198	1.4	1.9	$86,284	$191,295
CZ06-2	LA	174,855	0	33.92	$201,904	$165,538	$393,198	0.8	1.9	($36,366)	$191,295
CZ07	SDG&E	181,854	0	35.32	$201,904	$373,974	$404,713	1.9	2.0	$172,070	$202,809
CZ08	SCE	176,954	0	34.23	$201,904	$284,481	$415,789	1.4	2.1	$82,577	$213,885
CZ08-2	LA	176,954	0	34.23	$201,904	$161,366	$415,789	0.8	2.1	($40,538)	$213,885
CZ09	SCE	179,267	0	35.18	$201,904	$289,050	$412,097	1.4	2.0	$87,146	$210,193
CZ09-2	LA	179,267	0	35.18	$201,904	$168,822	$412,097	0.8	2.0	($33,082)	$210,193
CZ10	SDG&E	181,443	0	35.41	$201,904	$410,310	$402,999	2.0	2.0	$208,406	$201,095
CZ10-2	SCE	181,443	0	35.41	$201,904	$291,236	$402,999	1.4	2.0	$89,332	$201,095
CZ11	PG&E	172,983	0	33.46	$201,904	$464,776	$391,550	2.3	1.9	$262,872	$189,646
CZ12	PG&E	172,597	0	33.33	$201,904	$467,870	$389,573	2.3	1.9	$265,966	$187,669
CZ12-2	SMUD	172,597	0	33.33	$201,904	$267,086	$389,573	1.3	1.9	$65,182	$187,669
CZ13	PG&E	174,151	0	33.81	$201,904	$478,857	$387,968	2.4	1.9	$276,953	$186,065
CZ14	SDG&E	192,789	0	36.97	$201,904	$396,181	$448,268	2.0	2.2	$194,277	$246,364
CZ14-2	SCE	192,789	0	36.97	$201,904	$288,782	$448,268	1.4	2.2	$86,878	$246,364
CZ15	SCE	183,214	0	35.12	$201,904	$277,867	$415,789	1.4	2.1	$75,963	$213,885
CZ16	PG&E	195,665	0	37.97	$201,904	$522,352	$416,558	2.6	2.1	$320,448	$214,654
CZ16-2	LA	195,665	0	37.97	$201,904	$171,802	$416,558	0.9	2.1	($30,101)	$214,654

Figure 65. Cost Effectiveness for Medium Retail – Mixed-Fuel + 110 kW PV + 50 kWh Battery

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	Lifecycle TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Mixed Fuel + 110kW PV + 50 kWh Battery											
CZ01	PG&E	143,423	0	29.48	$229,804	$452,119	$324,373	2.0	1.4	$222,315	$94,569
CZ02	PG&E	170,542	0	35.14	$229,804	$486,704	$398,363	2.1	1.7	$256,900	$168,559
CZ03	PG&E	172,266	0	35.66	$229,804	$535,974	$395,374	2.3	1.7	$306,170	$165,570
CZ04	PG&E	175,940	0	36.32	$229,804	$525,788	$422,579	2.3	1.8	$295,984	$192,775
CZ04-2	CPAU	175,940	0	36.32	$229,804	$416,019	$422,579	1.8	1.8	$186,216	$192,775
CZ05	PG&E	178,728	0	36.91	$229,804	$554,968	$409,086	2.4	1.8	$325,164	$179,283
CZ06	SCE	173,567	0	35.99	$229,804	$290,599	$412,690	1.3	1.8	$60,795	$182,886
CZ06-2	LA	173,567	0	35.99	$229,804	$169,786	$412,690	0.7	1.8	($60,018)	$182,886
CZ07	SDG&E	180,508	0	37.61	$229,804	$425,793	$427,040	1.9	1.9	$195,989	$197,236
CZ08	SCE	175,616	0	36.29	$229,804	$296,318	$434,687	1.3	1.9	$66,514	$204,883
CZ08-2	LA	175,616	0	36.29	$229,804	$170,489	$434,687	0.7	1.9	($59,315)	$204,883
CZ09	SCE	177,966	0	36.74	$229,804	$300,540	$421,195	1.3	1.8	$70,736	$191,391
CZ09-2	LA	177,966	0	36.74	$229,804	$178,852	$421,195	0.8	1.8	($50,952)	$191,391
CZ10	SDG&E	180,248	0	36.91	$229,804	$459,486	$410,537	2.0	1.8	$229,683	$180,733
CZ10-2	SCE	180,248	0	36.91	$229,804	$301,219	$410,537	1.3	1.8	$71,415	$180,733
CZ11	PG&E	171,779	0	34.85	$229,804	$490,245	$417,679	2.1	1.8	$260,442	$187,875
CZ12	PG&E	171,392	0	34.77	$229,804	$497,363	$417,371	2.2	1.8	$267,559	$187,567
CZ12-2	SMUD	171,392	0	34.77	$229,804	$273,783	$417,371	1.2	1.8	$43,979	$187,567
CZ13	PG&E	173,052	0	34.97	$229,804	$488,196	$397,791	2.1	1.7	$258,392	$167,987
CZ14	SDG&E	191,703	0	38.31	$229,804	$420,241	$452,641	1.8	2.0	$190,437	$222,837
CZ14-2	SCE	191,703	0	38.31	$229,804	$294,010	$452,641	1.3	2.0	$64,206	$222,837
CZ15	SCE	182,299	0	36.01	$229,804	$279,036	$416,382	1.2	1.8	$49,232	$186,578
CZ16	PG&E	194,293	0	40.00	$229,804	$535,137	$432,951	2.3	1.9	$305,333	$203,147
CZ16-2	LA	194,293	0	40.00	$229,804	$175,573	$432,951	0.8	1.9	($54,231)	$203,147

Figure 66. Cost Effectiveness for Medium Retail – All-Electric + 3kW PV

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	Lifecycle TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
All-Electric + 3kW PV											
CZ01	PG&E	-25,214	3893	14.61	($16,318)	$4,288	($5,450)	>1	3.0	$20,606	$10,868
CZ02	PG&E	-17,101	2448	8.40	($20,734)	$859	$5,779	>1	>1	$21,593	$26,513
CZ03	PG&E	-9,851	1868	7.18	($17,381)	$15,418	$8,702	>1	>1	$32,799	$26,083
CZ04	PG&E	-9,353	1706	6.24	($16,166)	$9,110	$10,394	>1	>1	$25,276	$26,560
CZ04-2	CPAU	-9,353	1706	6.24	($16,166)	$24,000	$10,394	>1	>1	$40,166	$26,560
CZ05	PG&E	-9,423	1746	6.42	($18,776)	$14,076	$6,351	>1	>1	$32,852	$25,127
CZ06	SCE	-2,759	1002	4.24	($15,032)	$29,710	$12,592	>1	>1	$44,741	$27,623
CZ06-2	LA	-2,759	1002	4.24	($15,032)	$26,292	$12,592	>1	>1	$41,324	$27,623
CZ07	SDG&E	1,148	522	2.72	($17,032)	$76,810	$12,350	>1	>1	$93,842	$29,382
CZ08	SCE	-979	793	3.64	($20,192)	$28,576	$13,185	>1	>1	$48,768	$33,377
CZ08-2	LA	-979	793	3.64	($20,192)	$24,475	$13,185	>1	>1	$44,667	$33,377
CZ09	SCE	-2,352	970	4.28	($25,383)	$29,776	$13,207	>1	>1	$55,159	$38,590
CZ09-2	LA	-2,352	970	4.28	($25,383)	$25,823	$13,207	>1	>1	$51,207	$38,590
CZ10	SDG&E	-5,388	1262	4.95	($20,541)	$75,458	$11,493	>1	>1	$95,999	$32,034
CZ10-2	SCE	-5,388	1262	4.95	($20,541)	$32,394	$11,493	>1	>1	$52,936	$32,034
CZ11	PG&E	-14,533	2415	8.86	($25,471)	$7,618	$13,295	>1	>1	$33,090	$38,766
CZ12	PG&E	-14,764	2309	8.19	($25,774)	$2,210	$10,152	>1	>1	$27,984	$35,926
CZ12-2	SMUD	-14,764	2309	8.19	($25,774)	$21,215	$10,152	>1	>1	$46,988	$35,926
CZ13	PG&E	-12,069	1983	7.08	($21,428)	$5,647	$8,570	>1	>1	$27,075	$29,998
CZ14	SDG&E	-7,950	1672	6.45	($19,926)	$60,412	$16,679	>1	>1	$80,338	$36,605
CZ14-2	SCE	-7,950	1672	6.45	($19,926)	$28,631	$16,679	>1	>1	$48,557	$36,605
CZ15	SCE	2,534	518	3.10	($22,813)	$27,271	$17,162	>1	>1	$50,084	$39,976
CZ16	PG&E	-36,081	4304	14.26	($19,041)	($30,111)	($41,181)	0.6	0.5	($11,070)	($22,140)
CZ16-2	LA	-36,081	4304	14.26	($19,041)	$45,706	($41,181)	>1	0.5	$64,747	($22,140)

Figure 67. Cost Effectiveness for Medium Retail – All-Electric + 3kW PV + 5 kWh Battery

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	$-TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
All-Electric + 3kW PV + 5 kWh Battery											
CZ01	PG&E	-25,214	3893	14.61	($14,692)	$4,288	($5,450)	>1	2.7	$18,980	$9,242
CZ02	PG&E	-17,101	2448	8.40	($14,692)	$859	$5,779	>1	>1	$15,551	$20,472
CZ03	PG&E	-9,851	1868	7.18	($14,692)	$15,418	$8,702	>1	>1	$30,110	$23,394
CZ04	PG&E	-9,353	1706	6.24	($14,692)	$9,110	$10,394	>1	>1	$23,802	$25,086
CZ04-2	CPAU	-9,353	1706	6.24	($14,692)	$24,000	$10,394	>1	>1	$38,693	$25,086
CZ05	PG&E	-9,423	1746	6.42	($14,692)	$14,076	$6,351	>1	>1	$28,768	$21,043
CZ06	SCE	-2,759	1002	4.24	($14,692)	$29,710	$12,592	>1	>1	$44,402	$27,284
CZ06-2	LA	-2,759	1002	4.24	($14,692)	$26,292	$12,592	>1	>1	$40,984	$27,284
CZ07	SDG&E	1,148	522	2.72	($14,692)	$76,810	$12,350	>1	>1	$91,502	$27,042
CZ08	SCE	-979	793	3.64	($14,692)	$28,576	$13,185	>1	>1	$43,268	$27,877
CZ08-2	LA	-979	793	3.64	($14,692)	$24,475	$13,185	>1	>1	$39,167	$27,877
CZ09	SCE	-2,352	970	4.28	($14,692)	$29,776	$13,207	>1	>1	$44,468	$27,899
CZ09-2	LA	-2,352	970	4.28	($14,692)	$25,823	$13,207	>1	>1	$40,516	$27,899
CZ10	SDG&E	-5,388	1262	4.95	($14,692)	$75,458	$11,493	>1	>1	$90,150	$26,185
CZ10-2	SCE	-5,388	1262	4.95	($14,692)	$32,394	$11,493	>1	>1	$47,086	$26,185
CZ11	PG&E	-14,533	2415	8.86	($14,692)	$7,618	$13,295	>1	>1	$22,310	$27,987
CZ12	PG&E	-14,764	2309	8.19	($14,692)	$2,210	$10,152	>1	>1	$16,902	$24,845
CZ12-2	SMUD	-14,764	2309	8.19	($14,692)	$21,215	$10,152	>1	>1	$35,907	$24,845
CZ13	PG&E	-12,069	1983	7.08	($14,692)	$5,647	$8,570	>1	>1	$20,339	$23,262
CZ14	SDG&E	-7,950	1672	6.45	($14,692)	$60,412	$16,679	>1	>1	$75,104	$31,371
CZ14-2	SCE	-7,950	1672	6.45	($14,692)	$28,631	$16,679	>1	>1	$43,323	$31,371
CZ15	SCE	2,534	518	3.10	($14,692)	$27,271	$17,162	>1	>1	$41,963	$31,855
CZ16	PG&E	-36,081	4304	14.26	($14,692)	($30,111)	($41,181)	0.5	0.4	($15,419)	($26,489)
CZ16-2	LA	-36,081	4304	14.26	($14,692)	$45,706	($41,181)	>1	0.4	$60,398	($26,489)

Figure 68. Cost Effectiveness for Medium Retail – All-Electric + 110kW PV

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	Lifecycle TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
All-Electric + 110kW PV											
CZ01	PG&E	115,344	3893	41.82	$143,932	$454,277	$296,025	3.2	2.1	$310,345	$152,093
CZ02	PG&E	150,004	2448	40.80	$139,516	$470,236	$371,817	3.4	2.7	$330,720	$232,301
CZ03	PG&E	158,951	1868	39.82	$142,869	$544,095	$370,696	3.8	2.6	$401,226	$227,827
CZ04	PG&E	163,043	1706	39.73	$144,084	$488,619	$388,847	3.4	2.7	$344,534	$244,763
CZ04-2	CPAU	163,043	1706	39.73	$144,084	$432,905	$388,847	3.0	2.7	$288,821	$244,763
CZ05	PG&E	165,711	1746	40.30	$141,473	$565,525	$382,760	4.0	2.7	$424,051	$241,287
CZ06	SCE	167,328	1002	37.24	$145,218	$306,670	$395,066	2.1	2.7	$161,452	$249,848
CZ06-2	LA	167,328	1002	37.24	$145,218	$184,797	$395,066	1.3	2.7	$39,579	$249,848
CZ07	SDG&E	178,042	522	37.07	$143,218	$428,332	$406,032	3.0	2.8	$285,114	$262,814
CZ08	SCE	171,149	793	36.94	$140,058	$301,219	$417,635	2.2	3.0	$161,161	$277,577
CZ08-2	LA	171,149	793	36.94	$140,058	$178,419	$417,635	1.3	3.0	$38,361	$277,577
CZ09	SCE	172,027	970	38.50	$134,867	$307,640	$414,075	2.3	3.1	$172,773	$279,208
CZ09-2	LA	172,027	970	38.50	$134,867	$187,813	$414,075	1.4	3.1	$52,946	$279,208
CZ10	SDG&E	171,107	1262	39.40	$139,708	$463,692	$403,505	3.3	2.9	$323,984	$263,796
CZ10-2	SCE	171,107	1262	39.40	$139,708	$311,464	$403,505	2.2	2.9	$171,755	$263,796
CZ11	PG&E	153,732	2415	41.41	$134,778	$467,356	$394,165	3.5	2.9	$332,578	$259,387
CZ12	PG&E	153,126	2309	40.61	$134,476	$467,106	$389,111	3.5	2.9	$332,630	$254,635
CZ12-2	SMUD	153,126	2309	40.61	$134,476	$283,343	$389,111	2.1	2.9	$148,867	$254,635
CZ13	PG&E	157,332	1983	39.97	$138,822	$477,831	$385,947	3.4	2.8	$339,008	$247,124
CZ14	SDG&E	179,582	1672	42.42	$140,324	$437,575	$452,729	3.1	3.2	$297,251	$312,405
CZ14-2	SCE	179,582	1672	42.42	$140,324	$309,064	$452,729	2.2	3.2	$168,740	$312,405
CZ15	SCE	180,751	518	37.26	$137,436	$294,877	$421,612	2.1	3.1	$157,440	$284,176
CZ16	PG&E	154,248	4304	51.20	$141,209	$473,892	$364,016	3.4	2.6	$332,682	$222,807
CZ16-2	LA	154,248	4304	51.20	$141,209	$211,677	$364,016	1.5	2.6	$70,467	$222,807

Figure 69. Cost Effectiveness for Medium Retail – All-Electric + 110kW PV + 50 kWh Battery

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	Lifecycle TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
All-Electric + 90kW PV + 50 kWh Battery											
CZ01	PG&E	114,356	3893	43.52	$171,832	$451,043	$310,265	2.6	1.8	$279,211	$138,433
CZ02	PG&E	148,793	2448	42.89	$167,416	$475,081	$394,099	2.8	2.4	$307,664	$226,683
CZ03	PG&E	157,707	1868	42.12	$170,769	$541,418	$394,034	3.2	2.3	$370,649	$223,265
CZ04	PG&E	161,769	1706	41.82	$171,984	$523,603	$422,535	3.0	2.5	$351,618	$250,551
CZ04-2	CPAU	161,769	1706	41.82	$171,984	$430,567	$422,535	2.5	2.5	$258,582	$250,551
CZ05	PG&E	164,408	1746	42.68	$169,373	$561,966	$405,087	3.3	2.4	$392,592	$235,714
CZ06	SCE	166,052	1002	39.48	$173,118	$306,697	$414,756	1.8	2.4	$133,579	$241,638
CZ06-2	LA	166,052	1002	39.48	$173,118	$187,941	$414,756	1.1	2.4	$14,823	$241,638
CZ07	SDG&E	176,705	522	39.47	$171,118	$479,038	$428,490	2.8	2.5	$307,920	$257,372
CZ08	SCE	169,825	793	39.14	$167,958	$312,602	$436,709	1.9	2.6	$144,645	$268,751
CZ08-2	LA	169,825	793	39.14	$167,958	$187,142	$436,709	1.1	2.6	$19,185	$268,751
CZ09	SCE	170,747	970	40.23	$162,767	$318,113	$423,370	2.0	2.6	$155,346	$260,604
CZ09-2	LA	170,747	970	40.23	$162,767	$197,006	$423,370	1.2	2.6	$34,240	$260,604
CZ10	SDG&E	169,935	1262	41.08	$167,608	$503,504	$411,284	3.0	2.5	$335,896	$243,675
CZ10-2	SCE	169,935	1262	41.08	$167,608	$317,927	$411,284	1.9	2.5	$150,319	$243,675
CZ11	PG&E	152,559	2415	42.99	$162,678	$491,775	$420,667	3.0	2.6	$329,096	$257,989
CZ12	PG&E	151,956	2309	42.21	$162,376	$494,703	$417,063	3.0	2.6	$332,327	$254,687
CZ12-2	SMUD	151,956	2309	42.21	$162,376	$288,950	$417,063	1.8	2.6	$126,573	$254,687
CZ13	PG&E	156,271	1983	41.25	$166,722	$485,422	$395,770	2.9	2.4	$318,699	$229,047
CZ14	SDG&E	178,505	1672	43.94	$168,224	$452,456	$457,387	2.7	2.7	$284,232	$289,163
CZ14-2	SCE	178,505	1672	43.94	$168,224	$311,520	$457,387	1.9	2.7	$143,296	$289,163
CZ15	SCE	179,840	518	38.23	$165,336	$296,004	$422,293	1.8	2.6	$130,668	$256,957
CZ16	PG&E	152,965	4304	53.53	$169,109	$483,205	$378,299	2.9	2.2	$314,096	$209,190
CZ16-2	LA	152,965	4304	53.53	$169,109	$215,341	$378,299	1.3	2.2	$46,231	$209,190

6.7.3 Cost Effectiveness Results – Small Hotel

Figure 70 through Figure 77 contain the cost-effectiveness findings for the Small Hotel packages. Notable findings for each package include:

- **Mixed-Fuel + 3 kW PV:** Packages are cost effective and achieve savings for all climate zones for both the On-Bill and TDV approaches.
- **Mixed-Fuel + 3 kW PV + 5 kWh Battery:** The packages are less cost effective as compared to the previous minimal PV only package and not cost effective for LADWP and SMUD service area. The addition of battery reduces the cost effectiveness of packages.
- **Mixed-Fuel + PV only:** Packages are cost effective and achieve savings for the On-Bill approach for all climate zones except for LADWP territory. Packages are cost effective and achieve savings for the TDV approach for all climate zones.
- **Mixed-Fuel + PV + 50 kWh Battery:** Adding battery slightly reduces On-Bill B/C ratios. Packages are not cost effective for LADWP territory, SMUD territory as well as for climate zones 6,8,9 under PG&E service area.
- **All-Electric + 3 kW PV:** All packages are cost effective using the On-Bill approach. All packages are cost effective using the TDV approach but do not achieve positive energy cost savings.
- **All-Electric + 3 kW PV + 5 kWh Battery:** Similar to minimal PV only package, all packages are cost effective using the On-Bill approach. All packages are cost effective using the TDV approach but do not achieve positive energy cost savings.
- **All-Electric + PV only**: All packages are cost effective for both On-Bill and TDV approaches. Packages achieve on-bill savings for all climate zones.
- **All-Electric + PV + 50 kWh Battery:** Adding battery slightly reduces On-Bill B/C ratios but is still cost effective for all climate zones.

Figure 70. Cost Effectiveness for Small Hotel – Mixed Fuel + 3kW PV

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	Lifecycle $- TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Mixed Fuel + 3kW PV											
CZ01	PG&E	3,941	0	0.8	$5,566	$12,616	$8,326	2.3	1.5	$7,050	$2,760
CZ02	PG&E	4,785	0	0.9	$5,566	$12,639	$10,332	2.3	1.9	$7,073	$4,766
CZ03	PG&E	4,733	0	0.9	$5,566	$15,146	$9,991	2.7	1.8	$9,580	$4,425
CZ04	PG&E	4,834	0	1.0	$5,566	$13,266	$10,445	2.4	1.9	$7,700	$4,879
CZ04-2	CPAU	4,834	0	1.0	$5,566	$11,507	$10,445	2.1	1.9	$5,941	$4,879
CZ05	PG&E	5,027	0	1.0	$5,566	$16,048	$10,634	2.9	1.9	$10,482	$5,068
CZ06	SCE	4,769	0	0.9	$5,566	$10,276	$10,559	1.8	1.9	$4,710	$4,993
CZ06-2	LA	4,769	0	0.9	$5,566	$6,307	$10,559	1.1	1.9	$741	$4,993
CZ07	SDG&E	4,960	0	1.0	$5,566	$14,576	$10,861	2.6	2.0	$9,010	$5,295
CZ08	SCE	4,824	0	0.9	$5,566	$10,837	$11,202	1.9	2.0	$5,271	$5,636
CZ08-2	LA	4,824	0	0.9	$5,566	$6,505	$11,202	1.2	2.0	$939	$5,636
CZ09	SCE	4,779	0	0.9	$5,566	$10,298	$10,824	1.9	1.9	$4,732	$5,258
CZ09-2	LA	4,779	0	0.9	$5,566	$6,201	$10,824	1.1	1.9	$635	$5,258
CZ10	SDG&E	4,905	0	1.0	$5,566	$16,302	$10,710	2.9	1.9	$10,736	$5,144
CZ10-2	SCE	4,905	0	1.0	$5,566	$9,468	$10,710	1.7	1.9	$3,902	$5,144
CZ11	PG&E	4,701	0	0.9	$5,566	$14,193	$10,483	2.6	1.9	$8,627	$4,917
CZ12	PG&E	4,770	0	0.9	$5,566	$15,262	$10,596	2.7	1.9	$9,696	$5,030
CZ12-2	SMUD	4,770	0	0.9	$5,566	$7,848	$10,596	1.4	1.9	$2,282	$5,030
CZ13	PG&E	4,633	0	0.9	$5,566	$14,674	$10,105	2.6	1.8	$9,108	$4,539
CZ14	SDG&E	5,377	0	1.1	$5,566	$16,615	$12,375	3.0	2.2	$11,049	$6,809
CZ14-2	SCE	5,377	0	1.1	$5,566	$10,021	$12,375	1.8	2.2	$4,455	$6,809
CZ15	SCE	4,997	0	1.0	$5,566	$9,542	$11,164	1.7	2.0	$3,976	$5,598
CZ16	PG&E	5,240	0	1.0	$5,566	$14,961	$10,975	2.7	2.0	$9,395	$5,409
CZ16-2	LA	5,240	0	1.0	$5,566	$5,670	$10,975	1.0	2.0	$104	$5,409

Figure 71. Cost Effectiveness for Small Hotel – Mixed Fuel + 3kW PV + 5 kWh Battery

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	$-TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Mixed Fuel + 3kW PV + 5kWh Battery											
CZ01	PG&E	3,941	0	0.8	$9,520	$12,616	$8,326	1.3	0.9	$3,096	($1,194)
CZ02	PG&E	4,785	0	0.9	$9,520	$12,639	$10,332	1.3	1.1	$3,119	$811
CZ03	PG&E	4,733	0	0.9	$9,520	$15,146	$9,991	1.6	1.0	$5,626	$471
CZ04	PG&E	4,834	0	1.0	$9,520	$13,266	$10,445	1.4	1.1	$3,746	$925
CZ04-2	CPAU	4,834	0	1.0	$9,520	$11,507	$10,445	1.2	1.1	$1,987	$925
CZ05	PG&E	5,027	0	1.0	$9,520	$16,048	$10,634	1.7	1.1	$6,528	$1,114
CZ05-2	SCG	5,027	0	1.0	$9,520	$16,048	$10,634	1.7	1.1	$6,528	$1,114
CZ06	SCE	4,769	0	0.9	$9,520	$10,276	$10,559	1.1	1.1	$756	$1,039
CZ06-2	LA	4,769	0	0.9	$9,520	$6,307	$10,559	0.7	1.1	($3,213)	$1,039
CZ07	SDG&E	4,960	0	1.0	$9,520	$14,576	$10,861	1.5	1.1	$5,056	$1,341
CZ08	SCE	4,824	0	0.9	$9,520	$10,837	$11,202	1.1	1.2	$1,317	$1,682
CZ08-2	LA	4,824	0	0.9	$9,520	$6,505	$11,202	0.7	1.2	($3,015)	$1,682
CZ09	SCE	4,779	0	0.9	$9,520	$10,298	$10,824	1.1	1.1	$778	$1,303
CZ09-2	LA	4,779	0	0.9	$9,520	$6,201	$10,824	0.7	1.1	($3,319)	$1,303
CZ10	SDG&E	4,905	0	1.0	$9,520	$16,302	$10,710	1.7	1.1	$6,782	$1,190
CZ10-2	SCE	4,905	0	1.0	$9,520	$9,468	$10,710	0.99	1.1	($52)	$1,190
CZ11	PG&E	4,701	0	0.9	$9,520	$14,193	$10,483	1.5	1.1	$4,673	$963
CZ12	PG&E	4,770	0	0.9	$9,520	$15,262	$10,596	1.6	1.1	$5,742	$1,076
CZ12-2	SMUD	4,770	0	0.9	$9,520	$7,848	$10,596	0.8	1.1	($1,672)	$1,076
CZ13	PG&E	4,633	0	0.9	$9,520	$14,674	$10,105	1.5	1.1	$5,154	$584
CZ14	SDG&E	5,377	0	1.1	$9,520	$16,615	$12,375	1.7	1.3	$7,095	$2,855
CZ14-2	SCE	5,377	0	1.1	$9,520	$10,021	$12,375	1.1	1.3	$501	$2,855
CZ15	SCE	4,997	0	1.0	$9,520	$9,542	$11,164	1.0	1.2	$22	$1,644
CZ16	PG&E	5,240	0	1.0	$9,520	$14,961	$10,975	1.6	1.2	$5,441	$1,455
CZ16-2	LA	5,240	0	1.0	$9,520	$5,670	$10,975	0.6	1.2	($3,851)	$1,455

Figure 72. Cost Effectiveness for Small Hotel - Mixed Fuel +80kW PV

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	Lifecycle TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Mixed Fuel + 80kW PV											
CZ01	PG&E	105,090	0	20.6	$179,470	$336,440	$221,883	1.9	1.2	$156,970	$42,413
CZ02	PG&E	127,592	0	25.0	$179,470	$320,009	$275,130	1.8	1.5	$140,539	$95,660
CZ03	PG&E	126,206	0	24.8	$179,470	$403,900	$266,426	2.3	1.5	$224,430	$86,956
CZ04	PG&E	128,894	0	25.4	$179,470	$322,782	$278,536	1.8	1.6	$143,312	$99,066
CZ04-2	CPAU	128,894	0	25.4	$179,470	$306,862	$278,536	1.7	1.6	$127,392	$99,066
CZ05	PG&E	134,041	0	26.5	$179,470	$427,935	$283,834	2.4	1.6	$248,465	$104,364
CZ06	SCE	127,168	0	25.0	$179,470	$200,425	$281,488	1.1	1.6	$20,955	$102,018
CZ06-2	LA	127,168	0	25.0	$179,470	$119,357	$281,488	0.7	1.6	($60,113)	$102,018
CZ07	SDG&E	132,258	0	26.1	$179,470	$247,646	$289,700	1.4	1.6	$68,176	$110,230
CZ08	SCE	128,641	0	25.3	$179,470	$207,993	$298,594	1.2	1.7	$28,523	$119,124
CZ08-2	LA	128,641	0	25.3	$179,470	$122,591	$298,594	0.7	1.7	($56,879)	$119,124
CZ09	SCE	127,447	0	25.3	$179,470	$211,567	$288,830	1.2	1.6	$32,096	$109,360
CZ09-2	LA	127,447	0	25.3	$179,470	$123,486	$288,830	0.7	1.6	($55,984)	$109,360
CZ10	SDG&E	130,792	0	25.8	$179,470	$274,832	$285,386	1.5	1.6	$95,361	$105,916
CZ10-2	SCE	130,792	0	25.8	$179,470	$206,865	$285,386	1.2	1.6	$27,395	$105,916
CZ11	PG&E	125,366	0	24.6	$179,470	$316,781	$279,331	1.8	1.6	$137,311	$99,861
CZ12	PG&E	127,203	0	25.0	$179,470	$406,977	$282,358	2.3	1.6	$227,507	$102,888
CZ12-2	SMUD	127,203	0	25.0	$179,470	$198,254	$282,358	1.1	1.6	$18,784	$102,888
CZ13	PG&E	123,535	0	24.4	$179,470	$317,261	$269,908	1.8	1.5	$137,791	$90,437
CZ14	SDG&E	143,387	0	28.1	$179,470	$309,521	$330,345	1.7	1.8	$130,051	$150,875
CZ14-2	SCE	143,387	0	28.1	$179,470	$225,083	$330,345	1.3	1.8	$45,612	$150,875
CZ15	SCE	133,246	0	25.9	$179,470	$207,277	$297,648	1.2	1.7	$27,807	$118,177
CZ16	PG&E	139,738	0	27.3	$179,470	$341,724	$292,728	1.9	1.6	$162,254	$113,258
CZ16-2	LA	139,738	0	27.3	$179,470	$114,215	$292,728	0.6	1.6	($65,255)	$113,258

Figure 73. Cost Effectiveness for Small Hotel – Mixed Fuel + 80kW PV + 50 kWh Battery

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	Lifecycle TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Mixed Fuel + 80kW PV + 50kWh Battery											
CZ01	PG&E	104,026	0	23.2	$207,370	$332,596	$237,740	1.6	1.1	$125,226	$30,370
CZ02	PG&E	126,332	0	28.1	$207,370	$336,179	$296,058	1.6	1.4	$128,809	$88,688
CZ03	PG&E	124,934	0	28.0	$207,370	$399,220	$289,360	1.9	1.4	$191,850	$81,990
CZ04	PG&E	127,602	0	28.5	$207,370	$332,161	$308,887	1.6	1.5	$124,790	$101,517
CZ04-2	CPAU	127,602	0	28.5	$207,370	$303,828	$308,887	1.5	1.5	$96,458	$101,517
CZ05	PG&E	132,725	0	29.8	$207,370	$423,129	$303,627	2.0	1.5	$215,758	$96,257
CZ06	SCE	125,880	0	28.4	$207,370	$193,814	$297,950	0.9	1.4	($13,556)	$90,580
CZ06-2	LA	125,880	0	28.4	$207,370	$123,083	$297,950	0.6	1.4	($84,287)	$90,580
CZ07	SDG&E	130,940	0	29.5	$207,370	$274,313	$309,682	1.3	1.5	$66,943	$102,312
CZ08	SCE	127,332	0	28.5	$207,370	$199,786	$312,899	1.0	1.5	($7,584)	$105,529
CZ08-2	LA	127,332	0	28.5	$207,370	$124,651	$312,899	0.6	1.5	($82,719)	$105,529
CZ09	SCE	126,232	0	28.2	$207,370	$206,706	$292,804	1.0	1.4	($664)	$85,433
CZ09-2	LA	126,232	0	28.2	$207,370	$126,710	$292,804	0.6	1.4	($80,660)	$85,433
CZ10	SDG&E	129,683	0	28.4	$207,370	$292,202	$287,278	1.4	1.4	$84,832	$79,908
CZ10-2	SCE	129,683	0	28.4	$207,370	$206,171	$287,278	1.0	1.4	($1,199)	$79,908
CZ11	PG&E	124,337	0	26.9	$207,370	$315,330	$283,683	1.5	1.4	$107,960	$76,313
CZ12	PG&E	126,013	0	27.8	$207,370	$403,127	$297,118	1.9	1.4	$195,757	$89,748
CZ12-2	SMUD	126,013	0	27.8	$207,370	$198,007	$297,118	1.0	1.4	($9,363)	$89,748
CZ13	PG&E	122,591	0	26.5	$207,370	$315,541	$280,996	1.5	1.4	$108,171	$73,626
CZ14	SDG&E	142,257	0	30.7	$207,370	$317,565	$334,697	1.5	1.6	$110,195	$127,327
CZ14-2	SCE	142,257	0	30.7	$207,370	$224,195	$334,697	1.1	1.6	$16,824	$127,327
CZ15	SCE	132,418	0	27.8	$207,370	$208,044	$299,199	1.0	1.4	$674	$91,829
CZ16	PG&E	138,402	0	30.7	$207,370	$358,582	$315,699	1.7	1.5	$151,212	$108,329
CZ16-2	LA	138,402	0	30.7	$207,370	$118,770	$315,699	0.6	1.5	($88,600)	$108,329

Figure 74. Cost Effectiveness for Small Hotel – All-Electric + 3kW PV

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost*	Lifecycle Energy Cost Savings	Lifecycle TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
All-Electric + 3kW PV											
CZ01	PG&E	-155,861	16917	54.7	($1,265,139)	($568,892)	($106,835)	2.2	11.8	$696,246	$1,158,304
CZ02	PG&E	-113,954	12677	40.9	($1,266,111)	($229,433)	($41,288)	5.5	30.7	$1,036,679	$1,224,823
CZ03	PG&E	-105,862	12322	41.4	($1,268,383)	($309,874)	($41,175)	4.1	30.8	$958,510	$1,227,208
CZ04	PG&E	-108,570	11927	37.5	($1,268,218)	($208,239)	($42,689)	6.1	29.7	$1,059,980	$1,225,530
CZ04-2	CPAU	-108,570	11927	37.5	($1,268,218)	($6,261)	($42,689)	202.6	29.7	$1,261,958	$1,225,530
CZ05	PG&E	-103,579	11960	39.3	($1,268,272)	($332,879)	($44,051)	3.8	28.8	$935,393	$1,224,221
CZ06	SCE	-73,524	8912	30.3	($1,268,413)	$48,898	($17,484)	>1	72.5	$1,317,311	$1,250,929
CZ06-2	LA	-64,859	8188	29.0	($1,266,760)	($120,842)	($12,337)	10.5	102.7	$1,145,918	$1,254,423
CZ07	SDG&E	-67,090	8353	29.2	($1,264,731)	($43,964)	($11,618)	28.8	108.9	$1,220,767	$1,253,113
CZ08	SCE	-67,090	8353	29.2	($1,264,731)	$48,736	($11,618)	>1	108.9	$1,313,467	$1,253,113
CZ08-2	LA	-67,483	8402	29.3	($1,266,529)	($35,547)	($11,126)	35.6	113.8	$1,230,982	$1,255,403
CZ09	SCE	-67,483	8402	29.3	($1,266,529)	$52,410	($11,126)	>1	113.8	$1,318,939	$1,255,403
CZ09-2	LA	-75,157	8418	27.2	($1,263,531)	($156,973)	($25,469)	8.0	49.6	$1,106,558	$1,238,061
CZ10	SDG&E	-75,157	8418	27.2	($1,263,531)	($54,711)	($25,469)	23.1	49.6	$1,208,820	$1,238,061
CZ10-2	SCE	-94,783	10252	31.9	($1,264,340)	($169,847)	($38,904)	7.4	32.5	$1,094,493	$1,225,436
CZ11	PG&E	-94,702	10403	33.0	($1,265,779)	($324,908)	($34,968)	3.9	36.2	$940,872	$1,230,811
CZ12	PG&E	-94,297	10403	33.1	($1,265,779)	$13,603	($33,757)	>1	37.5	$1,279,382	$1,232,022
CZ12-2	SMUD	-92,196	10029	31.5	($1,264,152)	($168,358)	($40,229)	7.5	31.4	$1,095,794	$1,223,923
CZ13	PG&E	-96,021	10056	30.7	($1,264,510)	($308,542)	($44,202)	4.1	28.6	$955,969	$1,220,308
CZ14	SDG&E	-96,021	10056	30.7	($1,264,510)	($110,730)	($44,202)	11.4	28.6	$1,153,780	$1,220,308
CZ14-2	SCE	-44,856	5579	19.0	($1,262,631)	$8,996	($10,256)	>1	123.1	$1,271,627	$1,252,375
CZ15	SCE	-211,468	17599	42.9	($1,268,907)	($625,671)	($228,203)	2.0	5.6	$643,236	$1,040,704
CZ16	PG&E	-211,468	17599	42.9	($1,268,907)	$37,142	($228,203)	>1	5.6	$1,306,049	$1,040,704
CZ16-2	LA	-155,861	16917	54.7	($1,265,139)	($568,892)	($106,835)	2.2	11.8	$696,246	$1,158,304

Figure 75. Cost Effectiveness for Small Hotel – All-Electric + 3kW PV + 5 kWh Battery

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	$-TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
All-Electric + 3kW PV + 5kWh Battery											
CZ01	PG&E	-155,861	16917	54.7	($1,288,428)	($568,892)	($106,835)	2.3	12.1	$719,536	$1,181,593
CZ02	PG&E	-113,954	12677	40.9	($1,288,428)	($229,433)	($41,288)	5.6	31.2	$1,058,996	$1,247,140
CZ03	PG&E	-105,862	12322	41.4	($1,288,428)	($309,874)	($41,175)	4.2	31.3	$978,554	$1,247,253
CZ04	PG&E	-108,570	11927	37.5	($1,288,428)	($208,239)	($42,689)	6.2	30.2	$1,080,190	$1,245,740
CZ04-2	CPAU	-108,570	11927	37.5	($1,288,428)	($6,261)	($42,689)	205.8	30.2	$1,282,167	$1,245,740
CZ05	PG&E	-103,579	11960	39.3	($1,288,428)	($332,879)	($44,051)	3.9	29.2	$955,549	$1,244,377
CZ06	SCE	-73,524	8912	30.3	($1,288,428)	($52,341)	($17,484)	24.6	73.7	$1,236,087	$1,270,944
CZ06-2	LA	-73,524	8912	30.3	($1,288,428)	$48,898	($17,484)	>1	73.7	$1,337,326	$1,270,944
CZ07	SDG&E	-64,859	8188	29.0	($1,288,428)	($120,842)	($12,337)	10.7	104.4	$1,167,586	$1,276,091
CZ08	SCE	-67,090	8353	29.2	($1,288,428)	($43,964)	($11,618)	29.3	110.9	$1,244,464	$1,276,810
CZ08-2	LA	-67,090	8353	29.2	($1,288,428)	$48,736	($11,618)	>1	110.9	$1,337,164	$1,276,810
CZ09	SCE	-67,483	8402	29.3	($1,288,428)	($35,547)	($11,126)	36.2	115.8	$1,252,881	$1,277,302
CZ09-2	LA	-67,483	8402	29.3	($1,288,428)	$52,410	($11,126)	>1	115.8	$1,340,838	$1,277,302
CZ10	SDG&E	-75,157	8418	27.2	($1,288,428)	($156,973)	($25,469)	8.2	50.6	$1,131,455	$1,262,959
CZ10-2	SCE	-75,157	8418	27.2	($1,288,428)	($54,711)	($25,469)	23.5	50.6	$1,233,718	$1,262,959
CZ11	PG&E	-94,783	10252	31.9	($1,288,428)	($169,847)	($38,904)	7.6	33.1	$1,118,582	$1,249,524
CZ12	PG&E	-94,702	10403	33.0	($1,288,428)	($324,908)	($34,968)	4.0	36.8	$963,520	$1,253,460
CZ12-2	SMUD	-94,297	10403	33.1	($1,288,428)	$13,603	($33,757)	>1	38.2	$1,302,031	$1,254,671
CZ13	PG&E	-92,196	10029	31.5	($1,288,428)	($168,358)	($40,229)	7.7	32.0	$1,120,071	$1,248,199
CZ14	SDG&E	-96,021	10056	30.7	($1,288,428)	($308,542)	($44,202)	4.2	29.1	$979,887	$1,244,226
CZ14-2	SCE	-96,021	10056	30.7	($1,288,428)	($110,730)	($44,202)	11.6	29.1	$1,177,698	$1,244,226
CZ15	SCE	-44,856	5579	19.0	($1,288,428)	$8,996	($10,256)	>1	125.6	$1,297,425	$1,278,172
CZ16	PG&E	-211,468	17599	42.9	($1,288,428)	($625,671)	($228,203)	2.1	5.6	$662,757	$1,060,225
CZ16-2	LA	-211,468	17599	42.9	($1,288,428)	$37,142	($228,203)	>1	5.6	$1,325,570	$1,060,225

Figure 76. Cost Effectiveness for Small Hotel – All-Electric + 80kW PV

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	$-TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
All-Electric + 80kW PV											
CZ01	PG&E	-54,712	16917	74.6	($1,123,442)	($240,170)	$106,722	4.7	>1	$883,272	$1,230,164
CZ02	PG&E	8,853	12677	65.0	($1,124,415)	$128,649	$223,510	>1	>1	$1,253,063	$1,347,925
CZ03	PG&E	15,612	12322	65.3	($1,126,687)	$44,532	$215,260	>1	>1	$1,171,219	$1,341,947
CZ04	PG&E	15,490	11927	62.0	($1,126,522)	$145,778	$225,402	>1	>1	$1,272,300	$1,351,924
CZ04-2	CPAU	15,490	11927	62.0	($1,126,522)	$289,094	$225,402	>1	>1	$1,415,616	$1,351,924
CZ05	PG&E	25,436	11960	64.8	($1,126,575)	$56,019	$229,149	>1	>1	$1,182,594	$1,355,724
CZ06	SCE	48,875	8912	54.4	($1,126,716)	$163,343	$253,445	>1	>1	$1,290,060	$1,380,161
CZ06-2	LA	62,439	8188	54.1	($1,125,064)	$115,822	$266,502	>1	>1	$1,240,886	$1,391,565
CZ07	SDG&E	56,727	8353	53.5	($1,123,034)	$147,987	$275,773	>1	>1	$1,271,022	$1,398,808
CZ08	SCE	56,727	8353	53.5	($1,123,034)	$163,971	$275,773	>1	>1	$1,287,005	$1,398,808
CZ08-2	LA	55,185	8402	53.7	($1,124,832)	$155,101	$266,880	>1	>1	$1,279,933	$1,391,712
CZ09	SCE	55,185	8402	53.7	($1,124,832)	$169,010	$266,880	>1	>1	$1,293,843	$1,391,712
CZ09-2	LA	50,731	8418	52.0	($1,121,834)	$113,936	$249,207	>1	>1	$1,235,770	$1,371,041
CZ10	SDG&E	50,731	8418	52.0	($1,121,834)	$138,265	$249,207	>1	>1	$1,260,099	$1,371,041
CZ10-2	SCE	25,882	10252	55.6	($1,122,643)	$162,626	$229,944	>1	>1	$1,285,269	$1,352,587
CZ11	PG&E	27,731	10403	57.1	($1,124,083)	$12,954	$236,794	>1	>1	$1,137,037	$1,360,876
CZ12	PG&E	28,136	10403	57.2	($1,124,083)	$206,756	$238,005	>1	>1	$1,330,839	$1,362,087
CZ12-2	SMUD	26,706	10029	55.0	($1,122,455)	$165,991	$219,574	>1	>1	$1,288,446	$1,342,030
CZ13	PG&E	41,989	10056	57.8	($1,122,814)	$22,333	$273,768	>1	>1	$1,145,147	$1,396,582
CZ14	SDG&E	41,989	10056	57.8	($1,122,814)	$120,943	$273,768	>1	>1	$1,243,757	$1,396,582
CZ14-2	SCE	83,393	5579	44.0	($1,120,934)	$210,511	$276,228	>1	>1	$1,331,445	$1,397,162
CZ15	SCE	-76,971	17599	69.2	($1,127,210)	($199,308)	$53,550	5.7	>1	$927,902	$1,180,760
CZ16	PG&E	-76,971	17599	69.2	($1,127,210)	$172,787	$53,550	>1	>1	$1,299,997	$1,180,760
CZ16-2	LA	-54,712	16917	74.6	($1,123,442)	($240,170)	$106,722	4.7	>1	$883,272	$1,230,164

Figure 77. Cost Effectiveness for Small Hotel – All-Electric + 80kW PV + 50 kWh Battery

CZ	IOU territory	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Incremental Package Cost	Lifecycle Energy Cost Savings	$-TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
All-Electric + 80kW PV + 50kWh Battery											
CZ01	PG&E	-55,323	16917	75.7	($1,095,542)	($238,351)	$118,605	4.6	>1	$857,191	$1,214,147
CZ02	PG&E	7,849	12677	67.4	($1,096,515)	$129,794	$239,632	>1	>1	$1,226,309	$1,336,146
CZ03	PG&E	14,594	12322	67.7	($1,098,787)	$43,166	$235,280	>1	>1	$1,141,953	$1,334,067
CZ04	PG&E	14,459	11927	64.4	($1,098,622)	$148,698	$249,244	>1	>1	$1,247,320	$1,347,866
CZ04-2	CPAU	14,459	11927	64.4	($1,098,622)	$286,573	$249,244	>1	>1	$1,385,195	$1,347,866
CZ05	PG&E	24,292	11960	67.6	($1,098,675)	$53,719	$244,514	>1	>1	$1,152,394	$1,343,189
CZ06	SCE	47,762	8912	57.2	($1,098,816)	$165,763	$267,221	>1	>1	$1,264,579	$1,366,037
CZ06-2	LA	61,252	8188	57.1	($1,097,164)	$138,060	$283,797	>1	>1	$1,235,223	$1,380,960
CZ07	SDG&E	55,588	8353	56.2	($1,095,134)	$138,718	$286,483	>1	>1	$1,233,852	$1,381,618
CZ08	SCE	55,588	8353	56.2	($1,095,134)	$165,932	$286,483	>1	>1	$1,261,066	$1,381,618
CZ08-2	LA	54,162	8402	56.1	($1,096,932)	$149,615	$269,453	>1	>1	$1,246,548	$1,366,386
CZ09	SCE	54,162	8402	56.1	($1,096,932)	$171,168	$269,453	>1	>1	$1,268,101	$1,366,386
CZ09-2	LA	49,832	8418	54.1	($1,093,934)	$120,627	$250,720	>1	>1	$1,214,561	$1,344,654
CZ10	SDG&E	49,832	8418	54.1	($1,093,934)	$136,144	$250,720	>1	>1	$1,230,078	$1,344,654
CZ10-2	SCE	25,148	10252	57.3	($1,094,743)	$160,744	$233,842	>1	>1	$1,255,487	$1,328,585
CZ11	PG&E	26,813	10403	59.2	($1,096,183)	$10,314	$247,504	>1	>1	$1,106,497	$1,343,686
CZ12	PG&E	27,217	10403	59.3	($1,096,183)	$206,749	$248,790	>1	>1	$1,302,931	$1,344,973
CZ12-2	SMUD	26,027	10029	56.5	($1,094,555)	$164,506	$229,300	>1	>1	$1,259,061	$1,323,856
CZ13	PG&E	41,123	10056	59.7	($1,094,914)	$25,707	$276,947	>1	>1	$1,120,621	$1,371,860
CZ14	SDG&E	41,123	10056	59.7	($1,094,914)	$119,382	$276,947	>1	>1	$1,214,296	$1,371,860
CZ14-2	SCE	82,697	5579	45.5	($1,093,034)	$209,837	$277,287	>1	>1	$1,302,871	$1,370,321
CZ15	SCE	-77,815	17599	71.1	($1,099,310)	($193,758)	$65,850	5.7	>1	$905,552	$1,165,160
CZ16	PG&E	-77,815	17599	71.1	($1,099,310)	$175,872	$65,850	>1	>1	$1,275,182	$1,165,160
CZ16-2	LA	-55,323	16917	75.7	($1,095,542)	($238,351)	$118,605	4.6	>1	$857,191	$1,214,147

6.8 List of Relevant Efficiency Measures Explored

The Reach Code Team started with a potential list of energy efficiency measures proposed for 2022 Title 24 codes and standards enhancement measures, as well as measures from the 2018 International Green Construction Code, which is based on ASHRAE Standard 189.1-2017. The team also developed new measures based on their experience. This original list was over 100 measures long. The measures were filtered based on applicability to the prototypes in this study, ability to model in simulation software, previously demonstrated energy savings potential, and market readiness. The list of 28 measures below represent the list of efficiency measures that meet these criteria and were investigated to some degree. The column to the far right indicates whether the measure was ultimately included in analysis or not.

Figure 78. List of Relevant Efficiency Measures Explored

Building Component	Measure Name	Measure Description	Notes	Include?
Water Heating	Drain water Heat Recovery	Add drain water heat recovery in hotel prototype	Requires calculations outside of modeling software.	Y
Envelope	High performance fenestration	Improved fenestration SHGC (reduce to 0.22).		Y
Envelope	High SHGC for cold climates	Raise prescriptive fenestration SHGC (to 0.45) in cold climates where additional heat is beneficial.		Y
Envelope	Allowable fenestration by orientation	Limit amount of fenestration as a function of orientation		Y
Envelope	High Thermal Mass Buildings	Increase building thermal mass. Thermal mass slows the change in internal temperature of buildings with respect to the outdoor temperature, allowing the peak cooling load during summer to be pushed to the evening, resulting in lower overall cooling loads.	Initial energy modeling results showed marginal cooling savings, negative heating savings.	N
Envelope	Opaque Insulation	Increases the insulation requirement for opaque envelopes (i.e., roof and above-grade wall).	Initial energy modeling results showed marginal energy savings at significant costs which would not meet c/e criteria.	N
Envelope	Triple pane windows	U-factor of 0.20 for all windows	Initial energy modeling results showed only marginal energy savings and, in some cases, increased energy use.	N

Building Component	Measure Name	Measure Description	Notes	Include?
Envelope	Duct Leakage Testing	Expand duct leakage testing requirements based on ASHRAE Standard 215-2018: Method of Test to Determine Leakage of Operating HVAC Air Distribution Systems (ANSI Approved).	More research needs to be done on current duct leakage and how it can be addressed.	N
Envelope	Fenestration area	Reduce maximum allowable fenestration area to 30%.	Instead of this measure, analyzed measure which looked at limiting fenestration based on wall orientation.	N
Envelope	Skinny triple pane windows	U-factor of 0.20 for all windows, with no changes to existing framing or building structure.	Market not ready. No commercially-available products for commercial buildings.	N
Envelope	Permanent projections	Detailed prescriptive requirements for shading based on ASHRAE 189. PF >0.50 for first story and >0.25 for other floors. Many exceptions. Corresponding SHGC multipliers to be used.	Title 24 already allows owner to trade off SHGC with permanent projections. Also, adding requirements for permanent projections would raise concerns.	N
Envelope	Reduced infiltration	Reduce infiltration rates by improving building sealing.	Infiltration rates are a fixed ACM input and cannot be changed. A workaround attempt would not be precise, and the practicality of implementation by developers is low given the modeling capabilities and the fact that in-field verification is challenging. Benefits would predominantly be for air quality rather than energy.	N

Building Component	Measure Name	Measure Description	Notes	Include?
HVAC	Heat recovery ventilation	For the hotel, recover and transfer heat from exhausted air to ventilation air.	For small hotels, the ventilation requirement could be met by various approaches, and the most common ones are: a. Exhaust only system, and ventilation is met by infiltration or window operation. b. Through a Z-duct that connects the zone AC unit's intake to an outside air intake louver. c. Centralized ventilation system (DOAS) The prototype developed for the small hotel is using Type 2 above. The major consideration is that currently, HRV + PTACs cannot be modeled at each guest room, only at the rooftop system. Option 1 would require the same type of HRV implementation as Option 2. Option 3 may be pursuable, but would require a significant redesign of the system, with questionable impacts. Previous studies have found heat recovery as cost effective in California only in buildings with high loads or high air exchange rates, given the relatively mild climate.	N
HVAC	Require Economizers in Smaller Capacity Systems	Lower the capacity trigger for air economizers. Previous studies have shown cost effectiveness for systems as low as 3 tons.		Y
HVAC	Reduce VAV minimum flow limit	Current T24 and 90.1 requirements limit VAV minimum flow rates to no more than 20% of maximum flow. Proposal based on ASHRAE Guideline 36 which includes sequences that remove technical barriers that previously existed. Also, most new DDC controllers are now capable of lower limits. The new limit may be as low as the required ventilation rate. A non-energy benefit of this measure is a reduction in over-cooling, thus improving comfort.		Y

Building Component	Measure Name	Measure Description	Notes	Include?
HVAC	Building Automation System (BAS) improvements	With adoption of ASHRAE Guideline 36 (GDL-36), there is now a national consensus standard for the description of high-performance sequences of operation. This measure will update BAS control requirements to improve usability and enforcement and to increase energy efficiency. BAS control requirement language will be improved either by adoption of similar language to GDL-36, or reference to GDL-36. Specific T24 BAS control topics that will be addressed include at a minimum: DCV, demand-based reset of SAT, demand-based reset of SP, dual-maximum zone sequences, and zone groups for scheduling.	In order to realize any savings in the difference, we would need a very detailed energy model with space-by-space load/occupant diversity, etc. We would also need more modeling capability than is currently available in CBECC-Com.	N
HVAC	Fault Detection Devices (FDD)	Expand FDD requirements to a wider range of AHU faults beyond the economizer. Fault requirements will be based on NIST field research, which has consequently been integrated into ASHRAE Guideline 36 Best in Class Sequences of Operations. Costs are solely to develop the sequences, which is likely minimal, and much of the hardware required for economizer FDD is also used to detect other faults.	Market not ready.	N
HVAC	Small circulator pumps ECM, trim to flow rate	Circulator pumps for industry and commercial.	Hot water pump energy use is small already (<1% building electricity usage) so not much savings potential. More savings for CHW pumps. Modeling limitations as well.	N
HVAC	High Performance Ducts to Reduce Static Pressure	Revise requirements for duct sizing to reduce static pressure.	Preliminary energy modeling results showed only marginal energy savings compared to measure cost.	N
HVAC	Parallel fan-powered boxes	Use of parallel fan-powered boxes	Unable to model PFPB with variable speed fans in modeling software.	N
Lighting	Daylight Dimming Plus OFF	Automatic daylight dimming controls requirements include the OFF step.		Y
Lighting	Occupant Sensing in Open Plan Offices	Take the PAF without allowing for increased design wattage		Y
Lighting	Institutional tuning	Take the PAF without allowing for increased design wattage		Y

Building Component	Measure Name	Measure Description	Notes	Include?
Lighting	Reduced Interior Lighting Power Density	Reduced interior LPD values.		Y
Lighting	Shift from general to task illumination	Low levels of general illumination with task and accent lighting added to locations where higher light levels are required. The shift from general to task illumination measure is based on the assumption that proper lighting of a desk surface with high efficacy lighting can allow for the significant reduction of ambient general lighting.	This is a tough measure to require as the LPDs decrease.	N
Lighting	Future-proof lighting controls	Fill any holes in the current code that could lead to the situations where TLEDS or LED fixtures that are not dimmable or upgradable in the future, or any other issues with code that make it hard to transition to ALCS/IoT lighting in the future	Major lighting controls already covered in other measures being considered	N
Lighting	Integrated control of lighting and HVAC systems	Formalize the definition of "lighting and HVAC control integration" by defining the level of data sharing required between systems and the mechanism needed to share such data. The highest savings potential would likely be generated from VAV HVAC systems by closing the damper in unoccupied zones based on the occupancy sensor information from the lighting systems.	Not market ready enough.	N
Other	NR Plug Load Controls	Energy savings opportunities for plug loads, which may include: energy efficient equipment, equipment power management, occupancy sensor control, and occupant awareness programs. The proposal could be extending controlled receptacles requirements in Section 130.5(d) to more occupancy types. It would also consider circuit-level controls.	Office equipment now all have their own standby power modes that use very little power, making plug load controls very difficult to be cost-effective.	N

6.9 Additional Rates Analysis - Healdsburg

After the final version of the report was released, the Reach Code Team provided additional cost effectiveness analysis in Climate Zone 2 using City of Healdsburg electric utility rates and PG&E gas rates. All aspects of the methodology remain the same, and the results for each package and prototype are aggregated below in Figure 79 through Figure 81. Results generally indicate:

- Mixed fuel prototypes achieve positive compliance margins for EE packages and are cost effective.
- All-electric prototypes achieve slightly lower compliance margins than mixed fuel for EE packages and are cost effective.
- All PV and PV+Battery packages are cost effective both using an on-bill and TDV approach.

Figure 79. Healdsburg Utility Rates Analysis – Medium Office, All Packages Cost Effectiveness Summary

Prototype	Package	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Comp-liance Margin (%)	Incremental Package Cost	Lifecycle Energy Cost Savings	$-TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Medium Office	Mixed Fuel + EE	40,985	-505	8.1	17%	$66,649	$89,645	$99,181	1.3	1.5	$22,996	$32,532
	Mixed Fuel + EE + PVB	255,787	-505	50.6	17%	$359,648	$510,922	$573,033	1.4	1.6	$151,274	$213,385
	Mixed Fuel + HE	3,795	550	4.3	4%	$68,937	$24,204	$24,676	0.4	0.4	-$44,733	-$44,261
	All-Electric	-49,684	3,868	5.0	-7%	-$73,695	-$7,042	-$41,429	10.5	1.8	$66,653	$32,266
	All-Electric + EE	-11,811	3,868	15.2	10%	-$7,046	$83,285	$58,563	>1	>1	$90,331	$65,609
	All-Electric + EE + PVB	203,026	3,868	57.8	10%	$285,953	$511,954	$532,273	1.8	1.9	$226,001	$246,320
	All-Electric + HE	-45,916	3,868	6.1	-5%	-$22,722	$6,983	-$26,394	>1	0.9	$29,705	-$3,672
	Mixed Fuel + 3kW	4,785	0	0.9	n/a	$5,566	$10,430	$10,500	1.9	1.9	$4,864	$4,934
	Mixed Fuel + 3kW + 5kWh	4,785	0	0.9	n/a	$8,356	$10,430	$10,500	1.2	1.3	$2,074	$2,144
	Mixed Fuel + 135kW	215,311	0	41.5	n/a	$250,470	$424,452	$471,705	1.7	1.9	$173,982	$221,235
	Mixed Fuel + 135kW + 50kWh	214,861	0	42.6	n/a	$278,370	$423,721	$472,898	1.5	1.7	$145,351	$194,528
	All-Electric + 3kW	-44,899	3,868	6.0	n/a	-$68,129	$3,299	-$30,928	>1	2.2	$71,429	$37,201
	All-Electric + 3kW + 5kWh	-44,899	3,868	6.0	n/a	-$65,339	$3,299	-$30,928	>1	2.1	$68,639	$34,411
	All-Electric + 135kW	165,627	3,868	46.6	n/a	$176,775	$424,146	$430,276	2.4	2.4	$247,371	$253,501
	All-Electric + 135kW + 50kWh	165,200	3,868	47.7	n/a	$204,675	$423,466	$431,469	2.1	2.1	$218,792	$226,795
	All-Electric + 80kW + 50kWh	40,985	-505	8.1	17%	$66,649	$89,645	$99,181	1.3	1.5	$22,996	$32,532

Figure 80. Healdsburg Utility Rates Analysis – Medium Retail, All Packages Cost Effectiveness Summary

Prototype	Package	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Comp-liance Margin (%)	Incremental Package Cost	Lifecycle Energy Cost Savings	$-TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Medium Retail	Mixed Fuel + EE	18,885	613	8.7	13%	$5,569	$49,546	$59,135	8.9	10.6	$43,977	$53,566
	Mixed Fuel + EE + PVB	189,400	613	43.8	13%	$249,475	$376,219	$465,474	1.5	1.9	$126,744	$215,999
	Mixed Fuel + HE	2,288	229	2.0	3%	$9,726	$13,143	$13,998	1.4	1.4	$3,417	$4,273
	All-Electric	-21,786	2,448	7.5	-1%	-$27,464	$9,228	-$4,483	>1	6.1	$36,692	$22,981
	All-Electric + EE	2,843	2,448	14.6	13%	-$21,895	$61,918	$56,893	>1	>1	$83,813	$78,788
	All-Electric + EE + PVB	173,387	2,448	49.9	13%	$222,012	$391,257	$463,431	1.8	2.1	$169,245	$241,419
	All-Electric + HE	-16,989	2,448	8.9	3%	-$4,211	$23,567	$11,251	>1	>1	$27,779	$15,463
	Mixed Fuel + 3kW	4,685	0	0.9	n/a	$5,566	$10,256	$10,262	1.8	1.8	$4,690	$4,696
	Mixed Fuel + 3kW + 5kWh	4,685	0	0.9	n/a	$8,356	$10,256	$10,262	1.2	1.2	$1,900	$1,906
	Mixed Fuel + 110kW	171,790	0	33.3	n/a	$204,087	$316,293	$376,300	1.5	1.8	$112,206	$172,213
	Mixed Fuel + 110kW + 50kWh	170,542	0	35.1	n/a	$231,987	$320,349	$398,363	1.4	1.7	$88,363	$166,376
	All-Electric + 3kW	-17,101	2,448	8.4	n/a	-$21,898	$19,523	$5,779	>1	>1	$41,421	$27,677
	All-Electric + 3kW + 5kWh	-17,101	2,448	8.4	n/a	-$19,108	$19,523	$5,779	>1	>1	$38,631	$24,887
	All-Electric + 110kW	150,004	2,448	40.8	n/a	$176,623	$332,213	$371,817	1.9	2.1	$155,591	$195,194
	All-Electric + 110kW + 50kWh	148,793	2,448	42.9	n/a	$204,523	$335,043	$394,099	1.6	1.9	$130,520	$189,577

Figure 81. Healdsburg Utility Rates Analysis – Small Hotel, All Packages Cost Effectiveness Summary

Prototype	Package	Elec Savings (kWh)	Gas Savings (therms)	GHG savings (tons)	Comp-liance Margin (%)	Incremental Package Cost	Lifecycle Energy Cost Savings	$-TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
Small Hotel	Mixed Fuel + EE	3,802	976	3.9	7%	$20,971	$22,829	$29,353	1.1	1.4	$1,857	$8,381
	Mixed Fuel + EE + PVB	130,144	976	31.1	7%	$205,967	$254,577	$336,575	1.2	1.6	$48,610	$130,608
	Mixed Fuel + HE	981	402	2.7	3%	$23,092	$12,291	$11,808	0.5	0.5	-$10,801	-$11,284
	All-Electric	-118,739	12,677	40.0	-12%	-$1,297,757	-$24,318	-$51,620	53.4	25.1	$1,273,439	$1,246,137
	All-Electric + EE	-88,410	12,677	45.9	5%	-$1,265,064	$45,918	$20,860	>1	>1	$1,310,982	$1,285,924
	All-Electric + EE + PVB	38,115	12,677	73.5	5%	-$1,080,068	$296,233	$317,296	>1	>1	$1,376,301	$1,397,365
	All-Electric + HE	-118,284	12,677	41.2	-11%	-$1,283,243	-$83,994	-$44,505	15.3	28.8	$1,199,249	$1,238,738
	Mixed Fuel + 3kW	4,785	0	0.9	n/a	$5,566	$8,927	$10,332	1.6	1.9	$3,361	$4,766
	Mixed Fuel + 3kW + 5kWh	4,785	0	0.9	n/a	$8,356	$8,927	$10,332	1.1	1.2	$571	$1,976
	Mixed Fuel + 80kW	127,592	0	25.0	n/a	$148,427	$229,794	$275,130	1.5	1.9	$81,367	$126,703
	Mixed Fuel + 80kW + 50kWh	126,332	0	28.1	n/a	$176,327	$236,570	$296,058	1.3	1.7	$60,243	$119,731
	All-Electric + 3kW	-113,954	12,677	40.9	n/a	-$1,292,191	-$14,447	-$41,288	89.4	31.3	$1,277,744	$1,250,902
	All-Electric + 3kW + 5kWh	-113,954	12,677	40.9	n/a	-$1,289,401	-$14,447	-$41,288	89.3	31.2	$1,274,954	$1,248,112
	All-Electric + 80kW	8,853	12,677	65.0	n/a	-$1,149,330	$222,070	$223,510	>1	>1	$1,371,400	$1,372,840
	All-Electric + 80kW + 50kWh	7,849	12,677	67.4	n/a	-$1,121,430	$223,812	$239,632	>1	>1	$1,345,241	$1,361,062

CALIFORNIA ENERGY CODES & STANDARDS
A STATEWIDE UTILITY PROGRAM

Last Modified: 10/13/2021

2020 Reach Code Cost-Effectiveness Analysis

Large Office

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SDGE A Sempra Energy utility | SoCalGas A Sempra Energy utility | Southern California Edison Energy for What's Ahead | PG&E Pacific Gas and Electric Company

Legal Notice

Acronym/Abbreviation List

ASHRAE - Society of Heating, Refrigerating and Air-Conditioning Engineers

B/C – Benefit-to-Cost (ratio)

CBECC - California Building Energy Code Compliance

BSC - California Building Standards Commission

CPAU – City of Palo Alto Utilities (utility)

CZ – Climate Zone

DOE – United States Department of Energy

E3 - Energy and Environmental Economics

Energy Commission - California Energy Commission

ft^2 – square foot

gal – gallon

GHG - Greenhouse Gas

HVAC - Heating, Ventilation, and Air-Conditioning (equipment)

IOU – Investor-Owned Utility

kBtu – kilo British thermal unit

kBtu/hr – kilo British thermal unit per hour

kW – kilowatt

kWh – kilowatt-Hour

LADWP – Los Angeles Department of Water and Power (utility)

mtons – metric tons

NPV – Net Present Value

POU – Publicly-Owned Utility

PG&E – Pacific Gas & Electric (utility)

PV - Photovoltaic (solar)

SCE – Southern California Edison (utility)

SoCalGas – Southern California Gas (utility)

SDG&E – San Diego Gas & Electric (utility)

SHW – Service Hot Water (equipment)

SMUD – Sacramento Municipal Utility District (utility)

TDV - Time Dependent Valuation

Title 24 – California Code of Regulations Title 24, Part 6

W – watt(s)

Wdc – direct current watt(s)

VAV – Variable Air Volume

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1 Introduction

The California Building Energy Efficiency Standards Title 24, Part 6 (Title 24) is maintained and updated every three years by two state agencies: the California Energy Commission (Energy Commission) and the Building Standards Commission (BSC). In addition to enforcing the code, local jurisdictions have the authority to adopt local energy efficiency ordinances—or reach codes—that exceed the minimum standards defined by Title 24 (as established by Public Resources Code Section 25402.1(h)2 and Section 10-106 of Title 24, Part 6). Local jurisdictions that adopt energy conservation amendments or ordinances as the term is used in PRC 25402.1(h2) must demonstrate that the requirements of the proposed ordinance are cost-effective according to the local jurisdiction criteria and do not result in buildings consuming more energy than is permitted by Title 24. For energy conservation amendments, the jurisdiction must obtain approval from the Energy Commission and file the ordinance with the BSC for the ordinance to be legally enforceable.

This report documents cost-effective combinations of measures that exceed the minimum state requirements, the 2019 Building Energy Efficiency Standards, effective January 1, 2020, for design in newly constructed buildings. This report was developed in coordination with the California Statewide Investor-Owned Utilities (IOUs) Codes and Standards Program, key consultants, and engaged cities—collectively known as the Reach Code Team.

The Reach Code Team published nonresidential new construction studies in 2019 that documented the cost-effectiveness of energy measure packages for Medium Office, Medium Retail, and Small Hotel prototypes (Statewide Utility Team, 2020). Based on stakeholder requests, this report extends that analysis to the Large Office new construction prototype.

The United States Department of Energy (DOE) sets minimum efficiency standards for equipment and appliances that are federally regulated under the National Appliance Energy Conservation Act, including heating, cooling, and water heating equipment (E-CFR, 2020). Since state and local governments are prohibited from adopting higher minimum efficiencies than the federal standards require, the focus of this study is to identify and evaluate cost-effective packages that do not include high-efficiency heating, cooling, and water heating equipment. High-efficiency appliances are often the easiest and most affordable measures to increase energy performance. While federal preemption limits reach code mandatory requirements for covered appliances, in practice, builders may install any package of compliant measures to achieve the performance requirements.

2 Methodology and Assumptions

The Reach Code Team analyzed the large office prototype using the general cost-effectiveness methodology described in this section.

2.1 Cost-Effectiveness

This section describes the approach to calculating cost-effectiveness including benefits, costs, metrics, and utility rate selection.

2.1.1 Benefits

This analysis used both *on-bill* and *time dependent valuation* (TDV) of energy-based approaches to evaluate cost-effectiveness. Both on-bill and TDV require quantifying the energy savings and costs associated with energy measures. The primary difference between on-bill and TDV is how energy is valued:

- **On-bill**: Customer-based lifecycle cost approach that values energy based upon estimated site energy usage and customer on-bill savings using electricity and natural gas utility rate schedules over a 15-year duration for nonresidential buildings, accounting for a three percent discount rate and energy cost inflation per Appendix 7.2.
- **TDV**: TDV was developed by the Energy Commission to reflect the time dependent value of energy including long-term projected costs of energy, such as the cost of providing energy during peak periods of demand and other societal costs including projected costs for carbon emissions and grid transmission impacts. With the TDV approach, electricity used (or saved) during peak periods has a much higher value than electricity used (or saved) during off-peak periods. This metric values energy use differently depending on the fuel source (natural gas, electricity, and propane), time of day, and season.

The Reach Code Team performed energy simulations using the most recent software available for 2019 Title 24 code compliance analysis, California Building Energy Code Compliance for Commercial/Nonresidential Buildings (CBECC-Com) 2019.1.3. The Reach Code Team also tested the 2022 weather files and 2022 TDV multipliers using CBECC-Com 2022 software for most results to understand potential impacts on cost-effectiveness.

2.1.2 Costs

The Reach Code Team assessed the incremental costs and savings of the energy packages over the 15 years for nonresidential prototypes. Incremental costs represent the equipment, installation, replacements, and maintenance costs of the proposed measure relative to the 2019 Title 24 Standards minimum requirements or standard industry practices. The Reach Code Team obtained measure costs from manufacturer distributors, contractors, literature review, and online sources, such as Home Depot and RS Means. Taxes and contractor markups were added as appropriate. Maintenance and replacement costs are included.

2.1.3 Metrics

Cost-effectiveness is presented using net present value (NPV) and benefit-to-cost (B/C) ratio metrics.

- **NPV**: The Reach Code Team uses net savings (NPV benefits minus NPV costs) as the cost-effectiveness metric. If the net savings of a measure or package is positive, it is considered cost-effective. Negative savings represent net costs. A measure that has negative energy cost benefits (energy cost increase) can still be cost-effective if the costs to implement the measure are even more negative (i.e., construction and maintenance cost savings).
- **B/C ratio**: The ratio of the present value of all benefits to the present value of all costs over 15 years (NPV benefits divided by NPV costs). The criteria for cost-effectiveness is a B/C ratio greater than 1.0. A value of 1.0 indicates the savings over the life of the measure are equivalent to the incremental cost of that measure. A value greater than one represents a positive return on investment.

Improving the energy performance of a building often requires an initial investment. In most cases the benefit is represented by annual on-bill utility or TDV savings, and the cost by incremental first cost and replacement costs. However, some packages result in initial construction cost savings (negative incremental cost), and either energy cost

savings (positive benefits), or increased energy costs (negative benefits). In cases where both incremental construction cost and energy-related savings are negative, the construction cost savings are treated as the benefit while the increased energy costs are the cost. In cases where a measure or package is cost-effective immediately (i.e., upfront construction cost savings and lifetime energy cost savings), B/C ratio cost-effectiveness is represented by “>1”. Because of these situations, NPV savings are also reported, which, in these cases, are positive values.

2.1.4 Utility Rates

In coordination with the rate specialists at each IOU, and the publicly available information for several Publicly-Owned Utilities (POUs), the Reach Code Team determined appropriate utility rate for each measure package (see Appendix 7.2 for details). The utility tariffs were determined based on the annual load profile of each prototype and the corresponding package, the most prevalent rate in each territory, and information assuring that the rate was not planned to be phased out. For some prototypes there are multiple options for rates because of the varying load profiles of mixed-fuel buildings versus all-electric buildings. If more than one rate schedule is applicable for a particular load profile, the Reach Code Team did not attempt to compare or test a variety of tariffs to determine their impact on cost-effectiveness. Utility rates were applied to each climate zone (CZ) based on the predominant IOU serving the population of each zone according to Figure 1.

A time-of-use (TOU) rate was applied to all cases. In addition to energy consumption charges, there are kW demand charges for monthly peak loads. Utilities calculate the peak load by the highest kW of the 15-minute interval readings in the month. However, the energy modeling software produces results on hourly intervals, hence TRC calculated the demand charges by multiplying the highest load of all hourly loads in a month with the corresponding demand charge per kW. For cases with PV generation, the approved NEM2 (Net Energy Metering) tariffs were applied along with minimum daily use billing and mandatory non-bypassable charges. For the PV cases, annual electric production was always less than annual electricity consumption; and therefore, no credits for surplus generation were necessary.

Figure 1. Utility Tariffs used based on CZ

CZ	Electric/Gas Utility	Electricity (TOU)	Natural Gas
	IOUs		
1-5,11-13,16	Pacific Gas and Electric Company (PG&E)	B-1/B-10	G-NR1
5	PG&E/Southern California Gas Company (SoCalGas)	B-1/B-10	G-10 (GN-10)
6, 8-10, 14, 15	Southern California Edison (SCE)/SoCalGas	TOU-GS-1/TOU-GS-2/TOU-GS-3	G-10 (GN-10)
7, 10, 14	San Diego Gas & Electric Company (SDG&E)	TOU-A+EECC/AL-TOU+EECC	GN-3
	POUs		
4	City of Palo Alto (CPAU)	E-2/E-4 TOU	G-2
12	Sacramento Municipal Utility District (SMUD)/PG&E	GSN/GSS	G-NR1
6, 8, 9, 16	Los Angeles Department of Water and Power (LADWP)/SoCalGas	A-1/A-2	G-10 (GN-10)

Utility rates are assumed to escalate over time, using assumptions from research conducted by Energy and Environmental Economics (E3) in the 2019 study Residential Building Electrification in California (Energy & Environmental Economics, 2019) and escalation rates used in the development of the 2022 TDV multipliers (Energy & Environmental Economics, 2021). See Appendix 7.2 Utility Rate Schedules for additional details.

2.2 Greenhouse Gas Emissions

The analysis uses the greenhouse gas (GHG) emissions multipliers developed by E3 (Energy & Environmental Economics, 2021). E3 developed the multipliers to support development of compliance metrics for use in the 2022 Title 24. There are 8,760 hourly multipliers accounting for GHG source emissions, including Renewable Portfolio Standards, methane leakage, and refrigerant leakage. There are 32 strings of multipliers, with a different string for each California Climate Zone and each fuel type (electricity and natural gas). The Reach Code Team used the multipliers to calculate emissions from both the 2019 and 2022 simulation results.

3 Prototype Description, Measure Packages, and Costs

This section describes the prototype and analysis method, drawing from previous 2019 Reach Code research where necessary. The Reach Code Team used a modified version of the DOE building prototype to evaluate cost-effectiveness of measure packages, after initializing the prototypes to comply with 2019 Title 24 new construction requirements, to reflect a prescriptively compliant new construction building in each CZ.

The 2019 Nonresidential Reach Code Cost-Effectiveness Study (Statewide Utility Team, 2020) examined the Medium Office prototype for mixed-fuel plus efficiency, all-electric plus efficiency, and demand flexibility measure packages (Statewide Reach Code Team 2019a). The Medium Office was a 53,000 ft^2 building, and representatives from jurisdictions planning to use the results to inform the development of local ordinances were unsure whether findings would apply to larger office buildings. In response, the Reach Code Team builds on the 2019 study by examining a Large Office prototype in this report.

3.1 Prototype Characteristics

Figure 2 summarizes the basic geometry and features of the Large Office. For the purposes of this study, the number of above-grade floors were reduced from the DOE prototype from ten to five at the request of jurisdictions to more accurately represent their building stock, which also reduces the total conditioned floor area. The Reach Code Team would not expect results to vary significantly compared to a ten-story office due to similar building characteristics and systems, just at a larger scale.

The baseline HVAC system includes two natural gas hot water boilers, two chillers and two cooling towers, one built up rooftop unit per floor, and variable air volume (VAV) hot water reheat boxes. The SHW design includes one 20.12 kW electric resistance hot water heater with a 70-gal storage tank.

Figure 2. Large Office Prototype Characteristics

	Large Office
Conditioned Floor Area (ft^2)	191,765
Number of Stories	5 (1 below grade)
Window-to-Wall Area Ratio	0.38
Baseline HVAC System	Built-up VAV hot water reheat system. Central gas hot water boilers (2), chillers (2), and cooling towers (2)
Baseline Water Heating System	70 gal of electric resistance water heating

3.2 Measure Definition and Costs

3.2.1 All-Electric

For the Large Office all-electric HVAC design, as with the Medium Office, the Reach Code Team selected a VAV system with an electric resistance reheat instead of hot water reheat coil. An alternative all-electric design that is designed frequently in large offices is a central heat recovery chiller and water heater serving hot water reheat coils. While this system can perform very efficiently, as of October 2021 it cannot be modeled in CBECC-Com (though the Energy Commission intends on adding this functionality in the near term). Actual energy consumption for the VAV hot water reheat baseline may be higher than the current simulation results show due to a combination of boiler and hot water distribution losses. A recent research study shows that the total losses can account for as much as 80 percent of the boiler energy use (Raftery, Geronazzo, Cheng, and Paliaga, 2018). If these losses are considered savings for the

electric resistance reheat (which has no associated distribution losses) compared to the mixed-fuel baseline, the savings may be higher.

Cost data for the Large Office prototype are presented in Figure 3. The all-electric HVAC system presents cost savings compared to the hot water reheat system from elimination of the hot water boiler and associated hot water piping distribution. Chiller, chilled-water piping, and controls cost are not presented as they are assumed to be the same for both the mixed-fuel and all-electric scenarios. The all-electric SHW system remains the same electric resistance water heater as the baseline and has no associated incremental costs.

Figure 3. Large Office All-Electric Heating System Costs

Mixed-Fuel Measure	Mixed-Fuel Cost	All-Electric Measure	All-Electric Cost	All-Electric Incremental Cost	Source
Boilers (2) and heating hot water piping	$876,616	n/a	$0	($876,616)	Cost estimator
Hydronic VAV reheat terminal units	$2,041,460	Electric resistance VAV reheat terminal units	$2,322,839	$281,379	Cost estimator
Gas plumbing distribution	$6,843	Electrical upgrades, such as wiring, distribution boards, and transformers	$478,656	$471,813	RSMeans
Natural gas plan review, service extension, meter	$18,316	n/a	$0	($18,316)	2019 Nonresidential New Construction Reach Code Study (Statewide Reach Code Team 2019a)
Total	**$2,943,235**		**$2,801,495**	($141,740)	

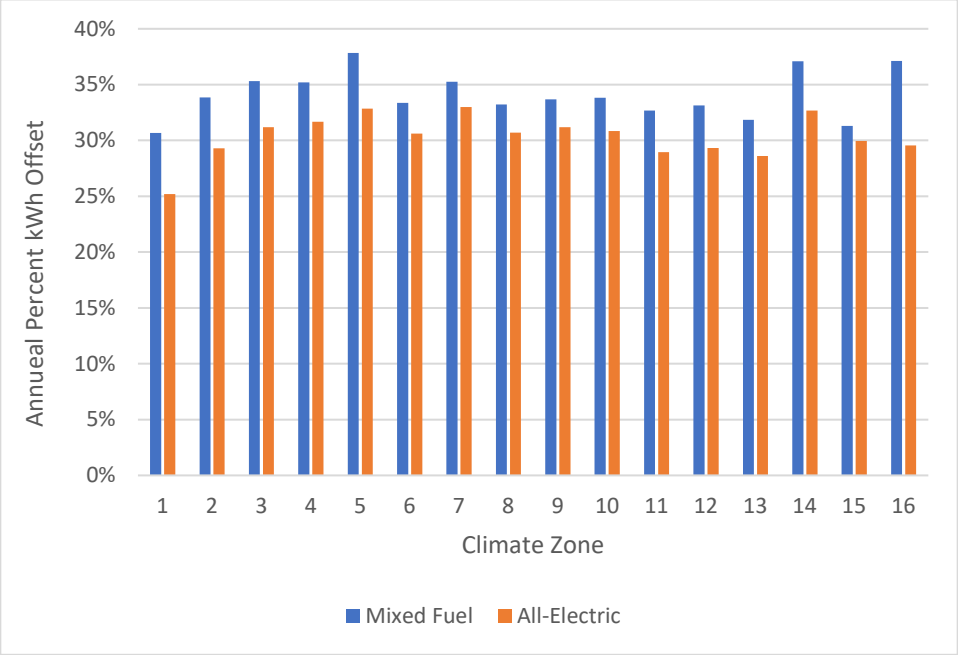
3.2.2 Efficiency

Efficiency measures are the same as those from the 2019 Nonresidential Reach Code Cost-Effectiveness Study (Statewide Reach Codes Team 2019a) for the Medium Office, which are primarily lighting measures but also include envelope and HVAC measures. Please refer to Appendix 7.3 Efficiency Measures for Large Office for cost information reproduced from the 2019 study.

3.2.3 Solar PV

The Reach Code Team estimated a large PV system size at 15 W/ft^2 covering 50 percent of the roof area. This approach assumes that the other 50 percent of the roof is for skylights, mechanical equipment, and walking paths. Figure 4 shows the percent of electricity offset by PV for both mixed-fuel and all-electric buildings over their respective federal minimum design package.

Figure 4. Annual Percent kWh Offset with 285 kW Array



3.2.4 Measure Packages

The Reach Code Team examined the following packages:

- Large Office Baseline Package: Mixed-fuel prescriptively built building.
- All-Electric (AE): Including electric appliances that meet federal minimum efficiency criteria, as well as electrical upgrades, such as on-site secondary transformers. All other aspects of the building are prescriptively built.
- All-Electric + Efficiency (AE Eff): All-electric, including efficiency measures. See Appendix 7.3 Efficiency Measures for Large Office for details.
- All-Electric + Efficiency + Solar PV (AE Eff PV): All-electric, including efficiency measures and a solar PV array.

4 Results

TDV and on-bill based cost-effectiveness results are presented in terms of B/C ratio and NPV savings. What constitutes a 'benefit' or a 'cost' varies with the scenarios because both energy savings and incremental construction costs may be negative depending on the package. Typically, on-bill savings are categorized as a 'benefit' while incremental construction costs are treated as 'costs.' In cases where both construction costs and on-bill savings are negative; the construction cost savings are treated as the 'benefit' while the on-bill negative savings are the 'cost.'

Overarching factors to keep in mind when reviewing the results include:

- All-electric packages will have lower **GHG emissions** than mixed-fuel packages in all cases, due to the clean power sources currently available from California's power providers.
- To be approved by the Energy Commission's application process, local reach codes that amend the energy code must **both be cost-effective** compared to the mixed-fuel baseline package **and exceed the energy performance budget** using TDV (i.e., have a positive compliance margin) compared to the standard design in the compliance software. To emphasize these two important factors, the figures in this section highlight in green the modeling results that have **either** a positive compliance margin or are cost-effective. This will allow readers to identify whether a scenario is fully or partially supportive of a reach code. When a modeling result is not cost-effective, it is highlighted in red. Section 5 highlights only results that have **both** a positive compliance margin and are cost-effective, to allow readers to identify reach code-ready scenarios.
- Nonresidential buildings **do not have an all-electric prescriptive design pathway** and are compared to a mixed-fuel standard design for most occupancies. Because of current policy metrics, this comparison typically results in TDV-related penalties and associated negative compliance margins. These negative compliance margins are reflected in the 'baseline' all-electric packages, and must be overcome with the addition of building energy efficiency measures.
- The Energy Commission **does not currently allow compliance credit for solar PV** in nonresidential buildings. Thus, compliance margins for nonresidential packages containing these technologies are the same as packages without. However, the Reach Code Team did include the impact of solar PV when calculating overall TDV cost-effectiveness.
- As mentioned in Section 2.1.4, The Reach Code Team coordinated with utilities to select tariffs given the annual energy demand profile and the most prevalent rates in each utility territory. The Reach Code Team **did not compare a variety of tariffs** to determine their impact on cost-effectiveness although utility rate changes or updates can effect on-bill cost-effectiveness results.
- As a point of comparison, **mixed-fuel baseline** energy figures are provided in Appendix 7.4 Mixed-Fuel Baseline Energy Figures.
- The cost-effectiveness results for 2022 analysis differs from 2019 mainly in TDV savings, but also differs slightly in energy consumption which translates in minor difference in on-bill energy savings. The Reach Code Team **has not reported the 2022 Energy Code compliance margin outputs** as the compliance software has not yet been updated to reflect the 2022 Energy Code.

Because there is no all-electric prescriptive pathway for nonresidential buildings under the 2019 Energy Code, Figure 5 shows negative compliance margins in all CZs when replacing natural gas HVAC equipment with all-electric. The addition of cost-effective energy efficiency measures—with lighting delivering the most savings—yields positive compliance margins in all CZs except the coldest (CZs 1 and 16). The construction cost savings of using electric HVAC results in cost-effective all-electric efficiency packages in most CZs, and efficiency + solar PV packages in all CZs, as shown in Figure 6 and Figure 7, respectively.

Figure 5. Cost-effectiveness for Large Office: All-Electric

CZ	Utility	Annual Elec Savings (kWh)	Annual Gas Savings (therms)	Annual GHG Reductions (tons)	Comp-liance Margin	Upfront Incremental Package Cost	Lifecycle Utility Cost Savings	Lifecycle $TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
CZ01	PG&E	(262,847)	16,395	28.5	-29.8%	$(141,740)	$(359,716)	$(371,473)	0.4	0.4	$(217,976)	$(229,733)
CZ02	PG&E	(206,143)	12,600	19.7	-11.5%	$(141,740)	$(290,124)	$(233,027)	0.5	0.6	$(148,385)	$(91,287)
CZ03	PG&E	(166,467)	9,905	13.6	-16.6%	$(141,740)	$(227,387)	$(206,276)	0.6	0.7	$(85,647)	$(64,536)
CZ04	PG&E	(147,048)	8,778	12.1	-11.0%	$(141,740)	$(186,234)	$(170,819)	0.7	0.8	$(44,494)	$(29,079)
CZ04-2	CPAU	(147,048)	8,778	12.1	-11.0%	$(141,740)	$(81,699)	$(170,819)	0.8	0.8	$60,041	$(29,079)
CZ05	PG&E	(194,316)	11,756	17.1	-18.1%	$(141,740)	$(226,399)	$(241,369)	0.6	0.6	$(84,659)	$(99,629)
CZ05-2	SoCalGas	(194,316)	11,756	17.1	-18.1%	$(141,740)	$(288,893)	$(241,369)	0.5	0.6	$(147,154)	$(99,629)
CZ06	SCE	(123,271)	7,088	7.5	-7.7%	$(141,740)	$(45,293)	$(146,660)	3.2	0.97	$96,447	$(4,920)
CZ06-2	LADWP	(123,271)	7,088	7.5	-7.7%	$(141,740)	$33,031	$(146,660)	>1	0.97	$174,771	$(4,920)
CZ07	SDG&E	(93,327)	5,092	4.7	-7.9%	$(141,740)	$(36,592)	$(116,624)	3.9	1.2	$105,148	$25,116
CZ08	SCE	(112,492)	6,371	6.4	-5.1%	$(141,740)	$(34,679)	$(134,973)	4.1	1.1	$107,061	$6,767
CZ08-2	LADWP	(112,492)	6,371	6.4	-5.1%	$(141,740)	$34,202	$(134,973)	>1	1.1	$175,942	$6,767
CZ09	SCE	(112,134)	6,444	7.1	-2.6%	$(141,740)	$(35,382)	$(131,390)	4.1	1.1	$106,358	$10,350
CZ09-2	LADWP	(112,134)	6,444	7.1	-2.6%	$(141,740)	$33,011	$(131,390)	>1	1.1	$174,751	$10,350
CZ10	SDG&E	(134,491)	7,574	7.8	-4.8%	$(141,740)	$(61,938)	$(160,839)	2.3	0.9	$79,802	$(19,099)
CZ10-2	SCE	(134,491)	7,574	7.8	-4.8%	$(141,740)	$(54,157)	$(160,839)	2.7	0.9	$87,583	$(19,099)
CZ11	PG&E	(179,689)	10,792	13.9	-5.9%	$(141,740)	$(244,543)	$(200,734)	0.6	0.7	$(102,803)	$(58,994)
CZ12	PG&E	(177,729)	10,678	14.0	-7.3%	$(141,740)	$(258,118)	$(200,865)	0.5	0.7	$(116,378)	$(59,126)
CZ12-2	SMUD	(177,729)	10,678	14.0	-7.3%	$(141,740)	$(102,625)	$(200,865)	1.3	0.7	$39,115	$(59,126)
CZ13	PG&E	(159,727)	9,590	11.5	-5.8%	$(141,740)	$(220,348)	$(183,952)	0.6	0.8	$(78,608)	$(42,212)
CZ14	SDG&E	(190,360)	10,986	10.4	-7.4%	$(141,740)	$(216,220)	$(221,327)	0.7	0.6	$(74,480)	$(79,587)
CZ14-2	SCE	(190,360)	10,986	10.4	-7.4%	$(141,740)	$(138,030)	$(221,327)	1.05	0.6	$3,710	$(79,587)
CZ15	SCE	(71,444)	3,890	1.9	2.1%	$(141,740)	$(22,684)	$(86,001)	6.4	1.6	$119,056	$55,739
CZ16	PG&E	(336,846)	18,599	23.5	-37.8%	$(141,740)	$(536,715)	$(576,006)	0.3	0.2	$(394,975)	$(434,266)
CZ16-2	LADWP	(336,846)	18,599	23.5	-37.8%	$(141,740)	$(56,676)	$(576,006)	2.5	0.2	$85,064	$(434,266)

Figure 6. Cost-effectiveness for Large Office: All-Electric + Eff

CZ	Utility	Annual Elec Savings (kWh)	Annual Gas Savings (therms)	Annual GHG Reductions (tons)	Comp-liance Margin	Upfront Incremental Package Cost	Lifecycle Utility Cost Savings	Lifecycle $TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
CZ01	PG&E	(164,077)	16,395	44.3	-11.3%	$58,676	$(109,969)	$(145,177)	-1.9	-2.5	$(168,645)	$(203,854)
CZ02	PG&E	(91,089)	12,600	38.4	6.1%	$58,676	$15,651	$57,472	0.3	0.98	$(43,025)	$(1,205)
CZ03	PG&E	(47,376)	9,905	33.3	5.5%	$58,676	$89,927	$84,923	1.5	1.4	$31,251	$26,246
CZ04	PG&E	(23,199)	8,778	32.7	9.2%	$84,515	$143,442	$137,608	1.7	1.6	$58,927	$53,094
CZ04-2	CPAU	(23,199)	8,778	32.7	9.2%	$84,515	$195,263	$137,608	2.3	1.6	$110,748	$53,094
CZ05	PG&E	(80,683)	11,756	35.2	2.2%	$58,676	$75,708	$34,757	1.29	0.6	$17,031	$(23,919)
CZ05-2	SoCalGas	(80,683)	11,756	35.2	2.2%	$58,676	$13,213	$34,757	0.2	0.6	$(45,463)	$(23,919)
CZ06	SCE	10,223	7,088	30.5	12.6%	$84,515	$151,619	$192,519	1.8	2.3	$67,105	$108,004
CZ06-2	LADWP	10,223	7,088	30.5	12.6%	$84,515	$164,918	$192,519	1.95	2.3	$80,403	$108,004
CZ07	SDG&E	42,211	5,092	28.5	14.1%	$84,515	$349,658	$232,184	4.1	2.7	$265,144	$147,670
CZ08	SCE	21,755	6,371	29.9	13.6%	$84,515	$158,816	$207,746	1.9	2.5	$74,302	$123,231
CZ08-2	LADWP	21,755	6,371	29.9	13.6%	$84,515	$161,890	$207,746	1.9	2.5	$77,376	$123,231
CZ09	SCE	18,792	6,444	29.4	13.8%	$84,515	$156,638	$202,843	1.9	2.4	$72,123	$118,328
CZ09-2	LADWP	18,792	6,444	29.4	13.8%	$84,515	$161,996	$202,843	1.9	2.4	$77,482	$118,328
CZ10	SDG&E	4,572	7,574	32.1	13.0%	$84,515	$300,594	$184,670	3.6	2.2	$216,079	$100,155
CZ10-2	SCE	4,572	7,574	32.1	13.0%	$84,515	$140,138	$184,670	1.7	2.2	$55,624	$100,155
CZ11	PG&E	(58,308)	10,792	33.9	9.1%	$84,515	$86,028	$102,806	1.0	1.2	$1,513	$18,291
CZ12	PG&E	(58,409)	10,678	33.4	8.8%	$84,515	$53,554	$102,291	0.6	1.2	$(30,961)	$17,777
CZ12-2	SMUD	(58,409)	10,678	33.4	8.8%	$84,515	$110,597	$102,291	1.3	1.2	$26,082	$17,777
CZ13	PG&E	(43,265)	9,590	30.5	9.5%	$84,515	$84,765	$104,812	1.0	1.2	$250	$20,297
CZ14	SDG&E	(70,979)	10,986	30.0	7.7%	$84,515	$88,727	$80,053	1.0	0.9	$4,213	$(4,462)
CZ14-2	SCE	(70,979)	10,986	30.0	7.7%	$84,515	$18,453	$80,053	0.2	0.9	$(66,062)	$(4,462)
CZ15	SCE	55,545	3,890	23.4	15.6%	$84,515	$167,981	$235,297	2.0	2.8	$83,466	$150,782
CZ16	PG&E	(217,178)	18,599	45.5	-18.9%	$58,676	$(263,234)	$(289,187)	-4.5	-4.9	$(321,910)	$(347,863)
CZ16-2	LADWP	(217,178)	18,599	45.5	-18.9%	$58,676	$18,637	$(289,187)	0.3	-4.9	$(40,040)	$(347,863)

Figure 7. Cost-effectiveness for Large Office: All-Electric + Eff + PV

CZ	Utility	Annual Elec Savings (kWh)	Annual Gas Savings (therms)	Annual GHG Reductions (tons)	Comp-liance Margin	Upfront Incremental Package Cost	Lifecycle Utility Cost Savings	Lifecycle $TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
CZ01	PG&E	208,501	16,395	61.2	-11.3%	$669,506	$793,703	$652,657	1.2	0.97	$124,197	$(16,848)
CZ02	PG&E	355,791	12,600	58.7	6.1%	$669,506	$1,091,002	$1,033,622	1.6	1.5	$421,496	$364,116
CZ03	PG&E	399,620	9,905	53.8	5.5%	$669,506	$1,168,136	$1,041,892	1.7	1.6	$498,630	$372,386
CZ04	PG&E	440,513	8,778	54.6	9.2%	$695,344	$1,265,593	$1,150,898	1.8	1.7	$570,248	$455,553
CZ04-2	CPAU	440,513	8,778	54.6	9.2%	$695,344	$1,252,581	$1,150,898	1.8	1.7	$557,237	$455,553
CZ05	PG&E	401,653	11,756	59.1	2.2%	$669,506	$1,239,738	$1,068,395	1.9	1.6	$570,232	$398,889
CZ05-2	SoCalGas	401,653	11,756	59.1	2.2%	$669,506	$1,177,244	$1,068,395	1.8	1.6	$507,738	$398,889
CZ06	SCE	465,400	7,088	54.1	12.6%	$695,344	$680,649	$1,210,243	0.98	1.7	$(14,695)	$514,899
CZ06-2	LADWP	465,400	7,088	54.1	12.6%	$695,344	$579,838	$1,210,243	0.8	1.7	$(115,506)	$514,899
CZ07	SDG&E	517,218	5,092	54.0	14.1%	$695,344	$1,360,957	$1,282,704	2.0	1.8	$665,612	$587,360
CZ08	SCE	481,259	6,371	53.4	13.6%	$695,344	$685,891	$1,274,010	0.99	1.8	$(9,453)	$578,665
CZ08-2	LADWP	481,259	6,371	53.4	13.6%	$695,344	$575,703	$1,274,010	0.8	1.8	$(119,642)	$578,665
CZ09	SCE	492,757	6,444	53.9	13.8%	$695,344	$692,836	$1,283,827	0.99	1.8	$(2,508)	$588,483
CZ09-2	LADWP	492,757	6,444	53.9	13.8%	$695,344	$582,237	$1,283,827	0.8	1.8	$(113,108)	$588,483
CZ10	SDG&E	478,753	7,574	56.7	13.0%	$695,344	$1,296,256	$1,229,995	1.9	1.8	$600,912	$534,651
CZ10-2	SCE	478,753	7,574	56.7	13.0%	$695,344	$674,381	$1,229,995	0.97	1.8	$(20,964)	$534,651
CZ11	PG&E	399,585	10,792	55.4	9.1%	$695,344	$1,162,457	$1,129,930	1.7	1.6	$467,113	$434,585
CZ12	PG&E	392,978	10,678	54.0	8.8%	$695,344	$1,131,755	$1,115,934	1.6	1.6	$436,411	$420,590
CZ12-2	SMUD	392,978	10,678	54.0	8.8%	$695,344	$904,425	$1,115,934	1.3	1.6	$209,080	$420,590
CZ13	PG&E	404,328	9,590	50.6	9.5%	$695,344	$1,150,674	$1,095,498	1.7	1.6	$455,329	$400,153
CZ14	SDG&E	449,987	10,986	57.4	7.7%	$695,344	$1,231,844	$1,289,059	1.8	1.9	$536,499	$593,715
CZ14-2	SCE	449,987	10,986	57.4	7.7%	$695,344	$631,960	$1,289,059	0.91	1.9	$(63,384)	$593,715
CZ15	SCE	544,152	3,890	49.3	15.6%	$695,344	$692,819	$1,335,246	0.99	1.9	$(2,526)	$639,902
CZ16	PG&E	269,671	18,599	69.9	-18.9%	$669,506	$846,748	$748,403	1.3	1.1	$177,242	$78,897
CZ16-2	LADWP	269,671	18,599	69.9	-18.9%	$669,506	$418,341	$748,403	0.6	1.1	$(251,165)	$78,897

The Reach Code Team tested the All-Electric + Efficiency package in 2022 software to ascertain potential improvements in cost-effectiveness resulting from 2022 weather files and TDV, because the TDV intensity of electricity usage is lower in 2022 versus 2019 TDV (i.e., electricity usage has become less valuable, and thus electrification may be less penalized in the compliance software). Figure 8 depicts the growing TDV intensity of gas and the lower intensity of electricity for the Large Office when comparing the 2022 annual TDV consumption of the mixed-fuel baseline to the 2019 annual TDV consumption. The overall 2022 TDV energy consumption is lower than 2019.

Figure 8. Annual TDV Energy Consumption Mixed-Fuel Baseline, 2019 and 2022

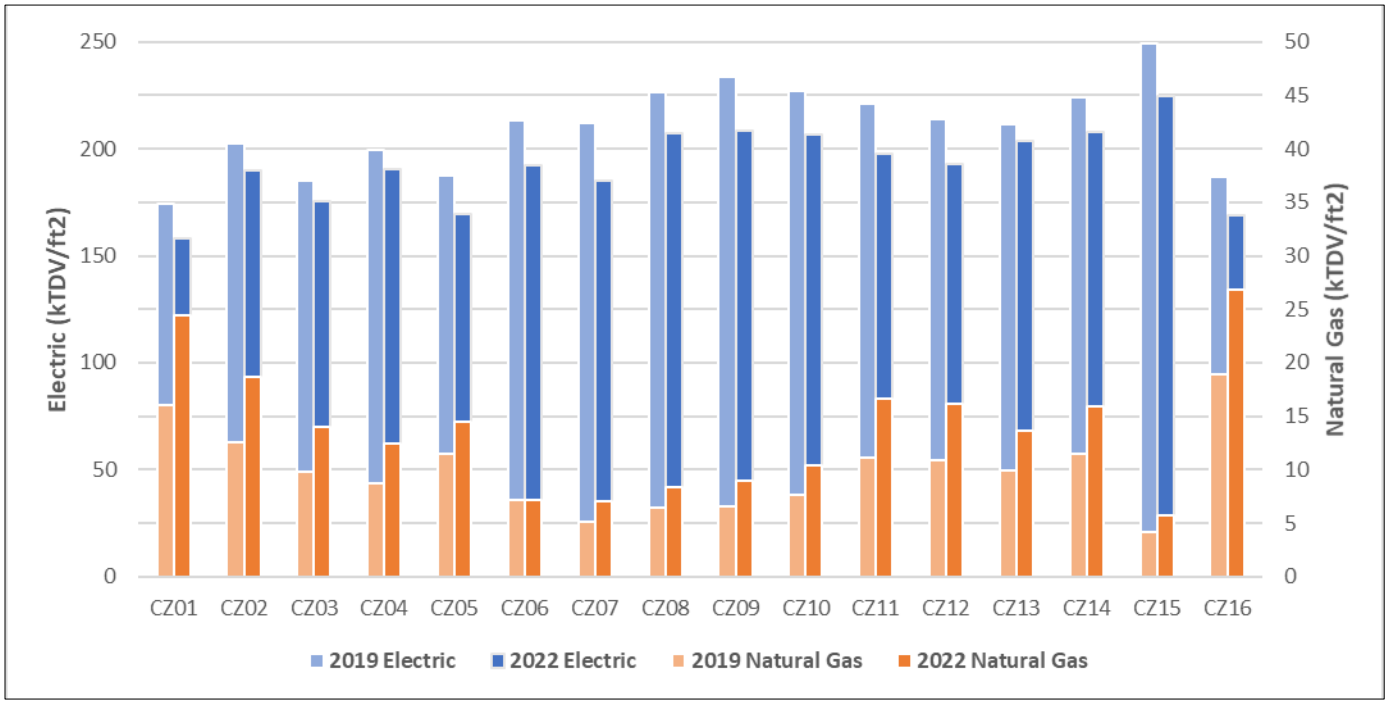
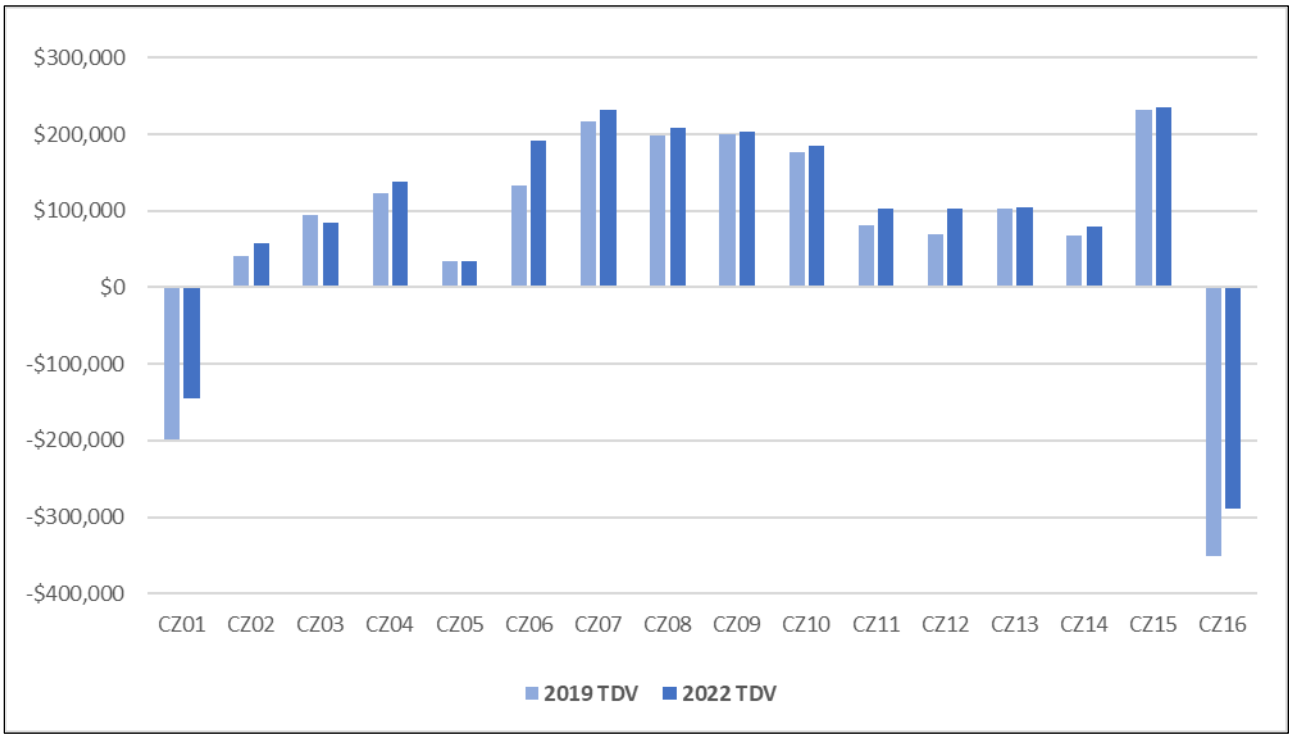


Figure 9 shows that the 2022 TDV savings of the All-Electric + Eff packages are lower than 2019 for all CZs except CZ3. This may be because the 1) overall TDV consumption of the mixed-fuel baseline is lower in 2022, as shown above, and thus the available savings are also smaller, and 2) the largest energy efficiency gains are resulting from lighting measure electricity savings, and these savings are less valued under 2022 TDV.

Figure 9. TDV Savings for All-Electric + Eff Packages, 2019 vs 2022



Cost-effectiveness does not show significant improvement in Figure 10. Note that the software outputs for 2022 compliance margins are not reported. The 2022 Energy Code compliance software is still in development.

Figure 10. Cost-effectiveness for Large Office: All-Electric + Eff 2022

CZ	Utility	Annual Elec Savings (kWh)	Annual Gas Savings (therms)	Annual GHG Reductions (tons)	Comp-liance Margin	Upfront Incremental Package Cost	Lifecycle Utility Cost Savings	Lifecycle $TDV Savings	B/C Ratio (On-bill)	B/C Ratio (TDV)	NPV (On-bill)	NPV (TDV)
CZ01	PG&E	(187,142)	18,821	36.4	<0	$58,676	$(107,652)	$(197,805)	-1.8	-3.4	$(166,328)	$(256,481)
CZ02	PG&E	(106,635)	14,094	39.2	>0	$58,676	$40,368	$41,623	0.7	0.7	$(18,308)	$(17,054)
CZ03	PG&E	(50,653)	10,650	38.2	>0	$58,676	$132,079	$95,007	2.3	1.6	$73,402	$36,331
CZ04	PG&E	(26,266)	9,368	40.1	>0	$84,515	$177,292	$122,821	2.1	1.5	$92,777	$38,306
CZ04-2	CPAU	(26,266)	9,368	40.1	>0	$84,515	$229,143	$122,821	2.7	1.5	$144,628	$38,306
CZ05	PG&E	(62,776)	11,028	36.7	>0	$58,676	$123,433	$33,729	2.1	0.6	$64,757	$(24,948)
CZ05-2	SoCalGas	(62,776)	11,028	36.7	>0	$58,676	$64,558	$33,729	1.1	0.6	$5,882	$(24,948)
CZ06	SCE	14,532	5,151	41.7	>0	$84,515	$117,536	$133,269	1.4	1.6	$33,021	$48,754
CZ06-2	LADWP	14,532	5,151	41.7	>0	$84,515	$120,465	$133,269	1.4	1.6	$35,951	$48,754
CZ07	SDG&E	42,566	5,313	42.0	>0	$84,515	$330,250	$217,762	3.9	2.6	$245,735	$133,248
CZ08	SCE	30,239	6,218	41.9	>0	$84,515	$161,511	$198,882	1.9	2.4	$76,997	$114,367
CZ08-2	LADWP	30,239	6,218	41.9	>0	$84,515	$162,228	$198,882	1.9	2.4	$77,714	$114,367
CZ09	SCE	24,495	6,646	41.2	>0	$84,515	$158,352	$201,004	1.9	2.4	$73,838	$116,490
CZ09-2	LADWP	24,495	6,646	41.2	>0	$84,515	$162,958	$201,004	1.9	2.4	$78,444	$116,490
CZ10	SDG&E	5,973	7,669	42.9	>0	$84,515	$315,200	$176,958	3.7	2.1	$230,686	$92,443
CZ10-2	SCE	5,973	7,669	42.9	>0	$84,515	$146,716	$176,958	1.7	2.1	$62,202	$92,443
CZ11	PG&E	(69,606)	12,156	40.1	>0	$84,515	$108,111	$81,549	1.3	0.96	$23,596	$(2,966)
CZ12	PG&E	(67,837)	11,933	38.4	>0	$84,515	$101,811	$70,264	1.2	0.8	$17,297	$(14,251)
CZ12-2	SMUD	(67,837)	11,933	38.4	>0	$84,515	$118,718	$70,264	1.4	0.8	$34,204	$(14,251)
CZ13	PG&E	(39,003)	9,930	37.3	>0	$84,515	$127,205	$102,422	1.5	1.2	$42,691	$17,908
CZ14	SDG&E	(66,480)	11,529	35.5	>0	$84,515	$190,690	$67,444	2.3	0.8	$106,175	$(17,071)
CZ14-2	SCE	(66,480)	11,529	35.5	>0	$84,515	$74,832	$67,444	0.89	0.8	$(9,683)	$(17,071)
CZ15	SCE	60,850	4,137	38.4	>0	$84,515	$167,823	$231,422	2.0	2.7	$83,309	$146,907
CZ16	PG&E	(233,692)	20,003	37.1	<0	$58,676	$(250,720)	$(350,853)	-4.3	-6.0	$(309,396)	$(409,529)
CZ16-2	LADWP	(233,692)	20,003	37.1	<0	$58,676	$43,985	$(350,853)	0.7	-6.0	$(14,691)	$(409,529)

5 Summary of Results

The Reach Code Team developed packages of energy efficiency measures as well as packages combining energy efficiency with PV generation and battery storage systems, simulated them in CBECC-Com, and gathered costs to determine the cost-effectiveness of multiple scenarios. The Reach Code Team coordinated assumptions with multiple utilities, cities, and building community experts to develop a set of assumptions considered reasonable in the current market. Changing assumptions, such as the period of analysis, measure selection, cost assumptions, energy escalation rates, or utility tariffs are likely to change results.

Figure 11 summarizes results for the Large Office prototype and depicts the compliance margins achieved for each CZ and package. Because local reach codes must both exceed the Energy Commission performance budget (i.e., have a positive compliance margin) and be cost-effective, the Reach Code Team highlighted cells meeting these two requirements to help clarify the upper boundary for potential reach code policies:

- Cells highlighted in green depict a positive compliance margin and cost-effective results using both on-bill and TDV approaches.
- Cells highlighted in yellow depict a positive compliance and cost-effective results using either the on-bill or TDV approach.
- Cells not highlighted either depict a negative compliance margin or a package that was not cost-effective using either the on-bill or TDV approach.

The Reach Code Team found that electrifying Large Office HVAC and adding efficiency measures is generally cost-effective. The all-electric plus energy efficiency packages are cost-effective in all CZs except 1, 2, 5-2 (SoCalGas), 14-2 (SCE), and 16. Adding solar PV makes the efficiency packages cost-effective in all CZs, though do not achieve positive compliance margins in CZs 1 and 16. Reach codes may require all-electric large offices in all CZs except 1 and 16, but must include solar PV requirements in CZs 2, 5-2, and 14-2.

Figure 11. Large Office Summary of Compliance Margin and Cost-effectiveness

CZ	Utility	All Electric (2019 TDV)			All Electric (2022 TDV)
		AE	AE + Eff	AE + Eff + PV	AE + Eff
CZ01	PG&E	-30%	-11%	-11%	<0
CZ02	PG&E	-12%	6%	6%	>0
CZ03	PG&E	-17%	5%	5%	>0
CZ04	PG&E	-11%	9%	9%	>0
CZ04-2	CPAU	-11%	9%	9%	>0
CZ05	PG&E	-18%	2%	2%	>0
CZ05-2	SoCalGas	-18%	2%	2%	>0
CZ06	SCE	-8%	13%	13%	>0
CZ06-2	LADWP	-8%	13%	13%	>0
CZ07	SDG&E	-8%	14%	14%	>0
CZ08	SCE	-5%	14%	14%	>0
CZ08-2	LADWP	-5%	14%	14%	>0
CZ09	SCE	-3%	14%	14%	>0
CZ09-2	LADWP	-3%	14%	14%	>0
CZ10	SDG&E	-5%	13%	13%	>0
CZ10-2	SCE	-5%	13%	13%	>0
CZ11	PG&E	-6%	9%	9%	>0
CZ12	PG&E	-7%	9%	9%	>0
CZ12-2	SMUD	-7%	9%	9%	>0
CZ13	PG&E	-6%	10%	10%	>0
CZ14	SDG&E	-7%	8%	8%	>0
CZ14-2	SCE	-7%	8%	8%	>0
CZ15	SCE	2%	16%	16%	>0
CZ16	PG&E	-38%	-19%	-19%	<0
CZ16-2	LADWP	-38%	-19%	-19%	<0

6 References

E3. (2021). Retrieved from https://efiling.energy.ca.gov/GetDocument.aspx?tn=233260&DocumentContentId=65748

E-CFR. (2020). Retrieved from Electronic Code of Federal Regulations: https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=8de751f141aaa1c1c9833b36156faf67&mc=true&n=pt10.3.431&r=PART&ty=HTML#se10.3.431_197

Energy & Environmental Economics. (2019). *Residential Building Electrification in California.* Retrieved from https://www.ethree.com/wp-content/uploads/2019/04/E3_Residential_Building_Electrification_in_California_April_2019.pdf

Energy & Environmental Economics. (2021). *Staff Workshop - 2022 Energy Code Compliance Metrics*. Retrieved from https://www.energy.ca.gov/event/workshop/2020-03/staff-workshop-2022-energy-code-compliance-metrics

Navigant. (2018). Retrieved from http://calmac.org/publications/LED_Pricing_Analysis_Report_-_Revised_1.19.2018_Final.pdf

NORESCO. (2020). *Time Dependent Valuation of Energy for Developing Building Efficiency Standards.* Retrieved from https://efiling.energy.ca.gov/GetDocument.aspx?tn=233257&DocumentContentId=65743

Raftery, Geronazzo, Cheng, and Paliaga. (2018). *Quantifying energy losses in hot water reheat systems. Energy and Buildings.* Retrieved from https://doi.org/10.1016/j.enbuild.2018.09.020

Seventhwave. (2015). Retrieved from https://slipstreaminc.org/sites/default/files/2018-12/task-tuning-report-mndoc-2015.pdf

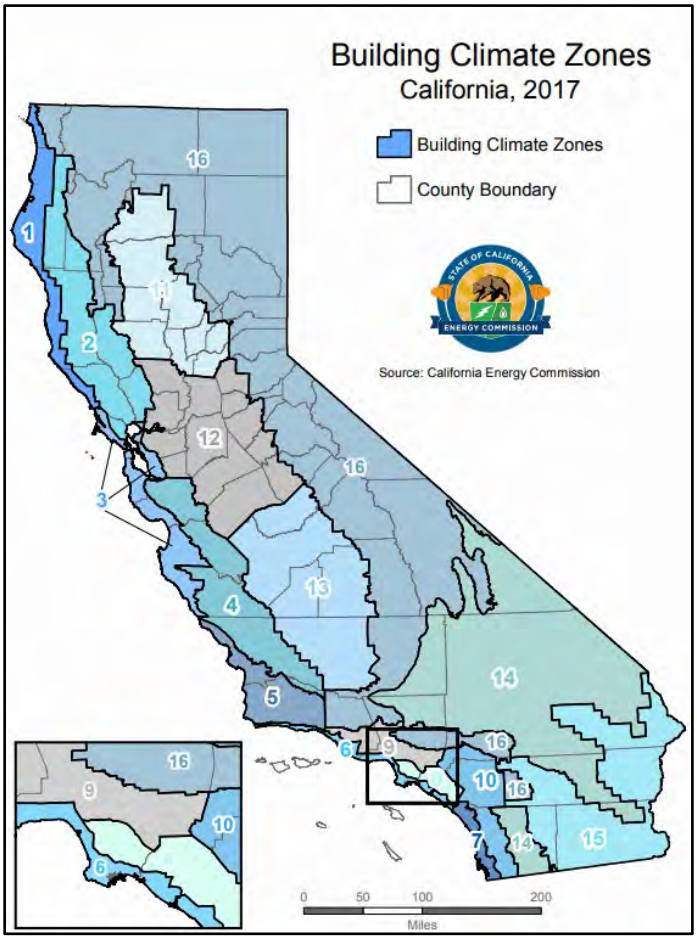
Statewide Utility Team. (2020, September 24). *2019 Nonresidential New Construction Reach Code Cost Effectiveness Study.* Retrieved from https://efiling.energy.ca.gov/GetDocument.aspx?tn=233820-7&DocumentContentId=66491

7 Appendices

7.1 Map of California CZs

CZ geographical boundaries are depicted in Figure 12. The map in Figure 12 along with a zip-code search directory is available at: https://ww2.energy.ca.gov/maps/renewable/building_climate_zones.html

Figure 12. Map of California CZs



7.2 Utility Rate Schedules

The Reach Code Team used the IOU rate tariffs listed in to determine the on-bill savings for each prototype.

Figure 13. Utility Tariffs Analyzed Based on CZ: Detailed View

CZ	Electric/Gas Utility	Electricity (TOU)	Natural Gas
CZ01	PG&E	B-10	G-NR1
CZ02	PG&E	B-10	G-NR1
CZ03	PG&E	B-10	G-NR1
CZ04	PG&E	B-10	G-NR1
CZ04-2	CPAU	E-2	G-2
CZ05	PG&E	B-10	G-NR1
CZ05-2	PG&E/SoCalGas	B-10	G-10 (GN-10)
CZ06	SCE/SoCalGas	TOU-GS-3	G-10 (GN-10)
CZ06-2	LADWP/SoCalGas	A-2	G-10 (GN-10)
CZ07	SDG&E	AL-TOU+EECC	GN-3
CZ08	SCE/SoCalGas	TOU-GS-3	G-10 (GN-10)
CZ08-2	LADWP/SoCalGas	A-2	G-10 (GN-10)
CZ09	SCE/SoCalGas	TOU-GS-3	G-10 (GN-10)
CZ09-2	LADWP/SoCalGas	A-2	G-10 (GN-10)
CZ10	SDG&E	AL-TOU+EECC	GN-3
CZ10-2	SCE/SoCalGas	TOU-GS-3	G-10 (GN-10)
CZ11	PG&E	B-10	G-NR1
CZ12	PG&E	B-10	G-NR1
CZ12-2	SMUD/PG&E	GSS	G-NR1
CZ13	PG&E	B-10	G-NR1
CZ14	SDG&E	AL-TOU+EECC	GN-3
CZ14-2	SCE/SoCalGas	TOU-GS-3	G-10 (GN-10)
CZ15	SCE/SoCalGas	TOU-GS-3	G-10 (GN-10)
CZ16	PG&E	B-10	G-NR1
CZ16-2	LADWP/PG&E	A-2	G-NR1

Utility rates are assumed to escalate over time, using assumptions from research conducted by Energy and Environmental Economics (E3) in the 2019 study Residential Building Electrification in California (Energy & Environmental Economics, 2019) and escalation rates used in the development of the 2022 TDV multipliers (Energy & Environmental Economics, 2021). Figure 14 demonstrates the escalation rates used for nonresidential buildings above inflation.

Figure 14. Real Utility Rate Escalation Rate Assumptions Above Inflation

Year	Source	Statewide Electric Nonresidential Average Rate (%/year, real)	Natural Gas Nonresidential Core Rate (%/year, real)
2020	E3 2019	2.0%	4.3%
2021	E3 2019	2.0%	4.3%
2022	E3 2019	2.0%	2.7%
2023	E3 2019	2.0%	4.0%
2024	2022 TDV	0.7%	7.7%
2025	2022 TDV	0.5%	5.5%
2026	2022 TDV	0.7%	5.6%
2027	2022 TDV	0.2%	5.6%
2028	2022 TDV	0.6%	5.7%

2029	2022 TDV	0.7%	5.7%
2030	2022 TDV	0.6%	5.8%
2031	2022 TDV	0.6%	3.3%
2032	2022 TDV	0.6%	3.6%
2033	2022 TDV	0.6%	3.4%
2034	2022 TDV	0.6%	3.4%

7.3 Efficiency Measures for Large Office

The Reach Code Team applied the efficiency measures from the 2019 Nonresidential Reach Code Cost-Effectiveness Study to the Large Office. These measures are listed below. Refer to Figure 15 for cost information reproduced from the 2019 study.

- **Modify SHGC fenestration**: In all CZs, Reduce window SHGC from the prescriptive value of 0.25 to 0.22. The fenestration visible transmittance and U-factor remain at prescriptive values.
- **Fenestration as a function of orientation**: Limit the amount of fenestration area as a function of orientation. East-facing and west-facing windows are each limited to one-half of the average amount of north-facing and south-facing windows.
- **VAV box minimum flow**: Reduce VAV box minimum airflows from the current T24 prescriptive requirement of 20 percent of maximum (design) airflow to the T24 zone ventilation minimums.[1]
- **Interior lighting reduced LPD**: Reduce LPD by 15 percent.
- **Institutional tuning**: Limit the maximum output or maximum power draw of lighting to 85 percent of full light output or full power draw.
- **Daylight dimming plus off**: Turn daylight-controlled lights completely off when the daylight available in the daylit zone is greater than 150 percent of the illuminance received from the general lighting system at full power. There is no associated cost with this measure, as the 2019 T24 Standards already require multilevel lighting and daylight sensors in primary and secondary daylit spaces. This measure is simply a revised control strategy, and does not increase the number of sensors required or labor to install and program a sensor
- **Occupant sensing in open plan offices**: In an open plan office area greater than 250 ft^2, control lighting based on occupant sensing controls. Two workstations per occupancy sensor.

Figure 15. Energy Efficiency Measures for Large Office

Measure	Baseline T24 Requirement	Incremental Cost	Sources & Notes
Modify SHGC Fenestration	SHGC of 0.25	$1.60 /ft^2 window for SHGC decreases, $0/ft^2 for SHGC increases	Costs from major U.S. manufacturer.
Fenestration as a Function of Orientation	Limit on total window area and west-facing window area as a function of wall area.	$0	No additional cost associated with the measure; measure is a design consideration not an equipment cost.
VAV Box Minimum Flow	20 percent of maximum (design) airflow	$0	No additional cost associated with the measure; measure is a design consideration not an equipment cost.
Interior Lighting Reduced LPD	Per Area Category Method, varies by Primary Function Area. Office area 0.60 – 0.70 W/ft^2 depending on area of space.	$0	Industry report on LED pricing analysis shows that costs are not correlated with efficacy (Navigant, 2018)
Institutional Tuning	No requirement, but Power Adjustment Factor (PAF) credit of 0.10 available for luminaires in non-daylit areas and 0.05 for luminaires in daylit areas[2]	$0.06/ft^2	Industry report on institutional tuning (Seventhwave, 2015)
Daylight Dimming Plus Off	No requirement, but PAF credit of 0.10 available.	$0	Given the amount of lighting controls already required, this measure is no additional cost.
Occupant Sensing in Open Plan Offices	No requirement, but PAF credit of 0.30 available.	$189 /sensor; $74 /powered relay; $108 /secondary relay	2 workstations per sensor; 1 fixture per workstation; 4 workstations per master relay; 120 ft^2/workstation in open office area, which is 53% of total floor area of the office

[2] Power Adjustment Factors allow designers to tradeoff increased lighting power densities for more efficient designs. In this study, PAF-related measures assume that the more efficient design is incorporated without a tradeoff for increased lighting power density.

7.4 Mixed-Fuel Baseline Energy Figures

Figure 16 show the annual electricity and natural gas consumption and cost, compliance TDV, and GHG emissions for the mixed-fuel design baseline Large Office. The compliance margins are non-zero in some cases and represent typical baseline compliance margins with prescriptive prototypes. The non-zero compliance margins are largely a result of compliance software complexities, and they are not expected to significantly impact the proposed case results or nature of recommendations.

Figure 16. Large Office: Mixed-Fuel Baseline

CZ	Utility	Annual Electricity Consumption (kWh)	Annual Natural Gas Consumption (therms)	Annual Electricity Cost	Annual Natural Gas Cost	Compliance Margin	Annual GHG Emissions (mton)
CZ01	PG&E	1,215,150	16,395	$285,639	$18,373	-0.2%	234
CZ02	PG&E	1,319,740	12,600	$319,306	$14,117	2.5%	223
CZ03	PG&E	1,266,120	9,905	$301,581	$11,148	-1.0%	202
CZ04	PG&E	1,317,420	8,779	$315,439	$9,962	0.3%	202
CZ04-2	CPAU	1,317,420	8,779	$300,066	$11,493	0.3%	202
CZ05	PG&E	1,274,340	11,756	$304,572	$13,106	-0.4%	212
CZ05-2	SoCalGas	1,274,340	11,756	$304,572	$9,512	-0.4%	212
CZ06	SCE	1,363,960	7,088	$181,861	$6,093	1.1%	196
CZ06-2	LADWP	1,363,960	7,088	$138,338	$6,093	1.1%	196
CZ07	SDG&E	1,346,930	5,092	$411,744	$4,401	-0.5%	186
CZ08	SCE	1,383,530	6,371	$185,083	$5,308	2.4%	195
CZ08-2	LADWP	1,383,530	6,371	$140,976	$5,308	2.4%	195
CZ09	SCE	1,407,310	6,444	$190,030	$5,259	4.0%	200
CZ09-2	LADWP	1,407,310	6,444	$145,758	$5,259	4.0%	200
CZ10	SDG&E	1,402,250	7,574	$430,610	$6,419	3.5%	205
CZ10-2	SCE	1,402,250	7,574	$186,796	$6,018	3.5%	205
CZ11	PG&E	1,401,560	10,792	$336,954	$12,362	4.2%	224
CZ12	PG&E	1,361,920	10,678	$327,386	$12,186	3.6%	218
CZ12-2	SMUD	1,361,920	10,678	$190,932	$12,186	3.6%	218
CZ13	PG&E	1,405,300	9,590	$336,926	$11,074	4.1%	217
CZ14	SDG&E	1,404,070	10,986	$430,133	$8,626	3.8%	224
CZ14-2	SCE	1,404,070	10,986	$186,646	$8,527	3.8%	224
CZ15	SCE	1,560,390	3,890	$204,763	$3,365	5.8%	204
CZ16	PG&E	1,311,220	18,599	$307,718	$21,068	-0.4%	258
CZ16-2	LADWP	1,311,220	18,599	$127,503	$14,046	-0.4%	258

MCE's Planning to Support Greater Building Electrification

12/22/21

MCE was formed for the express purpose of empowering its member communities to choose supply-side and demand-side resources that reflect their specific values and needs. Member community values and needs are reflected in the procurement principles, goals, targets, and directives reviewed and adopted by MCE's governing Board via MCE's Operational Integrated Resource Plan (OIRP). MCE's 2022 OIRP (this document) has a planning period of 2022 through 2031 and takes into account numerous dimensions:

- Load forecasts based on the number and types of customers, potential service territory expansions, opt-out rates, electrification trends, demand-side resources, and weather;
- Renewables and emissions targets;
- Agency-wide budgetary considerations and customer rate implications;
- Long-term contracting requirements and goals for new steel in the ground;
- Grid reliability needs and capacity requirements, including regulatory mandates;
- Market price hedging needs;
- Goals for local resources, local resiliency

MCE's Procurement Process MCE has a well-established procurement process that includes the following ten key activities:

1. Forecasting load based on the number and types of customers, potential service territory expansions, opt-out rates, electrification trends, demand-side resources, and weather;
2. Integrated resource planning based on load forecasts, renewables and emissions targets, agency-wide budgetary considerations and customer rate implications, long-term contracting requirements and goals for new steel in the ground, grid reliability needs and capacity requirements, market price hedging needs and goals for local resources, local resiliency, and local workforce development;
3. Calculating open positions and interim volumetric needs based on MCE's risk management policies;
4. Soliciting volumetric needs through Requests for Offers (RFOs), bilateral discussions or brokers;
5. Evaluating offers using a combination of proprietary and public models;
6. Negotiating (and ultimately executing) power purchase agreements, while enabling agreements and confirmations including credit provisions and collateral requirements;
7. Managing pre-Commercial Operation Date (COD) executed contracts and monitoring progress towards key development milestones (such as interconnection status, deliverability studies, siting, zoning, permitting, financing, construction, commercial operation, etc.);
8. Managing post-COD executed contracts: obtaining generation forecasts, bidding and scheduling resources into the CAISO, validating and paying invoices;
9. Bidding and scheduling MCE's load into the CAISO; and
10. Regulatory compliance reporting.

Electrification assumptions come from the CPUC's Integrated Energy Policy Report (IEPR) which accounts for state level policy goals for building and transportation electrification. To learn more please see the report here.

Below are slides from:

11/10/21 Power Association of Northern California (PANC) Presentation from the CEC - On Future Planning

Seven Broad Strategies of Building Decarbonization

1. Building end-use electrification
2. Decarbonizing electricity generation system
3. Distributed energy resources
4. Refrigerant conversion and leakage reduction
5. Energy efficiency
6. Demand flexibility
7. Decarbonizing gas system

DER ACTION PLAN 2.0

Structure and Initiatives List

TRACK ONE	TRACK TWO	TRACK THREE	TRACK FOUR
Load Flexibility & Rates	Grid Infrastructure	Market Integration	DER Customer Programs

• Net Energy Metering
• PG&E Day Ahead Hourly Real Time Pricing (DAHRTP) Rate and Pilot Application to Evaluate Customer Understanding and Supporting Technology
• SDG&E, PG&E and SCE GRC Phase 2
• Rate Design Applications for evaluating and implementing default residential TOU rate designs
• SDG&E Application for Approval of Electric Vehicle High Power (EV-HP) Charging Rate Application
• Load Flexibility Management, recommended by CPUC staff
• CEC's Load Management Standard
	• High DER Grid Planning
	• Streamlining Interconnection of Distributed Energy Resources and Improvements to Rule 21
	• Microgrids
	• PG&E, SCE and SDG&E General Rate Case Phase 1
		• Resource Adequacy
		• Successor Storage and/or Demand Response, as recommended by CPUC staff
		• Streamlining Interconnection of Distributed Energy Resources and Improvements to Rule 21
		• FERC Proceedings
		• Potential CAISO Initiatives:
		  • Energy Storage and Distributed Energy Resources,
		  • Energy Storage Enhancements,
		  • Hybrid Resources,
		  • Transmission Planning Process,
		  • Storage as a Transmission Asset,
		  • Dispatch Enhancements
			• Integrated Distributed Energy Resources
			• Self-Generation Incentive Program
			• Energy Efficiency
			• Building Decarbonization
			• Transportation Electrification
			• Demand Response
			• Net Energy Metering
			• Energy Savings Assistance Program

January 6, 2022

Contra Costa Board of Supervisors

RE: DRAFT ELECTRIC NEW BUILDING ORDINANCE

Dear Members of the Board,

Thank you for moving forward on the proposed ordinance to ban natural gas in all new residences, and many new nonresidential buildings. We have reviewed the draft ordinance, and only have a couple of comments:

1. The ordinance is silent on new commercial buildings where HVAC and water heating systems are installed prior to occupancy types being identified (where a building is a multiple tenant type, and where a single tenant may have both applicable and exempt space types). On December 13, I spoke to Demian Hardman-Saldana about this, and he assured me – to our organization's satisfaction – that planning and building department staff will not allow natural gas infrastructure to be installed unless a space is an exempt occupancy type.

2. Solar Thermal Systems. While this proposed ordinance has been characterized as an "electrification" ordinance, its purpose is to stop new buildings from burning fossil fuels. Therefore, solar thermal space heating and water heating systems ought to be allowed (and encouraged). Section III (b) includes a definition for All-Electric Building. The definition's final line is "An all-electric building may utilize solar thermal pool heating."

   We propose that this line's wording change to "An all-electric building may utilize solar thermal space and solar water heating".

We look forward to working with the County on additional programs to phase out fossil fuels in transportation, and in all buildings – new and existing.

Please feel free to contact me should you need any additional information.

Gary Farber, on behalf of 350 Contra Costa

cc: Demian Hardman-Saldana, Wes Sullens, Clerk of the Board

ORDINANCE NO. 2022-02

ADOPTION AND AMENDMENT OF THE 2019 CALIFORNIA ENERGY CODE TO REQUIRE CERTAIN NEWLY CONSTRUCTED BUILDINGS TO BE ALL-ELECTRIC BUILDINGS

The Contra Costa County Board of Supervisors ordains as follows (omitting the parenthetical footnotes from the official text of the enacted or amended provisions of the County Ordinance Code):

SECTION I. SUMMARY. This ordinance adopts and amends the 2019 California Energy Code to require all newly constructed residential buildings, hotels, offices, and retail buildings to be constructed as all-electric buildings without natural gas infrastructure. This ordinance is adopted pursuant to Health and Safety Code sections 17922, 17958, 17958.5, 17958.7, and 18941.5, Public Resources Code section 25402.1(h)(2), and Government Code sections 50020 through 50022.10.

SECTION II. Section 74-2.002 (Adoption) of Division 74 (Building Code) of the County Ordinance Code is amended to read:

74-2.002 Adoption.

(a) The building code of this county is the 2019 California Building Code (California Code of Regulations, Title 24, Part 2, Volumes 1 and 2), the 2019 California Residential Code (California Code of Regulations, Title 24, Part 2.5), the 2019 California Green Building Standards Code (California Code of Regulations, Title 24, Part 11), the 2019 California Existing Building Code (California Code of Regulations, Title 24, Part 10), and the 2019 Energy Code (California Code of Regulations, Title 24, Part 6), as amended by the changes, additions, and deletions set forth in this division and Division 72.

(b) The 2019 California Building Code, with the changes, additions, and deletions set forth in Chapter 74-4 and Division 72, is adopted by this reference as though fully set forth in this division.

(c) The 2019 California Residential Code, with the changes, additions, and deletions set forth in Chapter 74-4 and Division 72, is adopted by this reference as though fully set forth in this division.

(d) The 2019 California Green Building Standards Code, with the changes, additions, and deletions set forth in Chapter 74-4 and Division 72, is adopted by this reference as though fully set forth in this division.

(e) The 2019 California Existing Building Code, with the changes, additions, and deletions set forth in Chapter 74-4 and Division 72, is adopted by this reference as though fully set forth in this division.

(f) The 2019 California Energy Code, with the changes, additions, and deletions set forth in Chapter 74-4 and Division 72, is adopted by this reference as though fully set forth in this division.

(g) At least one copy of this building code is now on file with the building inspection division, and the other requirements of Government Code section 50022.6 have been and shall be complied with.

(h) As of the effective date of the ordinance from which this division is derived, the provisions of the building code are controlling and enforceable within the county. (Ords. 2022-02 § 2, 2019-31 § 2, 2016-22 § 2, 2013-24 § 2, 2011-03 § 2, 2007-54 §3, 2002-31 § 3, 99-17 § 5, 99-1, 90-100 § 5, 87-55 § 4, 80-14 § 5, 74-30.)

SECTION III. Section 74.4.010 (Amendments to CEnC) is added to Chapter 74-4 (Modifications) of Division 74 (Building Code) of the County Ordinance Code, to read:

74-4.010 Amendments to CEnC. The 2019 California Energy Code ("CEnC") is amended by the changes, additions, and deletions set forth in this chapter and Division 72. Section numbers used below are those of the 2019 California Energy Code.

(a) Section 100.0(e)(2)(A) of CEnC Subchapter 1 (All Occupancies - General Provisions) is amended to read:

A. **All newly constructed buildings.**

i. Sections 110.0 through 110.12 apply to all newly constructed buildings within the scope of Section 100.0(a). In addition, newly constructed buildings shall meet the requirements of Subsection B, C, D, or E, as applicable.

ii. A newly constructed building that is any of the following building types shall be an all-electric building:

a. Residential.

b. Detached accessory dwelling unit.

c. Hotel.

d. Office.

e. Retail.

Exception to Section 100.0(e)(2)(A)(ii): Development projects that have obtained vested rights before the effective date of this subsection (ii) or June 1, 2022, whichever is later, pursuant to a development agreement in accordance with Government Code section 65866, a vesting tentative map in accordance with Government Code section 66998.1, or other applicable law, are exempt for the requirements of Section 100.0(e)(2)(A)(ii).

(b) Section 100.1(b) (Definitions) of CEnC Subchapter 1 (All Occupancies - General Provisions) is amended by adding the following definition:

ALL-ELECTRIC BUILDING means a building that has no natural gas or propane plumbing installed within the building, and that uses electricity as the sole source of energy for its space heating (including heating of all indoor and outdoor spaces of the building), water heating (including heating of indoor and outdoor pools and spas), cooking appliances, and clothes drying appliances. An all-electric building may utilize solar thermal pool heating.

(Ord. 2022-02 § 3.)

SECTION IV. VALIDITY. The Contra Costa County Board of Supervisors declares that if any section, paragraph, sentence, or word of this ordinance or of the 2019 California Energy Code as adopted and amended herein is declared for any reason to be invalid, it is the intent of the Contra Costa County Board of Supervisors that it would have passed all other portions or provisions of this ordinance independent of the elimination herefrom any portion or provision as may be declared invalid.

SECTION V. EFFECTIVE AND OPERATIVE DATE. This ordinance becomes effective, but not operative, upon approval by the California Energy Commission or 30 days after passage, whichever is later. This ordinance will become operative on the effective date of this ordinance or June 1, 2022, whichever is later. Within 15 days of passage, this ordinance shall be published once in the East Bay Times, a newspaper published in this County.

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PASSED on JANUARY 18 2022, by the following vote:

AYES: John Gioia, Diane Burgis, Karen Mitchoff, Federal Glover
NOES: Candace Andersen
ABSENT: None
ABSTAIN: None

ATTEST: MONICA NINO,
Clerk of the Board of Supervisors
and County Administrator

Board Chair Karen Mitchoff

By: Deputy Clerk June McHuen

[SEAL]

KCK:
H:\Client Matters\2021\DCD\Ordinance No. 2022-02 All-Electric Buildings.wpd

January 6, 2022

Contra Costa Board of Supervisors

RE: DRAFT ELECTRIC NEW BUILDING ORDINANCE

Dear Members of the Board,

Thank you for moving forward on the proposed ordinance to ban natural gas in all new residences, and many new nonresidential buildings. We have reviewed the draft ordinance, and only have a couple of comments:

1. The ordinance is silent on new commercial buildings where HVAC and water heating systems are installed prior to occupancy types being identified (where a building is a multiple tenant type, and where a single tenant may have both applicable and exempt space types). On December 13, I spoke to Demian Hardman-Saldana about this, and he assured me – to our organization's satisfaction – that planning and building department staff will not allow natural gas infrastructure to be installed unless a space is an exempt occupancy type.

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   We propose that this line's wording change to "An all-electric building may utilize solar thermal space and solar water heating".

We look forward to working with the County on additional programs to phase out fossil fuels in transportation, and in all buildings – new and existing.

Please feel free to contact me should you need any additional information.

Gary Farber, on behalf of 350 Contra Costa

cc: Demian Hardman-Saldana, Wes Sullens, Clerk of the Board

From: Adrian Byram
Sent: Thursday, January 13, 2022 11:00 AM
To: Diane Burgis; John Gioia; District5; Karen Mitchoff; Supervisor Candace Andersen
Cc: Clerk of the Board
Subject: Ordinance to decarbonize new buildings
Attachments: CCC BOS re decarb Jan 2022_.pdf

January 12, 2022

Dear Supervisors,

Thank you for committing in the 2020 Contra Costa County Climate Emergency Resolution to require all new buildings in the unincorporated parts of the county to be all-electric, and for your December 14, 2021 vote to instruct staff to create the ordinance to make this a reality. As you may recall, many community members and groups came out to express their strong support for this action.

Sustainable Rossmoor's mission is to promote environmentally sustainable practices in Rossmoor, the surrounding community, and the world at large. Reducing the use is natural gas and other fossil fuels and replacing them with renewable energy is one of our top priorities.

We urge you to pass the new ordinance on January 18th, and look forward to a time not too far away when you will plan incentives to phase out the use of natural gas in existing buildings.

Respectfully,

Adrian Byram
President, Sustainable Rossmoor
415-465-2189

Sustainable Rossmoor

Re: The ordinance to decarbonize new buildings on the January 18th agenda

January 12, 2022

Dear Supervisors,

Thank you for committing in the 2020 Contra Costa County Climate Emergency Resolution to require all new buildings in the unincorporated parts of the county to be all-electric, and for your December 14, 2021 vote to instruct staff to create the ordinance to make this a reality. As you may recall, many community members and groups came out to express their strong support for this action.

Sustainable Rossmoor's mission is to promote environmentally sustainable practices in Rossmoor, the surrounding community, and the world at large. Reducing the use is natural gas and other fossil fuels and replacing them with renewable energy is one of our top priorities.

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Respectfully,

Adrian Byram
President, Sustainable Rossmoor

From: Andy Ferguson <
Sent: Thursday, January 13, 2022 11:55 AM
To: Karen Mitchoff
Cc: Diane Burgis; John Gioia; District5; Clerk of the Board; Supervisor Candace Andersen
Subject: Comment on Building Electrification Ordinance for 1-18-22 BOS meeting.

Dear Supervisor:

My name is Andy Ferguson of Petaluma and I am a member of the American Geophysical Union (AGU) and the American Association for the Advancement of Science.

Thank you for passing a climate emergency resolution. The last seven years have been the hottest years in history. Often, officials don't have the time to become well informed about the science behind calls to eliminate the use of natural gas/methane. I know you are extremely busy, but if you have time to review it below is a one page synopsis of some critical findings concerning natural gas/methane emissions including info about presentations on this topic at the AGU Fall Meeting held in San Francisco in Dec 2019. If you want to understand more about the gravity of the situation around natural gas emissions, the information below helps summarize certain key findings as they relate to building and local pipeline emissions. Thank you for your interest and attention to this vital issue.

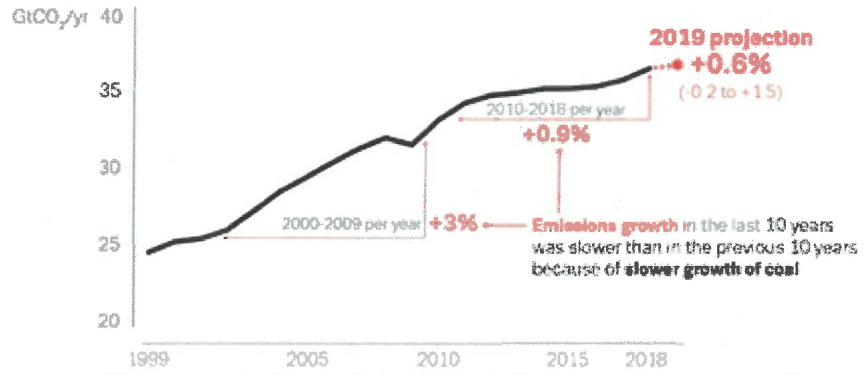
2020 Report on Methane Emissions with latest information from the American Geophysical Union Fall Meeting of Dec 2019, plus other recent research

Methane emissions, coming mainly from oil and natural gas production, appear to be growing faster than emissions from any other sources of GHGs worldwide. Because methane's atmospheric life is around 20 years or less, compared with CO2's lifespan of 300+ years, it is the current focus of public policy to reduce natural gas emissions to forestall more rapid global warming. A graphic of the Global Carbon Budget, a cooperative work of a large scientific network, is shown below. The illustration for the year 2019 shows a continued growth in CO2 and CO2 equivalent (CO2e) emissions despite widespread efforts to reduce GHGs. The graph on the left shows natural gas emissions have increased by 2.6%, while oil related CO2 emissions increased about 0.9% and coal emissions fell by 0.9%. This is not the whole story, however, because the Global Carbon Budget does not include leakage of natural gas occurring during recovery and transport of natural gas. These plus other facts described below suggest that methane's contribution to GHG emissions remains understated in the Global Carbon Budget estimates.

Global Carbon Budget 2019

CO_2 emissions grow amidst slowly emerging climate policies

Fossil CO_2 emissions grow more slowly... but do not yet decline



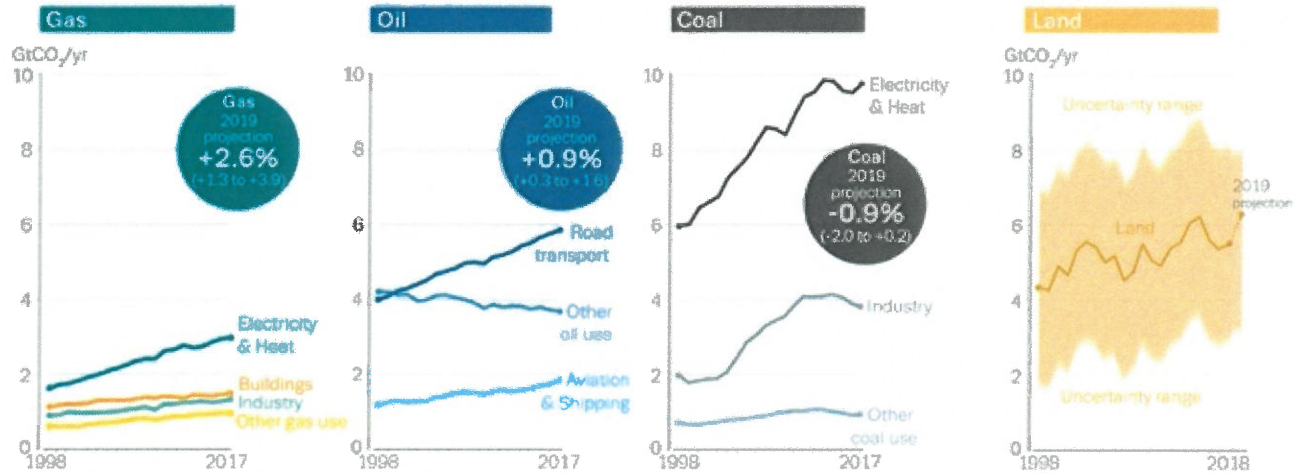
Source: Global Carbon Project based on UNFCCC/CDIAC/BP/USGS. Units: Billion tonnes of carbon dioxide per year (GtCO2/yr)

CO_2 emissions need to decline rapidly to net-zero around mid-century to pursue the Paris Agreement 1.5°C goal

Natural gas and oil now drive global emissions growth

Continued support for low-carbon technologies needs to be combined with policies that phase out fossil fuels.

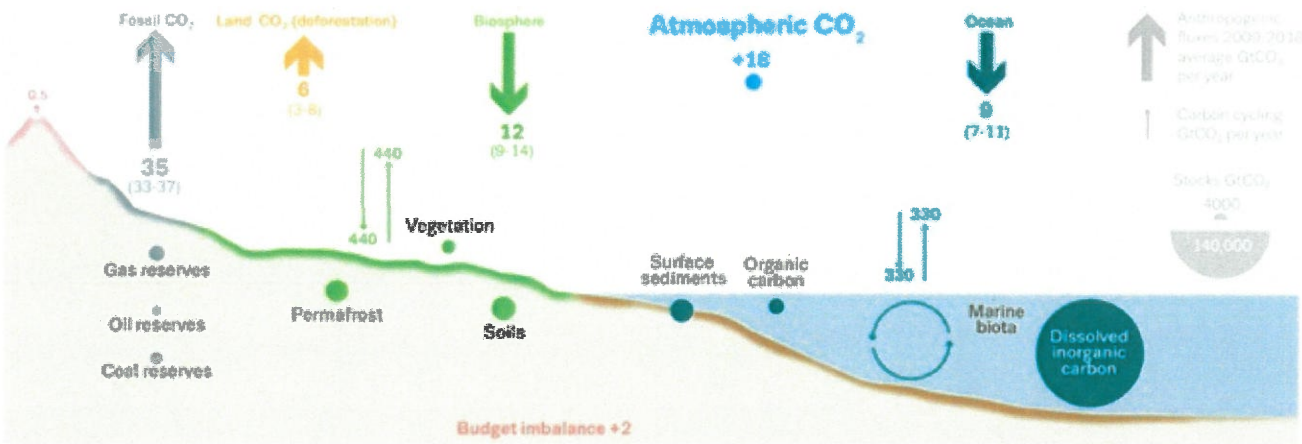
Deforestation fires in 2019 drive emissions up on land



Source: 2019 projection by the Global Carbon Project. Trend to 2017 based on data from the IEA (2019) CO_2 Emissions from Fuel Combustion, www.iea.org/statistics. All rights reserved.

The rise in atmospheric CO_2 causes climate change

The global carbon cycle 2009-2018



Summary of Findings:

Key scientific papers during the past ten years have established the climate related danger of using natural gas. A widely cited paper by Alverez et al. (2012) established that if total leakage from exploration, recovery, and distribution of natural gas exceeds 3.2 percent of the gas used to generate electricity, then natural gas offers no climate advantages over the burning of coal for the same purpose. Other studies found that leak rates of natural gas exceeded this percentage. See, for example, Howarth et al. (2011), Schneising et al. (2014), Franco et al. (2016), Howarth et al. (2019) etc. Since the 2012 Alverez paper natural gas production and related fugitive emissions have risen in absolute terms.

In light of the crucial role of methane emissions as a leading cause of climate change, what follows are bullet points of information about natural gas emissions made available at the American Geophysical Union (AGU) Fall Meeting in San Francisco during Dec 9-16, 2019, plus other relevant AGU research. The AGU meeting is attended by more than 25,000 scientists.

- **Local Gas Main Leakage**: The amount of local leakage from natural gas mains has been seriously underestimated by both the EPA and utility companies. A research team headed by Zachary Weller and Joseph von Fisher of Colorado State University estimates that there are 630,000 leaks in the gas mains in USA cities contributing 0.7 teragrams (700 thousand tons) of methane leaked from USA gas mains each year. Presenters of this information stated that this is 5X the amount estimated by the EPA. In 2017, a team of scientists (Shindell et al. 2017) found that the full social cost of methane when weather impacts, air quality, and other factors were included is $4822/ton. The accelerating amount of damage from climate events in recent years would indicate that the true costs of methane emissions is growing rapidly.
- **Permian Basin Leakage**: A large area source of natural gas emissions in the USA is the Permian Basin oil and gas development located in West Texas and New Mexico. The oil and gas production from this basin alone could surpass the total output of all foreign countries by 2029. A research team (Robertson et al.) of the University of Wyoming has determined that methane emissions from the PB exceeded EPA estimates by more than 1000%. Emissions of natural gas from both the Permian Basin in Texas and the Marcellus basin in Pennsylvania/Appalachia have increased dramatically over the past five years.
- **Underestimation of Methane Radiative Forcing**: An AGU paper by Etminan et al. (2016) shows that estimates of atmospheric radiative forcing (effectively warming) due to natural gas/methane have been systematically underestimated. In their paper entitled "Radiative forcing of carbon dioxide, methane, and nitrous oxide: A significant revision of the methane radiative forcing" the research group contends that the Intergovernmental Panel on Climate Change (IPCC) estimates of the total forcing by methane during the years 1750 to 2011 should be increased by 25% because not all of the emitted electromagnetic spectrum energy is accounted for in standard measurements. Below is a graph from the IPCC Fifth Assessment (2014) that shows estimated anthropogenic radiative forcing by CO2 and by methane (CH4) during the years 1750 to 2011. Measurements are in watts per square meter (W m^{-2}). Methane's estimated effect was 0.97 W m^{-2} compared to 1.68 W m^{-2} from CO2. Therefore, methane was estimated to have provided about 37% of the total of man-made radiative forcing by these two gases in this historical period. The revision by Etminan would increase methane's contribution to approximately 43% of the radiative forcing by these two gases. Since methane has a short atmospheric life, eliminating this gas is the best method to slow climate change.

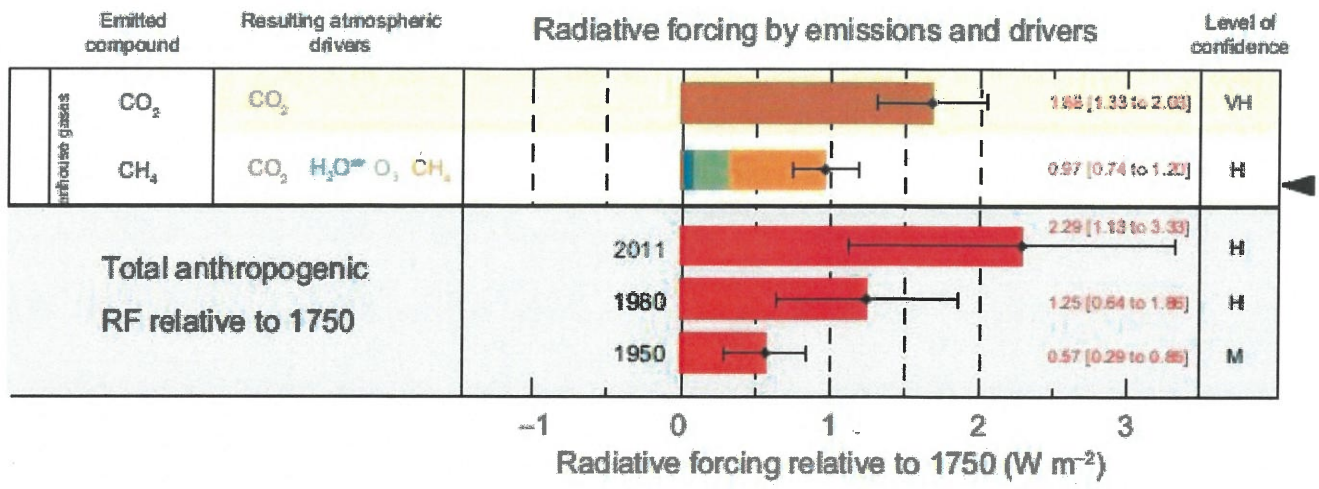


Figure SPM.5 | Radiative forcing estimates in 2011 relative to 1750 and aggregated uncertainties for the main drivers of climate change. Value global average radiative forcing (RF[14]), partitioned according to the emitted compounds or processes that result in a combination of drivers. The best mates of the net radiative forcing are shown as black diamonds with corresponding uncertainty intervals; the numerical values are provided on the of the figure, together with the confidence level in the net forcing (VH – *very high*, H – *high*, M – *medium*, L – *low*, VL – *very low*).

- **Redefining Oil and Gas Emissions**: In recent years the amount of the contribution by the oil and gas industry to the sharp rise in atmospheric methane has been controversial. Many scientists have sought to identify the source of methane in the atmosphere by its atomic weight. Put simply, "heavier" methane was believed to come from oil and gas production, while "lighter" methane was thought to come from recent biologically active sources like landfills, swamps, and meat/dairy production. Because a fairly high amount of the recently measured methane was detected as "light," many scientists argued that tropical swamps and other biological sources were contributing much of the methane increase. Research offered by Karlis Muehlenbachs and others from the University of Alberta at the AGU meeting casts serious doubt on this methodology of measuring methane sources. Muehlenbach's analysis of hundreds of samples of natural gas from the West Alberta Sedimentary Basin (4th largest world O&G producer) indicates that much of the so called "light" methane actually comes from oil and gas deposits, generally from shallower geological sources. Muehlenbach's research reinforces similar conclusions by researchers at Cornell University (Howarth et al. 2019). This suggests that much more of the recent rise in atmospheric methane is coming from oil and gas than many scientists previously recognized.
- **Methane Emissions from Abandoned Oil and Gas Wells**: At the AGU meeting Mary Kang of McGill University presented findings of her team of scientists and other researchers showing that methane emissions from abandoned oil and gas wells are a significant long-lived source of methane emissions. In 2019 there were three million or more such wells in the USA and one million or more in Canada and the numbers have continued to grow. Average leak rates at abandoned wells in Pennsylvania studied by Kang are believed to be 0.66 tons of methane per year per well in unplugged wells and 0.41 tons/year in plugged but vented wells. The cost of plugging wells varies widely from about $11,000 up to $100,000 per well, with an average cost of $37,000/well. Wells are often abandoned unplugged or insufficiently plugged. Local governments, who can ill afford it, are left to plug the wells and many simply remain abandoned. Based on the social cost of methane calculated by Shindell et al. ($4,822/ton) plugging such wells is worthwhile, but without reducing the use of natural gas and stopping fracking, plus giving greater attention to such wells, they will remain a growing contributor to climate change.

Conclusion

Methane emissions, primarily from natural gas fugitive emissions, are a main cause of the continued increase in worldwide GHG emissions. While the Global Carbon Budget indicates a 2.6% increase in natural gas emissions in 2019 the true number and impact of methane emissions is possibly higher. Because rising methane levels strongly correlate with recent rapidly rising global temperatures and the incidence of droughts and wildfires public policy has turned to rapidly reducing methane emissions plus phasing out natural gas and replacing it with renewable energy.

From:	SRV Climate Coalition <srvclimate@gmail.com>
Sent:	Thursday, January 13, 2022 1:15 PM
To:	Diane Burgis; John Gioia; District5; Karen Mitchoff; Supervisor Candace Andersen
Cc:	Clerk of the Board; sue bock; martiroach@gmail.com
Subject:	SRV Climate Coalition Comment on Electrification Ordinance

Hello!

We, the members of the San Ramon Valley Climate Coalition, would like to draw your attention to the issue of: A Public Hearing scheduled for **Tuesday January 18th** regarding the draft **Contra Costa Building Electrification Ordinance for New Buildings.**

This effectively means that:

Fact 1. Addressing the climate crisis requires immediate and sustained investment to eliminate net global greenhouse gas emissions by 2050 (it's sooner than we think). Climate change is already harming communities with wildfires, storms, floods, extreme heat, and other climate-fueled impacts costing us 688 lives and $145 billion in 2021.

Fact 2. Driven by plummeting costs for solar and wind technologies the United States has set a goal of 100% clean electricity by 2035. This can be achieved from more efficient appliances and the integration of efficiency into new and existing buildings.

Fact 3. Shifting from HFCs to climate-friendly working fluids in cooling equipment and other profitable or low-cost options will reduce non-CO2 sources. The last County Climate Action Plan attributed 28% of emissions to buildings. Reducing emissions in buildings is a critical step by our County to prioritize with this ordinance.

Thank you and the Board for making a commitment to electrification with the passage of the Climate Emergency Resolution and voting to authorize development of this ordinance.

Your staff is proposing 6/1/22 as the implementation date and has the full support of the Sustainability Commission, community leaders and members, and groups throughout the county.

We urge you to unanimously pass the **Contra Costa Building Electrification Ordinance for New Buildings.**

Sue Bock
San Ramon Valley Climate Coalition

https://srvclimate.org/

From:	Zoe Siegel
Sent:	Friday, January 14, 2022 10:38 AM
To:	Diane Burgis; John Gioia; District5; Karen Mitchoff; Supervisor Candace Andersen
Cc:	Clerk of the Board; Sadie Wilson; Karen Rosenberg
Subject:	Support for Building Electrification Ordinance for 1-18-22 BOS meeting
Attachments:	Building Electrification.pdf

Dear Chair Mitchoff and Supervisors Anderson, Burgis, Gioia and Glover,

I write on behalf of Greenbelt Alliance in **support of the draft Contra Costa Building Electrification Ordinance for New Buildings**. In the last County Climate Action Plan 28% of emissions came from buildings, therefore reducing emissions in buildings is a **CRITICAL** step to prioritize as soon as possible.

For over 60 years, Greenbelt Alliance has worked towards a vision of a Bay Area made up of healthy, thriving, resilient communities where all members are given equal protection from climate risks and equal opportunities to enjoy the benefits of the environment and other nature-based infrastructure. How we build can make a significant difference in our commitment to reduce GhG emissions and build healthy resilient communities.

We appreciate the continued commitment to building climate resilience across the county. When the Board passed the Climate Emergency Resolution you committed to authorize the deployment of this ordinance and we are writing to you today to support your actions. Additionally, the Sustainability Commission unanimously supported the Building Electrification policy, and there are many community members and organizations who have also come out in support of this. **The time to act is now.** We urge the Board of Supervisors to adopt and implement this ordinance as soon as possible.

Sincerely,

Zoe Siegel

--

Zoe Siegel (she/her/hers)
Director of Climate Resilience | **Greenbelt Alliance**
(510) 367-4464 | *Let's connect on LinkedIn* | @thezoesiegel
Schedule a meeting with me through Calendly

Check out my Chronicle Op Ed about why infill housing is a critical climate solution.

The Resilience Playbook is your go-to guide for accelerating equitable adaptation to the climate crisis in the Bay Area. Check it out today!
greenbelt.org | Facebook | Twitter | Instagram

From: Lisa Chang <[redacted].com>
Sent: Friday, January 14, 2022 11:05 AM
To: Diane Burgis; John Gioia; District5; Karen Mitchoff; Supervisor Candace Andersen; Clerk of the Board
Subject: A comment on the Building Electrification Ordinance for the 1-18-22 Board of Supervisors meeting.

To the Board of Supervisors:

I am a retired physician in Alamo who cares deeply about the harmful effects of burning fossil fuels on our safety and public health.

I urge you to vote to adopt the Building Electrification ordinance, and to implement it as swiftly as possible.

Thank you for committing to building electrification when you passed the Climate Emergency Resolution. There is tremendous support for building electrification among our neighbors, colleagues, and friends here in Alamo and Contra Costa County.

Climate disasters, fires, smoke, and air pollution are already affecting our safety and health here in Contra Costa County, and it is crucial that we act swiftly to reduce our use of fossil fuels.

Please vote to adopt the Building Electrification ordinance.

Sincerely,

Lisa F Chang, MD

Alamo, CA 94507

From: Ryan Buckley [redacted]g>
Sent: Friday, January 14, 2022 2:44 PM
To: Diane Burgis; John Gioia; District5; Karen Mitchoff; Supervisor Candace Andersen; Clerk of the Board
Cc: tina; Tyler Snortum-Phelps
Subject: Comment on Building Electrification Ordinance for 1-18-22 BOS meeting
Attachments: SCOCO BOS Letter.pdf

Chair and Members of the Contra Costa Board of Supervisors,

Please find attached a letter from Sustainable Contra Costa in support of the Building Electrification Ordinance.

Regards,

Ryan Buckley

—
Board of Directors
Sustainable Contra Costa
(510) 325-7039

From:	Sheila Tarbet <[redacted]>
Sent:	Friday, January 14, 2022 4:23 PM
To:	Diane Burgis; John Gioia; District5; Karen Mitchoff; Supervisor Candace Andersen
Cc:	Clerk of the Board
Subject:	Comment on Building Electrification Ordinance for 1-18-22 BOS meeting
Attachments:	Ltr support CCC reach code electrification.docx

ELDERS CLIMATE ACTION
Nor Cal Chapter

January 14, 2022

To Chair of the Contra Costa County Board of Supervisors, Supervisor Mischoff, and to Supervisors Anderson, Gioia, Burgis, and Glover,

I am a resident of El Cerrito, and I'm very concerned about the climate emergency and the steady warming of our planet. Due to my concern, I'm a member of Elders Climate Action, a national organization, and a co-leader of our local NorCal ECA chapter. I am also a member of El Cerrito's Environmental Quality Committee, which reports to the City Council, as well as volunteer environmental project lead at the Unitarian Universalist Church of Berkeley, located in Kensington in Contra Costa County.

In my role as a co-leader of our Elders Climate Action NorCal Chapter, I'm writing to support draft ordinance NO. 2022-02 to require certain newly constructed buildings to be all electric. I want to express our chapter's full support for this draft ordinance. We urge you to adopt this ordinance and implement it as soon as possible. We approve of the staff recommendation to implement the ordinance as of June 1, 2022.

Thank you for passing the Climate Emergency Resolution and authorizing the development of this ordinance. I know that the County Sustainability Commission unanimously supports this building electrification policy, as do many community members, neighbors, and community groups.

Elders Climate Action is working to promote policies to address the climate crisis at all levels of government across the country so that our children and grandchildren can have a livable future. We know that "electrifying everything" is one huge, constructive step we can take to restore the damage done to our climate by our dependency on fossil fuels. I personally will be so proud of our County if you take this very powerful step forward to address the climate crisis.

Thank you for your consideration.

Sincerely,

Sheila F. Tarbet
Volunteer Co-Leader
Elders Climate Action (ECA), Northern California (NorCal) Chapter
515 Ashbury Avenue
El Cerrito, CA 94530

From:	Laura Feinstein
Sent:	Friday, January 14, 2022 5:14 PM
To:	Diane Burgis; John Gioia; District5; Karen Mitchoff; Supervisor Candace Andersen; Clerk of the Board
Cc:	Leah Louis-Prescott; Melissa Yu
Subject:	Subject: Comment on Building Electrification Ordinance for 1-18-22 BOS meeting
Attachments:	Letter Contra Costa.pdf

To the Board of Supervisors and Clerk of the Board,

Please find attached a comment letter from SPUR, Sierra Club, and RMI on the building electrification reach code. Have a great weekend.

Best,

Laura Feinstein

—

Laura Feinstein, PhD (she • her • they)
Sustainability and Resilience Policy Director
1.510.827.1286 (google voice)
lfeinstein@spur.org

SPUR
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1/18/2022

Subject: Comment on Building Electrification Ordinance for 1-18-22 BOS meeting

Dear Chair Mitchoff and Supervisors Anderson, Burgis, Gioia and Glover;

On behalf of the organizations signed below, I am writing in support of Ordinance Number 2022-02 to require new construction to be all-electric. Our organizations recognize that climate change threatens the health and well-being of people and ecosystems, with the greatest impacts felt by the most vulnerable communities.

It is urgent that this ordinance be adopted and implemented as soon as possible. The last Contra Costa County Climate Action Plan attributed 28% of emissions to buildings. Curbing these emissions is critical to reducing emissions as laid out in the County's Climate Action Plan.

We thank the Board for authorizing the development of an all-electric reach code for new construction and committing to adopt it when they passed the Climate Emergency Resolution. The Board's action on this item is aligned with the Contra Costa Sustainability Commission, which unanimously supported a Building Electrification policy.

Sincerely,

Laura Feinstein, Ph.D.
Sustainability and Resilience Policy Director, SPUR

Melissa Yu
Sierra Club, SF Bay Chapter Conservation Program Coordinator

Leah Louis-Prescott
Senior Associate, RMI

To:
Diane.Burgis@bos.cccounty.us
John.Gioia@bos.cccounty.us
District5@bos.cccounty.us
Karen.Mitchoff@bos.cccounty.us
SupervisorAndersen@bos.cccounty.us
Clerkoftheboard@cob.cccounty.us

From: Amanda Millstein < n>
Sent: Saturday, January 15, 2022 7:08 AM
To: Diane Burgis; John Gioia; District5; Karen Mitchoff; Supervisor Candace Andersen
Cc: Clerk of the Board
Subject: Comment on Building Electrification Ordinance for 1-18-22 BOS meeting.

Dear Chair Mitchoff and Supervisors Anderson, Burgis, Gioia and Glover,

My name is Amanda Millstein, MD. I am a pediatrician practicing in Contra Costa County and also a resident of the country, raising my two young children here.

I am writing to express my strong support for the Building Electrification Ordinance.

As a pediatrician in our County, I see the ways in which climate change -- and local air pollution caused by fossil fuels -- are impacting the health of babies, children, and teenagers in our county. Building electrification is important for the health and safety of our County's residents and a vital step toward mitigating the climate crisis, which poses an existential threat to health.

Thank you for your leadership on this issue -- though I work my hardest to protect the health of children in our county in my clinic every day, your leadership and action here has the potential to protect and prevent harm in a much larger way than what I can accomplish in my clinic.

Sincerely,
Amanda Millstein, MD

From: Jan Warren
Sent: Saturday, January 15, 2022 6:27 PM
To: Diane Burgis
Subject: Comment on Jan. 18, 2022 Item D2 Adoption & Amendment to Ordinance No 2022-02

Happy New Year,

The Interfaith Climate Action Network of CCC supports the Contra Costa Building Electrification Ordinance for New Buildings as another significant step to meet the County's Climate Action Goals.

To require electric power in new residential housing, hotels, offices, and retail buildings will move us one step closer to decarbonizing our economy.

We already know how natural gas in indoor spaces contributes to respiratory ailments such as asthma, such that children living in homes with gas cooking are 42% more likely to develop asthma.

What we build or install today affects the future for years because it is part of our "infrastructure". In addition electricity has proven to be a more efficient energy source than natural gas.

I encourage the Board to educate and encourage residents who live in existing housing to begin the transition to all electric homes. Half Moon Bay has a proposed Ordinance that will require electric retrofits for various types of remodels.
By encouraging training for our building trades and offering resources we can all be part of creating a cleaner County.

Thanks for your leadership

Jan Warren
Chair, Interfaith Climate Action Network of CCC
[illegible] ne
Walnut Creek, CA 94598

From: Marcia L. m>
Sent: Sunday, January 16, 2022 11:11 AM
Cc: Clerk of the Board
Subject: Comment on Building Electrification Ordinances for 1//18/22 BOS meeting
Attachments: download.svg

It is important that this ordinance be adopted and implemented as soon as possible. Staff are proposing 6/1/22 as the implementation start date. The last County Climate Action Plan attributed 28% of emissions to buildings and reducing emissions in buildings is a critical step for our County to prioritize as this ordinance does. The Sustainability Commission unanimously supported the Building Electrification policy, and many community members and groups have also come out in support of this.

Our world is burning up and I care abut what is happening on our local level. I am a member of 350 Contra Costa County.

Thank you.

Marcia Liberson , Walnut Creek 95495

From: cynthia mahoney < net>
Sent: Sunday, January 16, 2022 12:13 PM
To: District5
Cc: Clerk of the Board
Subject: Comment In Favor of Building Electrification Ordinance for 1-18-22 BOS meeting

Dear Federal.

The members of Contra Costa Citizens Climate Lobby want to add our voices in support of the **Contra Costa Building Electrification Ordinance for New Buildings.** Although our primary focus has been on the strategy of putting a price on carbon pollution with carbon cashback to all Americans, our goal is to preserve a liveable world. That now requires vigorous action in all sectors and at all levels of government.

Passing the **Contra Costa Building Electrification Ordinance for New Buildings** is essential to meeting the climate goals of the county. The state of CA and the US are not on track to meet the goal of 50% emissions reductions by 2030. Reducing GHG emissions 50% by 2030 is just the minimum goal to stay within 1.5ºC of warming. If anything , our targets will need to be ramped up, as we are in a Code Red for humanity with climate impacts accelerating even faster than scientists have predicted.
That is why it is important that the ordinance be adopted and implemented as soon as possible.

Ωε τhank the Board for committing to do this when you passed the Climate Emergency Resolution and voted to authorize development of this ordinance, which was unanimously supported by the Sustainability Commission, and had strong support from community members when the ordinance was introduced at the 12/14/21 BoS meeting.

Sincerely,

Cynthia Mahoney MD and Bill Olsen;
Co-leads, Contra Costa Citizens Climate Lobby.

From: Denice A Dennis <[redacted]nail.com>
Sent: Sunday, January 16, 2022 5:04 PM
To: Karen Mitchoff; Diane Burgis; District5; Supervisor Candace Andersen; John Gioia
Cc: Clerk of the Board
Subject: Item D2 Building Electrification 1/18 Board meeting

Dear Chair Mitchoff and members of the Board,
Thank you for your Climate Emergency Resolution commitment to moving an Electrification Ordinance forward for New Buildings. Please take action to move adoption and set 6/1/22 for full implementation of the ordinance.

New Building Electrification has been unanimously supported by the Sustainability Commission and the Board voted in favor of this policy in September after robust discussion by the Sustainability Committee.

In order to have the best possible outcomes for people and our planet, we need to do a great deal over the next 6-8 years to reduce greenhouse gas emissions. It is clear that we need to depend on local governmental actions to get where we need to be.

Any analysis of the costs of building electrification (or other climate emergency actions) needs to examine the costs of continued emissions on the health and safety of our children and grandchildren.

Toward health for all,
Denice Dennis
Volunteer, 1000 Grandmothers for Future Generations

From: Ogie Strogatz <
Sent: Sunday, January 16, 2022 7:37 PM
To: Diane Burgis; John Gioia; District5; Karen Mitchoff; Supervisor Candace Andersen
Cc: Clerk of the Board
Subject: Ordinance No. 2022-02: all-electric, newly constructed buildings

Dear Chair Mitchoff and Supervisors Andersen, Burgis, Gioia and Glover,

I'm writing to convey my strong support for the subject ordinance.

I am grateful that you committed to authorizing the development of this ordinance when you passed the County Climate Emergency Resolution. I note that the Sustainability Commission unanimously supported the Building Electrification policy, and many community members and groups also have stepped up to express their support.

Last Friday, 1/14/22, I attended a webinar hosted by Acterra, "Code Red for Humanity: What Municipalities Can Do". The content included calls to action for county supervisors as well as mayors, city council members, and individuals. I was reminded that we are lagging significantly behind in our efforts to respond to global warming, and that county and local level electrification initiatives play a pivotal role in GHG emission reduction.

It is crucial that this ordinance be adopted and implemented as soon as possible, with staff proposing 6/1/22 as the implementation start date. The last County Climate Action Plan attributed 28% of greenhouse gas emissions to buildings. Reducing emissions in buildings is a critical step for our County to address the climate crisis.

Please approve Ordinance No. 2022-02.

Respectfully,

Ogie Strogatz
350 Contra Costa
Sunrise Bay Area, "35+" Elders

From: Marti Roach <
Sent: Monday, January 17, 2022 10:11 AM
To: Karen Mitchoff; Diane Burgis; District5; Supervisor Candace Andersen; John Gioia
Cc: martiroach@gmail.com; Clerk of the Board
Subject: Item D2 Building Electrification 1/18 Board meeting

Dear Chair Mitchoff and Supervisors Anderson, Burgis, Gioia and Glover,
There is still a significant gap in the level of emissions reductions needed to stave off the worst, and most likely catastrophic, impacts of global warming. All governments, at all scales, are part of the possibility that we can achieve the reductions in greenhouse gases that we need. By recognizing this reality and passing your Climate Emergency Resolution, you brought Contra Costa County into the fold of leaders that commit to bold action to address this situation. Thank you.

Passing the New Building Electrification Ordinance is a vital step to enact your commitment. Thank you for moving on this and for moving it forward swiftly.

The tremendous transformation in our energy systems is not an easy path or a straightforward one. It requires many actions at once like preparing the grid for more clean electricity transfer as we (hopefully rapidly) electrify our buildings and transport. This is a challenge we must take on.

Many existing businesses reliant on the current fossil fuel energy system will resist this and push to slow the path of transition. It is your job, and we stand behind you, to help us transition fast for healthier, safer communities and a new economy based on clean energy.

With respect and appreciation for your service to our County,

-Marti Roach

925-376-3853

350ContraCosta.org
350BayAreaAction.org
Join the Contra Costa Climate Action Network!

WHY 350? "If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted, paleoclimate evidence and ongoing climate change suggest that CO2 will need to be reduced from current levels (411) to at most 350 ppm." -**Dr. James Hansen**

From: Karen Leung <[redacted]om>
Sent: Monday, January 17, 2022 4:53 PM
To: Diane Burgis; John Gioia; District5; Karen Mitchoff; Supervisor Candace Andersen
Cc: Clerk of the Board
Subject: Contra Costa Building Electrification Ordinance

Dear Chair Mitchoff and Supervisors Anderson, Burgis, Gioia and Glover,

As someone who was born and raised in Contra Costa County and came back after college to raise my 2 children in this county, I feel it's extremely important that our county, as part of the SF Bay Area, leads by example and does everything we can to mitigate the disastrous effects of climate change. I therefore, strongly support passing of the Building Electrification Ordinance for New Buildings with the 6/1/22 implementation start date. It's clear from the last County Climate Action Plan that building emissions are a significant portion of climate warming emissions (28%) and moving to full electrification of all future buildings will significantly lower building emission levels. Electrifying buildings will not only reduce emissions, but should also make future buildings safer during future earthquakes by reducing the chances of burst/leaking gas lines and associated fire danger.

Thank you so much for already committing to the Climate Emergency Resolution. And when considering this new building electrification ordinance, please keep in mind that the Sustainability Commission unanimously supported the Building Electrification policy, along with much of the community.

I'm grateful for everything you have already done to move us towards a more sustainable future for all of us, but especially future generations.

Sincerely,
Karen Leung
[redacted].com

From:	Amanda Millstein <a il.com>
Sent:	Monday, January 17, 2022 7:23 PM
To:	Diane Burgis; John Gioia; District5; Karen Mitchoff; Supervisor Candace Andersen
Cc:	Clerk of the Board
Subject:	Comment on Building Electrification Ordinance for 1-18-22 BOS Meeting from Climate Health Now
Attachments:	CCBoS_Electrification_Letter from CHN 2022.01.18.pdf

Dear Chair Mitchoff and Supervisors Anderson, Burgis, Gioia and Glover,

Attached please find a letter in strong support of the Building Electrification Ordinance from Climate Health Now. We are a group of over 500 health professionals in California working to advance policies to promote climate, health and equity. Many of our members are residents of Contra Costa County.

We thank you all for your service and work and your leadership in protecting our climate and health.

Sincerely,
Cynthia Mahoney, MD, Amanda Millstein, MD, and Ashley McClure, MD
On Behalf of Climate Health Now

Subject : Health Professionals Comment In Favor of Building Electrification Ordinance for 1-18-22 BOS meeting

Jan 18, 2022

Supervisor Diane Burgis, Chair of the Board
Supervisor Federal Glover, Vice Chair of the Board
Supervisor Candace Andersen
Supervisor John Gioia
Supervisor Karen Mitchoff

cc Clerk of the board

Dear Chair Burgis and members of the Board,

We are writing on behalf of Climate Health Now, an organization of over 500 health professionals throughout California, in support of the **Contra Costa Building Electrification Ordinance for New Buildings.** Many of us are here in Contra Costa County, including the first two authors of this letter. We thank the Board for committing to do this when you passed the Climate Emergency Resolution and voted to authorize development of this ordinance. The ordinance was unanimously supported by the Sustainability Commission, and had strong support from community members when it was introduced at the 12/14/21 BoS meeting. **We urge you to pass this ordinance at the Jan 18, 2022 BoS meeting, and implement it as soon as possible.**

Over 45 California cities and counties have adopted new building electrification "reach" codes over the past few years. It is time for Contra Costa to join them. In addition to reducing greenhouse gas emissions, these ordinances lead to buildings that are healthier and safer for the community.

As health care professionals, we are on the frontlines of the climate health emergency and treat the adverse health effects of fossil fuel combustion. It is our expert opinion that electrification of buildings will have multiple health benefits for our county.

Health benefits of this ordinance are both immediate - related to air pollution - and long term - related to climate change. Please see details in our previous letter of August 2, 2021 in support of creating the ordinance.

In summary:
1- **Immediate health benefits of building electrification to decrease pollution.** Building Electrification will improve health immediately by removing exposure to toxic indoor pollution that contributes to childhood asthma. This is especially important in Contra Costa, with our F grade for particle pollution and D for ozone and our hot spots for pollution near refineries and heavy traffic areas. As expected, air quality is worsening as climate change progresses with both heat related increases in ozone and particulates, and increasing wildfires brought on by heat and drought. The wildfire smoke of the past few years adds to the burden of particle pollution, making it only more imperative that we control the pollution that we can. COVID adds to the burden of lung damage, with the burden born disproportionately by communities of color. We should be doing everything we can to decrease pollution where we can and as quickly as possible.

2- **Building Electrification is essential to reach our greenhouse gas emissions goals.** Climate Change is a human health emergency, and according to the Lancet and the latest IPCC reports, we are in a Code Red for humanity. Reducing GHG emissions 50% by 2030 is just the minimum goal to stay within 1.5ºC of warming. If anything, our targets will need to be ramped up, as 2021 demonstrated that climate impacts are accelerating even faster than scientists have predicted. Neither the state of California nor the U.S. are not on track to meet the goal of 50% emissions reductions by 2030. Buildings in Contra Costa account for 28% of our County's emissions, so this is an excellent way to make progress on emissions reductions at the local level. Continuing to build out new gas infrastructure will make it impossible to meet our emissions reduction targets, and contribute to more methane gas leakage - which is an extremely potent greenhouse gas.

On behalf of our patients and their families, we ask that you pass the **Contra Costa Building Electrification Ordinance for New Buildings and** implement it as quickly as possible, but no later than June 2022.

Sincerely,

Cynthia Mahoney, MD and Amanda Millstein, MD and Ashley McClure, M
On behalf of Climate Health Now

From: Brenden Millstein <[redacted].edu>
Sent: Monday, January 17, 2022 8:30 PM
To: Diane Burgis; John Gioia; District5; Karen Mitchoff; Supervisor Candace Andersen
Cc: Clerk of the Board
Subject: Comment in Support of Building Electrification Ordinance for 1-18-22 BOS

Hi, I hope this note finds you well.

I am writing to voice support of the Building Electrification Ordinance, and state my desire for the ordinance to be adopted and implemented as soon as possible. I believe the issue is simple: if we do not stop burning fossil fuels, we will pay hundreds of billions of dollars in additional costs for wildfires, droughts, increased housing costs, not to mention healthcare costs for spread of vector-borne disease (mosquito breeding seasons are temperature dependent). California has already spent an average of $15 *billion* per year the past few years in wildfire-related damage. This will only get worse. The electric grid is becoming ever more renewable rapidly. Natural gas is not, and we are discovering more problems with methane leaks by the month.

Take action. Lead. Reduce our reliance on fossil fuels. The economic cost of inaction is far too great. Thank you.

Best,
Brenden

From: Nancy Hu <
Sent: Tuesday, January 18, 2022 9:30 AM
To: Diane Burgis; John Gioia; District5; Karen Mitchoff; Supervisor Candace Andersen; Clerk of the Board
Subject: Support for Ordinance on Building Electrification

Dear County Board of Supervisors,

Thank you so much for working on this important matter of electrifying new buildings within unincorporated Contra Costa County. I want to express my strong support for the ordinance, and am glad to see the date of implementation so soon.

I look forward to in the near future we can also count on your leadership for addressing retrofits as we decarbonize our existing buildings.

Thank you again.

Respectfully,
Nancy Hu
Lafayette resident and mom
Chair, Lafayette Environmental Task Force
Climate Reality Project

Contra Costa County

To: Board of Supervisors

From: Monica Nino, County Administrator

Date: January 18, 2022

Subject: Update on COVID -19

RECOMMENDATION(S):
ACCEPT update on COVID 19 and PROVIDE direction to staff.

FISCAL IMPACT:
Administrative Reports with no specific fiscal impact.

BACKGROUND:
The Health Services Department has established a website dedicated to COVID-19, including daily updates. The site is located at: https://www.coronavirus.cchealth.org/

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

Contact: Monica Nino

By: , Deputy

cc:

CLERK'S ADDENDUM

Speakers: No name given; Casimir Karbo; Debbie Toth, Choice in Aging; Natalie.

ACCEPTED the oral report.

Contra Costa County

To: Board of Supervisors

From: LEGISLATION COMMITTEE

Date: January 18, 2022

Subject: Proposed 2022 State and Federal Legislative Programs for Contra Costa County

RECOMMENDATION(S):

1. CONSIDER and ADOPT the Proposed 2022 State and Federal Legislative Programs for Contra Costa County.

2. DIRECT the County Administrator's Office to return to the Board of Supervisors, as necessary, to update the County's adopted 2021-22 Legislative Platforms to reflect intervening actions of the Board.

3. DIRECT the County Administrator's Office and Department staff to review proposed legislation and regulation that relates to the County's adopted Legislative Platforms and recommend appropriate positions or comments on specific bills, ballot measures and regulations for consideration by the Board's Legislation Committee and/or the Board of Supervisors.

4. AUTHORIZE Board Members, the County's federal and state legislative representatives, and the County Administrator, or designee, to prepare and present information, position papers and testimony in support of the adopted 2021-22 Federal and State Legislative Platforms.

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [x] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: L. DeLaney, 925-655-2057

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc:

FISCAL IMPACT:

No direct impact to the County from the adoption of the Legislative Programs. However, if the programs are successful, additional state and federal funds could flow to Contra Costa County.

BACKGROUND:

At the beginning of each two-year legislative cycle, the Board of Supervisors adopts State and Federal Legislative Platforms that establish Contra Costa County's priorities and policy positions with regard to state and federal legislation and regulation. The Board of Supervisors adopted the 2021-22 State and Federal Legislative Platforms on January 19, 2021, with subsequent amendments in March 2021.

The State Legislative Platform includes County-sponsored bill proposals, legislative or regulatory advocacy priorities, and principles that provide direction and guidance for identification of and advocacy on bills, regulations and ballot measures which could affect the services, programs or finances of Contra Costa County. The Federal Legislative Platform establishes federal funding needs and policy positions with regard to potential federal legislation and regulation. These Legislative Platform documents, prepared by staff of the County Administrator's Office in collaboration and consulation with County department heads and other key staff, the County's state and federal advocates, and with input from the Board's commissions/committees and the public, are utilized by the County's state and federal advocates, elected officials, and staff as the basis for the County's annual advocacy programs.

For the development of the 2022 state and federal legislative programs, centered on the sponsored bills and appropriation requests initiated by the County as well as the County's legislative priorities, CAO staff conducted outreach in the fall of 2021, inviting input so that draft programs could be considered by the Legislation Committee (Chair Burgis/Vice Chair Mitchoff) at their November 8, 2021 meeting. Subsequent to the November 8, 2021 meeting of the Legislation Committee and their approval of the 2022 legislative programs, CAO staff conducted additional outreach to County department heads and key staff regarding potential state budget earmark requests; two additional earmark proposals were identified by Contra Costa Fire Protection District and staff to the East Contra Costa County Habitat Conservancy. (These additional state budget earmark requests were not considered by the Legislation Committee due to timing.)

Proposed 2022 State Legislative Program

Carry-over from 2021

1. AB 988 (Bauer-Kahan) Mental Health: Mobile Crisis Support Teams: 988 Crisis: Additional funding is needed to provide community-based crisis response services. As a co-sponsor of AB 988, the County's role in system development and operations is of great concern to County Behavioral Health staff. Advocacy and engagement on this bill will continue in 2022.

2. AB 844 (Grayson) Green Empowerment Zone for the Northern Waterfront Area: Funding and staffing are needed to implement the bill. Incentive mechanisms need to be identified. Additional representation for Contra Costa County and the City of Richmond is also needed on the board. Although the bill was enacted in 2021, engagement on implementation and potential amendment will continue in 2022.

3. Medi-Cal expansion for ages 27-49: On July 27, Governor Newsom signed into law the first-in the-nation expansion of Medi-Cal to undocumented Californians age 50 and over, through the health care trailer bill, AB 133. Under AB 133, approximately 235,000 Californians aged 50 and older are newly eligible for Medi-Cal, including preventive services, long-term care and In-Home Supportive Services. In 2019, California became the frist state to expand Medi-Cal coverage to all eligible undocumented young adults up to the age of 26. With the Governor's signature on AB 133, a gap exists in eligibility for those ages 27-49. As part of the Governor's proposed 2022-23 budget, a proposal was included to extend coverage to immigrants ages 27-49 beginning in 2024.

4. ACA 1: ACA 1 would lower the necessary voter threshold from a two-thirds supermajority to 55 percent to approve local general obligation (GO) bonds and special taxes for affordable housing and public infrastructure projects. ACA 1 would create an additional exception to the 1% ad valorem tax rate limit on real property that would authorize a city, county, or special district to levy an ad valorem tax to service bonded indebtedness incurred to fund the construction, reconstruction, rehabilitation, or replacement of public infrastructure, affordable housing, or permanent supportive housing, if the proposition proposing the tax is approved by 55% of the voters of the city or county, and the proposition includes accountability requirements. This proposal will be carried over into 2022 for further consideration by the Legislature. This bill proposes an amendment to the California Constitution, which means that if passed by the Legislature, the proposal would then go to the ballot for voter approval at a statewide election.

New County-sponsored (or co-sponsored) Legislation for 2022

1. **Stipends to Address Menstruation Equity**: *Attachment A*. The umbrella term "period poverty" describes inequities resulting from the lack of access to menstrual hygiene tools and resources. Menstrual hygiene products cannot be purchased with Food Stamps (CalFresh), Medi-Cal, and the WIC program. EHSD staff have developed a legislative proposal to provide monthly $15 stipends for hygiene products for female, transgender, and non-binary Welfare-to-Work recipients, aged 11-55, to allow for their purchase. The County Welfare Directors Association has approved an S-3 position on the proposal, which .

2. **Illegal Dumping:** Consistent with a strategy to target commercial actors who engage in illegal dumping activities, the County's state advocates have proposed, and staff in the Department of Conservation and Development and District Attorney's Office have reviewed, revisions to state statute (California Penal Code 374.3) that would allow for greater monetary penalties for persons who dump commercial quantities (increasing the ceilings of the fine from $3,000 to $5,000 on first conviction, from $6,000 to $10,000 on second conviction, and from $10,000 to $20,000 on third or subsequent conviction), loss of license, paying for the cost of removal, and posting the information publicly in a manner set forth by the court. If authorized by the Board of Supervisors, the proposed legislative changes would be submitted to the state Office of Legislative Counsel for drafting and introduction by a legislator.

3. **Flaring Penalty Amendments**: (*co-sponsor*) Bay Area Air Quality Management District (BAAQMD) staff have developed legislative language relative to amending various sections of the Health and Safety Code (42400-42411) regarding violations of emissions limitations at large stationary sources. If introduced as a Senate or Assembly Bill, BAAQMD would likely act as the primary sponsor, pending Board approval, and Contra Costa County would co-sponsor, pending Board of Supervisor approval.

4. **Accessible Transportation**: (*co-sponsor*) The California Senior Legislature (CSL) is proposing new legislation to fund and improve accessible transportation statewide. Department of Conservation and Development staff and our transportation legislative advocate have been providing support to the CSL on the subject, given the supporting language in the adopted 2021-22 State Legislative Platform. The proposal would create the Accessible Transportation Account (ATA), authorize Consolidated Transportation Services Agencies (CTSAs, authorized under existing law) to oversee expenditures at the local level, and improve the CTSA mechanism. While vehicle registration/license fees are cited as potential revenue sources in the proposal, that specific detail has not yet been finalized. The origin of the bill was the State's Master Plan for Aging (MPA) process which began in 2019 and was completed in early 2021. The MPA addressed a spectrum of aging issues including housing, caregiving, affordability of aging, fighting isolation, and transportation.

5. While no language has been drafted or proposed as yet for a legislative vehicle, County Administrator staff seek authority, aligned with the adopted Platform advocacy priority "Health Care, including Mental Health, Behavioral Health and Substance Use Disorder services," to advocate for sufficient funding and streamlined statutory authority to provide individual or group psychotherapy, psychotropic medication, and discharge planning services to behavioral health patient inmates within County detention facilities, including those committed incompetent to stand trial, in community or in-custody settings. These efforts are a component of the County's comprehensive system to address the population of those with mental illness in the County's jail facilities.

6. **Permanent Changes to the Brown Act**: Although not proposed as County-sponsored legislation, the County would support permanent changes to the Brown Act to allow for hybrid Board and commission/committee meetings (including in-person, Zoom, and phone) without requiring elected officials or members of the commission/committee to post their address on the agenda. The Urban Counties of California (UCC) will take a leadership role in advocating for improvements to statutory provisions that direct the conduct of public meetings that ensure that (1) they are open and accessible to all members of the public, and (2) disruptive behavior and hate speech can be addressed swiftly to maintain a safe environment. The County's adopted 2021-22 State Platform currently contains the principle: "ENABLE local governments to continue offering opportunities for public meeting attendance, participation, and accessibility through technological means after the pandemic has ended." (p. 14)

FY 2022-23 State Budget Requests

Although there is no existing, established state budget earmark process (as there has been in prior years for federal community project funding requests), given the projected surplus in the FY 2022-23 budget and the experience of FY 2021-22 wherein legislators sought and secured project/program specific budget allocations, our state advocates have urged the identification of possible Contra Costa County-specific earmarks for FY 22-23. The following state budget earmark requests have been identified. Staff seeks Board of Supervisor input on the prioritization of these requests:

1. "Seed money" for a Regional Responders Complex at the Concord Naval Weapons Station site: **$3 million**.

Since 2007 the Fire District and Office of the Sheriff have been working towards a plan to reuse approximately 75 acres of former Concord Naval Weapons Station land for a combined administrative, training, and logistics center. The County and the Fire District expect to take physical possession of the land in late 2022 or 2023. There is a need to refresh a business plan and conceptual design that was originally authored in 2007. The Fire District envisions a unique all-risk training facility with props and facilities not found anywhere else in the region. This could include swift water rescue, rail, BART cars, electric vehicles, confined space, indoor and outdoor tactical ranges, a skid pan driving course, a training village to simulate residential and commercial settings and modern classrooms. Space planning, conceptual design and civil work such as utility planning are all needed design elements. Additionally, once the land is transferred a temporary access will need to be constructed. This temporary access has already been tentatively identified as Evora Road. One time $3 million in funding will help the team advance the planning concepts required to define what the facility needs are on the site, provide temporary access, and begin some of the civil design work required for the site.

2. Choice in Aging's "Aging in Place Campus:" **$20 million**. (*Attachment B*)

Choice in Aging, a non-profit organization serving some of Contra Costa County's frailest and most vulnerable residents since 1949, is in the process of building a new and innovative model for how we age in our community – the Aging in Place on Campus – which will provide elder and fragile adults with independent housing and co-located services that will allow them to age with dignity in their homes. The campus will include intergenerational services that will allow multiple generations to learn and grow together in a single location. The housing construction funding will be made available from other sources, but the full range of services can only be realized with the help of the state.

3. Funding to implement the proposed Menstruation Equity bill: **$8.5 million**.

4. Funding to provide individual or group psychotherapy, psychotropic medication, and discharge planning services to behavioral health patient inmates within County detention facilities, including those committed incompetent to stand trial: **$5 million** (*approximately*)

5. Funding to support the East Contra Costa County Habitat Conservancy: *Attachment C*

   1. Conservation Grazing Infrastructure: **$1,000,000** (*scaleable*)

2. Mount Diablo: Pine tree and Manzanita Die-off Investigation: **$500,000**
3. Land Acquisition funding for the local regional Natural Community Conservation Plan (East CCC HCP/NCCP): **$6,000,000** (*scaleable proposal*)
4. Habitat Restoration funding for the local regional Natural Community Conservation Plan (East CCC HCP/NCCP): **$6,000,000** (*scaleable proposal*)

The above described sponsored (and co-sponsored) bills and state budget requests, if approved by the Board of Supervisors, will be pursued in 2022 in addition to the Advocacy Priorities included in the 2021-22 State Legislative Platform:

- COVID-19 Response and Economic Recovery
- Climate Change
- Health Care, including Mental Health, Behavioral Health and Substance Use Disorder (SUD) services
- Housing and Homelessness
- Justice Reform
- The Delta/ Water and Levees

Proposed 2022 Federal Legislative Program

Similar to the process undertaken for the development of the 2022 State Legislative Program, County staff and the County's federal advocate, Mr. Paul Schlesinger of Alcalde & Fay, initiated outreach to County staff and officials in the fall of 2021 in anticipation of future federal member-directed spending requests (colloquially referred to as "earmarks") in 2022, as well as for the purpose of ascertaining federal legislative priorties for the year. CAO staff was notified on November 1, 2022 that Mr. Schlesinger had separated from Alcalde & Fay and joined the firm Thorn Run Partners; he has been the County's principal federal lobbyist since 2001, assisting the County with its federal legislative and regulatory needs and helping to secure federal appropriations and grants.

In addition to the consideration of member-directed community project funding requests, which have been discussed but not finalized for Board action, County staff have identified federal policy and funding priorities for 2022, including the following (*not in priority order*):

1. The Elimination of the IMD Exclusion Rule. Requested by County Behavioral Health Director, Dr. Tavano, this prohibition on so-called "institutes of mental diseases" (IMD), has been in place since 1965. Under the IMD exclusion, federal rules prohibit Medicaid from paying for psychiatric inpatient care facilities with at least 16 beds. The facilities can be those treating for acute behavioral conditions and substance use disorders with regulations on the exclusion varying among states.

2. Federal Weatherization Programchanges to include more Energy Efficiency Options. Requested by the County's Sustainability Coordinator, Jody London. SUPPORT modifications to the federal Weatherization Assistance Program that expand eligible measures to include whole building clean energy improvements such as wall insulation, duct sealing, electric panel upgrades, electric heat pumps, and related measures. Also SUPPORT modifications that increase the income eligibility limits for the Weatherization Assistance Program.

3. Medicare expansion and lowering prescription drug prices. Requested by Dr. William Walker, on behalf of Contra Costa Health Services. Medicare expansion to cover dental, hearing, and vision. Empower Medicare to negotiate prices for certain drugs and cap the out-of-pocket costs for seniors on Medicare.

4. Hospital infrastructure funding. Requested by Dr. William Walker, on behalf of Contra Costa Health Services.

5. Emergency Rental Assistance Program (ERAP) Reallocation. Requested by Chief Assistant CAO Time Ewell, support for an application by the state to the U.S. Treasury Department for reallocation of ERAP 1 dollars for the continued benefit of California and Contra Costa County residents.

6. Municipal Securities. Requested by Chief Assistant CAO Tim Ewell, support fully reinstating tax-exemption of advance refunding bonds as well as provisions restoring and expanding the use of direct-pay bonds. Advocacy efforts consistent with past federal platforms have been under way.

7. Families First Prevention Services Act. Requested by Chief Probation Officer Esa Ehmen-Krause. This legislation from 2018 offered states an opportunity to transform state child welfare systems by providing substance abuse, mental health and other prevention and treatment services to prevent children's entry into foster care. The law also sought to reduce states' reliance on group and residential treatment homes and instead prioritize family-based care. Information on implementation outcomes in California and financial benefits was requested.

8. Housing Vouchers for Homeless Veterans: The HUD-Veterans Affairs Supportive Housing (HUD-VASH) program combines HUD's Housing Choice Voucher (HCV) rental assistance for homeless Veterans with case management and clinical services provided by the Department of Veterans Affairs (VA). VA provides these services for participating Veterans at VA medical centers (VAMCs), community-based outreach clinics (CBOCs), through VA contractors, or through other VA designated entities. Congress has appropriated additional funding for new HUD-VASH vouchers every year since 2008. The County Administrator requests additional efforts in 2022 to secure these VASH vouchers for homeless Veterans in Contra Costa County.

9. Funding for Buchanan Field Airport (Tower replacement) and Byron Airport development: The County has submitted earmark requests relative to these projects and although not successful in advancing those earmarks in FY '22, there may be additional opportunities in FY '23.

CONSEQUENCE OF NEGATIVE ACTION:

Without the adoption of a 2022 legislative program, County staff and its advocates will not have direction on specific state and federal policy and funding priorities to pursue.

ATTACHMENTS

Attachment A

Attachment B

Attachment C

CONTRA COSTA COUNTY
EMPLOYMENT & HUMAN SERVICES

2022 Legislative Proposal

Submitted by: Contra Costa County
Contact: Sherry Lynn Peralta, (925) 608-4881, speralta@ehsd.cccounty.us

Topic: Stipends to Address Menstruation Equity

PROBLEM STATEMENT: In Contra Costa County and across the country, too many low-income women struggle to obtain menstrual hygiene products for themselves and their female children or dependent household members. A 2019 study by Obstetrics & Gynecology of low-income women in a large U.S. city found that nearly two-thirds (64%) could not afford menstrual hygiene products or supplies in the past year. The same study found that more than one in five (21%) women experienced this problem monthly[1].

The umbrella term "period poverty" describes inequities resulting from the lack of access to menstrual hygiene tools and resources. In addition to low-income women and girls, "period poverty" also adversely affects students, transgender and non-binary individuals, incarcerated women, and homeless women. Among the key contributors to "period poverty" are:

- Exorbitant prices of tampons or pads: 27 states* currently view these products as luxury goods and impose sales tax, also known as the "tampon tax," on menstrual hygiene products.
    - Last year, menstrual products and diapers were permanently exempted from the retail tax through a budget bill, AB 150. See: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220AB150&search_keywords=menstrual+products
- Menstrual hygiene products cannot be purchased with Food Stamps (CalFresh in California), Medicaid (Medi-Cal in California), and the WIC program. Health savings accounts only recently allowed for the purchase of menstrual hygiene products due to the recent CARES Act.

Recent studies have found linkages between frequent instances of "period poverty" and the prevalence of health inequities. For example, a recent analysis of college-age women in the U.S. conducted by the National Library of Medicine found that women who experienced monthly period poverty over the past year were the most likely to report moderate/severe depression[2].

LEGISLATIVE HISTORY

Research reveals that Assemblywoman Lorena Gonzalez carried a bill in 2018 that made $30 in diaper assistance available in the CalWORKs Welfare to Work and Cal Learn programs. See: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB480

In Illinois, House Bill 155 was recently signed into law and will take effect on January 1, 2022. House Bill 155 will require the Department of Human Services to apply for a waiver from the U.S. Department of Agriculture's Food and Nutrition Service permitting Supplemental Nutrition Assistance Program (SNAP) and Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) benefit recipients to use their benefits to purchase diapers and menstrual hygiene products.

[1] Unmet Menstrual Hygiene Needs Among Low-Income Women: Obstetrics & Gynecology (lww.com)
[2] Period poverty and mental health implications among college-aged women in the United States - PubMed (nih.gov)

PROPOSED SOLUTION: This proposal aims to help alleviate menstrual inequity through a stipend pilot program for CalWORKs Welfare-to-Work recipients. EHSD proposes a $15 monthly stipend for all female, transgender, and non-binary WTW recipients between the ages of 11 solely to purchase feminine hygiene products. Stipend-eligible individuals shall receive the benefit monthly through the household's CalWORKs-issued EBT Card.

Modelled after the diaper stipend, EHSD proposes this pilot program as a way to cover an initial population of vulnerable individuals engaged in Welfare-to-Work, with the intent to expand the stipend to a broader population of vulnerable individuals in the future.

ANALYSIS

Potential Eligibles:

All active CalWORKs Welfare-to-Work (WTW) participants who are female, transgender, or non-binary, and between ages 11 and 55 shall be eligible for the stipend. Individuals experiencing program sanctions and ineligible household members shall not be eligible for the stipend. An analysis of the current active Contra Costa CalWORKs households in CalWIN reveals the following as of September 2021:

- There are **12,608 CalWORKs participants** in Contra Costa County which includes **1,809 individuals who are enrolled in Welfare-To-Work (WTW).**
- There are **4,156 individuals enrolled in CalWORKs** who are females between the ages of 11-55, of which **1,363 individuals enrolled in WTW** are eligible for the stipend.

Contra Costa worked with CDSS to generate statewide estimates of the number of potentially eligible. CDSS estimates that as of September 2021, there may be approximately 43,000 WTW recipients statewide who are female, between the ages of 11-55, and are not sanctioned or excluded from WTW activities[3].

POTENTIAL FISCAL IMPACT

Rough Estimates

Annual cost of the stipend are as follows:

- This proposal would allow **1,363 female, aged 11-55, non-exempt, non-sanctioned Contra Costa WTW participants to qualify to a monthly $15 stipend** as a supportive service. This translates to an annual cost of 1,363 x $15 x 12 = **$245,340** to cover eligible individuals in Contra Costa County.
- This proposal would allow 43,000 female, aged 11-55, non-exempt, non-sanctioned individuals statewide (per CDSS estimates) to qualify to a monthly $15 stipend as a supportive service. This translates to an annual cost of 43,000 x $15 x 12 = **$7.74 million** to cover eligible individuals statewide.
- There is an approximate one-time cost of **$800,000** for CalSAWS integration.

[3] CDSS generated this estimate by pulling a Medi-Cal Eligibility Data System (MEDS) point-in-time extract of eligibility data as of the end of September 2021, and matching that with a Welfare Data Tracking Implementation Project (WDTIP) point-in-time extract from November 2021.

In summary, this pilot stipend program may allow **more than 43,000 low-income females aged 11-55 statewide, which includes 1,300 vulnerable Contra Costa community members,** to benefit from a monthly stipend of $15 per month based on the above estimates.

Transmission of Stipend:

Qualified individuals linked to an active CalWORKs case shall receive the monthly stipend through the listed Head of Household's EBT card. These costs may be recouped in other areas, such as lower utilization of public health resources (including mental health resources), an increase in overall health and well-being of individuals who experience menstruation, leading to positive outcomes.

POTENTIAL IMPACT TO OTHER COUNTY DEPARTMENTS OR SPECIFIC SUPERVISORIAL DISTRICTS
N/A

ANTICIPATED SUPPORT OR OPPOSITION
Anticipated Support:

- Other County Human Services Departments
- American Academy of Pediatrics, California
- American College of Obstetricians and Gynecologists, District IX
- Anti-Defamation League
- California Grocers Association
- CaliforniaHealth+ Advocates
- California Welfare Directors Association
- Courage Campaign
- End the Tampon Tax in California Grassroots Coalition
- Equal Rights Advocates
- IGNITE
- The Indie-Activists
- National Association of Social Workers, California Chapter
- National Women's Political Caucus of California
- Pad Project
- Sacramento Homeless Period Project
- Western Center on Law and Poverty
- Women's Empowerment
- Feeding America
- California Association of Food Banks
- California WIC Association

Anticipated Opposition:
N/A

REQUEST FOR FUNDING FOR *CHOICE IN AGING* CAMPUS IN CONTRA COSTA COUNTY

Choice in Aging is a not-for-profit organization that has been serving Contra Costa County's frailest and most vulnerable residents since 1949. It provides a variety of services to older adults and children in Contra Costa, Solano, Napa, and Sacramento counties. Choice in Aging has been a leader in creating innovative programs that allow more people to age independently, in their own homes.

Choice in Aging is in the process of building a new and innovative model for how we age in our community – the Aging in Place on Campus – which will provide elder and fragile adults with independent housing and co-located services that will allow them to age with dignity in their homes. The campus will include intergenerational services that will allow multiple generations to learn and grow together in a single location. Research shows that intergenerational programming provides a myriad of benefits, including decreased isolation and/or increased connectedness, increased self-esteem and feelings of worth, increased trust, and an increased sense of community.[1] This model for aging independently will create a blueprint that can be used nationwide to meet the challenges our aging population faces.

Choice in Aging is seeking a one-time allocation of $20 million in the 2022-23 state budget to build out the facilities for services for the residents, community members, and preschool attendees. The housing construction funding will be made available from other sources, but the full range of services can only be realized with the help of the state. While the campus will serve local residents, it will stand as both an incubator and policy platform for an intergenerational and integrated service approach to aging in place.

Attached is an FAQ for the project. Additional details of the project and services can be made available upon request.

[1] See http://www.ltsscenter.org/resource-library/Research_Snapshot_Intergenerational_Programming_in_Senior_Housing.pdf

CHOICE IN AGING CAMPUS: FAQ

WHAT ARE THE PROJECT GOALS?

- Create a national model for aging independently with wrap around services outside (and inside) your front door
- Build 82 single bedroom apartment units
- New Choice in Aging adult day health care facility
- New Choice in Learning Montessori intergenerational pre-school

WHAT ARE THE DETAILS OF THE HOUSING COMPONENT?

- 82 single bedroom apartment units in a three-story building (1 is for onsite property manager)
- Satellite Affordable Housing Association (SAHA) is the non-profit developer
- SAHA is securing funding for the housing on the campus – there are a multitude of available funding streams to build housing, such that a capital campaign is not necessary for them

WHY IS A NEW CAMPUS NEEDED?

- Access to affordable senior housing for a fast-growing population
- Current facility is more than 75 years old; maintenance is becoming cost prohibitive

WHAT IS INNOVATIVE ABOUT THIS PROJECT?

- This project is the first of its kind to provide an intergenerational space with independent senior living for frail adults with the services they need right outside their front door to keep them living independently, and out of a skilled nursing facility.
- A senior living independently, instead of in a skilled nursing facility, is healthier and happier. And, it costs less for seniors and their families and for taxpayers.

WHAT IS THE $20 MILLION CAPITAL CAMPAIGN FUNDING?

- Construction of a new facility for Choice in Aging including:
- Adult Day Health Care
  - Alzheimer's Day Care Resource Center
  - Caregiver Support and Education
  - Farsi Speaking Program
  - Russian Speaking Program
  - Physical Therapy
  - Outdoor Program and Therapy Spaces
- Construction of a new facility for Choice in Learning including:
  - Montessori classrooms
  - Playgrounds
- Continuation of our innovative intergenerational program and activities
- Expansion of our complex case management programs
- Expansion of our transitions out of skilled nursing program
- Expansion of our wraparound support services including fiduciary, elder abuse prevention and care management services

WHAT IS THE PROJECT STATUS?

- Architectural renderings have been approved by the City of Pleasant Hill
- First phase entitlements have been approved by the City of Pleasant Hill
- Initial construction begins this year; to begin grading and underground infrastructure installed

490 Golf Club Road, Pleasant Hill, CA 94523 • Phone: (925) 682-6330 • www.choiceinaging.org

CHOICE IN AGING

WHAT ARE CHOICE IN AGING'S PROGRAMS?

- Adult Day Health Care (2)
- Alzheimer's Day Care Resource Center (2)
- Caregiver Support and Education
- Multipurpose Senior Services Program (MSSP) (2) -- provides nursing and social work care management to Medi-Cal eligible individuals who are 65 years or older and disabled as an alternative to nursing facility placement.
- California Community Transitions (CCT) – Transition out of skilled nursing facilities; gives on-going support, services and funding to support seniors and disabled to transition back to community living.
- The Prevention and Early Access for Seniors Program (PEAS) -- a mental health case management program that strives to identify Older Adults 60+ in Solano County that are struggling with isolation, depression or anxiety. There is also a community education component around stigma reduction, suicide prevention and neighborhood support.
- CiA provides other services such as transportation, caregiver support groups, community education and more. Additionally, CiA provides comprehensive budget and policy advocacy at the local, state and federal levels. CiA is also a teaching institute and take advantage of opportunities to provide internships for CNAs, nurses, social workers, physicians and other students pursuing careers in the geriatric health and social fields of practice.
- Young at Heart Intergenerational Program
- Montessori Pre-School

WHAT IS INNOVATIVE ABOUT CHOICE IN AGING'S MODEL OF CARE?

- Participated in the piloting of the first-in-the-nation program that serves seniors with mid to late stage Alzheimer's disease and related dementias in an adult day health care setting – a model for subsequent programs around the country.
- Created a model intergenerational program that allows clients and preschoolers to master and maintain similar motor skills and bust ageism through weekly interactions that build bonds between participants.
- Partnered with the Contra Costa County Health Department to administer vaccination clinics for seniors in congregate care facilities, contributing to one of the highest vaccination rates for seniors in the nation.
- CEO Debbie Toth was appointed by California Health and Human Services Secretary Dr. Mark Ghaly to the California Masterplan for Aging Stakeholder Advisory Committee. The Committee created a blueprint for building an age-friendly environment in California.

MODEL AGING IN PLACE CAMPUS

CHOICE IN AGING

East Contra Costa County Habitat Conservancy (and partners)

PROPOSAL 1:

Conservation Grazing Infrastructure: $1,000,000. (scale-able proposal)

This project proposes to fund infrastructure to support use of livestock to manage grasslands. Funds will be used to establish wells/water sources, construct livestock watering systems, install fencing, and provide other critical infrastructure for livestock. These funds would be used across the east Contra Costa County region to ensure efficient function systems to support livestock as a tool to manage habitat, control invasive weeds and reduce wildfire risk. Well managed conservation grazing helps maintain healthy grasslands that act as a carbon sink and provide habitat for native endangered species. *Livestock grazing is the most powerful tool in East Contra Costa County to help the region respond to the effects of climate change that is further threatening endangered species, habitat and local communities*.

These priorities are identified in a variety of state platforms and documents.

AB1500 Chapter 2 / SB 45 Chapter 2: Wildfire: Fuel management: Conservation grazing reduces the fuel load in open space areas around the region. Contra Costa County has extensive urban-wildlife interface and the use of livestock to reduce fuel loads helps prevent the acceleration of wildfires.

AB1500 Chapter 5 / SB45 Chapter 4: Protecting fish, wildlife and natural areas: Habitat and Endangered Species: Conservation grazing uses livestock as a tool to manage grassland habitats. The timing of grazing, type of livestock, and close monitoring of grasslands results the creation and maintenance of habitat that support state and federally endangered and special status species. In Contra Costa County conservation grazing is key to maintaining habitats for western burrowing owl, California red legged frog, California tiger salamander and others. With more frequent drought cycles in our region, natural and restored wetlands, streams, and ponds are drying more quickly. The water in these habitat features needs to be conserved for wildlife breeding habitat. By excluding cattle from these areas are providing alternate sources of water we can preserve wetland habitats and continue to keep livestock on grazing throughout the growing season to manage the upland habitats.

AB1500 Chapter 6 / SB45 Chapter 5: Protecting farms, ranches and working lands: Invasive Weeds: Conservation grazing uses livestock to mange invasive weeds in our grasslands. Livestock when introduced to a landscape early in the rainy season can eat and control noxious and invasive weeds. Livestock are land managers greatest tool in addressing widespread invasive plans in grasslands.

Timing: This project is ready to go and start spending in January 2022. It will probably take up to 3 years to spend the entirety of these funds across 14,000 acres of conserved land owned and managed by the East Contra Costa County Habitat Conservancy and East Bay Regional Park District.

PROPOSAL 2:

Mount Diablo: Pine tree and Manzanita Die-off: $500,000.

This project seeks to investigate the cause of the recent sudden (over the last 12 months) die off and/or dieback of thousands of manzanita and knob cone pine trees in the Knob Cone Point area, contiguous to Save Mount Diablo's Curry Canyon reserve and Mount Diablo State Park, as well as along the Wall Point Trail area of Mount Diablo State Park, and potentially identify methods of management of this situation. All species of manzanita (including the Mount Diablo Manzanita) are being affected by this issue and are dying at dizzying rates in lush, wide chaparral areas, some seemingly impenetrable. This die off is concerning as it greatly increases the vulnerability of the area to fire and also has the potential to have extreme impacts to state and federally endangered and special status species.

Justification, by chapter of AB1500 & SB45: Forest management to reduce fire risk to Mount Diablo State Park and surrounding conservation areas. This project provides important fire management and environmental benefits (Chapters 2 and 5).

AB1500 Chapter 2 / SB 45 Chapter 2: Wildfire: The sudden die-off of pines and manzanitas needs to be understood, controlled and managed. The cause is currently unknown and partners in the region would like to move quickly to prevent the spread of this phenomenon across though the region. The current situation is a fire risk, but an spread of this would be devastating for the fuels management in the region (note powerlines in photo).

AB1500 Chapter 5 / SB45 Chapter 4: Protecting fish, wildlife and natural areas: Habitat and Endangered Species: This forest and chaparral habitat supports state and federal endangered and special status species including Alameda whipsnake, golden eagle, mount diablo manzanita. The loss of the pine and manzanita cover could dramatically impact the populations of the species that are targeted for conservation.

Timing: This project is ready to go and start spending as of March 2022. It will probably take up to 4 years to spend the entirety of these funds on research, experimental management, and to develop management protocols and guidelines.

PROPOSAL 3:

Land Acquisition funding for the local regional Natural Community Conservation Plan (East CCC HCP/NCCP): $6,000,000. (scale-able proposal)

The East Contra Costa County Habitat Conservancy (ECCCHC) implements the Habitat Conservation Plan/ Natural Community Conservation Plan (HCP/NCCP). There is an ambitious land acquisition component of this plan that anticipates up to 30,300 acres of new conservation in the region. The ECCCHC will provide match funding for the state funds toward acquisition up to 45% with local, federal funds, and/or private funds for the conservation of endangered species habitat. Conservation of land helps secure and manage healthy watersheds, sequester carbon, preserve habitat for state and federally listed endangered species.

AB1500 Chapter 5 / SB45 Chapter 4: Protecting fish, wildlife and natural areas: The HCP/NCCP targets habitats that support 28 state and federally protected species. The ECCCHC has a track record of working with other local agencies and NGOs to move quickly to effectively protect and manage lands. In the last 14 years, the ECCCHC has successfully conserved over 14,000 acres of land and is working to continue this effort.

Timing: This project is ready to go and start spending as of June 2022. It will probably take up to 4 years to spend the entirety of these funds and the pace of expenditures will depend on the opportunities to acquire land from willing sellers in the region.

PROPOSAL 4:

Habitat Restoration funding for the local regional Natural Community Conservation Plan (East CCC HCP/NCCP): $6,000,000. (scale-able proposal)

The East Contra Costa County Habitat Conservancy (ECCCHC) implements the Habitat Conservation Plan/ Natural Community Conservation Plan (HCP/NCCP). There is an ambitious aquatic habitat restoration and creation component of this plan (focusing on wetland, pond and stream habitats).

AB1500 Chapter 5 / SB45 Chapter 4: Protecting fish, wildlife and natural areas: The HCP/NCCP targets habitats that support 28 state and federally protected species. The ECCCHC has a track record of working designing, constructing, monitoring and maintaining habitat restoration projects. In the last 14 years, the ECCCHC has successfully constructed 11 restoration projects and has three projects in the planning stages. These funds could be used for planning/design or construction.

Timing: There projects ready to go (planning) and start spending as of January 2022. Other projects could start construction in summer 2022. It will probably take up to 6 years to spend

the entirety of these funds and the pace of expenditures will depend on the opportunities presented on existing and soon to be acquired conserved lands.

Contra Costa County

To: Board of Supervisors

From: Supervisor Karen Mitchoff, Chair

Date: January 18, 2022

Subject: Ordinance increasing limits on individual campaign contributions to candidates for all County offices

RECOMMENDATION(S):
INTRODUCE Ordinance No. 2022-04, amending the Election Campaign Ordinance to revise the limits on individual campaign contributions to supervisorial and non-supervisorial candidates; WAIVE reading; FIX February 1, 2022, for adoption.

FISCAL IMPACT:
None.

BACKGROUND:
The Contra Costa County Election Campaign Ordinance was first adopted in 1984 and has been amended sporadically since that time. The limit for individual campaign contributions to non-supervisorial county office candidates was last revised in 2004. The current limit is one-thousand, six hundred seventy-five dollars ($1,675) per election cycle, and it applies to candidates for the offices of Assessor, Auditor-Controller, County Clerk-Recorder, District Attorney, Sheriff-Coroner, and Treasurer-Tax Collector. (See Ordinance, §§ 530-2.210; 530-2.402).

The limit for individual campaign contributions to supervisorial candidates was last revised in 2005. The current limit is one-thousand, six hundred seventy-five dollars ($1,675) per election cycle. This limit increases to five thousand dollars ($5,000) in two limited circumstances: where the total cumulative expenditures of the committee or committees making independent expenditures opposing the candidate or supporting the candidate's opponent equal $75,000 or more; where the candidate faces a self-funded opponent, as defined. (See Ordinance, §§ 530-2.703; 530-2.705 (a); 530-2.708 (c).)

The proposed ordinance amendment would increase the individual campaign contributions limits for both supervisorial and non-supervisorial candidates to two thousand, five hundred dollars ($2,500) per election cycle. As to supervisorial candidates, the increased limit triggered by large independent expenditures and self-funded candidates would continue to apply. All other provisions of the Election Campaign Ordinance would remain unchanged. (See proposed Ordinance No. 2022-04, attached.)

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

Contact: Anne O, Chief of Staff, District IV, (925) 521-7100

By: June McHuen, Deputy

cc: Monica Nino, County Administrator, Mary Ann McNett Mason, County Counsel, Deborah Cooper, County Clerk-Recorder, Assessor, Auditor-Controller, District Attorney, Sheriff-Coroner, Treasurer-Tax Collector

BACKGROUND: (CONT'D)

In the sixteen years since these campaign contribution limits were last revised, the cost of election campaigns has significantly increased due to the rising cost of living and the increased cost for outreach resulting from the increased County population. Another related factor in rising campaign costs is the larger role of Independent Expenditure Committees for or against candidates in campaigns at the local level. Independent Expenditure Committees can raise large sums of money that can have an impact on the outcome of an election. Raising the individual campaign contribution limits for County elected offices will help candidates offset the potential impacts of the changes that have raised the costs of local campaigns.

In 2019, Assembly Bill 571 (Chapter 566) was signed by the Governor, and beginning January 1, 2021, it applied statutory campaign contribution limits to elective city and county offices in jurisdictions that do not have local laws imposing campaign contribution limits. Along with the statutory contribution limits, other related provisions that formerly applied only to state level candidates now apply in such local jurisdictions. The current statutory contribution limit for city and county candidates is $4,900 per election. This amount is adjusted every odd-numbered year by the Fair Political Practices Commission to reflect any increase or decrease in the Consumer Price Index.

Because this County's Election Campaign Ordinance imposes campaign contribution limits for all elective County offices, the new statutory contribution limits and other related provisions do not apply to County candidates. (See Government Code, §§ 85301 (d); 85702.5.) AB 571 expressly acknowledges that a local government may establish a different limitation that is more precisely tailored to the needs of its communities. The proposed ordinance which would increase individual contribution limits for all County candidates to $2,500 is permitted by state law and is less than the higher statutory limit of $4,900 for individual campaign contributions in counties without local contribution limits.

If Ordinance No. 2022-04 is adopted on February 1 as proposed, it will be effective March 2, during an ongoing election cycle for candidates for both supervisorial and non-supervisorial office. This ordinance would provide that the increased contribution limits would apply to both supervisorial and non-supervisorial candidates during the remainder of the current election cycle. Thus, candidates could receive individual campaign contributions at the increased amount during the current election cycle. (See, Ordinance No. 2022-04, § IV, Effect of Ordinance on Limits Applicable to Current Election Cycle.)

CONSEQUENCE OF NEGATIVE ACTION:

The current individual campaign contribution limits will remain unchanged.

ATTACHMENTS

Ordinance No. 2022-04

ORDINANCE NO. 2022-04

AMENDING THE COUNTY'S ELECTION CAMPAIGN ORDINANCE

The Contra Costa County Board of Supervisors ordains as follows (omitting the parenthetical footnotes from the official text of the enacted or amended provisions of the County Ordinance Code):

SECTION I. SUMMARY. This ordinance amends Division 530 of the County Ordinance Code, the County's Election Campaign Ordinance, to increase the limit on individual campaign contributions made during a single county election cycle to or for a candidate for county supervisor or other county office.

SECTION II. Section 530-2.402 of the County Ordinance Code is amended to read:

530-2.402 Individual campaign contributions. For a single county election cycle, no person or political committee (other than the candidate or a broad based political committee) shall make, and no candidate or campaign treasurer shall accept, any monetary or nonmonetary contribution to or for a single candidate for county office or to or for a committee authorized in writing by the candidate to accept contributions for him or her that will cause the total amount contributed by that person or political committee in support of that candidate for that election cycle to exceed $2,500. (Ords. 2022-04 § 2, 04-22 § 2, 89-11, 84-9.)

SECTION III. Section 530-2.703 of the County Ordinance Code is amended to read:

530-2.703 Individual campaign contributions. For a single county election cycle, no person or political committee (other than the candidate or a broad based political committee) shall make, and no candidate or campaign treasurer shall accept, any contribution to or for a single candidate for county supervisor or to or for a committee authorized in writing by the candidate to accept contributions to him or her that will cause the total amount contributed by that person or political committee in support of that candidate for that election cycle to exceed $2,500, except as provided in Section 530-2.705(a) and Section 530-2.708(c) of this article. (Ords. 2022-04 § 3, 2005-22 § 3, 99-40 § 3, 98-6, 96-48, 95-8.)

SECTION IV. NEW CONTRIBUTION LIMITS APPLY TO CURRENT ELECTION CYCLES. The individual campaign contribution limits established by this ordinance go into effect on the effective date of this ordinance. If an election cycle began before the effective date, the new campaign contribution limits established by this ordinance apply during the remainder of the election cycle to all non-supervisorial candidates and to all supervisorial candidates, except as otherwise provided in Ordinance Code sections 530-2.705(a) and 530-2.708(c).

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SECTION V. EFFECTIVE DATE. This ordinance becomes effective 30 days after passage, and within 15 days after passage shall be published once with the names of supervisors voting for or against it in the East Bay Times, a newspaper published in this County.

PASSED on _____, by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

ATTEST: MONICA NINO,
Clerk of the Board of Supervisors
and County Administrator

_____
Board Chair

By: _____
Deputy

[SEAL]

KCK:
H:\Client Matters\2022\Ordinance No. 2022-04 Election Campaigns.wpd

Contra Costa County

To: Board of Supervisors

From: Brian M. Balbas, Public Works Director/Chief Engineer

Date: January 18, 2022

Subject: Prohibit parking on the north side of Winslow Street (Road No. 2295AD), Crockett area.

RECOMMENDATION(S):
ADOPT Traffic Resolution No. 2022/4514 to prohibit stopping, standing, or parking at all times, except for those vehicles of individuals with disabilities (blue curb) on the north side of Winslow Street (Road No. 2295AD), beginning at a point 405 feet east of the east roadway edge of Bay Street (Road No. 2295AJ) and continuing easterly a distance of 20 feet, as recommended by the Public Works Director, Crockett area. (District V)

FISCAL IMPACT:
No fiscal impact.

BACKGROUND:
County Public Works Department, Transportation Engineering staff, upon request for a residential disabled parking space, conducted a field visit to 600 Winslow Street in Crockett. The onsite visit included an onsite assessment and verification that the property did not have a driveway or garage. Evidence of disability by the resident was also provided. Therefore, criteria is met to designate a disabled persons parking space in front of the requestor's residence. Entering/exiting the vehicle from the elevated curb/sidewalk in front of the residence will allow a safer/easier transition into/out of the resident's rear entry accessible vehicle.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Monish Sen, 925.313.2187

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc:

CONSEQUENCE OF NEGATIVE ACTION:
Parking will remain unrestricted at this location.

AGENDA ATTACHMENTS
Traffic Resolution 2022/4514
MINUTES ATTACHMENTS
Signed Resolution No. 2022/4514

THE BOARD OF SUPERVISORS OF CONTRA COSTA COUNTY, CALIFORNIA

Adopted this Traffic Resolution on January 18, 2022 by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

TRAFFIC RESOLUTION NO. 2022/4514
Supervisorial District V

SUBJECT: Prohibit parking at all times, except for those vehicles displaying a special identification license plate or distinguishing placard issued to those individuals with disabilities, on a portion of Winslow Street (Road No. 2295AD), Crockett area.

The Contra Costa Board of Supervisors RESOLVES that:

Based on recommendations by the County Public Works Department's Transportation Engineering Division, and pursuant to County Ordinance Code Sections 46-2.002 - 46-2.012, the following traffic regulation is established:

> Pursuant to Sections 22507 and 22511.7 of the California Vehicle Code declaring parking to be prohibited at all times, except for vehicles of individuals with disabilities (blue curb), on the north side of Winslow Street (Road No. 2295AD), beginning at a point 405 feet east of the east roadway edge of Bay Street (Road No. 2295AJ), and continuing easterly a distance of 20 feet, Crockett area.

I hereby certify that this is a true and correct Copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED:_____
Monica Nino, Clerk of the Board of Supervisors and County Administrator

By _____, Deputy

JS:sr

Orig. Dept: Public Works (Traffic)
Contact: Monish Sen (925-313-2187)

cc: California Highway Patrol
Sheriff Department

THE BOARD OF SUPERVISORS OF CONTRA COSTA COUNTY, CALIFORNIA

Adopted this Traffic Resolution on January 18, 2022 by the following vote:

AYES: John Gioia, Candace Andersen, Diane Burgis, Karen Mitchoff, Federal Glover

NOES: None

ABSENT: None

ABSTAIN: None

TRAFFIC RESOLUTION NO. 2022/4514
Supervisorial District V

SUBJECT: Prohibit parking at all times, except for those vehicles displaying a special identification license plate or distinguishing placard issued to those individuals with disabilities, on a portion of Winslow Street (Road No. 2295AD), Crockett area.

The Contra Costa Board of Supervisors RESOLVES that:

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I hereby certify that this is a true and correct Copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18 2022
Monica Nino, Clerk of the Board of Supervisors and County Administrator

By _____, Deputy

JS:sr

Orig. Dept: Public Works (Traffic)
Contact: Monish Sen (925-313-2187)

cc: California Highway Patrol
Sheriff Department

Contra Costa County

To: Board of Supervisors

From: Brian M. Balbas, Public Works Director/Chief Engineer

Date: January 18, 2022

Subject: Construction Contract for the Crockett Area Guardrail Upgrades, Crockett Area.

RECOMMENDATION(S):

(1) APPROVE plans, specifications, and design for Crockett Area Guardrail Upgrades, Crockett area. County Project No. 0662-6R4105, Federal Project No. HSIPL-5928(157) (District V)

(2) DETERMINE that the bid submitted by Coral Construction Company (Coral Construction) exceeded the Disadvantaged Business Enterprise (DBE) goal for this project, and FURTHER DETERMINE that Coral Construction has submitted the lowest responsive and responsible bid for this project.

(3) AWARD the construction contract for the above project to Coral Construction in the listed amount ($1,117,777.00) and the unit prices submitted in the bid, and DIRECT that Coral Construction shall present two good and sufficient surety bonds, as indicated below, and that the Public Works Director, or designee, shall prepare the contract.

(4) ORDER that, after the contractor has signed the contract and returned it, together with the bonds as noted below and any required certificates of insurance or other required documents, and the Public Works Director has reviewed and found them to be sufficient, the Public Works Director, or designee, is authorized to sign the contract for this Board.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Adelina Huerta, 925-313-2305

cc:

RECOMMENDATION(S): (CONT'D)

(5) ORDER that, in accordance with the project specifications and/or upon signature of the contract by the Public Works Director, or designee, bid bonds posted by the bidders are to be exonerated and any checks or cash submitted for security shall be returned.

(6) ORDER that, the Public Works Director, or designee, is authorized to sign any escrow agreements prepared for this project to permit the direct payment of retentions into escrow or the substitution of securities for moneys withheld by the County to ensure performance under the contract, pursuant to Public Contract Code Section 22300.

(7) DELEGATE, pursuant to Public Contract Code Section 4114, to the Public Works Director, or designee, the Board's functions under Public Contract Code Sections 4107 and 4110.

(8) DELEGATE, pursuant to Labor Code Section 6705, to the Public Works Director, or to any registered civil or structural engineer employed by the County, the authority to accept detailed plans showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection during trench excavation covered by that section.

(9) DECLARE that, should the award of the contract to Coral Construction be invalidated for any reason, the Board would not in any event have awarded the contract to any other bidder, but instead would have exercised its discretion to reject all of the bids received. Nothing in this Board Order shall prevent the Board from re-awarding the contract to another bidder in cases where the successful bidder establishes a mistake, refuses to sign the contract, or fails to furnish required bonds or insurance (see Public Contract Code Sections 5100-5107).

FISCAL IMPACT:

The Project will be funded by 51.55% Federal Highway Safety Improvement Program (HSIP), 48.45% Local Road Funds

BACKGROUND:

The above project was previously approved by the Board of Supervisors, plans and specifications were filed with the Board, and bids were invited by the Public Works Director. On December 21, 2021, the Public Works Department received bids from the following contractors:

BIDDER, TOTAL AMOUNT, BOND AMOUNTS
Coral Construction Company.: $1,117,777.00; Payment: $1,117,777.00; Performance: $1,117,777.00

Dirt and Aggregate Interchange, Inc.: $1,148,833.00

Midstate Barrier, Inc.: $1,185,410.00

Construction H Inc.: $1,788,600.00

The first bidder listed above, Coral Construction, submitted the lowest responsive and responsible bid, which is $31,056.00 less than the next lowest bid.

This is a federally funded project subject to a Disadvantaged Business Enterprise (DBE) contract goal and requirements. The Public Works Director reports that the lowest monetary bidder, Coral Construction, exceeded the DBE goal (11.00%) for this project.

The Public Works Director recommends that the Board determine that Coral Construction has complied with the DBE requirements for this project and recommends that the construction contract be awarded to Coral Construction.

The Board of Supervisors previously determined that the project is exempt from the California Environmental Quality Act (CEQA) as a Class 2(c) Categorical Exemption, and a Notice of Exemption was filed with the County Clerk on September 17, 2020.

The general prevailing rates of wages, which shall be the minimum rates paid on this project, have been filed with the Clerk of the Board, and copies will be made available to any party upon request.

CONSEQUENCE OF NEGATIVE ACTION:

Construction of the project would be delayed, and the project might not be built.

Contra Costa County

To: Board of Supervisors

From: Brian M. Balbas, Public Works Director/Chief Engineer

Date: January 18, 2022

Subject: Approving the Seventh Extension of the Subdivision Agreement for Subdivision SD91-07553, Alamo area

RECOMMENDATION(S):
ADOPT Resolution No. 2022/19 approving the seventh extension of the Subdivision Agreement for subdivision SD91-07553, for a project being developed by Alamo Land Investors, LLC and Alamo 37, LLC, as recommended by the Public Works Director, Alamo area. (District II)

FISCAL IMPACT:
No fiscal impact.

BACKGROUND:
The termination date of the Subdivision Agreement needs to be extended. The developer has not completed the required improvements and has requested more time. (Approximately 0% of the work has been completed to date.) By granting an extension, the County will give the developer more time to complete improvements and keeps the bond current.

CONSEQUENCE OF NEGATIVE ACTION:
The termination date of the Subdivision Agreement will not be extended and the developer will be in default of the agreement, requiring the County to take legal action against the developer and surety to get the improvements installed, or revert the development to acreage.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Randolf Sanders (925) 313-2111

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc:

AGENDA
ATTACHMENTS
Resolution No. 2022/19
Application Extension
Agreement Extension
MINUTES
ATTACHMENTS
Signed Resolution No. 2022/8

Recorded at the request of: **Clerk of the Board**
Return To: **Public Works, Engineering Services Division**

THE BOARD OF SUPERVISORS OF CONTRA COSTA COUNTY, CALIFORNIA
and for Special Districts, Agencies and Authorities Governed by the Board

Adopted this Resolution on 01/18/2022 by the following vote:

AYE:	**John Gioia, District I SupervisorCandace Andersen, District II SupervisorDiane Burgis, District III SupervisorKaren Mitchoff, District IV SupervisorFederal D. Glover, District V Supervisor**
NO:	
ABSENT:	
ABSTAIN:	
RECUSE:	

Resolution No. 2022/19

IN THE MATTER OF approving the seventh extension of the Subdivision Agreement for subdivision SD91-07553, for a project being developed by Alamo Land Investors, LLC and Alamo 37, LLC, as recommended by the Public Works Director, Alamo area. (District II)

WHEREAS the Public Works Director having recommended that he be authorized to execute the seventh agreement extension which extends the subdivision agreement between Alamo Land Investors, LLC and Alamo 37, LLC and the County for construction of certain improvements in SD91-07553, Alamo area, through January 12, 2023.
APPROXIMATE PERCENTAGE OF WORK COMPLETE: 0%
ANTICIPATED DATE OF COMPLETION: 2026
BOND NO.: LICX1203868 Date: January 21, 2021
REASON FOR EXTENSION: Custom lots with specific home foot prints. Currently finalizing waterline issues with EBMUD. Break Ground anticipated in 2024 (grading), improvements in 2025 (under grounding), construction in 2026 (vertical building).

NOW, THEREFORE, BE IT RESOLVED that the recommendation of the Public Works Director is APPROVED.

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

Contact: Randolf Sanders (925) 313-2111

ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc:

THE BOARD OF SUPERVISORS OF CONTRA COSTA COUNTY, CALIFORNIA

and for Special Districts, Agencies and Authorities Governed by the Board

Adopted this Resolution on 01/11/2022 by the following vote:

AYE:	5	**John Gioia** **Candace Andersen** **Diane Burgis** **Karen Mitchoff** **Federal D. Glover**
NO:	0	
ABSENT:	0	
ABSTAIN:	0	
RECUSE:	0	

Resolution No. 2022/8

IN THE MATTER OF: Approving and Authorizing the Public Works Director, or designee, to fully close portions of First Street, Garretson Avenue, Pacific Avenue, Second Street, Rodeo Avenue, Lake Avenue, and Fourth Street. All closures will occur between Harris Avenue and Parker Avenue from January 12, 2022 to August 12, 2022 from 7:00 a.m. through 5:00 p.m., for the purpose of installing new earthquale resistant water mains and appurtenances and transfer existing service laterals for infrastructure renewal project, Rodeo area. (District V)

RC21-28

NOW, THEREFORE, BE IT RESOLVED that permission is granted to East Bay Municipal Utility District to fully close portions of First Street, Garretson Avenue, Pacific Avenue, Second Street, Rodeo Avenue, Lake Avenue, and Fourth Street. All closures will occur between Harris Avenue and Park Avenue from January 12, 2022 to August 12, 2022 from 7:00 a.m. through 5:00 p.m., for the purpose of installing new water mains for infrastructure renewal, except for local and emergency traffic, US Postal Services, and garbage trucks. East Bat Municipal Utility District shall be subject to the following conditions:

1. Traffic will be detoured via neighboring streets per traffic control plan reviewed by Public Works.

2. All signing to be in accordance with the California Manual on Uniform Traffic Control Devices.

3. East Bay Municipal Utility District shall comply with the requirements of the Ordinance Code of Contra Costa County.

4. Provide the County with a Certificate of Insurance in the amount of $1,000,000.00 for Comprehensive General Public Liability which names the County as an additional insured prior to permit issuance.

5. Obtain approval for the closure from the Sheriff's Department, the California Highway Patrol and the Fire District.

Contact: Bob Hendry (925) 374-2136

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 11, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc: Larry Gossett- Engineering Services, Randolf Sanders- Engineering Services, Bob Hendry -Engineering Services, EBMUD, CHP, Sheriff - Patrol Division Commander

CONTRA COSTA COUNTY
APPLICATION FOR AGREEMENT EXTENSION

Development Number: SD91-07553 **Year:** 2022

This form must be filled out and returned with your renewal form if you wish Public Works to consider your extension request. **Because you did not complete the agreed to improvements within the two-year period originally granted by the Board of Supervisors in The Agreement, the County may grant you a one-year extension upon your completion of the included forms. Please realize that you must complete your improvements in an expeditious manner, as unlimited extensions will not be granted.**

Please provide the reason why you need additional time to complete your improvements:

CUSTOM LOTS WITH SPECIFIC HOME FOOT PRINTS. FINALIZING WATERLINE ISSUES WITH EBMUD

What percentage of your improvements has been completed? 0

Please provide your anticipated date of completion: 2026

Please provide your construction schedule:

BREAK GROUND 2024 (GRADING) IMPROVEMENT 2025 (UNDER GROUNDING) CONSTRUCTION 2026 (VERTICAL BUILDING)

Please provide us with your Federal Tax ID Number: 68-0406953

Please identify any parcel numbers and owners of lots within the development:
(Use additional pages, if necessary)

Assessor's Parcel Number	Owner's Name	Property Address	Owner's Address	Phone Number

SEE DETACHED SHEET

Subject: Alamo Summit

Here's a list of lots and APN's:

APN	Property Address	Owner's Name	Owner's Address	Phone #
APN 191-190-001	Lot 1	Alamo Land Investor, LLC & Alamo 37, LLC	4021 Port Chicago hwy, Concord ca	
APN 191-190-002	Lot 2			
APN 191-190-003	Lot 3			
APN 191-190-004	Lot 4			
APN 191-190-005	Lot 5			
APN 191-190-006	Lot 6			
APN 191-190-007	Lot 7			
APN 191-190-008	Lot 8			
APN 191-190-000	Lot 9			
APN 191-190-010	Lot 10			
APN 191-190-011	Lot 11			
APN 191-190-012	Lot 12			925-682-6419
APN 191-200-001	Lot 13			
APN 191-190-013	Lot 14			
APN 191-190-014	Lot 15			
APN 191-190-015	Lot 16			
APN 191-190-016	Lot 17			
APN 191-190-017	Lot 18			
APN 191-190-018	Lot 19			
APN 191-190-019	Lot 20			925-682-6419
APN 191-200-002	Lot 21			
APN 191-200-003	Lot 22			
APN 191-200-004	Lot 23			
APN 191-200-005	Lot 24			
APN 191-200-006	Lot 25			
APN 191-200-007	Lot 26			
APN 191-200-008	Lot 27			925-682-6419
APN 191-210-001	Lot 28			
APN 191-210-002	Lot 29			
APN 191-210-003	Lot 30			
APN 191-210-004	Lot 31			
APN 191-210-005	Lot 32			
APN 191-210-006	Lot 33			
APN 191-210-007	Lot 34			
APN 191-210-008	Lot 35			
APN 191-210-009	Lot 36			
APN 191-210-010	Lot 37			925-682-6419

CONTRA COSTA COUNTY

SUBDIVISION AGREEMENT EXTENSION

Development Number: SD91-07553

Developer: ALAMO LAND INVESTORS, LLC AND ALAMO 37, LLC

Original Agreement Date: January 12, 2010

Extension New Termination Date: January 12, 2023

Improvement Security

SURETY: Lexon Insurance Company

BOND No. LICX1203868	**Date: January 21, 2021**
Security Type	**Security Amount**
Cash:	**$ 52,200.00 (1% cash, $1,000 Min.)**
SURETY BOND:	**$ 5,167,900.00 (Performance)**
	$ 2,610,000.00 (Labor& Material)

The Developer and the Surety desire this Agreement to be extended through the above date; and Contra Costa County and said Surety hereby agree thereto and acknowledge same.

Dated: _____

FOR CONTRA COSTA COUNTY
Brian M. Balbas, Public Works Director

By: _____

RECOMMENDED FOR APPROVAL:

By: _____
(Engineering Services Division)

(NOTE: Developer's, Surety's and Financial Institution's Signatures must be Notarized.)

FORM APPROVED: Victor J. Westman, County Counsel

After Approval Return to Clerk of the Board

Dated: December 7th, 2021
Dated:
West Coast Home Builders, Inc.*
Albert D. Seeno III CEO
Developer's Signature(s)

Albert D. Seeno, III, President & C.E.O.
Printed Discovery Builders, Inc.**

Developer's Signature(s)
Albert D. Seeno, III, C.E.O.
Printed

4021 Port Chicago Highway, Concord, CA 94520
Address

Lexon Insurance Company
Surety or Financial Institution

10002 Shelbyville Rd, Suite 100
Louisville, KY 40223
Address

Attorney in Facts Signature

Jessica L. Nowlin, Attorney-in-Fact
Printed

*Managing Member of Alamo 37, LLC
**Managing Member of Alamo Land Investors, LLC

ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Contra Costa)

On December 7th, 2021 before me, Nancy McMillin, Notary Public
(insert name and title of the officer)

personally appeared Albert D. Seeno, III,
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ **(Seal)**

NANCY MCMILLIN
Notary Public - California
Contra Costa County
Commission # 2376453
My Comm. Expires Sep 25, 2025

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

Civil Code § 1189

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy or validity of that document.

State of California)
) ss
County of San Francisco)

On DEC 0 6 2021, before me, Natalie K. Trofimoff, Notary Public, personally appeared Jessica L. Nowlin, who proved to me on the basis of satisfactory evidence to be the person~~(s)~~ whose name~~(s)~~ is~~/are~~ subscribed to the within instrument and acknowledged to me that ~~he/~~she~~/they~~ executed the same in ~~his/~~her~~/their~~ authorized capacity~~(ies)~~, and that by ~~his/~~her~~/their~~ signature~~(s)~~ on the instrument the person~~(s)~~, or the entity upon behalf of which the person~~(s)~~ acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

NATALIE K. TROFIMOFF
COMM #2308129
Notary Public - California
LOS ANGELES COUNTY
My Comm. Expires OCT 22, 2023

Signature: _____
Natalie K. Trofimoff, Notary Public

(Seal)

SOMPO INTERNATIONAL
INSURANCE

POWER OF ATTORNEY

2697

KNOW ALL BY THESE PRESENTS, that **Endurance Assurance Corporation**, a Delaware corporation, **Endurance American Insurance Company**, a Delaware corporation, **Lexon Insurance Company**, a Texas corporation, and/or **Bond Safeguard Insurance Company**, a South Dakota corporation, each, a "Company" and collectively, **"Sompo International,"** do hereby constitute and appoint: **Jessica L. Nowlin, John T. Lettieri, Natalie K. Trofimoff, Patricia S. Arana** as true and lawful Attorney(s)-In-Fact to make, execute, seal, and deliver for, and on its behalf as surety or co-surety; bonds and undertakings given for any and all purposes, also to execute and deliver on its behalf as aforesaid renewals, extensions, agreements, waivers, consents or stipulations relating to such bonds or undertakings provided, however, that no single bond or undertaking so made, executed and delivered shall obligate the Company for any portion of the penal sum thereof in excess of the sum of **ONE HUNDRED MILLION Dollars ($100,000,000.00).**

Such bonds and undertakings for said purposes, when duly executed by said attorney(s)-in-fact, shall be binding upon the Company as fully and to the same extent as if signed by the President of the Company under its corporate seal attested by its Corporate Secretary.

This appointment is made under and by authority of certain resolutions adopted by the sole shareholder of each Company by unanimous written consent effective the 15th day of June, 2019, a copy of which appears below under the heading entitled "Certificate".

This Power of Attorney is signed and sealed by facsimile under and by authority of the following resolution adopted by the sole shareholder of each Company by unanimous written consent effective the 15th day of June, 2019 and said resolution has not since been revoked, amended or repealed:

RESOLVED, that the signature of an individual named above and the seal of the Company may be affixed to any such power of attorney or any certificate relating thereto by facsimile, and any such power of attorney or certificate bearing such facsimile signature or seal shall be valid and binding upon the Company in the future with respect to any bond or undertaking to which it is attached.

IN WITNESS WHEREOF, each Company has caused this instrument to be signed by the following officers, and its corporate seal to be affixed this 15th day of June, 2019.

Endurance Assurance Corporation
By: Richard M Appel
Richard Appel; SVP & Senior Counsel
Endurance Assurance Corporation CORPORATE SEAL 2002 DELAWARE

Endurance American Insurance Company
By: Richard M Appel
Richard Appel; SVP & Senior Counsel
Endurance American Insurance Company CORPORATE SEAL 1996 DELAWARE

Lexon Insurance Company
By: Richard M Appel
Richard Appel; SVP & Senior Counsel
LEXON INSURANCE COMPANY CORPORATE SEAL MARCH 16, 1954 STATE OF TEXAS

Bond Safeguard Insurance Company
By: Richard M Appel
Richard Appel; SVP & Senior Counsel
BOND SAFEGUARD INSURANCE COMPANY A SOUTH DAKOTA INSURANCE COMPANY

ACKNOWLEDGEMENT

On this 15th day of June, 2019, before me, personally came the above signatories known to me, who being duly sworn, did depose and say that he/they is an officer of each of the Companies; and that he executed said instrument on behalf of each Company by authority of his office under the by-laws of each Company.

By: Amy Taylor
Amy Taylor, Notary Public – My Commission Expires 5/9/23
AMY TAYLOR STATE OF TENNESSEE NOTARY PUBLIC DAVIDSON COUNTY

CERTIFICATE

I, the undersigned Officer of each Company, DO HEREBY CERTIFY that:

1. That the original power of attorney of which the foregoing is a copy was duly executed on behalf of each Company and has not since been revoked, amended or modified; that the undersigned has compared the foregoing copy thereof with the original power of attorney, and that the same is a true and correct copy of the original power of attorney and of the whole thereof;
2. The following are resolutions which were adopted by the sole shareholder of each Company by unanimous written consent effective June 15, 2019 and said resolutions have not since been revoked, amended or modified:

   "RESOLVED, that each of the individuals named below is authorized to make, execute, seal and deliver for and on behalf of the Company any and all bonds, undertakings or obligations in surety or co-surety with others: RICHARD M. APPEL, BRIAN J. BEGGS, CHRISTOPHER DONELAN, SHARON L. SIMS, CHRISTOPHER L. SPARRO, MARIANNE L. WILBERT

   ; and be it further

   RESOLVED, that each of the individuals named above is authorized to appoint attorneys-in-fact for the purpose of making, executing, sealing and delivering bonds, undertakings or obligations in surety or co-surety for and on behalf of the Company."
3. The undersigned further certifies that the above resolutions are true and correct copies of the resolutions as so recorded and of the whole thereof.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the corporate seal this 6th day of December, 20 21.

By:
Daniel S. Lune, Secretary

NOTICE: U. S. TREASURY DEPARTMENT'S OFFICE OF FOREIGN ASSETS CONTROL (OFAC)

No coverage is provided by this Notice nor can it be construed to replace any provisions of any surety bond or other surety coverage provided. This Notice provides information concerning possible impact on your surety coverage due to directives issued by OFAC. **Please read this Notice carefully.**

The Office of Foreign Assets Control (OFAC) administers and enforces sanctions policy, based on Presidential declarations of "national emergency". OFAC has identified and listed numerous foreign agents, front organizations, terrorists, terrorist organizations, and narcotics traffickers as "Specially Designated Nationals and Blocked Persons". This list can be located on the United States Treasury's website – https://www.treasury.gov/resource-center/sanctions/SDN-List.

In accordance with OFAC regulations, if it is determined that you or any other person or entity claiming the benefits of any coverage has violated U.S. sanctions law or is a Specially Designated National and Blocked Person, as identified by OFAC, any coverage will be considered a blocked or frozen contract and all provisions of any coverage provided are immediately subject to OFAC. When a surety bond or other form of surety coverage is considered to be such a blocked or frozen contract, no payments nor premium refunds may be made without authorization from OFAC. Other limitations on the premiums and payments may also apply.

Any reproductions are void.

Surety Claims Submission: LexonClaimAdministration@sompo-intl.com
Telephone: 615-553-9500 Mailing Address: Sompo International; 12890 Lebanon Road; Mount Juliet, TN 37122-2870

Contra
Costa
County

To: Board of Supervisors
From: Director of Airports
Date: January 18, 2022

Subject: Exclusive Negotiating Agreements – Urban Air Mobility, LLC for Land at the Buchanan Field Airport, Concord Area (District IV)

RECOMMENDATION(S):

A. APPROVE and AUTHORIZE the Director of Airports, or designee, to execute an Exclusive Negotiating Agreement with Urban Air Mobility, LLC, a Delaware limited liability company, for the negotiation of a long-term lease of approximately 0.86-acre of land on the northwest side of the Buchanan Field Airport.

B. APPROVE and AUTHORIZE the Director of Airports, or designee, to execute an Exclusive Negotiating Agreement with Urban Air Mobility, LLC, a Delaware limited liability company, for the negotiation of a long-term lease of approximately 11-acres of land on the northeast side of the Buchanan Field Airport.

FISCAL IMPACT:
There is no negative impact on the General Fund. The Airport Enterprise Fund could realize lease and other revenues. The County General Fund could realize sales tax and other revenues if a lease is successfully negotiated.

BACKGROUND:
On January 14, 2021, the Board authorized the Director of Airports, or

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Beth Lee, 925-681-4200

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc:

BACKGROUND: (CONT'D)

designee, to negotiate a long-term ground lease and development terms for this 0.86-acre site. The property is located on the northwest side of Buchanan Field Airport on Sally Ride Drive. The proposal from Mark Scott Construction, Inc. was the only offer the County received following a solicitation for competitive interest in the site.

On March 10, 2020, the Board authorized the Director of Airports, or designee, to negotiate a long-term ground lease and development terms for this 11-acre site. The property is located on the northeast side of Buchanan Field Airport on Marsh Drive immediately west of the Walnut Creek channel. The proposal from Mark Scott Construction, Inc. was the only offer the County received following a solicitation for competitive interest in the site.

Mark Scott Construction, Inc. desires to lease the sites and develop them for aviation purposes and has formed a limited liability company called Urban Air Mobility, LLC for this purpose. By entering into exclusive negotiation agreements with Urban Air Mobility, they can actively market the properties to identify a tenant or tenants. Further, it will enable the County and Urban Air Mobility to feel confident in proceeding with the CEQA process, as mandated by State law.

Development of these vacant parcels would expand economic development activity at the Buchanan Field Airport and lead to increased revenues to the Airport Enterprise Fund and added local jobs.

CONSEQUENCE OF NEGATIVE ACTION:

A delay in entering into exclusive negotiating agreements for either of these sites will delay their development, which could impact the Airport Enterprise Fund and County General Fund.

ATTACHMENTS

Authorization to Execute an Exclusive Negotiation Agmt 0.86-acre

Authorization to Execute an Exclusive Negotiating Agmt 11-acres

EXCLUSIVE NEGOTIATING RIGHTS AGREEMENT
0.86-ACRE PARCEL AT BUCHANAN FIELD AIRPORT

This Exclusive Negotiating Rights Agreement ("Agreement") is dated January 25, 2022, (the "Effective Date") and is between CONTRA COSTA COUNTY, a political subdivision of the State of California (the "County") and URBAN AIR MOBILITY, LLC, a California limited liability company ("Developer").

RECITALS

A. The County is the owner of approximately 0.86 acres of real property located on the northwest side of Buchanan Field Airport, in Concord, California, on Sally Ride Drive immediately to the west of 1500 Sally Ride Drive, as shown in Exhibit A (the "Property").

B. The County has planned for the development of the Property, as reflected in the County's adopted Buchanan Field Airport Master Plan (2008), and has actively solicited interest in the development of the Property. In February 2021, Mark Scott Construction, Inc. notified the County in writing of its interest in developing the Property. The County gave public notice of the availability of the Property and no further expressions of interest were received in the time period prescribed for responses. The County Board of Supervisors then designated, through a board order dated March 30, 2021, Mark Scott Construction, Inc. as the preferred party to enter into negotiations with the County for development of the Property. Mark Scott Construction, Inc. formed the limited liability company that is the Developer for the purpose of leasing and developing the Property.

C. The County and Developer desire to enter into a long-term lease of the Property following a due diligence period and the negotiation of a mutually acceptable lease.

The parties therefore agree as follows:

AGREEMENT

1. Exclusive Right to Negotiate. The County hereby grants Developer the exclusive right to negotiate with the County for a long-term ground lease to develop the Property. During the term of this Agreement, the County will not negotiate with any entity other than Developer regarding the development of the Property or solicit or entertain bids or proposals to develop the Property.

2. Term. Unless terminated in accordance with this Agreement, the term of this Agreement is comprised of (i) an initial period of 15 months, beginning on the Effective Date, and (ii) if agreed to by the parties in writing, one six-month renewal period. The County's Director of Airports (the "Director") will make the determination for the County with respect to whether the term will be extended through any renewal period. The Director's decision will be based on his reasonable judgment as to whether sufficient progress has been made toward a

mutually acceptable lease to merit further negotiations. Nothing in this Agreement obligates either party to agree to an extension.

3. Deposit. Developer has paid the County a nonrefundable deposit in the amount of $10,000 in consideration for this Agreement.

4. Due Diligence; Timing; Default. During the term of this Agreement, Developer shall actively take steps to pursue the development of the Property, including the preparation of technical studies; environmental review; development application and entitlement processing, including site plan, landscape plan and elevations for the proposed use; and the finalization of a mutually-acceptable lease. The timetable set forth in Exhibit B reflects the parties' best estimate of when certain activities will be undertaken or completed. Developer will keep the County informed of the progress being made and of any delays. If the County's Director of Airports determines, in his sole and reasonable judgment, that the activities described in Exhibit B are not being vigorously pursued, or that insufficient progress is being made, the Director of Airports will notify Developer, in writing, of this determination. If the issue identified in the notification provided by the Director of Airports is not resolved to the satisfaction of the Director of Airports within 30 days after the issuance of the notification, Developer will be in default of this Agreement. In the event of Developer's default, the County may terminate this Agreement.

5. Lease Terms. Among the issues to be negotiated in the lease are the permitted use of the Property, the permitted improvements to be constructed on the Property, the lease term, the amount of the security deposit, the construction period rent, the operating term rent, periodic rent increases; maintenance of improvements, and end of term obligations.

6. Costs and Fees.

    a. Developer shall pay all applicable development application fees.

    b. At the sole and reasonable discretion of the County's Director of Airports, Developer shall reimburse the County for staff time devoted to Developer's development of the Property, at the hourly rate established by the County for such staff person's time.

7. Consultants; Environmental Review; Technical Reports.

    a. If during the term of this Agreement, the County requires the assistance of outside consultants in connection with Developer's development of the Property, Developer shall reimburse the County for the cost of such consultants. Prior to engaging a consultant, the County will provide Developer with an estimate of the cost of the consultant and obtain Developer's approval of the estimated cost.

    b. The County, at Developer's expense, shall prepare or cause to be prepared the appropriate environmental documentation required by the California Environmental Quality Act ("CEQA") for consideration of approval of the proposed development, provided that nothing in this Agreement may be construed to compel the County to

approve or make any particular findings with respect to such CEQA documentation. Developer shall provide any information about the proposed development that the County requires to enable it to prepare, or cause to be prepared, CEQA-required documents and shall generally cooperate with the County to complete CEQA-related tasks. Developer may, at is sole expense, also prepare the CEQA required report and submit that document to the County for review.

c. Developer, at its sole expense, may engage its own consultants to prepare any technical reports or studies required for the development of the Property. The County reserves the right to approve or disapprove in advance, any professional consultant, the consultant's scope of work and the draft technical reports prepared by Developer or Developer's consultant. County approvals will not be unreasonably withheld.

8. Limitation on Effect of Agreement. This Agreement does not obligate either the County or Developer to enter into a lease. Execution of this Agreement by the County is merely an agreement to allow a period of exclusive negotiations in accordance with the terms hereof, reserving for subsequent action by the County Board of Supervisors (the "Board"), the final discretion and approval regarding the execution of a lease and all proceedings and decisions in connection therewith. Any lease resulting from negotiations pursuant to this Agreement will be effective only if it is considered and approved by the Board in accordance with all legally required procedures, and if it is executed by duly authorized representatives of the County and the Developer. Until and unless a lease is approved by the Board and executed by the County and the Developer, no agreement drafts, actions, deliverables or communications arising from the performance of this Agreement will impose any legally binding obligation on either party to enter into or support entering into a lease or be used as evidence of any oral or implied agreement by either party to enter into any other legally binding document.

9. Right of Entry. If the Developer or its consultants enter upon the Property, the Developer shall:

a. Give the County seventy-two (72) hours' notice of intent to enter the Property and the purpose of the entry.

b. Repair and restore any damage it may cause.

c. Deliver to the County, within ten (10) days of receipt thereof, a complete copy of any investigation, test, report or study that the Developer conducts, or causes to be conducted, with respect to the Property.

d. Indemnify, defend and hold the County and its directors, officers, employees and agents harmless from any and all claims, liabilities, damages, losses, expenses, costs and fees (including attorneys' fees and costs) that may proximately arise out of the Developer's entry upon the Property or the investigation(s) and test(s) the Developer may conduct; provided, however, mere discovery by Developer of existing conditions or defects shall not give rise to Developer's liability.

e. Prior to entry, cause the County to be named as an additional insured on a Commercial General Liability insurance policy with limits of not less than Two Million Dollars ($2,000,000) each occurrence combined single limit for Bodily Injury and Property Damage, including coverage from Contractual Liability, Personal Injury, Broadform Property Damage, Products and Completed Operations. The required insurance is to be provided under an occurrence form by an insurer authorized and licensed to provide such insurance in the State of California, and the Developer shall maintain such overage for not less than two (2) years after the expiration of the term of this Agreement.

10. No Encumbrances. It is expressly understood and agreed by the parties that no liens or other encumbrance may be filed against the Property by reason of this Agreement or any dispute or act arising from this Agreement.

11. Confidentiality.

a. Both parties agree to treat all confidential information disclosed by the other party, either directly or indirectly, in writing, orally, electronically or by inspection of tangible objects (including without limitation documents, business plans, financial projections, intellectual property), as confidential, and take all steps necessary to preserve such confidentiality, subject to any legal requirements of disclosure. Confidential information does not include (i) information that was publicly available at the time of the disclosure, other than as a result of disclosure in breach of this Agreement, (ii) information that becomes publicly available through no fault of the recipient after the time of the delivery, and (iii) information that was rightfully in the possession of the recipient (without confidential or proprietary restriction) at the time of delivery or that becomes available to the recipient from a source not subject to any restriction against disclosing such information to the recipient.

b. If a recipient is required by applicable law or by a court or regulatory agency to disclose confidential information, the recipient will, to the extent possible, give the disclosing party prompt notice of such request so that the disclosing party may seek an appropriate protective order.

c. Developer acknowledges that the County may share information provided by Developer of a financial and potential proprietary nature with third party consultants who have been contractually engaged to advise the County concerning matters related to this Agreement and to members of the County's Board of Supervisor as part of the negotiation and decision-making process.

12. Notices. Any notices required or permitted under this Agreement (other than day to day routine communications) must be in writing and sent by overnight or personal delivery with delivery receipt. Such notices are to be sent to the address listed below:

County: Director of Airports

Contra Costa County
550 Sally Ride Drive
Concord, CA 94520

Developer: Urban Air Mobility, LLC
2835 Contra Costa Blvd., Suite A
Pleasant Hill, CA 94523
Attention: Mark Scott

And a copy to: Urban Air Mobility, LLC
c/o Nearon Enterprises
101 Ygnacio Valley Road, Suite 450
Walnut Creek, CA 94596
Attention: Anthony Perino

At any time, either party may designate in writing a substitute address for an address set forth above and thereafter notices are to be directed to such substituted address. Notices will be deemed received as follows: on the date shown on the delivery receipt as the date of delivery, the date delivery was refused, or the date the item was returned as undeliverable. If the date on the delivery receipt is not a business day, notice will be deemed received on the following business day.

13. Default and Remedies. Failure by either party to negotiate in good faith or to fulfill its obligations under this Agreement is an event of default hereunder. At the non-defaulting party's election, the non-defaulting party may give written notice of a default to the defaulting party, specifying the nature of the default and the action required to cure the default. Subject to Section 4 above, if the default remains uncured fifteen days after receipt of the notice by the defaulting party, the non-defaulting party may terminate this Agreement.

    a. Following a default and termination, neither party will have any further right, remedy or obligation under this Agreement, except that the obligations under Section 10 (no encumbrances), and Section 9(d) (indemnity), all survive the termination of this Agreement.

    b. Except as expressly provided above, if there is a default under this Agreement, (i) neither party will be liable to the other party for damages or otherwise, and (ii) neither party will have any other claims with respect to performance under this Agreement. Each party specifically waives and releases any such rights or claims it may otherwise have at law or in equity.

14. Governing Law. The laws of the State of California govern all matters arising out of this Agreement.

15. Entire Agreement; Counterparts. This Agreement constitutes the entire agreement between the parties regarding the subject matter of this Agreement. This Agreement may be executed in counterparts.

16. Assignment. The Developer may not transfer or assign any or all of its rights or obligations under this Agreement.

17. No Third-Party Beneficiaries. This Agreement is made and entered into solely for the benefit of the County and the Developer and no other person has any right of action under or by reason of this Agreement.

[Remainder of Page Intentionally Left Blank]

The parties are signing this Agreement as of the date set forth in the introductory paragraph.

COUNTY	DEVELOPER
Contra Costa County, a political subdivision of the State of California	Urban Air Mobility, LLC, a California limited liability company
By: _____ Name, Title	By: _____ Name: Anthony Perino Its: Officer

APPROVED AS TO FORM

MARY ANN McNETT MASON, COUNTY COUNSEL

By: _____
Kathleen M. Andrus
Deputy County Counsel

Exhibit B .86 Acre Site Buchanan Field

1/25/2022

	Activity
Jan '22	Execute Exclusive Negotiation Rights Agreement (ENRA)
Feb '22	Urban Air Mobility (UAM) Initiates Environmental Phase 1 study (30 days), if needed
Feb '22	UAM develops conceptual site plan
Feb '22	Review Conceptual Site plan, receive feedback and make adjustments
Feb '22	Present Conceptual Site plan to Airport
	Airport Approval of Conceptual site plan
Mar ' 22	UAM Pre-project planning meeting to identify project description and stakeholders
Mar '22	Pre-Project meeting with Department of Conservation and Development (DCD), Public Works, Fire Department, and Watershed group
Mar-Apr '22	UAM Consultants to develop Site Development Plan
Mar-Apr '22	Develop C3 Plan (Contain-Collect-Convey), Stormwater Control Plan (SWCP), and Stormwater Pollution Prevention Plan (SWPPP)
Apr '22	Submit C3 design to Public Works for review and approval
May - Jun '22	California Environmental Quality Act (CEQA)/Environmental Study and Document preparation
July '22 - Nov '22	Publish CEQA documents for public circulation, response, comments, hearings, entitlement
Nov '23	CEQA/NEPA (National Environmental Policy Act)- Environmental Impact Report (EIR)/ Mitigated Negative Declarations (MND)/Exempt Determination
Nov '23	Pre project planning meeting with Airport – Design Review. Commence lease discussions.
Dec-Feb '23	Construction drawings document phase
Feb '23	File Federal Aviation Administration (FAA) form 7460 for Construction and/or Alteration
Feb '23	Finalize Site Development plan and submit to DCD
Feb - Mar '23	Plan Checks – Fire, Sanitary, Building
Mar '23	Permits
Mar '23	Finalize Lease with Airport

EXCLUSIVE NEGOTIATING RIGHTS AGREEMENT
11-ACRE PARCEL AT BUCHANAN FIELD AIRPORT

This Exclusive Negotiating Rights Agreement ("Agreement") is dated January 25, 2022, (the "Effective Date") and is between CONTRA COSTA COUNTY, a political subdivision of the State of California (the "County") and URBAN AIR MOBILITY, LLC, a California limited liability company ("Developer").

RECITALS

A. The County is the owner of approximately 11 acres of real property located on the northeast side of Buchanan Field Airport, in Concord, California, on Marsh Drive immediately to the west of the Walnut Creek channel, as shown in Exhibit A (the "Property").

B. The County has planned for the development of the Property, as reflected in the County's adopted Buchanan Field Airport Master Plan (2008), and has actively solicited interest in the development of the Property. In January 2020, Mark Scott Construction, Inc. notified the County in writing of its interest in developing the Property. The County gave public notice of the availability of the Property and no further expressions of interest were received in the time period prescribed for responses. The County Board of Supervisors then designated, through a board order dated March 10, 2020, Mark Scott Construction, Inc. as the preferred party to enter into negotiations with the County for development of the Property. Mark Scott Construction, Inc. formed the limited liability company that is the Developer for the purpose of leasing and developing the Property.

C. The County and Developer desire to enter into a long-term lease of the Property following a due diligence period and the negotiation of a mutually acceptable lease.

The parties therefore agree as follows:

AGREEMENT

1. Exclusive Right to Negotiate. The County hereby grants Developer the exclusive right to negotiate with the County for a long-term ground lease to develop the Property. During the term of this Agreement, the County will not negotiate with any entity other than Developer regarding the development of the Property or solicit or entertain bids or proposals to develop the Property.

2. Term. Unless terminated in accordance with this Agreement, the term of this Agreement is comprised of (i) an initial period of 24 months, beginning on the Effective Date, and (ii) if agreed to by the parties in writing, four six-month renewal periods. The County's Director of Airports (the "Director") will make the determination for the County with respect to whether the term will be extended through any renewal period. The Director's decision will be based on his reasonable judgment as to whether sufficient progress has been made toward a

mutually acceptable lease to merit further negotiations. Nothing in this Agreement obligates either party to agree to an extension.

3. Deposit. Developer has paid the County a nonrefundable deposit in the amount of $10,000 in consideration for this Agreement.

4. Due Diligence; Timing; Default. During the term of this Agreement, Developer shall actively take steps to pursue the development of the Property, including the preparation of technical studies; environmental review; development application and entitlement processing, including site plan, landscape plan and elevations for the proposed use; and the finalization of a mutually-acceptable lease. The timetable set forth in Exhibit B reflects the parties' best estimate of when certain activities will be undertaken or completed. Developer will keep the County informed of the progress being made and of any delays. If the County's Director of Airports determines, in his sole and reasonable judgment, that the activities described in Exhibit B are not being vigorously pursued, or that insufficient progress is being made, the Director of Airports will notify Developer, in writing, of this determination. If the issue identified in the notification provided by the Director of Airports is not resolved to the satisfaction of the Director of Airports within 30 days after the issuance of the notification, Developer will be in default of this Agreement. In the event of Developer's default, the County may terminate this Agreement.

5. Lease Terms. Among the issues to be negotiated in the lease are the permitted use of the Property, the permitted improvements to be constructed on the Property, the lease term, the amount of the security deposit, the construction period rent, the operating term rent, periodic rent increases; maintenance of improvements, and end of term obligations.

6. Costs and Fees.

    a. Developer shall pay all applicable development application fees.

    b. At the sole and reasonable discretion of the County's Director of Airports, Developer shall reimburse the County for staff time devoted to Developer's development of the Property, at the hourly rate established by the County for such staff person's time.

7. Consultants; Environmental Review; Technical Reports.

    a. If during the term of this Agreement, the County requires the assistance of outside consultants in connection with Developer's development of the Property, Developer shall reimburse the County for the cost of such consultants. Prior to engaging a consultant, the County will provide Developer with an estimate of the cost of the consultant and obtain Developer's approval of the estimated cost.

    b. The County, at Developer's expense, shall prepare or cause to be prepared the appropriate environmental documentation required by the California Environmental Quality Act ("CEQA") for consideration of approval of the proposed development, provided that nothing in this Agreement may be construed to compel the County to

approve or make any particular findings with respect to such CEQA documentation. Developer shall provide any information about the proposed development that the County requires to enable it to prepare, or cause to be prepared, CEQA-required documents and shall generally cooperate with the County to complete CEQA-related tasks. Developer may, at is sole expense, also prepare the CEQA required report and submit that document to the County for review.

c. Developer, at its sole expense, may engage its own consultants to prepare any technical reports or studies required for the development of the Property. The County reserves the right to approve or disapprove in advance, any professional consultant, the consultant's scope of work and the draft technical reports prepared by Developer or Developer's consultant. County approvals will not be unreasonably withheld.

8. Limitation on Effect of Agreement. This Agreement does not obligate either the County or Developer to enter into a lease. Execution of this Agreement by the County is merely an agreement to allow a period of exclusive negotiations in accordance with the terms hereof, reserving for subsequent action by the County Board of Supervisors (the "Board"), the final discretion and approval regarding the execution of a lease and all proceedings and decisions in connection therewith. Any lease resulting from negotiations pursuant to this Agreement will be effective only if it is considered and approved by the Board in accordance with all legally required procedures, and if it is executed by duly authorized representatives of the County and the Developer. Until and unless a lease is approved by the Board and executed by the County and the Developer, no agreement drafts, actions, deliverables or communications arising from the performance of this Agreement will impose any legally binding obligation on either party to enter into or support entering into a lease or be used as evidence of any oral or implied agreement by either party to enter into any other legally binding document.

9. Right of Entry. If the Developer or its consultants enter upon the Property, the Developer shall:

a. Give the County seventy-two (72) hours' notice of intent to enter the Property and the purpose of the entry.

b. Repair and restore any damage it may cause.

c. Deliver to the County, within ten (10) days of receipt thereof, a complete copy of any investigation, test, report or study that the Developer conducts, or causes to be conducted, with respect to the Property.

d. Indemnify, defend and hold the County and its directors, officers, employees and agents harmless from any and all claims, liabilities, damages, losses, expenses, costs and fees (including attorneys' fees and costs) that may proximately arise out of the Developer's entry upon the Property or the investigation(s) and test(s) the Developer may conduct; provided, however, mere discovery by Developer of existing conditions or defects shall not give rise to Developer's liability.

e. Prior to entry, cause the County to be named as an additional insured on a Commercial General Liability insurance policy with limits of not less than Two Million Dollars ($2,000,000) each occurrence combined single limit for Bodily Injury and Property Damage, including coverage from Contractual Liability, Personal Injury, Broadform Property Damage, Products and Completed Operations. The required insurance is to be provided under an occurrence form by an insurer authorized and licensed to provide such insurance in the State of California, and the Developer shall maintain such overage for not less than two (2) years after the expiration of the term of this Agreement.

10. No Encumbrances. It is expressly understood and agreed by the parties that no liens or other encumbrance may be filed against the Property by reason of this Agreement or any dispute or act arising from this Agreement.

11. Confidentiality.

a. Both parties agree to treat all confidential information disclosed by the other party, either directly or indirectly, in writing, orally, electronically or by inspection of tangible objects (including without limitation documents, business plans, financial projections, intellectual property), as confidential, and take all steps necessary to preserve such confidentiality, subject to any legal requirements of disclosure. Confidential information does not include (i) information that was publicly available at the time of the disclosure, other than as a result of disclosure in breach of this Agreement, (ii) information that becomes publicly available through no fault of the recipient after the time of the delivery, and (iii) information that was rightfully in the possession of the recipient (without confidential or proprietary restriction) at the time of delivery or that becomes available to the recipient from a source not subject to any restriction against disclosing such information to the recipient.

b. If a recipient is required by applicable law or by a court or regulatory agency to disclose confidential information, the recipient will, to the extent possible, give the disclosing party prompt notice of such request so that the disclosing party may seek an appropriate protective order.

c. Developer acknowledges that the County may share information provided by Developer of a financial and potential proprietary nature with third party consultants who have been contractually engaged to advise the County concerning matters related to this Agreement and to members of the County's Board of Supervisor as part of the negotiation and decision-making process.

12. Notices. Any notices required or permitted under this Agreement (other than day to day routine communications) must be in writing and sent by overnight or personal delivery with delivery receipt. Such notices are to be sent to the address listed below:

County: Director of Airports

Contra Costa County
550 Sally Ride Drive
Concord, CA 94520

Developer: Urban Air Mobility, LLC
2835 Contra Costa Blvd., Suite A
Pleasant Hill, CA 94523
Attention: Mark Scott

And a copy to: Urban Air Mobility, LLC
c/o Nearon Enterprises
101 Ygnacio Valley Road, Suite 450
Walnut Creek, CA 94596
Attention: Anthony Perino

At any time, either party may designate in writing a substitute address for an address set forth above and thereafter notices are to be directed to such substituted address. Notices will be deemed received as follows: on the date shown on the delivery receipt as the date of delivery, the date delivery was refused, or the date the item was returned as undeliverable. If the date on the delivery receipt is not a business day, notice will be deemed received on the following business day.

13. Default and Remedies. Failure by either party to negotiate in good faith or to fulfill its obligations under this Agreement is an event of default hereunder. At the non-defaulting party's election, the non-defaulting party may give written notice of a default to the defaulting party, specifying the nature of the default and the action required to cure the default. Subject to Section 4 above, if the default remains uncured fifteen days after receipt of the notice by the defaulting party, the non-defaulting party may terminate this Agreement.

    a. Following a default and termination, neither party will have any further right, remedy or obligation under this Agreement, except that the obligations under Section 10 (no encumbrances), and Section 9(d) (indemnity), all survive the termination of this Agreement.

    b. Except as expressly provided above, if there is a default under this Agreement, (i) neither party will be liable to the other party for damages or otherwise, and (ii) neither party will have any other claims with respect to performance under this Agreement. Each party specifically waives and releases any such rights or claims it may otherwise have at law or in equity.

14. Governing Law. The laws of the State of California govern all matters arising out of this Agreement.

15. Entire Agreement; Counterparts. This Agreement constitutes the entire agreement between the parties regarding the subject matter of this Agreement. This Agreement may be executed in counterparts.

16. Assignment. The Developer may not transfer or assign any or all of its rights or obligations under this Agreement.

17. No Third-Party Beneficiaries. This Agreement is made and entered into solely for the benefit of the County and the Developer and no other person has any right of action under or by reason of this Agreement.

[Remainder of Page Intentionally Left Blank]

The parties are signing this Agreement as of the date set forth in the introductory paragraph.

COUNTY	DEVELOPER
Contra Costa County, a political subdivision of the State of California	Urban Air Mobility, LLC, a California limited liability company
By: _____ Name, Title	By: _____ Name: Anthony Perino Its: Officer

APPROVED AS TO FORM

MARY ANN McNETT MASON, COUNTY COUNSEL

By: _____
Kathleen M. Andrus
Deputy County Counsel

Exhibit B

11 Acre Site Buchanan Field

12/25/202

	Activity
Jan '22	Execute Exclusive Negotiation Rights Agreement (ENRA)
Feb '22	Urban Air Mobility (UAM) Initiates Environmental Phase 1 study (30 days), if needed
Feb '22	UAM develops conceptual site plan
Feb '22	Review Conceptual Site plan, receive feedback make adjustments
Feb '22	Present Conceptual Site plan to Airport
	Airport Approval of Conceptual site plan
Mar ' 22	UAM Pre-project planning meeting to identify project description and stakeholders
Mar '22	Pre-Project meeting with Department of Conservation and Development (DCD), Public Works, Fire Dept, and Watershed group
Mar-Apr '22	UAM Consultants to develop Site Development Plan
Mar-Apr '22	Develop C3 Plan (Contain-Collect-Convey), Stormwater Control Plan (SWCP), and Stormwater Pollution Prevention Plan (SWPPP)
Apr '22	Submit C3 design to Public Works for review and approval
May - Jul '22	California Environmental Quality Act (CEQA) / Environmental Study and Document preparation
July '22 - Jan '23	Publish CEQA documents for public circulation, response, comments, hearings, entitlement.
Jan '23	CEQA/NEPA (National Environmental Policy Act) - Environmental Impact Report (EIR)/ Mitigated Negative Declarations (MND) /Exempt Determination
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Apr - May '23	Finalize Site Development plan and submit to DCD.
Jun - Aug '23	Plan Checks – Fire, Sanitary, Building
Sept '23	Permits
Sept '23	Finalize Lease with Airport

Contra Costa County

To: Board of Supervisors

From: Monica Nino, County Administrator

Date: January 18, 2022

Subject: Claims

RECOMMENDATION(S):
DENY claims filed by CA Insurance Co., as subrogee of Aaron Smith, DeMaria Gipson, Mercury Insurance, as subrogee of Peter Fogarty, Dustin Rober Scudder, Aaron and Holli Smith, State Farm, a subrogee of Rodolfo L. Angelito, Subro Claims Insurance Obo Geico Insurance, a subrogee of Christina Given, and Scott Talley.

FISCAL IMPACT:
No fiscal impact.

BACKGROUND:
California Automobile Insurance Company as subrogee of Aaron Smith: Property claim for damage to vehicle in the amount of $1,456.25
DeMaria Gipson: Personal injury claim for fungal infection in the amount of $500,000.
Mercury Insurance a subrogee of Peter Fogarty: Amended property claim for damage to vehicle in the amount of $15,694.93
Dustin Robert Scudder: Property claim for damage to vehicle in the amount of $293.98
Aaron & Holli Smith: Property claim for damage to vehicle in the amount of $500.
State Farm a subrogee of Rodolfo L. Angelito: Property claim for damage to vehicle in the amount

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☐ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

RECUSE: Candace Andersen, District II Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: , Deputy

Contact: Risk Management

cc:

BACKGROUND: (CONT'D)

of $1,987.
Subro Claims Inc. obo Geico Insurance a subrogee of Christina Given: Property claim for damage to vehicle in the amount of $9,625.61
Scott Talley: Property claim for damage to vehicle in an amount to be determined.

CONSEQUENCE OF NEGATIVE ACTION:

Not acting on the claims could extend the claimants' time limits to file actions against the County.

Contra Costa County

To: Board of Supervisors

From: Karen Caoile, Director of Risk Management

Date: January 18, 2022

Subject: Property Damage Reimbursement

RECOMMENDATION(S):
APPROVE clarification of Board action on November 2, 2021, regarding payment of up to $100,000 for property damage repairs and associated costs to the building at 611 23rd Street in Richmond, to reflect the legal owner of the building as Paper Tree Garden LLC, with no change to the payment amount.

FISCAL IMPACT:
Risk Management Liability Internal Service Fund payment of up to $100,000.

BACKGROUND:
Risk Management was previously authorized by the Board of Supervisors to pay up to $100,000 to Arnulfo Ramirez for property damage repairs to the building at 611 23rd Street in Richmond after a deputy sheriff struck the building with his patrol vehicle, causing property damage. Risk Management later learned that the legal owner of the property is Paper Tree Garden LLC and is requesting authorization to change the payee on the claim to Paper Tree Garden LLC and to negotiate and execute a final settlement agreement, including paying up to $100,000 for property damage repairs and associate costs, with Paper Tree Garden LLC.

CONSEQUENCE OF NEGATIVE ACTION:
The County would incur additional expenses with a lawsuit, and repairs to the building would be delayed.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Karen Caoile 925-335-1400

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc:

Contra
Costa
County

To: Board of Supervisors

From: Monica Nino, County Administrator

Date: January 18, 2022

Subject: ACCEPT Board members meeting reports for December 2021

RECOMMENDATION(S):
ACCEPT Board members meeting reports for December 2021.

FISCAL IMPACT:
No fiscal impact.

BACKGROUND:
Government Code section 53232.3(d) requires that members of legislative bodies report on meetings attended for which there has been expense reimbursement (mileage, meals, lodging ex cetera). The attached reports were submitted by the Board of Supervisors members in satisfaction of this requirement. Districts I and V have nothing to report.

CONSEQUENCE OF NEGATIVE ACTION:
The Board of Supervisors will not be in compliance with Government Code 53232.3(d).

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Joellen Bergamini 925.655.2000

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc:

ATTACHMENTS

District II December 2021 Report

District IV December 2021 Report

District III December 2021 Report

Supervisor Candace Andersen – Monthly Meeting Report *December 2021*

Date	Meeting	Location
1	Urban Counties BOD	Zoom Meeting
2	MP&L Health Comm	Zoom meeting
4	EBRCSA	Zoom meeting
6	DVOC	Zoom meeting
6	CCCTA/LAVTA	Zoom Meeting
6	SWAT	Zoom Meeting
7	Board of Supervisors	Zoom Meeting
7	Dnvl/Ornda/WC council	Zoom Meeting
8	CCCERA	Zoom meeting
8	JJCC	Zoom meeting
8	Moraga Council	Zoom meeting
9	EBEDA	Zoom meeting
9	Recycle Smart	Zoom meeting
10	JCC	Zoom meeting
13	TWIC	Zoom meeting
13	Internal Operations	Zoom meeting
13	TVTC	Zoom meeting
13	First 5	Zoom meeting
14	Board of Supervisors	Zoom meeting
16	CCCTA	Zoom meeting
16	Public Protection	Zoom meeting
16	ABAG Exec Board	Zoom meeting
29	TVTC Special meeting	Zoom meeting

Supervisor Karen Mitchoff
December 2021

DATE	MEETING NAME	LOCATION	PURPOSE
12/06/21	Meeting with CAO	Martinez	Discuss County related items

Supervisor Diane Burgis - December 2021 AB1234

(Government Code Section 53232.3(d) requires that members legislative
attended for which there has been expense reimbursement (mileage,

Date	Meeting Name	Location
1-Dec	California State Association of Counties 2021 Annual Meeting	Monterey CA
2-Dec	California State Association of Counties 2021 Annual Meeting	Monterey CA
3-Dec	California State Association of Counties 2021 Annual Meeting	Monterey CA
7-Dec	Board of Supervisors Meeting	Web Meeting
7-Dec	Contra Costa County Fire Protection District Meeting	Web Meeting
7-Dec	Contra Costa County Housing Authority	Web Meeting

* Reimbursement may come from an agency other than Contra Costa County

Report
bodies report on meetings
meals, lodging, etc).

Purpose
Meeting
Meeting
Meeting
Meeting
Meeting
Meeting

Contra Costa County

To: Board of Supervisors

From: Karen Mitchoff, District IV Supervisor

Date: January 18, 2022

Subject: In the Matter of Recognizing Assistance League of Diablo Valley's TeleCare Program and its 50 years of service to our community

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- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Lia Bristol, (925)521-7100

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc:

ATTACHMENTS

Resolution
2022/27

The Board of Supervisors of Contra Costa County, California

In the matter of: **Resolution No. 2022/27**

In the Matter of Recognizing Assistance League of Diablo Valley's TeleCare Program and its 50 years of service to our community

WHEREAS, Assistance League of Diablo Valley was chartered as a chapter of National Assistance League® on March 8, 1967, in Walnut Creek, California; and

WHEREAS, Assistance League of Diablo Valley is a nonprofit member volunteer organization dedicated to improving lives in our community through a wide variety of hands-on programs that serve a diverse set of needs; and

WHEREAS, Assistance League of Diablo Valley has been benefiting adults and children in need and at risk; and

WHEREAS, they currently have 16 philanthropic programs; and

WHEREAS, Assistance League of Diablo Valley's TeleCare Program started in 1971 and is the oldest philanthropic program of the chapter; and

WHEREAS, TeleCare has provided over 275,420 daily reassurance calls to housebound people who are living alone; and

WHEREAS, the calls are both a reassurance call for the health and welfare of the client, as well as an opportunity for a friendly chat and exchange of ideas; and

WHEREAS, in 2020 at the height of the pandemic when residents were experiencing more isolation, TeleCare callers placed over 5,000 daily reassurance calls to homebound clients.

Now, Therefore, Be It Resolved that the Contra Costa County Board of Supervisors does hereby commend the Assistance League of Diablo Valley TeleCare philanthropic program for its 50 years of service to our county.

_____

KAREN MITCHOFF
Chair, District IV Supervisor

_____

JOHN GIOIA
District I Supervisor

_____

CANDACE ANDERSEN
District II Supervisor

_____

DIANE BURGIS
District III Supervisor

_____

FEDERAL D. GLOVER
District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator

By: _____, Deputy

Contra Costa County

To: Board of Supervisors

From: Karen Mitchoff, District IV Supervisor

Date: January 18, 2022

Subject: In the Matter of Proclaiming January 2022 as Human Trafficking Awareness Month in Contra Costa County.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Colleen Awad, 925-521-7100

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc:

ATTACHMENTS

Resolution
2022/28

The Board of Supervisors of Contra Costa County, California

In the matter of: **Resolution No. 2022/28**

In the Matter of Proclaiming January 2022 as Human Trafficking Awareness Month in Contra Costa County.

WHEREAS, human trafficking is a form of abuse in which force, fraud or coercion is used to control victims for the purpose of commercial sexual or labor exploitation; that occurs in every industry and affects individuals of all genders, ages and of all backgrounds; and

WHEREAS, human trafficking is a lucrative industry and the fastest growing criminal industry in the world; and uses violent and exploitive tactics to target vulnerable members of our communities; and

WHEREAS, the crime of human trafficking violates an individual's privacy, dignity, security and humanity due to the systematic use of physical, emotional, sexual, psychological and economic exploitation, control and/or abuse; and

WHEREAS, the impact of human trafficking is wide-ranging, directly affecting foreign nationals as well as U.S. citizens, and society as a whole; victims experience trauma, violence, manipulation, fraud and coercion at the hands of their traffickers. It is often the most vulnerable members of our communities who are affected by human trafficking; and

WHEREAS, as of from January 1, 2020 to December 31, 2020, 10,583 human trafficking cases were reported nationwide to the National Human Trafficking Resource Center, of those reports, the majority of cases were reported in California, and it is likely that statistics for calendar year 2021 will be similar based on recent historical patterns in the data. Contra Costa County is not immune to human trafficking. While underreported, over the last four years the Contra Costa Human Trafficking Coalition and several partner agencies including Community Violence Solutions, STAND! for Families Free of Violence, Bay Area Legal Aid, International Rescue Committee and Calli House, identified and served over 500 victims of human trafficking; and

WHEREAS, the County's Alliance to End Abuse acknowledges that fighting exploitation and human trafficking is a shared community responsibility and therefore has worked with numerous public and private agencies to establish the Contra Costa Human Trafficking Coalition, in order to strengthen the County's comprehensive response to human trafficking initiated by county departments, law enforcement agencies, and numerous community and faith-based organizations; and continuing to build its collaboration by linking with local, regional and federal agencies; and

WHEREAS, the County of Contra Costa is working to raise awareness so individuals will become more informed, identify ways their behavior contributes to a patriarchal culture that supports and tolerates the systemic abuse of vulnerable populations that include women and people of color; and take action to end human trafficking in their communities.

NOW, THEREFORE BE IT RESOLVED that the Contra Costa County Board of Supervisors does hereby proclaim January 2022 as HUMAN TRAFFICKING AWARENESS MONTH, and urges all residents to actively participate in the efforts to both raise awareness of, and end, all forms of human trafficking in our communities. During Human Trafficking Awareness Month, let us recognize the survivors of trafficking, and let us resolve to build a future in which no people are denied their inherent human rights of freedom and dignity. Let us make it known that human trafficking has no place in this city, this county, this nation or this world.

KAREN MITCHOFF
Chair, District IV Supervisor

JOHN GIOIA
District I Supervisor

CANDACE ANDERSEN
District II Supervisor

DIANE BURGIS
District III Supervisor

FEDERAL D. GLOVER
District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator

By: _____, Deputy

Contra
Costa
County

To: Board of Supervisors

From: Karen Mitchoff, District IV Supervisor

Date: January 18, 2022

Subject: In the Matter of Proclaiming January 2022 as Positive Parenting Month

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☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Colleen Awad, 925-521-7100

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc:

ATTACHMENTS

Resolution
2022/30

The Board of Supervisors of Contra Costa County, California

In the matter of: **Resolution No. 2022/30**

In the Matter of Proclaiming January 2022 as Positive Parenting Month

WHEREAS, raising children and youth to become healthy, confident, capable individuals is the most important job parents and caregivers have; and
WHEREAS, positive parenting strengthens family relationships, increases parents' confidence, well-being and promotes children's healthy development; and
WHEREAS, the quality of parenting or caregiving – starting in the prenatal period – is one of the most powerful predictors of children's future social, emotional, and physical health; and
WHEREAS, positive parenting can prevent or mitigate the effects of Adverse Childhood Experiences (ACES) such as child abuse, neglect or other traumatic events that can create dangerous levels of stress and impair lifelong health and well-being; and
WHEREAS, many parents and caregivers begin the lifetime job of raising children feeling unprepared, and the social stigma of seeking help prevents many from getting parenting support; and
WHEREAS, in Contra Costa County, families caring for children, including parents, grandparents, foster parents, family members, and other caregivers, receive support from evidence-based positive parenting programs; and
WHEREAS, these programs equip parents with the knowledge and competencies necessary as socio-emotional buffers to mitigate the effects of toxic stress and ACEs; and
WHEREAS, the Triple P - Positive Parenting Program at C.O.P.E. Family Support Center is an international award-winning program with over 25 years of clinically proven, worldwide research and ranked #1 by the United Nations based on the extent of its evidence. Triple P is a prevention program, that helps parents learn strategies that promote social competence and self-regulation in children; and
WHEREAS, the Triple P – Positive Parenting Program provides levels of interventions of increasing strength based on the severity of behavioral problems, targeting all children, including specific populations such as children with special needs, and parents with a variety of issues including co-parent conflict and generational disfunction; and
WHEREAS, Child Abuse Prevention Council provides the Nurturing Parenting Program (NPP) a family-strengthening approach to parenting education for parents of children up to 12 years. The Nurturing Parenting Program is built on the Five Protective Factors Framework to make positive outcomes more likely for young children and their families, and to reduce the likelihood of child abuse and neglect, promote health development and wellbeing during times of stress. This family-centered, trauma-informed curriculum is designed to prevent Adverse Childhood Experiences (ACES) and build nurturing parenting skills as an alternative to abusive and neglectful parenting and childrearing practices, and
WHEREAS, research and evidence-based *Make Parenting a Pleasure*, parenting curriculum, provided by the Community Services Bureau Head Start, trained parent educators promote child and family well-being by focusing on the parents and their strengths. Key curriculum topics focus on self-care; stress and anger management; understanding child development; communication skills and positive discipline, and
WHEREAS, Organizations like Contra Costa County Office of Education, First 5 Contra Costa and Contra Costa County Behavioral Health Services MHSA, support and encourage positive parenting through a population health approach using collaborative funding so that all families have equitable opportunities to access information and support in ways that respects their unique beliefs, traditions, customs, interests, and racial, ethnic, tribal, and cultural practices; and
WHEREAS, during the month of January, C.O.P.E. Family Support Center, First 5 Contra Costa Family Resource Centers, Child Abuse Prevention Council, Early Childhood Prevention and Intervention Coalition (EPIC), Head Start Preschool Centers, Contra Costa Office of Education SARB and Court Schools, Contra Costa County Behavioral Health Services MHSA, together join in offering evidence-based parenting programs, to increase awareness of the importance of positive parenting and the availability of resources such as Triple P Positive Parenting, Nurturing Parenting and other evidence-based programs.
NOW, THEREFORE, BE IT RESOLVED THAT the Contra Costa County Board of Supervisors does hereby proclaim January 2022 to be the 3rd *Annual Positive Parenting Awareness* Month in Contra Costa County, and commend this observance to the people of this county.

_____

KAREN MITCHOFF
Chair, District IV Supervisor

JOHN GIOIA
District I Supervisor

CANDACE ANDERSEN
District II Supervisor

DIANE BURGIS
District III Supervisor

FEDERAL D. GLOVER
District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator

By: _____, Deputy

Contra Costa County

To: Board of Supervisors
From: Ann Elliott, Human Resources Director
Date: January 18, 2022

Subject: Introduce Ordinance No. 2022-05 amending the County Ordinance Code to exempt the classification Chief of Administrative Services

RECOMMENDATION(S):
INTRODUCE Ordinance No. 2022-05 amending the County Ordinance Code to exclude from the merit system the new classification of Chief of Administrative Services-Exempt, update section heading, and reorganize existing section, WAIVE READING and FIX February 1, 2022, for adoption.

FISCAL IMPACT:
Upon approval, this action will not have any fiscal impacts.

BACKGROUND:
In April 2018 the County established a new unrepresented classification of Chief of Administrative Services. The intention at that time was to exempt the classification from the merit system and consolidate several department-specific classification serving in that same capacity. However, that consolidation of the classifications was delayed, and the new classification has not been used. This Chief of Administrative Services typically reports to the department head and acts with a high-degree of independence when developing and implementing policies and procedures, and supervising staff performing personnel, payroll, fiscal, and administrative functions in mid-size or large departments. The Human Resources Department is recommending that the exemption of this classification so that it is available for use in County departments.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Gladys Reid (925) 655-2122

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc: Eric Suitos

CONSEQUENCE OF NEGATIVE ACTION:

Departments looking to use this classification will lack the authority to appoint an at-will employee needed to ensure the maximum level of responsiveness and and responsibility for major departmental functions.

ATTACHMENTS

Ordinance 2022-05

ORDINANCE NO. 2022-05
(Exclude from the Merit System the New Classification of Chief of Administrative Services-Exempt and Non-substantive Section Reorganization & Heading Update)

The Contra Costa County Board of Supervisors ordains as follows (omitting the parenthetical footnotes from the official text of the enacted or amended provisions of the County Ordinance Code):

SECTION I: Section 33-5.375 of the County Ordinance Code is amended to exclude from the merit system the new classification of Chief of Administrative Services-Exempt and non-substantive section reorganization & heading update:

33-5.375 – Countywide Departmental Exempt Classifications.

(a) The departmental human resources officer I-exempt and departmental human resources officer II-exempt are excluded and are appointed by any department head as may be authorized by the board.

(b) The chief of administrative services-exempt is excluded and is appointed by any department head as may be authorized by the board.

(Ord. Nos. 2022-05, § 1, 2-01-2022; 2021-14, § 1, 04-27-21; 2018-03 § 1, 02-06-18; Editor's note: Ord. No. 2014-01, § II, adopted January 14, 2014, repealed § 33-5.375 in its entirety. Former § 33-5.375 pertained to general services and was derived from Ord. No. 85-54 § 2; Ord. No. 85-79 § 2; Ord. No. 2000-34; Ord. No. 2000-42; Ord. No. 2002-51 § 1; Ord. No. 2005-30 § 1; Ord. No. 2009-22, § I, adopted October 20, 2009 and Ord. No. 2010-06, § I, adopted June 22, 2010.)

SECTION II: **EFFECTIVE DATE**. This ordinance becomes effective 30 days after passage, and within 15 days of passage shall be published once with the names of the supervisors voting for and against it in the _____, a newspaper published in this County.

PASSED ON _____ by the following vote:

AYES:

NOES:

ABSENT:

ABSTAIN:

ATTEST: MONICA NINO, Clerk of the
Board of Supervisors and County Administrator

By:_____ _____
Deputy Board Chair

[SEAL]

Contra
Costa
County

To: Board of Supervisors
From: Director of Airports
Date: January 18, 2022

Subject: APPOINT MICHAEL BRUNO TO THE AIRPORTS BUSINESS ASSOCIATION SEAT ON THE AVIATION ADVISORY COMMITTEE

RECOMMENDATION(S):
APPOINT Mr. Michael Bruno as the Sterling Aviation representative to the Aviation Advisory Committee (AAC) as recommended by the Contra Costa County Airports Business Association.

FISCAL IMPACT:
None.

BACKGROUND:
On July 1, 2021, the Airports Business Association sent an email attached, nominating Michael Bruno as their representative on the Aviation Advisory Committee (AAC). Mr. Bruno will complete the term vacated by Cody Moore and would begin serving as Airport Business Aviation's representative to the Committee immediately upon appointment by the Board of Supervisors and would serve until February 28, 2022.

The AAC was established by the Board of Supervisors (Board) to provide advice and recommendations to the Board on the aviation issues related to the economic viability and security of airports in Contra Costa County (County). The AAC is mandated to cooperate with local, state, and national aviation interests for the safe and orderly operation of airports; advance and promote the interests

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Beth Lee, 925-681-4200

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ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc:

BACKGROUND: (CONT'D)

of aviation; and protect the general welfare of the people living and working near the airport and the County in general.

The AAC may initiate discussions, observations, or investigations and may hear comments on airport and aviation matters from the public or other agencies in order to formulate recommendations to the Board. In conjunction with all the above, the AAC provides a forum for the Director of Airports regarding policy matters at and around the airport.

The AAC comprises 13 members who must work and/or reside in Contra Costa County: one appointed by each Supervisor; one from and nominated to the Board by the City of Concord; one from and nominated to the Board by the City of Pleasant Hill; one from and nominated to the Board by the Contra Costa County Airports Business Association; one from the community of Pacheco and nominated to the Board by the Airport Committee; one from the vicinity of Byron Airport (Brentwood, Byron, Knightsen or Discovery Bay) and nominated to the Board by the Airport Committee; and three at large to represent the general community, to be nominated by the Airport Committee.

CONSEQUENCE OF NEGATIVE ACTION:

The AAC Airports Business Association will not have representation regarding airport matters that could affect their businesses.

ATTACHMENTS

ABA Email Nominating Mike Bruno

From: Rashid Yahya <rashid@psa.aero>
Sent: Thursday, July 1, 2021 9:23 AM
To: Keith Freitas <Keith.Freitas@airport.cccounty.us>
Cc: Cody Moore <cody@ccrjet.com>; Concord Jet (warren@ccrjet.com) <warren@ccrjet.com>; Mike Bruno <michael@sterlingav.com>; Beth Lee <Beth.Lee@airport.cccounty.us>; Russell Milburn <Russell.Milburn@airport.cccounty.us>
Subject: Re: Contra Costa County Airports Business Association

Hi Keith,

As per the last email from Cody he nominated Mike Bruno and I agreed to it. If none of them have time to represent AAC then I will be willing to take up the role and do my best to represent AAC.

Thank you for your help and keeping the communication going.

On Thu, Jul 1, 2021 at 8:45 AM Keith Freitas <Keith.Freitas@airport.cccounty.us> wrote:

Gentlemen,

Is there anything the Airport staff can do to help facilitate the selection of a new representative

to the Aviation Advisory Committee? We just need your selection put in writing and we will

prepare the appropriate Board Order for approval by the County Board of Supervisors.

Keith Freitas, Director of Airports, A.A.E., C.A.E.

Contra Costa County

Buchanan Field and Byron Airports

550 Sally Ride Drive

Concord, CA 94520

(work) 844-FLY-ToUs (844-359-8687)

(cellular) 925-382-1715

www.contracostacountyairport.org

--

Rashid Yahya
President/CEO

The information contained in this electronic message is intended only for the use of the individual or entity named above. If you are not the above-named intended recipient, you are hereby notified that any review, dissemination, copying, or disclosure of this communication is strictly prohibited. If you have received this communication in error, please notify Pacific States Aviation at (925) 685-4400 and delete this communication immediately without making any copy or distribution. Pacific States Aviation secures all email transmissions using TLS (Transport Layer Security), provided you have TLS enabled on your server.

Pacific States Aviation reserves the right to monitor all email communications through its network.

Contra Costa County

To: Board of Supervisors

From: John Gioia, District I Supervisor

Date: January 18, 2022

Subject: ACCEPT the resignation of Richard Bell from the District 1 seat of the Family & Children's Trust Committee

RECOMMENDATION(S):
ACCEPT the resignation of Richard Bell, DECLARE a vacancy in the District 1 seat on the Family & Children's Trust Committee for a term ending September 30, 2023, and DIRECT the Clerk of the Board to post the vacancy.

FISCAL IMPACT:
None

BACKGROUND:
Mr. Bell has been serving successfully and now wishes to resign his seat.

CONSEQUENCE OF NEGATIVE ACTION:
Supervisor Gioia would not be able to fill the seat and that may cause the Family & Children's Trust committee to not have a quorum at their meetings.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: James Lyons, 510-942-2222

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc:

AGENDA
ATTACHMENTS
MINUTES
ATTACHMENTS
Vacancy Notice

Contra Costa County

NOTICE

The Board of Supervisors will make appointments to fill existing advisory body vacancies. Interested citizens may submit written applications for vacancies to the following address:

Clerk of the Board of Supervisors
1025 Escobar Street, 1st Floor
Martinez, CA 9455

Board, Commission, or Committee	Appointments will be made after
Family & Children's Trust Committee *Seat: District 1*	February 1, 2022

I, Monica Nino, Clerk of the Board of Supervisors and the County Administrator, hereby certify that, in accordance with Section 54974 of the Government Code, the above notice of vacancy (vacancies) will be posted on January 18, 2022.

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

Attested: January 18, 2022

Monica Nino, Clerk of the Board of Supervisors
And County Administrator

By: Lauren Hull
Deputy Clerk

cc: Hard Copy to Clerk of the Board Lobby
Hard Copy to Minutes File
Soft Copy .DOCX to M:\5-Notices and Postings
Soft Copy .PDF to S:\Minutes Attachments\Minutes 2020
Soft Copy .PDF to M:\1- Committee Files and Applications

Contra Costa County

To: Board of Supervisors

From: John Gioia, District I Supervisor

Date: January 18, 2022

Subject: ACCEPT the resignation of Silvia Ledezma from the District 1 seat of the Arts & Culture Commission

RECOMMENDATION(S):
ACCEPT the resignation of Silvia Ledezma, DECLARE a vacancy in the District 1 seat on the Arts & Culture Commission for a term ending June 30, 2025, and DIRECT the Clerk of the Board to post the vacancy.

FISCAL IMPACT:
None

BACKGROUND:
Ms. Ledezma has been serving successfully and now wishes to resign her seat.

CONSEQUENCE OF NEGATIVE ACTION:
Supervisor Gioia would not be able to fill the seat and that may cause the Arts & Culture Commission to not have a quorum at their meetings.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: James Lyons, 510-942-2222

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc:

AGENDA
ATTACHMENTS
MINUTES
ATTACHMENTS
Vacancy Notice

Contra Costa County

NOTICE

The Board of Supervisors will make appointments to fill existing advisory body vacancies. Interested citizens may submit written applications for vacancies to the following address:

Clerk of the Board of Supervisors
1025 Escobar Street, 1st Floor
Martinez, CA 9455

Board, Commission, or Committee	Appointments will be made after
Arts & Culture Commission *Seat: District 1*	February 1, 2022

I, Monica Nino, Clerk of the Board of Supervisors and the County Administrator, hereby certify that, in accordance with Section 54974 of the Government Code, the above notice of vacancy (vacancies) will be posted on January 18, 2022.

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

Attested: January 18, 2022

Monica Nino, Clerk of the Board of Supervisors
And County Administrator

By: Lauren Duel
Deputy Clerk

cc: Hard Copy to Clerk of the Board Lobby
Hard Copy to Minutes File
Soft Copy .DOCX to M:\5-Notices and Postings
Soft Copy .PDF to S:\Minutes Attachments\Minutes 2020
Soft Copy .PDF to M:\1- Committee Files and Applications

Contra Costa County

To: Board of Supervisors

From: Monica Nino, County Administrator

Date: January 18, 2022

Subject: Reclamation District 2065 Appointments In Lieu of Election

RECOMMENDATION(S):
APPOINT in lieu of election Coleman Foley and Thomas E. Baldocchi, Jr. to the Board of Trustees of Reclamation District 2065 for terms of four years, concluding December 5, 2025.

FISCAL IMPACT:
None.

BACKGROUND:
The Board of Supervisors received correspondence from Dante Nomellini, Jr., District Secretary and Attorney for Reclamation District 2065, requesting appointment to the Board of Trustees of the District in lieu of elections. Mr. Nomellini, Jr. reports that pursuant to the notice calling for nomination petitions for two vacancies, no petitions were received and no petition requesting an election was presented to the District. Therefore, the District respectfully requests that the Board of Supervisors appoint Coleman Foley and Thomas E. Baldocchi, Jr. to four-year terms on the Board of Trustees of Reclamation District 2065. The terms will conclude December 5, 2025.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Lauren Hull, (925) 655-2007

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc:

CONSEQUENCE OF NEGATIVE ACTION:

The proposed nominees to the Board of Trustees for Reclamation District 2065 would not be approved, which may hinder the Board of Trustees in achieving a quorum and conducting the District's business.

ATTACHMENTS

Reclamation District 2065 Letter

RECLAMATION DISTRICT NO. 2065
(VEALE TRACT)

235 East Weber Avenue, Stockton, CA 95202
Mailing Address:
P.O. Box 1461, Stockton, CA 95201-1461
Telephone: (209) 465-5883
Fax: (209) 465-3956
Email: dantejr@pacbell.net

December 27, 2021

Board of Supervisors
Contra Costa County
651 Pine Street
Martinez, California 94553

Re: Appointment of Trustees for Reclamation District No. 2065.

Dear Board of Supervisors:

Pursuant to the Notice Calling for Nomination Petitions for two (2) vacancies on the Board of Trustees for Reclamation District No. 2065 ("District"), no nomination petitions were received. Since no nomination petitions were received and no petition requesting an election was presented to the District, the Board of Trustees of the District requests that the Board of Supervisors appoint the incumbents, Coleman Foley and Thomas E. Baldocchi, Jr., to fill the vacancies since they are qualified and willing to serve as trustees. The appointments are requested to be as follows:

Coleman Foley for the term ending December, 2025
Thomas E. Baldocchi, Jr., for the term ending December, 2025

Thank you for your time and attention to this matter.

Very truly yours,

By: _____
Dante J. Nomellini, Jr.
Secretary & Attorney for RD 2065

Contra Costa County

To: Board of Supervisors

From: Monica Nino, County Administrator

Date: January 18, 2022

Subject: Accept the Resignation of Joan D'Onofrio from the At-Large 3 Seat of the Arts & Culture Commission

RECOMMENDATION(S):
ACCEPT the resignation of Joan D'Onofrio, DECLARE a vacancy in the At-Large 3 seat on the Arts & Culture Commission for a term ending June 30, 2025, and DIRECT the Clerk of the Board to post the vacancy, as recommended by the County Administrator.

FISCAL IMPACT:
None.

BACKGROUND:
The Arts and Culture Commission advises the Board of Supervisors in matters and issues relevant to arts and culture to: advance the arts in a way that promotes communication, education, appreciation and collaboration throughout Contra Costa County; to preserve, celebrate and share the arts and culture of the many diverse ethnic groups who live in Contra Costa County; to create partnerships with business and government; and to increase communications and understanding between all citizens through art. Most importantly, the Commission promotes arts and culture as a vital element of the quality of life for all of the citizens of Contra Costa County. Commissioner Joan D'Onofrio was appointed to the Arts and Culture Commission by the Board of Supervisors on November

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Lara DeLaney, (925) 655-2057

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc:

BACKGROUND: (CONT'D)

6, 2018. Commissioner D'Onofrio submitted her letter of resignation on January 4, 2022. Given the recent resignations of several commissioners, the County Administrator's Office will seek directions from the Internal Operations Committee regarding the next step for the Arts and Culture Commission.

CONSEQUENCE OF NEGATIVE ACTION:

If this action is not approved, the resignation will not be accepted.

AGENDA ATTACHMENTS

MINUTES ATTACHMENTS

Vacancy Notice

Contra Costa County

NOTICE

The Board of Supervisors will make appointments to fill existing advisory body vacancies. Interested citizens may submit written applications for vacancies to the following address:

Clerk of the Board of Supervisors
1025 Escobar Street, 1st Floor
Martinez, CA 9455

Board, Commission, or Committee	Appointments will be made after
Arts & Culture Commission *Seat: At-Large 3*	February 1, 2022

I, Monica Nino, Clerk of the Board of Supervisors and the County Administrator, hereby certify that, in accordance with Section 54974 of the Government Code, the above notice of vacancy (vacancies) will be posted on January 18, 2022.

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

Attested: January 18, 2022

Monica Nino, Clerk of the Board of Supervisors
And County Administrator

By: Lauren Duell
Deputy Clerk

cc: Hard Copy to Clerk of the Board Lobby
Hard Copy to Minutes File
Soft Copy .DOCX to M:\5-Notices and Postings
Soft Copy .PDF to S:\Minutes Attachments\Minutes 2020
Soft Copy .PDF to M:\1- Committee Files and Applications

Contra Costa County

To: Board of Supervisors

From: Kathy Gallagher, Employment & Human Services Director

Date: January 18, 2022

Subject: CSB Appropriation and Revenue Adjustment – Alternative Payment Programs - CAPP and C2AP Stage II

RECOMMENDATION(S):
APPROVE Appropriations and Revenue Adjustment No. 5025 authorizing additional revenue from the California Department of Social Services to the Employment and Human Services Department, Community Services Bureau (0589), in the amount of $3,249,222 for an increase in the Maximum Reimbursable Amount (MRA) in FY 21-22 for the California Alternative Payment Program (CAPP-1009-01); and an amount of $225,828 for an increase in the Maximum Reimbursable Amount (MRA) for the California Alternative Payment Program Stage II (C2AP-1008-01 Stage II).

FISCAL IMPACT:
This action is to adjust estimated revenue and appropriated expenditures based on additional funds approved by the California Department of Social Services during FY 21-22; no county Match is required.

BACKGROUND:
This Board Order is to appropriate the Maximum Reimbursable Amount (MRA) in FY 21-22 for the California Alternative Payment Child Care Program (CAPP-1009-01) and California Alternative Payment Program Stage II (C2AP-1008-01 Stage II).

The County routinely receives funds from the California Department of Social Services to provide Child care and Development Services for infant and preschool children.

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Nancy Benavides (925) 681-4268

cc:

CONSEQUENCE OF NEGATIVE ACTION:

Appropriations and estimated revenues will not be properly reflected in the FY 21/22 budget.

CHILDREN'S IMPACT STATEMENT:

The Employment and Human Services Department Community Services Bureau supports three (3) of Contra Costa County's community outcomes – Outcome 1: "Children Ready for and Succeeding in School," Outcome 3: "Families that are Economically Self-sufficient," and Outcome 4: "Families that are Safe, Stable, and Nurturing." These outcomes are achieved by offering comprehensive services, including high quality early childhood education, nutrition, and health services to low-income children throughout Contra Costa County.

AGENDA ATTACHMENTS

TC24/27_AP005025

MINUTES ATTACHMENTS

Signed Approp Adj 5025

AUDITOR-CONTROLLER USE ONLY:
FINAL APPROVAL NEEDED BY:
☒ BOARD OF SUPERVISORS
☒ COUNTY ADMINISTRATOR
☒ AUDITOR-CONTROLLER

CONTRA COSTA COUNTY
ESTIMATED REVENUE ADJUSTMENT/
ALLOCATION ADJUSTMENT
TC/24

ACCOUNT CODING		DEPARTMENT: 0589-EHSD-CSB		
ORGANIZATION	REVENUE ACCOUNT	REVENUE ACCOUNT DESCRIPTION	INCREASE	<DECREASE>
1862	9421	ST AID CHILD DAY CARE	3,249,222.00	
		TOTALS	3,249,222.00	0.00

APPROVED

AUDITOR – CONTROLLER

By: _____ Date 1/11/22

COUNTY ADMINISTRATOR

By: _____ Date _____

BOARD OF SUPERVISORS

YES:

NO:

By: _____ Date _____

EXPLANATION OF REQUEST

To appropriate FY21-22 increase in Maximum Reimbursable Amount (MRA) of $3,249,222 received from the California Department of Social Services pursuant to the provisions of Amendment 01 to provide additional child care slots and cost of living adjustment (COLA) per Section 265 of Assembly Bill 131 (Chapter 116, Statues of 2021), and funding for family fee waivers pursuant to Section 263 (b)(3) of Assembly Bill 131.

PREPARED BY: R. Castaneda
TITLE: Accountant, I
DATE: _____

REVENUE ADJ. JOURNAL NO. RAOO 5025

(M 129 Rev. 6/09 CAO)

CONTRA COSTA COUNTY
APPROPRIATION ADJUSTMENT/
ALLOCATION ADJUSTMENT
T/C-27

AUDITOR-CONTROLLER USE ONLY:
FINAL APPROVAL NEEDED BY:
☒ BOARD OF SUPERVISORS
☒ COUNTY ADMINISTRATOR
☒ AUDITOR-CONTROLLER

ACCOUNT CODING		DEPARTMENT: 0589-EHSD-CSB		
ORGANIZATION	EXPENDITURE SUB-ACCOUNT	EXPENDITURE ACCOUNT DESCRIPTION	<DECREASE>	INCREASE
1862	3622	GEN SVC-OTHER GS CHARGES		1,110.00
1862	5011	REIMBURSEMENTS-GOV/GOV		55,304.00
			0.00	56,414.00

APPROVED

AUDITOR – CONTROLLER

By: _____ Date 1/11/22

COUNTY ADMINISTRATOR

By: _____ Date _____

BOARD OF SUPERVISORS

YES:
NO:

By: _____ Date _____

EXPLANATION OF REQUEST

To appropriate FY21-22 increase in Maximum Reimbursable Amount (MRA) of $3,249,222 received from the California Department of Social Services pursuant to the provisions of Amendment 01 to provide additional child care slots and cost of living adjustment (COLA) per Section 265 of Assembly Bill 131 (Chapter 116, Statues of 2021), and funding for family fee waivers pursuant to Section 263 (b)(3) of Assembly Bill 131.

PREPARED BY: R. Castaneda
TITLE: Accountant I
DATE:

APPROPRIATION ADJ. JOURNAL NO. APOO 5025

(M 129 Rev. 6/09)

CONTRA COSTA COUNTY
APPROPRIATION ADJUSTMENT/
ALLOCATION ADJUSTMENT
T/C-27

AUDITOR-CONTROLLER USE ONLY:
FINAL APPROVAL NEEDED BY:
☒ BOARD OF SUPERVISORS
☒ COUNTY ADMINISTRATOR
☒ AUDITOR-CONTROLLER

ACCOUNT CODING		DEPARTMENT: 0589-EHSD-CSB		
ORGANIZATION	EXPENDITURE SUB-ACCOUNT	EXPENDITURE ACCOUNT DESCRIPTION	<DECREASE>	INCREASE
1862	1011	PERMANENT SALARIES		155,834.00
1862	1013	TEMPORARY SALARIES		5,184.00
1862	1015	DEFERRED COMP CTY CONTRB		2,939.00
1862	1042	EMPLOYER FICA		12,318.00
1862	1044	RETIREMENT EXPENSE		46,750.00
1862	1060	EMPLOYEE GROUP INSURANCE		46,215.00
1862	1063	UNEMPLOYMENT INSURANCE		161.00
1862	1070	WORKERS COMP INSUR		2,818.00
1862	2251	COMPUTER SOFTWARE COST		19,990.00
1862	2300	TRANSPORTATION AND TRAVEL		1,470.00
1862	2303	OTHER TRAVEL EMPLOYEES		998.00
1862	2310	NON CNTY PROF SPCLZD SVCS		1,874.00
1862	2314	CONTRACTED TEMPORARY HELP		3,421.00
1862	2467	TRAINING & REGISTRATIONS		2,891.00
1862	3318	CHILD DAY CARE AID		2,871,746.00
1862	3611	INTERFUND EXP - GOV/GOV		3,587.00
1862	3619	GEN SVC-BLDG OCPNCY COSTS		14,612.00
			0.00	3,192,808.00

APPROVED

AUDITOR – CONTROLLER

By: _____ Date 1/11/22

COUNTY ADMINISTRATOR

By: _____ Date _____

BOARD OF SUPERVISORS

YES:
NO:

By: _____ Date _____

EXPLANATION OF REQUEST

To appropriate FY21-22 increase in Maximum Reimbursable Amount (MRA) of $3,249,222 received from the California Department of Social Services pursuant to the provisions of Amendment 01 to provide additional child care slots and cost of living adjustment (COLA) per Section 265 of Assembly Bill 131 (Chapter 116, Statues of 2021), and funding for family fee waivers pursuant to Section 263 (b)(3) of Assembly Bill 131.

PREPARED BY: R. Castaneda
TITLE: Accountant I
DATE:

APPROPRIATION ADJ. JOURNAL NO. APOO 5025

(M 129 Rev. 6/09)

CONTRA COSTA COUNTY
ESTIMATED REVENUE ADJUSTMENT/
ALLOCATION ADJUSTMENT
TC/24

AUDITOR-CONTROLLER USE ONLY:
FINAL APPROVAL NEEDED BY:
☒ BOARD OF SUPERVISORS
☒ COUNTY ADMINISTRATOR
☒ AUDITOR-CONTROLLER

ACCOUNT CODING		DEPARTMENT: 0589-EHSD-CSB		
ORGANIZATION	REVENUE ACCOUNT	REVENUE ACCOUNT DESCRIPTION	INCREASE	<DECREASE>
1874	9421	ST AID CHILD DAY CARE	225,828.00	
		TOTALS	225,828.00	0.00

APPROVED

AUDITOR – CONTROLLER

By: _____ Date 1/11/22

COUNTY ADMINISTRATOR

By: _____ Date _____

BOARD OF SUPERVISORS

YES:

NO:

By: _____ Date _____

EXPLANATION OF REQUEST

To appropriate FY21-22 increase in Maximum Reimbursable Amount (MRA) of $225,828 received from the California Department of Social Services (CDSS) pursuant to the provisions of Amendment 01. Each annual budgeted MRA must be expended within the identified contract year. Unexpected funds cannot be shifted form one fiscal year to another. All unexpected funds revert to the CDSS.

PREPARED BY: R. Castaneda
TITLE: Accountant, I
DATE: _____

REVENUE ADJ. JOURNAL NO. RAOO 5025

(M 129 Rev. 6/09 CAO)

CONTRA COSTA COUNTY
APPROPRIATION ADJUSTMENT/
ALLOCATION ADJUSTMENT
T/C-27

AUDITOR-CONTROLLER USE ONLY:
FINAL APPROVAL NEEDED BY:
☒ BOARD OF SUPERVISORS
☒ COUNTY ADMINISTRATOR
☒ AUDITOR-CONTROLLER

ACCOUNT CODING		DEPARTMENT: 0589-EHSD-CSB		
ORGANIZATION	EXPENDITURE SUB-ACCOUNT	EXPENDITURE ACCOUNT DESCRIPTION	<DECREASE>	INCREASE
1874	1011	PERMANENT SALARIES		23,147.00
1874	1013	TEMPORARY SALARIES		222.00
1874	1015	DEFERRED COMP CTY CONTRB		309.00
1874	1042	F.I.C.A.		1,771.00
1874	1043	RET EXP-PRE 1997 RETIREES		51.00
1874	1044	RETIREMENT EXPENSE		6,819.00
1874	1060	EMPLOYEE GROUP INSURANCE		4,868.00
1874	1061	RETIREE HEALTH INSURANCE		100.00
1874	1063	UNEMPLOYMENT INSURANCE		46.00
1874	1070	WORKERS COMPENSATION INS		546.00
1874	2251	COMPUTER SOFTWARE COST		2,645.00
1874	3619	GEN SVC-BLDG OCPNCY COSTS		1,542.00
1874	5011	REIMBURSEMENTS-GOV/GOV		7,066.00
1874	3318	CHILD DAY CARE AID		176,696.00
			0.00	225,828.00

APPROVED

AUDITOR – CONTROLLER

By: _____ Date 1/11/22

COUNTY ADMINISTRATOR

By: _____ Date _____

BOARD OF SUPERVISORS

YES:
NO:

By: _____ Date _____

EXPLANATION OF REQUEST

To appropriate FY21-22 increase in Maximum Reimbursable Amount (MRA) of $225,828 received from the California Department of Social Services (CDSS) pursuant to the provisions of Amendment 01. Each annual budgeted MRA must be expended within the identified contract year. Unexpected funds cannot be shifted form one fiscal year to another. All unexpected funds revert to the CDSS

PREPARED BY: R. Castaneda
TITLE: Accountant I
DATE:

APPROPRIATION ADJ. JOURNAL NO. APOO 5025

(M 129 Rev. 6/09)

C.17

CONTRA COSTA COUNTY
ESTIMATED REVENUE ADJUSTMENT/ ALLOCATION ADJUSTMENT
TC/24

AUDITOR-CONTROLLER USE ONLY:
FINAL APPROVAL NEEDED BY:
☒ BOARD OF SUPERVISORS
☒ COUNTY ADMINISTRATOR
☒ AUDITOR-CONTROLLER

ACCOUNT CODING		DEPARTMENT: 0589-EHSD-CSB		
ORGANIZATION	REVENUE ACCOUNT	REVENUE ACCOUNT DESCRIPTION	INCREASE	<DECREASE>
1862	9421	ST AID CHILD DAY CARE	3,249,222.00	
		TOTALS	3,249,222.00	0.00

APPROVED

AUDITOR – CONTROLLER

By: _____ Date 1/11/22

COUNTY ADMINISTRATOR

By: _____ Date _____

BOARD OF SUPERVISORS

YES: Gioia, Andersen, Burgis, Mitchoff, Glover

NO: None

By: _____ Date 01-18-2022

EXPLANATION OF REQUEST

To appropriate FY21-22 increase in Maximum Reimbursable Amount (MRA) of $3,249,222 received from the California Department of Social Services pursuant to the provisions of Amendment 01 to provide additional child care slots and cost of living adjustment (COLA) per Section 265 of Assembly Bill 131 (Chapter 116, Statues of 2021), and funding for family fee waivers pursuant to Section 263 (b)(3) of Assembly Bill 131.

PREPARED BY: R. Castaneda
TITLE: Accountant, I
DATE: _____

REVENUE ADJ. JOURNAL NO. RAOO 5025

(M 129 Rev. 6/09 CAO)

CONTRA COSTA COUNTY
APPROPRIATION ADJUSTMENT/ ALLOCATION ADJUSTMENT
T/C-27

AUDITOR-CONTROLLER USE ONLY:
FINAL APPROVAL NEEDED BY:
- ☒ BOARD OF SUPERVISORS
- ☒ COUNTY ADMINISTRATOR
- ☒ AUDITOR-CONTROLLER

ACCOUNT CODING		DEPARTMENT: 0589-EHSD-CSB		
ORGANIZATION	EXPENDITURE SUB-ACCOUNT	EXPENDITURE ACCOUNT DESCRIPTION	<DECREASE>	INCREASE
1862	3622	GEN SVC-OTHER GS CHARGES		1,110.00
1862	5011	REIMBURSEMENTS-GOV/GOV		55,304.00
			0.00	56,414.00

APPROVED

AUDITOR – CONTROLLER

By: [signature] Date 1/11/22

COUNTY ADMINISTRATOR

By: _____ Date _____

BOARD OF SUPERVISORS

YES: Gioia, Andersen, Burgis, Mitchoff, Glover
NO: None

By: [signature] Date 01-18-2022

EXPLANATION OF REQUEST

To appropriate FY21-22 increase in Maximum Reimbursable Amount (MRA) of $3,249,222 received from the California Department of Social Services pursuant to the provisions of Amendment 01 to provide additional child care slots and cost of living adjustment (COLA) per Section 265 of Assembly Bill 131 (Chapter 116, Statues of 2021), and funding for family fee waivers pursuant to Section 263 (b)(3) of Assembly Bill 131.

PREPARED BY: R. Castaneda [signature]
TITLE: Accountant I
DATE:

APPROPRIATION ADJ. JOURNAL NO. APOO 5025

(M 129 Rev. 6/09)

C.17

CONTRA COSTA COUNTY
APPROPRIATION ADJUSTMENT/ ALLOCATION ADJUSTMENT
T/C-27

AUDITOR-CONTROLLER USE ONLY:
FINAL APPROVAL NEEDED BY:
☒ BOARD OF SUPERVISORS
☒ COUNTY ADMINISTRATOR
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ACCOUNT CODING		DEPARTMENT: 0589-EHSD-CSB		
ORGANIZATION	EXPENDITURE SUB-ACCOUNT	EXPENDITURE ACCOUNT DESCRIPTION	<DECREASE>	INCREASE
1862	1011	PERMANENT SALARIES		155,834.00
1862	1013	TEMPORARY SALARIES		5,184.00
1862	1015	DEFERRED COMP CTY CONTRB		2,939.00
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1862	1063	UNEMPLOYMENT INSURANCE		161.00
1862	1070	WORKERS COMP INSUR		2,818.00
1862	2251	COMPUTER SOFTWARE COST		19,990.00
1862	2300	TRANSPORTATION AND TRAVEL		1,470.00
1862	2303	OTHER TRAVEL EMPLOYEES		998.00
1862	2310	NON CNTY PROF SPCLZD SVCS		1,874.00
1862	2314	CONTRACTED TEMPORARY HELP		3,421.00
1862	2467	TRAINING & REGISTRATIONS		2,891.00
1862	3318	CHILD DAY CARE AID		2,871,746.00
1862	3611	INTERFUND EXP - GOV/GOV		3,587.00
1862	3619	GEN SVC-BLDG OCPNCY COSTS		14,612.00
			0.00	3,192,808.00

APPROVED

AUDITOR – CONTROLLER

By: _____ Date 1/11/22

COUNTY ADMINISTRATOR

By: _____ Date _____

BOARD OF SUPERVISORS

YES: Gioia, Andersen, Burgis, Mitchoff, Glover
NO: None

By: _____ Date 01-18-2022

EXPLANATION OF REQUEST

To appropriate FY21-22 increase in Maximum Reimbursable Amount (MRA) of $3,249,222 received from the California Department of Social Services pursuant to the provisions of Amendment 01 to provide additional child care slots and cost of living adjustment (COLA) per Section 265 of Assembly Bill 131 (Chapter 116, Statues of 2021), and funding for family fee waivers pursuant to Section 263 (b)(3) of Assembly Bill 131.

PREPARED BY: R. Castaneda
TITLE: Accountant I
DATE:

APPROPRIATION ADJ. JOURNAL NO. APOO 5025

(M 129 Rev. 6/09)

CONTRA COSTA COUNTY
ESTIMATED REVENUE ADJUSTMENT/
ALLOCATION ADJUSTMENT
TC/24

AUDITOR-CONTROLLER USE ONLY:
FINAL APPROVAL NEEDED BY:
☒ BOARD OF SUPERVISORS
☒ COUNTY ADMINISTRATOR
☒ AUDITOR-CONTROLLER

ACCOUNT CODING		DEPARTMENT: 0589-EHSD-CSB		
ORGANIZATION	REVENUE ACCOUNT	REVENUE ACCOUNT DESCRIPTION	INCREASE	<DECREASE>
1874	9421	ST AID CHILD DAY CARE	225,828.00	
		TOTALS	225,828.00	0.00

APPROVED

AUDITOR – CONTROLLER

By: _____ Date 1/11/22

COUNTY ADMINISTRATOR

By: _____ Date _____

BOARD OF SUPERVISORS

YES: Gioia, Andersen, Burgis, Mitchoff, Glover

NO: None

By: _____ Date 01-18-2022

EXPLANATION OF REQUEST

To appropriate FY21-22 increase in Maximum Reimbursable Amount (MRA) of $225,828 received from the California Department of Social Services (CDSS) pursuant to the provisions of Amendment 01. Each annual budgeted MRA must be expended within the identified contract year. Unexpected funds cannot be shifted form one fiscal year to another. All unexpected funds revert to the CDSS.

PREPARED BY: R. Castaneda
TITLE: Accountant, I
DATE: _____

REVENUE ADJ. JOURNAL NO. RAOO 5025

M 129 Rev. 6/09 CAO)

CONTRA COSTA COUNTY
APPROPRIATION ADJUSTMENT/ ALLOCATION ADJUSTMENT
T/C-27

AUDITOR-CONTROLLER USE ONLY:
FINAL APPROVAL NEEDED BY:
- ☒ BOARD OF SUPERVISORS
- ☒ COUNTY ADMINISTRATOR
- ☒ AUDITOR-CONTROLLER

ACCOUNT CODING		DEPARTMENT: 0589-EHSD-CSB		
ORGANIZATION	EXPENDITURE SUB-ACCOUNT	EXPENDITURE ACCOUNT DESCRIPTION	<DECREASE>	INCREASE
1874	1011	PERMANENT SALARIES		23,147.00
1874	1013	TEMPORARY SALARIES		222.00
1874	1015	DEFERRED COMP CTY CONTRB		309.00
1874	1042	F.I.C.A.		1,771.00
1874	1043	RET EXP-PRE 1997 RETIREES		51.00
1874	1044	RETIREMENT EXPENSE		6,819.00
1874	1060	EMPLOYEE GROUP INSURANCE		4,868.00
1874	1061	RETIREE HEALTH INSURANCE		100.00
1874	1063	UNEMPLOYMENT INSURANCE		46.00
1874	1070	WORKERS COMPENSATION INS		546.00
1874	2251	COMPUTER SOFTWARE COST		2,645.00
1874	3619	GEN SVC-BLDG OCPNCY COSTS		1,542.00
1874	5011	REIMBURSEMENTS-GOV/GOV		7,066.00
1874	3318	CHILD DAY CARE AID		176,696.00
			0.00	225,828.00

APPROVED

AUDITOR – CONTROLLER

By: _____ Date 1/11/22

COUNTY ADMINISTRATOR

By: _____ Date _____

BOARD OF SUPERVISORS

YES: Gioia, Andersen, Burgis, Mitchoff, Glover
NO: None

By: _____ Date 01-18-2022

EXPLANATION OF REQUEST

To appropriate FY21-22 increase in Maximum Reimbursable Amount (MRA) of $225,828 received from the California Department of Social Services (CDSS) pursuant to the provisions of Amendment 01. Each annual budgeted MRA must be expended within the identified contract year. Unexpected funds cannot be shifted form one fiscal year to another. All unexpected funds revert to the CDSS

PREPARED BY: R. Castaneda
TITLE: Accountant I
DATE:

APPROPRIATION ADJ. JOURNAL NO. APOO 5025

Contra Costa County

To: Board of Supervisors

From: Kathy Gallagher, Employment & Human Services Director

Date: January 18, 2022

Subject: CSB Appropriation and Revenue Adjustment – Child Care and Development Program (CCTR)

RECOMMENDATION(S):
APPROVE Appropriations and Revenue Adjustment No. 5026 authorizing additional revenue from the California Department of Social Services in the amount of $182,566 in the Employment and Human Services Department, Community Services Bureau (0589) for an increase in the Maximum Reimbursable Amount (MRA) to the Child Care and Development Program (CCTR).

FISCAL IMPACT:
This action is to adjust estimated revenue and appropriated expenditures based on additional funds approved by the California Department of Social Services during FY 21-22; no county match is required.

BACKGROUND:
This board order is to adjust estimated revenue and appropriated expenditures based on additional funds approved by the California Department of Social Services during FY 21-22. This is an increase to the Maximum Reimbursable Amount (MRA) to provide a cost of living adjustment (COLA). County routinely receives funds from the California Department of Social Services to provide child care and development services for infant and preschool children.

CONSEQUENCE OF NEGATIVE ACTION:
Appropriations and estimated revenues will not be properly reflected in the FY 21-22 budget.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Nancy Benavides (925) 681-4268

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc:

CHILDREN'S IMPACT STATEMENT:

The Employment and Human Services Department Community Services Bureau supports three (3) of Contra Costa County's community outcomes – Outcome 1: "Children Ready for and Succeeding in School," Outcome 2: "Families that are Economically Self-sufficient," and Outcome 3: "Families that are Safe, Stable, and Nurturing." These outcomes are achieved by offering comprehensive services, including high quality early childhood education, nutrition, and health services to low-income children throughout Contra Costa County.

AGENDA ATTACHMENTS

TC24/27_AP005026

MINUTES ATTACHMENTS

Signed Appropriation Adjustment 5026

CONTRA COSTA COUNTY
ESTIMATED REVENUE ADJUSTMENT/
ALLOCATION ADJUSTMENT
TC/24

AUDITOR-CONTROLLER USE ONLY:
FINAL APPROVAL NEEDED BY:
☒ BOARD OF SUPERVISORS
☒ COUNTY ADMINISTRATOR
☒ AUDITOR-CONTROLLER

ACCOUNT CODING		DEPARTMENT: 0589-EHSD		
ORGANIZATION	REVENUE ACCOUNT	REVENUE ACCOUNT DESCRIPTION	INCREASE	<DECREASE>
1822	9432	CCTR 1028	182,566.00	
		TOTALS	182,566.00	0.00

APPROVED

AUDITOR – CONTROLLER

By: _____ Date 1/11/22

COUNTY ADMINISTRATOR

By: _____ Date _____

BOARD OF SUPERVISORS

YES:

NO:

By: _____ Date _____

EXPLANATION OF REQUEST

To adjust estimated revenues due to new funding from the California Department of Social Services (CDSS) to the Child Care and Development Program CCTR for an increase in the Maximum Reimbursable Amount (MRI) in the amount not to exceed $182,566.

PREPARED BY: Nancy Benavides
TITLE: EHSD- CSB Fiscal Officer
DATE: 12/29/2021

REVENUE ADJ. JOURNAL NO. RAOO 5026

(M 129 Rev. 6/09 CAO)

CONTRA COSTA COUNTY
APPROPRIATION ADJUSTMENT/
ALLOCATION ADJUSTMENT
T/C-27

AUDITOR-CONTROLLER USE ONLY:
FINAL APPROVAL NEEDED BY:
☒ BOARD OF SUPERVISORS
☒ COUNTY ADMINISTRATOR
☒ AUDITOR-CONTROLLER

ACCOUNT CODING		DEPARTMENT: 0589-EHSD CSB		
ORGANIZATION	EXPENDITURE SUB-ACCOUNT	EXPENDITURE ACCOUNT DESCRIPTION	<DECREASE>	INCREASE
1822	2310	Subcontractor CCTR - 1028		182,566.00
			0.00	182,566.00

APPROVED

AUDITOR – CONTROLLER

By: _____ Date 1/11/22

COUNTY ADMINISTRATOR

By: _____ Date _____

BOARD OF SUPERVISORS

YES:
NO:

By: _____ Date _____

EXPLANATION OF REQUEST

To adjust estimated appropiated expenditures due to new funding from the California Department of Social Services (CDSS) to the Child Care and Development Program CCTR for an increase in the Maximum Reimbursable Amount (MRI) in the amount not to exceed $182,566.

PREPARED BY: Nancy Benavides
TITLE: EHSD CSB Fiscal Officer
DATE: 11/17/2021

APPROPRIATION ADJ. JOURNAL NO. APOO 5026

(M 129 Rev. 6/09)

C.18

CONTRA COSTA COUNTY
ESTIMATED REVENUE ADJUSTMENT/ ALLOCATION ADJUSTMENT
TC/24

AUDITOR-CONTROLLER USE ONLY:
FINAL APPROVAL NEEDED BY:
☒ BOARD OF SUPERVISORS
☒ COUNTY ADMINISTRATOR
☒ AUDITOR-CONTROLLER

ACCOUNT CODING		DEPARTMENT: 0589-EHSD		
ORGANIZATION	REVENUE ACCOUNT	REVENUE ACCOUNT DESCRIPTION	INCREASE	<DECREASE>
1822	9432	CCTR 1028	182,566.00	
		TOTALS	182,566.00	0.00

APPROVED

AUDITOR – CONTROLLER

By: _____ Date 1/11/22

COUNTY ADMINISTRATOR

By: _____ Date _____

BOARD OF SUPERVISORS

YES: Gioia, Andersen, Burgis, Mitchoff, Glover

NO: None

By: _____ Date 01-18-2022

EXPLANATION OF REQUEST

To adjust estimated revenues due to new funding from the California Department of Social Services (CDSS) to the Child Care and Development Program CCTR for an increase in the Maximum Reimbursable Amount (MRI) in the amount not to exceed $182,566.

PREPARED BY: Nancy Benavides
TITLE: EHSD- CSB Fiscal Officer
DATE: 12/29/2021

REVENUE ADJ. JOURNAL NO. RAOO 5026

(M 129 Rev. 6/09 CAO)

CONTRA COSTA COUNTY
APPROPRIATION ADJUSTMENT/
ALLOCATION ADJUSTMENT
T/C-27

AUDITOR-CONTROLLER USE ONLY:
FINAL APPROVAL NEEDED BY:
☒ BOARD OF SUPERVISORS
☒ COUNTY ADMINISTRATOR
☒ AUDITOR-CONTROLLER

ACCOUNT CODING		DEPARTMENT: 0589-EHSD CSB		
ORGANIZATION	EXPENDITURE SUB-ACCOUNT	EXPENDITURE ACCOUNT DESCRIPTION	<DECREASE>	INCREASE
1822	2310	Subcontractor CCTR - 1028		182,566.00
			0.00	182,566.00

APPROVED

AUDITOR – CONTROLLER

By: _____ Date 1/11/22

COUNTY ADMINISTRATOR

By: _____ Date _____

BOARD OF SUPERVISORS

YES: Gioia, Andersen, Burgis, Mitchoff, Glover
NO: None

By: _____ Date 01-18-2022

EXPLANATION OF REQUEST

To adjust estimated appropiated expenditures due to new funding from the California Department of Social Services (CDSS) to the Child Care and Development Program CCTR for an increase in the Maximum Reimbursable Amount (MRI) in the amount not to exceed $182,566.

PREPARED BY: Nancy Benavides
TITLE: EHSD CSB Fiscal Officer
DATE: 11/17/2021

APPROPRIATION ADJ. JOURNAL NO. APOO 5026

(M 129 Rev. 6/09)

Contra
Costa
County

To: Board of Supervisors

From: Mary Ann Mason, County Counsel

Date: January 18, 2022

Subject: Appropriation Transfer for Deputy County Counsel Position

RECOMMENDATION(S):
APPROVE Appropriation Adjustment No. 005027 transferring $154,693.00 in revenues to the County Counsel's Office (0030), for fiscal year 2021-22 specialized legal services for Health Services.

FISCAL IMPACT:
The specialized legal services are funded 100% by Health Services.

BACKGROUND:
The Health Services Department has requested that the County Counsel's Office dedicate a full-time Deputy County Counsel to Health Services to ensure necessary legal representation related to critical and time sensitive technical software and hardware contracts and data sharing agreements. Health Services advises that delays in IT contracting put millions of dollars in grant funding at risk, can cause critical CalAIM projects to be postponed and can delay implementations of critical system upgrades. Adding the proposed position corresponding to P300 AIR 48158 will ensure adequate legal staffing to serve Health Services IT projects.

CONSEQUENCE OF NEGATIVE ACTION:
The County Counsel's Office will not receive the funding necessary to provide additional staffing, hindering provision of critical legal services to Health Services and other clients.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Wanda McAdoo 925-655-2211

cc: Wanda McAdoo

AGENDA ATTACHMENTS

TC24/27_AP005027

MINUTES ATTACHMENTS

Signed Appropriation Adjustment 5027

CONTRA COSTA COUNTY
ESTIMATED REVENUE ADJUSTMENT/
ALLOCATION ADJUSTMENT
TC/24

AUDITOR-CONTROLLER USE ONLY:
FINAL APPROVAL NEEDED BY:
☒ BOARD OF SUPERVISORS
☒ COUNTY ADMINISTRATOR
☒ AUDITOR-CONTROLLER

ACCOUNT CODING		DEPARTMENT: Office of the County Counsel		
ORGANIZATION	REVENUE ACCOUNT	REVENUE ACCOUNT DESCRIPTION	INCREASE	<DECREASE>
1700	9647	Misc Legal Services	154,693.00	
		TOTALS	154,693.00	0.00

APPROVED

AUDITOR – CONTROLLER

By: _____ Date 1/11/22

COUNTY ADMINISTRATOR

By: _____ Date _____

BOARD OF SUPERVISORS

YES:

NO:

By: _____ Date _____

EXPLANATION OF REQUEST

To recognize estimated revenues to fund specialized legal services for Health Services.

PREPARED BY: Wanda R.McAdoo
TITLE: Administrative Services Officer
DATE: 1/18/2022

REVENUE ADJ. JOURNAL NO. RA00 5027

(M 129 Rev. 6/09 CAO)

CONTRA COSTA COUNTY
APPROPRIATION ADJUSTMENT/
ALLOCATION ADJUSTMENT
T/C-27

AUDITOR-CONTROLLER USE ONLY:
FINAL APPROVAL NEEDED BY:
☒ BOARD OF SUPERVISORS
☒ COUNTY ADMINISTRATOR
☑ AUDITOR-CONTROLLER

ACCOUNT CODING		DEPARTMENT: County Counsel		
ORGANIZATION	EXPENDITURE SUB-ACCOUNT	EXPENDITURE ACCOUNT DESCRIPTION	<DECREASE>	INCREASE
1700	1011	Permanent Salaries		103,069.00
1700	1044	Retirement Benefits		28,348.00
1700	1060	Employee Group Insurance		23,276.00
			0.00	154,693.00

APPROVED

AUDITOR – CONTROLLER

By: _____ Date 1/11/22

COUNTY ADMINISTRATOR

By: _____ Date _____

BOARD OF SUPERVISORS

YES:
NO:

By: _____ Date _____

EXPLANATION OF REQUEST

Appropriate permanent salary and benefits from line item (9647) to line items, (1011, 1044, 1060) to offset the revenue received for specialized legal services for Health Services.

PREPARED BY: Wanda R. McAdoo
TITLE: Administrative Services Officer
DATE: 1/18/2022

APPROPRIATION ADJ. JOURNAL NO. APOO 5027

(M 129 Rev. 6/09)

AUDITOR-CONTROLLER USE ONLY:
FINAL APPROVAL NEEDED BY:
☒ BOARD OF SUPERVISORS
☒ COUNTY ADMINISTRATOR
☒ AUDITOR-CONTROLLER

CONTRA COSTA COUNTY
ESTIMATED REVENUE ADJUSTMENT/
ALLOCATION ADJUSTMENT
TC/24

ACCOUNT CODING		DEPARTMENT: Office of the County Counsel		
ORGANIZATION	REVENUE ACCOUNT	REVENUE ACCOUNT DESCRIPTION	INCREASE	<DECREASE>
1700	9647	Misc Legal Services	154,693.00	
		TOTALS	154,693.00	0.00

APPROVED

AUDITOR – CONTROLLER

By: _____ Date 1/11/22

COUNTY ADMINISTRATOR

By: _____ Date _____

BOARD OF SUPERVISORS

YES: Gioia, Andersen, Burgis, Mitchoff, Glover

NO: None

By: _____ Date 01-18-2022

EXPLANATION OF REQUEST

To recognize estimated revenues to fund specialized legal services for Health Services.

PREPARED BY: Wanda R.McAdoo
TITLE: Administrative Services Officer
DATE: 1/18/2022

REVENUE ADJ. JOURNAL NO. RA00 5027

(M 129 Rev. 6/09 CAO)

AUDITOR-CONTROLLER USE ONLY:
FINAL APPROVAL NEEDED BY:

- ☒ BOARD OF SUPERVISORS
- ☒ COUNTY ADMINISTRATOR
- ☑ AUDITOR-CONTROLLER

CONTRA COSTA COUNTY
APPROPRIATION ADJUSTMENT/
ALLOCATION ADJUSTMENT
T/C-27

ACCOUNT CODING		DEPARTMENT: County Counsel		
ORGANIZATION	EXPENDITURE SUB-ACCOUNT	EXPENDITURE ACCOUNT DESCRIPTION	<DECREASE>	INCREASE
1700	1011	Permanent Salaries		103,069.00
1700	1044	Retirement Benefits		28,348.00
1700	1060	Employee Group Insurance		23,276.00
			0.00	154,693.00

APPROVED

AUDITOR – CONTROLLER

By: [signature] Date 1/11/22

COUNTY ADMINISTRATOR

By: _____ Date _____

BOARD OF SUPERVISORS

YES: Gioia, Andersen, Burgis, Mitchoff, Glover
NO: None

By: [signature] Date 01-18-2022

EXPLANATION OF REQUEST

Appropriate permanent salary and benefits from line item (9647) to line items, (1011, 1044, 1060) to offset the revenue received for specialized legal services for Health Services.

PREPARED BY: Wanda R. McAdoo
TITLE: Administrative Services Officer
DATE: 1/18/2022

APPROPRIATION ADJ. JOURNAL NO. APOO 5027

(M 129 Rev. 6/09)

Contra Costa County

To: Board of Supervisors

From: Mary Ann Mason, County Counsel

Date: January 18, 2022

Subject: Add one Deputy County Counsel - Advanced -Exempt position in the Office of County Counsel

RECOMMENDATION(S):
ADOPT Position Adjustment Resolution No. 25872 to add one (1) Deputy County Counsel - Advanced - Exempt (2ET3) (unrepresented) position at salary plan and grade B8B 2297 ($14,451.40-$17,178.18) in the Office of the County Counsel.

FISCAL IMPACT:
Upon approval, this action will result in an increased annual salary cost of approximately $206,138 and pension and benefit costs of $103,247 for the full-time position. The total cost for the remainder of this fiscal year is estimated to be $154,693. This is a dedicated position funded by the Health Services Department.

BACKGROUND:
The Health Services Department is requesting and funding the addition of one full-time Deputy County Counsel. This position will ensure the necessary legal representation in critical and time sensitive review of technical software and hardware contracts and data sharing agreements. Over the past year, the demand for these specialized legal services has increased significantly, necessitating the use of multiple attorneys

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Wanda McAdoo, (925) 655-2211

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc: Wanda McAdoo, Sylvia WongTam

BACKGROUND: (CONT'D)

in the General Law division of the County Counsel's Office to review, draft and negotiate a high volume of complex IT contracts and related documents. The Health Services Department advises that delays in contracting put millions of dollars in grant funding at risk, can cause critical CalAIM projects to be postponed and can delay implementations of critical system upgrades.

To continue to provide adequate representation at the increased level of services now needed by Health Services Information Technology, an additional permanent dedicated Deputy County Counsel position is necessary. Adding the proposed position will ensure adequate staffing to serve not only Health Services, but other clients as well.

CONSEQUENCE OF NEGATIVE ACTION:

Insufficient staffing in County Counsel will hinder provision of legal services to Health Services risking costly loss of grant funding and project delays for Health Services IT. It will also reduce availability of services for other clients.

AGENDA ATTACHMENTS

AIR 48158_P300 25872 - Add Deputy County Counsel Advanced_BOS 1.18.22.docx

MINUTES ATTACHMENTS

Signed P300 25872

POSITION ADJUSTMENT REQUEST

NO. 25872
DATE 1/18/2022

Department Office of the County Counsel — Department No./ Budget Unit No. 0030 Org No. 1700 Agency No. 17

Action Requested: ADOPT Position Adjustment Resolution No. to ADD one (1) full-time Deputy County Counsel - Advanced Exempt (2ET3) (unrepresented) position at salary level B8B 2297 ($14,451.40-$17,178.18) in the Office of the County Counsel.

Proposed Effective Date: 1/19/2022

Classification Questionnaire attached: Yes ☐ No ☒ / Cost is within Department's budget: Yes ☒ No ☐

Total One-Time Costs (non-salary) associated with request: $1,000.00

Estimated total cost adjustment (salary / benefits / one time):

Total annual cost $309,386.00 Net County Cost $0.00

Total this FY $154,693.00 N.C.C. this FY $0.00

SOURCE OF FUNDING TO OFFSET ADJUSTMENT Position funded by Health Service Department.

Department must initiate necessary adjustment and submit to CAO.
Use additional sheet for further explanations or comments.

Mary Ann Mason
(for) Department Head

REVIEWED BY CAO AND RELEASED TO HUMAN RESOURCES DEPARTMENT

L.Strobel — Deputy County Administrator — 1/6/22 Date

HUMAN RESOURCES DEPARTMENT RECOMMENDATIONS DATE 1/7/2022

Add one (1) full-time Deputy County Counsel - Exempt Advanced Level (2ET3) (Unrepresented) position at salary level; B8B 2297 ($14,451.40-$17,178.18) in the Office of the County Counsel.

Amend Resolution 71/17 establishing positions and resolutions allocating classes to the Basic / Exempt salary schedule.

Effective: ☒ Day following Board Action.
☐ _____(Date)

Amanda Monson — (for) Director of Human Resources — 1/7/2022 Date

COUNTY ADMINISTRATOR RECOMMENDATION: DATE _____

☐ Approve Recommendation of Director of Human Resources
☐ Disapprove Recommendation of Director of Human Resources
☐ Other: _____

(for) County Administrator

BOARD OF SUPERVISORS ACTION:
Adjustment is APPROVED ☐ DISAPPROVED ☐

Monica Nino, Clerk of the Board of Supervisors and County Administrator

DATE _____ BY _____

APPROVAL OF THIS ADJUSTMENT CONSTITUTES A PERSONNEL / SALARY RESOLUTION AMENDMENT

POSITION ADJUSTMENT ACTION TO BE COMPLETED BY HUMAN RESOURCES DEPARTMENT FOLLOWING BOARD ACTION
Adjust class(es) / position(s) as follows:

REQUEST FOR PROJECT POSITIONS

Department _____ Date _____ No. _____

1. Project Positions Requested:

2. Explain Specific Duties of Position(s)

3. Name / Purpose of Project and Funding Source (do not use acronyms i.e. SB40 Project or SDSS Funds)

4. Duration of the Project: Start Date _____ End Date _____
   Is funding for a specified period of time (i.e. 2 years) or on a year-to-year basis? Please explain.

5. Project Annual Cost

   a. Salary & Benefits Costs: _____

   b. Support Costs: _____
   (services, supplies, equipment, etc.)

   c. Less revenue or expenditure: _____

   d. Net cost to General or other fund: _____

6. Briefly explain the consequences of not filling the project position(s) in terms of:
   a. potential future costs
   b. legal implications
   c. financial implications
   d. political implications
   e. organizational implications

7. Briefly describe the alternative approaches to delivering the services which you have considered. Indicate why these alternatives were not chosen.

8. Departments requesting new project positions must submit an updated cost benefit analysis of each project position at the halfway point of the project duration. This report is to be submitted to the Human Resources Department, which will forward the report to the Board of Supervisors. Indicate the date that your cost / benefit analysis will be submitted

9. How will the project position(s) be filled?
   - ☐ a. Competitive examination(s)
   - ☐ b. Existing employment list(s) Which one(s)? _____
   - ☐ c. Direct appointment of:
     - ☐ 1. Merit System employee who will be placed on leave from current job
     - ☐ 2. Non-County employee

   Provide a justification if filling position(s) by C1 or C2

USE ADDITIONAL PAPER IF NECESSARY

POSITION ADJUSTMENT REQUEST

NO. 25872
DATE 1/18/2022

Department Office of the County Counsel — Department No./ Budget Unit No. 0030 Org No. 1700 Agency No. 17

Action Requested: ADOPT Position Adjustment Resolution No. to ADD one (1) full-time Deputy County Counsel - Advanced Exempt (2ET3) (unrepresented) position at salary level B8B 2297 ($14,451.40-$17,178.18) in the Office of the County Counsel.

Proposed Effective Date: 1/19/2022

Classification Questionnaire attached: Yes ☐ No ☒ / Cost is within Department's budget: Yes ☒ No ☐

Total One-Time Costs (non-salary) associated with request: $1,000.00

Estimated total cost adjustment (salary / benefits / one time):

Total annual cost $309,386.00 — Net County Cost $0.00

Total this FY $154,693.00 — N.C.C. this FY $0.00

SOURCE OF FUNDING TO OFFSET ADJUSTMENT Position funded by Health Service Department.

Department must initiate necessary adjustment and submit to CAO.
Use additional sheet for further explanations or comments.

Mary Ann Mason
(for) Department Head

REVIEWED BY CAO AND RELEASED TO HUMAN RESOURCES DEPARTMENT

L.Strobel — 1/6/22
Deputy County Administrator — Date

HUMAN RESOURCES DEPARTMENT RECOMMENDATIONS — DATE 1/7/2022

Add one (1) full-time Deputy County Counsel - Exempt Advanced Level (2ET3) (Unrepresented) position at salary level; B8B 2297 ($14,451.40-$17,178.18) in the Office of the County Counsel.

Amend Resolution 71/17 establishing positions and resolutions allocating classes to the Basic / Exempt salary schedule.

Effective: ☒ Day following Board Action.
☐ _____(Date)

Amanda Monson — 1/7/2022
(for) Director of Human Resources — Date

COUNTY ADMINISTRATOR RECOMMENDATION: — DATE _____

☐ Approve Recommendation of Director of Human Resources
☐ Disapprove Recommendation of Director of Human Resources
☐ Other: _____

(for) County Administrator

BOARD OF SUPERVISORS ACTION:
Adjustment is APPROVED ☒ ~~DISAPPROVED~~ ☐

Monica Nino, Clerk of the Board of Supervisors and County Administrator

DATE 01-18-2022

BY

APPROVAL OF THIS ADJUSTMENT CONSTITUTES A PERSONNEL / SALARY RESOLUTION AMENDMENT

POSITION ADJUSTMENT ACTION TO BE COMPLETED BY HUMAN RESOURCES DEPARTMENT FOLLOWING BOARD ACTION
Adjust class(es) / position(s) as follows:

Contra Costa County

To: Board of Supervisors

From: Brian M. Balbas, Public Works Director/Chief Engineer

Date: January 18, 2022

Subject: Reallocate the salary of the Director of Airports (9BD1) classification

RECOMMENDATION(S):
ADOPT Position Adjustment Resolution No. 25877 to reallocate the salary of the Director of Airports (9BD1) (unrepresented) classification from salary plan and grade B85 2071 (annual salary range of, $126,426 - $153,672) to salary plan and grade B85 2215 (annual salary range of, $145,800 - $177,221) in the Public Works Department – Airports Division.

FISCAL IMPACT:
This action will result in an additional annual salary and benefits costs of approximately $38,620, including pensions costs of approximately $6,309. This will be 100% funded by the Airport Enterprise Fund.

BACKGROUND:
The reallocation is recommended to attract highly qualified applicants for the position of Director of Airports. Our County airports, Buchanan Field and Byron Airport, are experiencing significant growth and development opportunities in addition to increasing demands for aviation uses at both facilities. While the airports are well positioned for future success based on the work done over recent years, this salary adjustment is necessary to help secure a successful

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Adrienne Todd (925) 313-2108

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc: Sylvia Wong Tam

BACKGROUND: (CONT'D)

candidate to lead the Contra Costa County Airports Division now and into the future.

The Airports Division has many development opportunities underway and in planning for both Buchanan Field and Byron Airports. There are also a number of airport infrastructure improvement projects either underway or being planned and developed for both airports. These important projects will potentially increase the use and attractiveness of the County's airports for aviation activities and thus will increase potential revenue sources for the airports and the County. The Airports Division will need a strong Director of Airports adept at managing competing demands, multiple priorities and strategic thinking to lead staff, and oversee airport administration and operations. A successful Director of Airports must be an effective communicator, able to build consensus from many diverse partners and lead by example. This adjustment will assist in developing a strong pool of candidates to meet the qualifications of an excellent Director of Airports.

After reviewing the existing salary for this position, it is recommended that this salary adjustment is necessary for the position of Director of Airports.

CONSEQUENCE OF NEGATIVE ACTION:

The County's pool of potential Director of Airports candidates may not be as well qualified and skilled to lead our Airports Division if this action is not approved.

AGENDA ATTACHMENTS

AIR 48140 P300 25877

MINUTES ATTACHMENTS

Signed P300 25877

POSITION ADJUSTMENT REQUEST

NO. 25877
DATE 1/5/2022

Department Public Works

Department No./
Budget Unit No. 0841 Org No. 4841 Agency No. 65

Action Requested: ADOPT Position Adjustment Resolution No. 25877 to reallocate the salary of the classification of Director of Airports (9BD1) (unrepresented) from salary plan and grade B85 2071 ($126,426 - $153,672) to salary plan and grade B85 2215 ($145,800 - $177,221) in the Public Works Department – Airport Division.

Proposed Effective Date: _____

Classification Questionnaire attached: Yes ☐ No ☒ / Cost is within Department's budget: Yes ☒ No ☐

Total One-Time Costs (non-salary) associated with request: _____

Estimated total cost adjustment (salary / benefits / one time):

Total annual cost 38620 Net County Cost 0

Total this FY 16092 N.C.C. this FY 0

SOURCE OF FUNDING TO OFFSET ADJUSTMENT 100% Airport Enterprise funds.

Department must initiate necessary adjustment and submit to CAO.
Use additional sheet for further explanations or comments.

Brian M. Balbas
_____
(for) Department Head

REVIEWED BY CAO AND RELEASED TO HUMAN RESOURCES DEPARTMENT

L.Strobel 1/7/22
_____ _____
Deputy County Administrator Date

HUMAN RESOURCES DEPARTMENT RECOMMENDATIONS DATE 1/11/2022
Reallocate the salary of the Director of Airports (9BD1) (unrepresented) classification

Amend Resolution 71/17 establishing positions and resolutions allocating classes to the Basic / Exempt salary schedule.

Effective: ☒ Day following Board Action.
☐ _____(Date)

Amber Lytle 1/10/22
_____ _____
(for) Director of Human Resources Date

COUNTY ADMINISTRATOR RECOMMENDATION: DATE _____

☐ Approve Recommendation of Director of Human Resources
☐ Disapprove Recommendation of Director of Human Resources
☐ Other: _____

_____
(for) County Administrator

BOARD OF SUPERVISORS ACTION:
Adjustment is APPROVED ☐ DISAPPROVED ☐

David J. Twa, Clerk of the Board of Supervisors and County Administrator

DATE _____ BY _____

APPROVAL OF THIS ADJUSTMENT CONSTITUTES A PERSONNEL / SALARY RESOLUTION AMENDMENT

POSITION ADJUSTMENT ACTION TO BE COMPLETED BY HUMAN RESOURCES DEPARTMENT FOLLOWING BOARD ACTION
Adjust class(es) / position(s) as follows:

REQUEST FOR PROJECT POSITIONS

Department _____ Date 1/12/2022 No. _____

1. Project Positions Requested:

2. Explain Specific Duties of Position(s)

3. Name / Purpose of Project and Funding Source (do not use acronyms i.e. SB40 Project or SDSS Funds)

4. Duration of the Project: Start Date _____ End Date _____
   Is funding for a specified period of time (i.e. 2 years) or on a year-to-year basis? Please explain.

5. Project Annual Cost

   a. Salary & Benefits Costs: _____

   b. Support Costs: _____
   (services, supplies, equipment, etc.)

   c. Less revenue or expenditure: _____

   d. Net cost to General or other fund: _____

6. Briefly explain the consequences of not filling the project position(s) in terms of:
   a. potential future costs
   b. legal implications
   c. financial implications
   d. political implications
   e. organizational implications

7. Briefly describe the alternative approaches to delivering the services which you have considered. Indicate why these alternatives were not chosen.

8. Departments requesting new project positions must submit an updated cost benefit analysis of each project position at the halfway point of the project duration. This report is to be submitted to the Human Resources Department, which will forward the report to the Board of Supervisors. Indicate the date that your cost / benefit analysis will be submitted

9. How will the project position(s) be filled?
   - ☐ a. Competitive examination(s)
   - ☐ b. Existing employment list(s) Which one(s)? _____
   - ☐ c. Direct appointment of:
     - ☐ 1. Merit System employee who will be placed on leave from current job
     - ☐ 2. Non-County employee

   Provide a justification if filling position(s) by C1 or C2

USE ADDITIONAL PAPER IF NECESSARY

POSITION ADJUSTMENT REQUEST

NO. 25877
DATE 1/5/2022

Department Public Works

Department No./
Budget Unit No. 0841 Org No. 4841 Agency No. 65

Action Requested: ADOPT Position Adjustment Resolution No. 25877 to reallocate the salary of the classification of Director of Airports (9BD1) (unrepresented) from salary plan and grade B85 2071 ($126,426 - $153,672) to salary plan and grade B85 2215 ($145,800 - $177,221) in the Public Works Department – Airport Division.

Proposed Effective Date: _____

Classification Questionnaire attached: Yes ☐ No ☒ / Cost is within Department's budget: Yes ☒ No ☐

Total One-Time Costs (non-salary) associated with request: _____

Estimated total cost adjustment (salary / benefits / one time):

Total annual cost 38620 Net County Cost 0

Total this FY 16092 N.C.C. this FY 0

SOURCE OF FUNDING TO OFFSET ADJUSTMENT 100% Airport Enterprise funds.

Department must initiate necessary adjustment and submit to CAO.
Use additional sheet for further explanations or comments.

Brian M. Balbas
(for) Department Head

REVIEWED BY CAO AND RELEASED TO HUMAN RESOURCES DEPARTMENT

L.Strobel — Deputy County Administrator — 1/7/22 Date

HUMAN RESOURCES DEPARTMENT RECOMMENDATIONS DATE 1/11/2022
Reallocate the salary of the Director of Airports (9BD1) (unrepresented) classification

Amend Resolution 71/17 establishing positions and resolutions allocating classes to the Basic / Exempt salary schedule.

Effective: ☒ Day following Board Action.
☐ _____(Date)

Amber Lytle — (for) Director of Human Resources — 1/10/22 Date

COUNTY ADMINISTRATOR RECOMMENDATION: DATE _____
☐ Approve Recommendation of Director of Human Resources
☐ Disapprove Recommendation of Director of Human Resources
☐ Other: _____

(for) County Administrator

BOARD OF SUPERVISORS ACTION:
Adjustment is APPROVED ☒ ~~DISAPPROVED ☐~~

Monica Nino, Clerk of the Board of Supervisors and County Administrator

DATE 01-18-2022

BY _____

APPROVAL OF THIS ADJUSTMENT CONSTITUTES A PERSONNEL / SALARY RESOLUTION AMENDMENT

POSITION ADJUSTMENT ACTION TO BE COMPLETED BY HUMAN RESOURCES DEPARTMENT FOLLOWING BOARD ACTION
Adjust class(es) / position(s) as follows:

P300 (M347) Rev 3/15/01

Contra Costa County

To: Board of Supervisors

From: Marc Shorr, Chief Information Officer

Date: January 18, 2022

Subject: Add one (1) Assistant Chief Information Officer-Exempt position

RECOMMENDATION(S):

ADOPT Position Resolution No. 25870 to add one (1) Assistant Chief Information Officer-Exempt (LTB1) position at salary plan and grade B85 2265 ($12,155.04 - $16,288.92) and appoint the incumbent in position no. 17614 to this position; cancel one (1) Chief Information Security Officer-Exempt (LWS1) position at salary plan and grade B85 2212 ($12,114.04 - $14,724.69) and abolish the class; and reallocate the salary of the Assistant Chief Information Officer-Exempt (LTB1) at salary plan and grade B85 2265 ($15,090 - $18,343) in the Department of Information Technology.

FISCAL IMPACT:

The annual cost of this action is $80,686 of which $6,605 represents an increase in pension costs. The cost will be covered through charges to user departments.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Marc Shorr, (925) 608-4071

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc: Nancy Zandonella, Sylvia WongTam

BACKGROUND:

The Human Resources Department recently performed a salary survey on the Assistant Chief Information Officer-Exempt classification as well as the Chief Information Security Officer-Exempt classification. Both salaries fell below the nine (9) bay area Counties surveyed. Accordingly, the Human Resources Department has recommended a 12.6% salary increase to establish parity with the other surrounding jurisdictions. The department is also abolishing the classification of Chief Information Security Officer-Exempt and adding a new Assistant Chief Information Officer-Exempt position as the duties of the current Chief Information Security Officer-Exempt are more in line with the duties of a Assistant Chief Information Officer-Exempt.

CONSEQUENCE OF NEGATIVE ACTION:

If this action is not approved, the salary of this classifications will remain below market.

AGENDA ATTACHMENTS

AIR 48144 P300 25870

MINUTES ATTACHMENTS

Signed P300 25870

POSITION ADJUSTMENT REQUEST

NO. 25870
DATE 1/6/22

Department Department of Information Technology Department No./ Budget Unit No. 0147 Org No. 1050 Agency No. ___

Action Requested: Add one (1) Assistant Chief Information Officer-Exempt (LTB1) position and appoint the incumbent in position no. 17614 to this position; cancel one (1) Chief IT Security Officer-Exempt (LWS1) position, abolish the class; and reallocate the salary of the Assistant Chief Information Officer-Exempt on the salary schedule.

Proposed Effective Date: _____

Classification Questionnaire attached: Yes ☐ No ☒ / Cost is within Department's budget: Yes ☒ No ☐

Total One-Time Costs (non-salary) associated with request: _____

Estimated total cost adjustment (salary / benefits / one time):

Total annual cost	$80,868.00	Net County Cost	$0.00
Total this FY	$26,956.00	N.C.C. this FY	$0.00

SOURCE OF FUNDING TO OFFSET ADJUSTMENT 100% User Departments

Department must initiate necessary adjustment and submit to CAO.
Use additional sheet for further explanations or comments.

Marc Shorr
_____
(for) Department Head

REVIEWED BY CAO AND RELEASED TO HUMAN RESOURCES DEPARTMENT

L.Strobel 1/6/2022
_____ _____
Deputy County Administrator Date

HUMAN RESOURCES DEPARTMENT RECOMMENDATIONS DATE 1/7/2022

Add one (1) Assistant Chief Information Officer-Exempt (LTB1) position and appoint the incumbent in position no. 17614 to this position; cancel one (1) Chief IT Security Officer-Exempt (LWS1) position and abolish the class; and reallocate the salary of the Assistant Chief Information Officer-Exempt (LTB1) at salary plan and grade B85 2265 ($15,090 - $18,343)

Amend Resolution 71/17 establishing positions and resolutions allocating classes to the Basic / Exempt salary schedule.

Effective: ☒ Day following Board Action.
☐ _____(Date)

Carol Berger 1/7/2022
_____ _____
(for) Director of Human Resources Date

COUNTY ADMINISTRATOR RECOMMENDATION: DATE _____

☐ Approve Recommendation of Director of Human Resources
☐ Disapprove Recommendation of Director of Human Resources
☐ Other: _____

_____
(for) County Administrator

BOARD OF SUPERVISORS ACTION:
Adjustment is APPROVED ☐ DISAPPROVED ☐

Monica Nino, Clerk of the Board of Supervisors and County Administrator

DATE _____ BY _____

APPROVAL OF THIS ADJUSTMENT CONSTITUTES A PERSONNEL / SALARY RESOLUTION AMENDMENT

POSITION ADJUSTMENT ACTION TO BE COMPLETED BY HUMAN RESOURCES DEPARTMENT FOLLOWING BOARD ACTION
Adjust class(es) / position(s) as follows:

REQUEST FOR PROJECT POSITIONS

Department _____ Date _____ No. _____

1. Project Positions Requested:

2. Explain Specific Duties of Position(s)

3. Name / Purpose of Project and Funding Source (do not use acronyms i.e. SB40 Project or SDSS Funds)

4. Duration of the Project: Start Date _____ End Date _____
   Is funding for a specified period of time (i.e. 2 years) or on a year-to-year basis? Please explain.

5. Project Annual Cost

   a. Salary & Benefits Costs: _____

   b. Support Costs: _____
   (services, supplies, equipment, etc.)

   c. Less revenue or expenditure: _____

   d. Net cost to General or other fund: _____

6. Briefly explain the consequences of not filling the project position(s) in terms of:
   a. potential future costs
   b. legal implications
   c. financial implications
   d. political implications
   e. organizational implications

7. Briefly describe the alternative approaches to delivering the services which you have considered. Indicate why these alternatives were not chosen.

8. Departments requesting new project positions must submit an updated cost benefit analysis of each project position at the halfway point of the project duration. This report is to be submitted to the Human Resources Department, which will forward the report to the Board of Supervisors. Indicate the date that your cost / benefit analysis will be submitted

9. How will the project position(s) be filled?
   - ☐ a. Competitive examination(s)
   - ☐ b. Existing employment list(s) Which one(s)? _____
   - ☐ c. Direct appointment of:
     - ☐ 1. Merit System employee who will be placed on leave from current job
     - ☐ 2. Non-County employee

   Provide a justification if filling position(s) by C1 or C2

USE ADDITIONAL PAPER IF NECESSARY

POSITION ADJUSTMENT REQUEST

NO. 25870
DATE 1/6/22

Department Department of Information Technology Department No./ Budget Unit No. 0147 Org No. 1050 Agency No. ___

Action Requested: Add one (1) Assistant Chief Information Officer-Exempt (LTB1) position and appoint the incumbent in position no. 17614 to this position; cancel one (1) Chief IT Security Officer-Exempt (LWS1) position, abolish the class; and reallocate the salary of the Assistant Chief Information Officer-Exempt on the salary schedule.

Proposed Effective Date: _____

Classification Questionnaire attached: Yes ☐ No ☒ / Cost is within Department's budget: Yes ☒ No ☐

Total One-Time Costs (non-salary) associated with request: _____

Estimated total cost adjustment (salary / benefits / one time):

Total annual cost	$80,868.00	Net County Cost	$0.00
Total this FY	$26,956.00	N.C.C. this FY	$0.00

SOURCE OF FUNDING TO OFFSET ADJUSTMENT 100% User Departments

Department must initiate necessary adjustment and submit to CAO.
Use additional sheet for further explanations or comments.

Marc Shorr
(for) Department Head

REVIEWED BY CAO AND RELEASED TO HUMAN RESOURCES DEPARTMENT

L.Strobel — Deputy County Administrator — 1/6/2022 Date

HUMAN RESOURCES DEPARTMENT RECOMMENDATIONS DATE 1/7/2022

Add one (1) Assistant Chief Information Officer-Exempt (LTB1) position and appoint the incumbent in position no. 17614 to this position; cancel one (1) Chief IT Security Officer-Exempt (LWS1) position and abolish the class; and reallocate the salary of the Assistant Chief Information Officer-Exempt (LTB1) at salary plan and grade B85 2265 ($15,090 - $18,343)

Amend Resolution 71/17 establishing positions and resolutions allocating classes to the Basic / Exempt salary schedule.

Effective: ☒ Day following Board Action.
☐ _____(Date)

Carol Berger — (for) Director of Human Resources — 1/7/2022 Date

COUNTY ADMINISTRATOR RECOMMENDATION: DATE _____

☐ Approve Recommendation of Director of Human Resources
☐ Disapprove Recommendation of Director of Human Resources
☐ Other: _____

(for) County Administrator

BOARD OF SUPERVISORS ACTION:
Adjustment is APPROVED ☒ ~~DISAPPROVED~~ ☐

Monica Nino, Clerk of the Board of Supervisors and County Administrator

DATE 01-18-2022 BY _____

APPROVAL OF THIS ADJUSTMENT CONSTITUTES A PERSONNEL / SALARY RESOLUTION AMENDMENT

POSITION ADJUSTMENT ACTION TO BE COMPLETED BY HUMAN RESOURCES DEPARTMENT FOLLOWING BOARD ACTION
Adjust class(es) / position(s) as follows:

Contra Costa County

To: Board of Supervisors

From: Marc Shorr, Chief Information Officer

Date: January 18, 2022

Subject: Add one (1) Chief of Administrative Services (APDK) (Exempt) position.

RECOMMENDATION(S):

ADOPT Position Resolution No. 25871 to add one (1) Chief of Administrative Services - Exempt (APDK) at Salary Plan and Grade B85 1003 ($9,593.34 - $11,660.76) and cancel one (1) Administrative Services Officer (APDB) (unrepresented) position no.12578 at Salary Plan and Grade B82 1692 ($7,458.06 - $10,030.27) in the Department of Information Technology.

FISCAL IMPACT:

The annual cost of this action is $22,100 of which $3,610 represents an increase in pension costs.

BACKGROUND:

In April 2021, the long tenured incumbent who was responsible for the

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Marc Shorr, (925) 608-4071

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc: Nancy Zandonella, Sylvia Wong Tam

BACKGROUND: (CONT'D)

department's fiscal and administrative matters as well as activities related to payroll and personnel functions retired. Since that time, the department has struggled to backfill this critical role with a classification that did not carry with it the knowledge, skills, and abilities to effectively fill this role. It is necessary for the department to add a Chief of Administrative Services position so we may recruit and fill this critical role with an individual who possesses the ability to perform complex and comprehensive budgetary analysis, the ability to maintain fiscal controls and to work closely with the senior management on organizational and policy implementation to accomplish the goals of the department. As a cost-recovery department, it is vital to fill this position with an individual who has progressively responsible experience in budgetary analysis.

CONSEQUENCE OF NEGATIVE ACTION:

If this action is not approved, we will continue to struggle to effectively meet the fiscal needs of the department.

AGENDA ATTACHMENTS

P300 25871

MINUTES ATTACHMENTS

Signed P300 25871

POSITION ADJUSTMENT REQUEST

NO. 25871
DATE 1/5/2022

Department Department of Information Technology Department No./ Budget Unit No. 0147 Org No. 1050 Agency No. ___

Action Requested: Add one (1) Chief of Administrative Services position (APDK) and cancel one (1) Administrative Services Officer position No. 12578 (APDB) in the Department of Information Technology.

Proposed Effective Date: _____

Classification Questionnaire attached: Yes ☐ No ☒ / Cost is within Department's budget: Yes ☒ No ☐

Total One-Time Costs (non-salary) associated with request: _____

Estimated total cost adjustment (salary / benefits / one time):

Total annual cost	$22,100.00	Net County Cost	$22,100.00
Total this FY	$5,525.00	N.C.C. this FY	$5,525.00

SOURCE OF FUNDING TO OFFSET ADJUSTMENT 100% User Departments

Department must initiate necessary adjustment and submit to CAO.
Use additional sheet for further explanations or comments.

Marc Shorr
_____
(for) Department Head

REVIEWED BY CAO AND RELEASED TO HUMAN RESOURCES DEPARTMENT

L.Strobel 1/6/2022
_____ _____
Deputy County Administrator Date

HUMAN RESOURCES DEPARTMENT RECOMMENDATIONS DATE 1/7/2022

Add one (1) Chief of Administrative Services position (APDK) (Exempt) at Salary Plan and Grade B85 1003 ($9,593.34 - $11,660.76) and cancel one (1) Administrative Services Officer position no. 12578 (APDB) (Not Represented) Salary Plan and Grade B82 1692 ($7,458.06 - $10,030.27) in the Department of Information Technology.

Amend Resolution 71/17 establishing positions and resolutions allocating classes to the Basic / Exempt salary schedule.

Effective: ☒ Day following Board Action.
☐ _____(Date)

Melissa Moglie 1/7/2022
_____ _____
(for) Director of Human Resources Date

COUNTY ADMINISTRATOR RECOMMENDATION: DATE _____

☐ Approve Recommendation of Director of Human Resources
☐ Disapprove Recommendation of Director of Human Resources
☐ Other: _____

_____
(for) County Administrator

BOARD OF SUPERVISORS ACTION:
Adjustment is APPROVED ☐ DISAPPROVED ☐

Monica Nino, Clerk of the Board of Supervisors and County Administrator

DATE _____ BY _____

APPROVAL OF THIS ADJUSTMENT CONSTITUTES A PERSONNEL / SALARY RESOLUTION AMENDMENT

POSITION ADJUSTMENT ACTION TO BE COMPLETED BY HUMAN RESOURCES DEPARTMENT FOLLOWING BOARD ACTION
Adjust class(es) / position(s) as follows:

REQUEST FOR PROJECT POSITIONS

Department _____ Date _____ No. _____

1. Project Positions Requested:

2. Explain Specific Duties of Position(s)

3. Name / Purpose of Project and Funding Source (do not use acronyms i.e. SB40 Project or SDSS Funds)

4. Duration of the Project: Start Date _____ End Date _____
   Is funding for a specified period of time (i.e. 2 years) or on a year-to-year basis? Please explain.

5. Project Annual Cost

   a. Salary & Benefits Costs: _____

   b. Support Costs: _____
   (services, supplies, equipment, etc.)

   c. Less revenue or expenditure: _____

   d. Net cost to General or other fund: _____

6. Briefly explain the consequences of not filling the project position(s) in terms of:
   a. potential future costs
   b. legal implications
   c. financial implications
   d. political implications
   e. organizational implications

7. Briefly describe the alternative approaches to delivering the services which you have considered. Indicate why these alternatives were not chosen.

8. Departments requesting new project positions must submit an updated cost benefit analysis of each project position at the halfway point of the project duration. This report is to be submitted to the Human Resources Department, which will forward the report to the Board of Supervisors. Indicate the date that your cost / benefit analysis will be submitted

9. How will the project position(s) be filled?
   - ☐ a. Competitive examination(s)
   - ☐ b. Existing employment list(s) Which one(s)? _____
   - ☐ c. Direct appointment of:
     - ☐ 1. Merit System employee who will be placed on leave from current job
     - ☐ 2. Non-County employee

   Provide a justification if filling position(s) by C1 or C2

USE ADDITIONAL PAPER IF NECESSARY

POSITION ADJUSTMENT REQUEST

NO. 25871
DATE 1/5/2022

Department No./
Department Department of Information Technology Budget Unit No. 0147 Org No. 1050 Agency No. ___

Action Requested: Add one (1) Chief of Administrative Services position (APDK) and cancel one (1) Administrative Services Officer position No. 12578 (APDB) in the Department of Information Technology.

Proposed Effective Date: _____

Classification Questionnaire attached: Yes ☐ No ☒ / Cost is within Department's budget: Yes ☒ No ☐

Total One-Time Costs (non-salary) associated with request: _____

Estimated total cost adjustment (salary / benefits / one time):

Total annual cost	$22,100.00	Net County Cost	$22,100.00
Total this FY	$5,525.00	N.C.C. this FY	$5,525.00

SOURCE OF FUNDING TO OFFSET ADJUSTMENT 100% User Departments

Department must initiate necessary adjustment and submit to CAO.
Use additional sheet for further explanations or comments.

Marc Shorr
(for) Department Head

REVIEWED BY CAO AND RELEASED TO HUMAN RESOURCES DEPARTMENT

L.Strobel — 1/6/2022
Deputy County Administrator — Date

HUMAN RESOURCES DEPARTMENT RECOMMENDATIONS DATE 1/7/2022

Add one (1) Chief of Administrative Services position (APDK) (Exempt) at Salary Plan and Grade B85 1003 ($9,593.34 - $11,660.76) and cancel one (1) Administrative Services Officer position no. 12578 (APDB) (Not Represented) Salary Plan and Grade B82 1692 ($7,458.06 - $10,030.27) in the Department of Information Technology.

Amend Resolution 71/17 establishing positions and resolutions allocating classes to the Basic / Exempt salary schedule.

Effective: ☒ Day following Board Action.
☐ _____(Date)

Melissa Moglie — 1/7/2022
(for) Director of Human Resources — Date

COUNTY ADMINISTRATOR RECOMMENDATION: DATE _____

☐ Approve Recommendation of Director of Human Resources
☐ Disapprove Recommendation of Director of Human Resources
☐ Other: _____

(for) County Administrator

BOARD OF SUPERVISORS ACTION:
Adjustment is APPROVED ☒ DISAPPROVED ☐

Monica Nino, Clerk of the Board of Supervisors and County Administrator

DATE 01-18-2022

BY _____

APPROVAL OF THIS ADJUSTMENT CONSTITUTES A PERSONNEL / SALARY RESOLUTION AMENDMENT

POSITION ADJUSTMENT ACTION TO BE COMPLETED BY HUMAN RESOURCES DEPARTMENT FOLLOWING BOARD ACTION
Adjust class(es) / position(s) as follows:

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services

Date: January 18, 2022

Subject: Add 73 positions in varied classifications in the Health Services Department

RECOMMENDATION(S):
ADOPT Position Adjustment Resolution No. 25879 to add the following 73 represented positions (35.0 full-time equivalent):

- Twelve (12) 32/40 and fifteen (15) 24/40 Registered Nurse (VWXG) positions at salary plan and grade L32-1880 ($10,398 - $12,986);
- Three (3) full-time Charge Nurse (VWTF) positions at salary plan and grade L35-1883 ($12,066 - $15,069);
- Six (6) 32/40 and six (6) 24/40 Certified Nursing Assistant (VTWA) positions at salary plan and grade TA5-0906 ($3,323 - $4,039);
- Three (3) 32/40 and three (3) 24/40 Licensed Vocational Nurse (VT7G) positions at salary plan and grade TAX-1287 ($4,833 - $6,172);
- One (1) 24/40 Clinical Lab Scientist II (VHVD) position at salary plan and grade TC5-1809 ($8,531 - $10,370);
- One (1) 24/40 Diagnostic Imaging Technician II (V8VE) position at salary plan and grade TC5-1738 ($8,323 - $10,116);
- One full-time MH Specialist II (VQVA) position at salary plan and grade TC2-1284 ($4,978 - $7,033);
- Two (2) full-time, three (3) 32/40, and three (3) 24/40 ISW - Generalist (1KVD) positions at salary plan and grade TB5-0922 ($3,376 - $4,104);

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Jo-Anne Linares, (925) 957-5240

cc: Bud Decesare, Nancy Hendra, Linh Huynh, Kathi Caudel, kathy Sitton

RECOMMENDATION(S): (CONT'D)

>

- One (1) 24/40 Lab Tech II (VJVA) position at salary plan and grade TC5-1095 ($4,007 - $4,870);
- Two (2) full-time and one (1) 24/40 Mental Health Clinical Specialist (VQSB) positions at salary plan and grade TC2-1384 ($5,496 - $8,158);
- One (1) full-time Dietitian (1KSA) position at salary plan and grade TC5-1376 ($5,292 - $6,433);
- Two (2) full-time Occupational Therapist II (V5VH) positions at salary plan and grade TC5-1746 ($7,634 - $9,279);
- Two (2) full-time Therapy Assistant (V5WF) positions at salary plan and grade TC5-1435 ($5,611 - $6,820)
- One (1) full-time Pharmacy Tech (VY9B) position at salary plan and grade TC5-1065 ($4,668 - $5,673)
- One (1) full-time Pharmacist II (VYTA) position at salary plan and grade TC5-1964 ($11,367 - $14,508); and
- Three (3) full-time Clerk-Senior Level (JWXC) positions at salary plan and grade 3RX-1033 ($3,759 - $4,800)

for Inpatient psychiatric services within the Contra Costa Regional Medical Center in the Health Services Department.

FISCAL IMPACT:

Upon approval, this action has an annual cost of approximately $10,994,062 with $4,263,497 in retirement and benefit costs already included. The permanent salary and benefit costs will be fully offset by the reduction of contract registry staffing expenditures.

BACKGROUND:

In 2020, Contra Costa Regional Medical Center reopened the Inpatient Psychiatric Services providing acute behavioral health care. The unit is a 24- hour operation staffed with nurses, physicians, social workers, and therapists to provide care for patients' psychiatric recovery. With an increase in needs for psychiatric emergency services due to COVID-19 and partnered with local and State shortages of inpatient psychiatric beds, the reopening was necessary to address the County's increasing community needs for local and immediate acute inpatient psychiatric care.

The Inpatient Psychiatric Services was initially opened with the use of contract employees, which was intended to be a temporary circumstance until the County was able to add and fill the necessary permanent positions.

CONSEQUENCE OF NEGATIVE ACTION:

If this action is not approved, there will not be permanent staff to provide a continuum of psychiatric patient care in the Inpatient Psychiatric Services unit at Contra Costa Regional Medical Center.

AGENDA ATTACHMENTS

P300 No. 25879 HSD

P300 No. 25879 Attachment

MINUTES ATTACHMENTS

Signed P300 25879

POSITION ADJUSTMENT REQUEST

NO. 25879
DATE 1/6/2022

Department Health Services

Department No./
Budget Unit No. 0540 Org No. 6314 Agency No. A18

Action Requested: Add 73 positions in varied classifications in the Health Services Department - see Attachment.

Proposed Effective Date: 2/1/2022

Classification Questionnaire attached: Yes ☐ No ☒ / Cost is within Department's budget: Yes ☐ No ☒

Total One-Time Costs (non-salary) associated with request: $0.00

Estimated total cost adjustment (salary / benefits / one time):

Total annual cost $10,994,062.00 Net County Cost $0.00

Total this FY $4,580,86.00 N.C.C. this FY $0.00

SOURCE OF FUNDING TO OFFSET ADJUSTMENT 100% Hospital Enterprise Fund I

Department must initiate necessary adjustment and submit to CAO.
Use additional sheet for further explanations or comments.

Jo-Anne Linares
(for) Department Head

REVIEWED BY CAO AND RELEASED TO HUMAN RESOURCES DEPARTMENT

Kaitlyn Jeffus for — 1/11/2022
Deputy County Administrator — Date

HUMAN RESOURCES DEPARTMENT RECOMMENDATIONS DATE _____
Exempt from Human Resources review under Delegated Authority

Amend Resolution 71/17 establishing positions and resolutions allocating classes to the Basic / Exempt salary schedule.

Effective: ☐ Day following Board Action.
☐ _____(Date)

(for) Director of Human Resources — Date

COUNTY ADMINISTRATOR RECOMMENDATION: DATE 1/13/2022

☐ Approve Recommendation of Director of Human Resources
☐ Disapprove Recommendation of Director of Human Resources
☒ Other: Approve as recommended by the department.

Enid Mendoza
(for) County Administrator

BOARD OF SUPERVISORS ACTION:
Adjustment is APPROVED ☐ DISAPPROVED ☐

Monica Nino, Clerk of the Board of Supervisors and County Administrator

DATE _____ BY _____

APPROVAL OF THIS ADJUSTMENT CONSTITUTES A PERSONNEL / SALARY RESOLUTION AMENDMENT

POSITION ADJUSTMENT ACTION TO BE COMPLETED BY HUMAN RESOURCES DEPARTMENT FOLLOWING BOARD ACTION
Adjust class(es) / position(s) as follows:

REQUEST FOR PROJECT POSITIONS

Department _____ Date _____ No. _____

1. Project Positions Requested:

2. Explain Specific Duties of Position(s)

3. Name / Purpose of Project and Funding Source (do not use acronyms i.e. SB40 Project or SDSS Funds)

4. Duration of the Project: Start Date _____ End Date _____
   Is funding for a specified period of time (i.e. 2 years) or on a year-to-year basis? Please explain.

5. Project Annual Cost

   a. Salary & Benefits Costs: _____

   b. Support Costs: _____
   (services, supplies, equipment, etc.)

   c. Less revenue or expenditure: _____

   d. Net cost to General or other fund: _____

6. Briefly explain the consequences of not filling the project position(s) in terms of:
   a. potential future costs
   b. legal implications
   c. financial implications
   d. political implications
   e. organizational implications

7. Briefly describe the alternative approaches to delivering the services which you have considered. Indicate why these alternatives were not chosen.

8. Departments requesting new project positions must submit an updated cost benefit analysis of each project position at the halfway point of the project duration. This report is to be submitted to the Human Resources Department, which will forward the report to the Board of Supervisors. Indicate the date that your cost / benefit analysis will be submitted

9. How will the project position(s) be filled?
   - ☐ a. Competitive examination(s)
   - ☐ b. Existing employment list(s) Which one(s)? _____
   - ☐ c. Direct appointment of:
     - ☐ 1. Merit System employee who will be placed on leave from current job
     - ☐ 2. Non-County employee

   Provide a justification if filling position(s) by C1 or C2

USE ADDITIONAL PAPER IF NECESSARY

POSITION ADJUSTMENT REQUEST

C.24

NO. 25879
DATE 1/6/2022

Department Health Services

Department No./ Budget Unit No. 0540 Org No. 6314 Agency No. A18

Action Requested: Add 73 positions in varied classifications in the Health Services Department - see Attachment.

Proposed Effective Date: 2/1/2022

Classification Questionnaire attached: Yes ☐ No ☒ / Cost is within Department's budget: Yes ☐ No ☒

Total One-Time Costs (non-salary) associated with request: $0.00

Estimated total cost adjustment (salary / benefits / one time):

Total annual cost $10,994,062.00 Net County Cost $0.00

Total this FY $4,580,86.00 N.C.C. this FY $0.00

SOURCE OF FUNDING TO OFFSET ADJUSTMENT 100% Hospital Enterprise Fund I

Department must initiate necessary adjustment and submit to CAO.
Use additional sheet for further explanations or comments.

Jo-Anne Linares

(for) Department Head

REVIEWED BY CAO AND RELEASED TO HUMAN RESOURCES DEPARTMENT

Kaitlyn Jeffus for — 1/11/2022

Deputy County Administrator — Date

HUMAN RESOURCES DEPARTMENT RECOMMENDATIONS DATE _____
Exempt from Human Resources review under Delegated Authority

Amend Resolution 71/17 establishing positions and resolutions allocating classes to the Basic / Exempt salary schedule.

Effective: ☐ Day following Board Action.
☐ 02-01-2022

(for) Director of Human Resources — Date

COUNTY ADMINISTRATOR RECOMMENDATION: DATE 1/13/2022

☐ Approve Recommendation of Director of Human Resources
☐ Disapprove Recommendation of Director of Human Resources
☒ Other: Approve as recommended by the department.

Enid Mendoza

(for) County Administrator

BOARD OF SUPERVISORS ACTION:
Adjustment is APPROVED ☒ ~~DISAPPROVED ☐~~

Monica Nino, Clerk of the Board of Supervisors and County Administrator

DATE 01-18-2022 BY _____

APPROVAL OF THIS ADJUSTMENT CONSTITUTES A PERSONNEL / SALARY RESOLUTION AMENDMENT

POSITION ADJUSTMENT ACTION TO BE COMPLETED BY HUMAN RESOURCES DEPARTMENT FOLLOWING BOARD ACTION
Adjust class(es) / position(s) as follows:

P300 (M347) Rev 3/15/01

Attachment to Position Adjustment No. 25879

Classification	Class Code	No. of Positions	Position Hours	Total FTE	Salary Plan and Grade
Registered Nurse	VWXG	12	32/40	9.6	L32-1880 ($10,398 - $12,986)
Registered Nurse	VWXG	15	24/40	9.0	L32-1880 ($10,398 - $12,986)
Charge Nurse	VWTF	3	40/40	3.0	L35-1883 ($12,066 - $15,069)
Certified Nursing Assistant	VTWA	6	32/40	4.8	TA5-0906 ($3,323 - $4,039)
Certified Nursing Assistant	VTWA	6	24/40	3.6	TA5-0906 ($3,323 - $4,039)
Licensed Vocational Nurse	VT7G	3	32/40	2.4	TAX-1287 ($4,833 - $6,172)
Licensed Vocational Nurse	VT7G	3	24/40	1.8	TAX-1287 ($4,833 - $6,172)
Clinical Lab Scientist II	VHVD	1	24/40	0.6	TC5-1809 ($8,531 - $10,370)
Diagnostic Imaging Technician II	V8VE	1	24/40	0.6	TC5-1738 ($8,323 - $10,116)
MH Specialist II	VQVA	1	40/40	1.0	TC2-1284 ($4,978 - $7,033)
ISW - Generalist	1KVD	2	40/40	2.0	TB5-0922 ($3,376 - $4,104)
ISW - Generalist	1KVD	3	32/40	2.4	TB5-0922 ($3,376 - $4,104)
ISW - Generalist	1KVD	3	24/40	1.8	TB5-0922 ($3,376 - $4,104)
Lab Tech II	VJVA	1	24/40	0.6	TC5-1095 ($4,007 - $4,870)
Mental Health Clinical Specialist	VQSB	2	40/40	2.0	TC2-1384 ($5,496 - $8,158)
Mental Health Clinical Specialist	VQSB	1	24/40	0.6	TC2-1384 ($5,496 - $8,158)
Dietitian	1KSA	1	40/40	1.0	TC5-1376 ($5,292 - $6,433)
Occupational Therapist II	V5VH	2	40/40	2.0	TC5-1746 ($7,634 - $9,279)
Therapy Assistant	V5WF	2	40/40	2.0	TC5-1435 ($5,611 - $6,820)
Pharm Tech	VY9B	1	40/40	1.0	TC5-1065 ($4,668 - $5,673)
Pharmacist II	VYTA	1	40/40	1.0	TC5-1964 ($11,367 - $14,508)
Clerk-Senior	JWXC	3	40/40	3.0	3RX-1033 ($3,759 - $4,800)
TOTALS		**73**		**35.0**	

Attachment to Position Adjustment No. 25879

Classification	Class Code	No. of Positions	Position Hours	Total FTE	Salary Plan and Grade
Registered Nurse	VWXG	12	32/40	9.6	L32-1880 ($10,398 - $12,986)
Registered Nurse	VWXG	15	24/40	9.0	L32-1880 ($10,398 - $12,986)
Charge Nurse	VWTF	3	40/40	3.0	L35-1883 ($12,066 - $15,069)
Certified Nursing Assistant	VTWA	6	32/40	4.8	TA5-0906 ($3,323 - $4,039)
Certified Nursing Assistant	VTWA	6	24/40	3.6	TA5-0906 ($3,323 - $4,039)
Licensed Vocational Nurse	VT7G	3	32/40	2.4	TAX-1287 ($4,833 - $6,172)
Licensed Vocational Nurse	VT7G	3	24/40	1.8	TAX-1287 ($4,833 - $6,172)
Clinical Lab Scientist II	VHVD	1	24/40	0.6	TC5-1809 ($8,531 - $10,370)
Diagnostic Imaging Technician II	V8VE	1	24/40	0.6	TC5-1738 ($8,323 - $10,116)
MH Specialist II	VQVA	1	40/40	1.0	TC2-1284 ($4,978 - $7,033)
ISW - Generalist	1KVD	2	40/40	2.0	TB5-0922 ($3,376 - $4,104)
ISW - Generalist	1KVD	3	32/40	2.4	TB5-0922 ($3,376 - $4,104)
ISW - Generalist	1KVD	3	24/40	1.8	TB5-0922 ($3,376 - $4,104)
Lab Tech II	VJVA	1	24/40	0.6	TC5-1095 ($4,007 - $4,870)
Mental Health Clinical Specialist	VQSB	2	40/40	2.0	TC2-1384 ($5,496 - $8,158)
Mental Health Clinical Specialist	VQSB	1	24/40	0.6	TC2-1384 ($5,496 - $8,158)
Dietitian	1KSA	1	40/40	1.0	TC5-1376 ($5,292 - $6,433)
Occupational Therapist II	V5VH	2	40/40	2.0	TC5-1746 ($7,634 - $9,279)
Therapy Assistant	V5WF	2	40/40	2.0	TC5-1435 ($5,611 - $6,820)
Pharm Tech	VY9B	1	40/40	1.0	TC5-1065 ($4,668 - $5,673)
Pharmacist II	VYTA	1	40/40	1.0	TC5-1964 ($11,367 - $14,508)
Clerk-Senior	JWXC	3	40/40	3.0	3RX-1033 ($3,759 - $4,800)
TOTALS		**73**		**35.0**	

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Authorization to Participate in the No Place Like Home Program/Competitive

RECOMMENDATION(S):

1. ADOPT Resolution No. 2022/11 authorizing the Health Services Department Director to apply for and accept loan funds from the State of California's No Place Like Home Program (NPLH)/Competitive Allocation, Round 4, as a joint applicant with a Resources for Community Development (RCD), as development sponsor, for a loan in an amount not to exceed $20 million to fund a portion of an affordable permanent supportive housing project on Ygnacio Valley Road in Walnut Creek for persons with a serious mental illness who are homeless, chronically homeless or at-risk of chronic homelessness, including:

a. Authorizing the Department of Health Services Director (HSD) to apply for and accept NPLH funds with the affordable housing developer, Resources for Community Development, as a joint applicant (the "Development Sponsor") and execute documents necessary to accept the funds;

b. Acknowledging that the County and/or the Development Sponsor will be subject to the terms and conditions included in the Standard Agreement to be entered into with the State pursuant to Government Code section 15463, Part 3.9 of Division 5 of the Welfare and Institutions Code, and Welfare and Institutions Code section 5890; and

c. Authorizing a commitment by the Health Services Department to make mental health supportive services available to the project's NPLH tenants for at least twenty years.

2. ADOPT Resolution No. 2022/34 authorizing the Health Services Department Director to apply for and accept loan funds from the State of California's No Place Like Home Program (NPLH)/Competitive Allocation, Round 4, as a joint applicant with Community Housing Development Corporation, as a development sponsor, for a loan in an amount not to exceed $20 million to fund a portion of an affordable permanent supportive housing project on Fred Jackson Way in Richmond for persons with a serious mental illness who are homeless, chronically homeless or at-risk of chronic homelessness, including:

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

Contact: Suzanne Tavano, Ph.D., 925-957-5201

By: Antonia Welty, Deputy

cc: Marcy Wilhelm, Adam Down

RECOMMENDATION(S): (CONT'D)

a. Authorizing the Department of Health Services Director (HSD) to apply for and accept NPLH funds with the affordable housing developer Community Housing Development Corporation, as a joint applicant (the "Development Sponsor") and execute documents necessary to accept the funds;

b. Acknowledging that the County and/or the Development Sponsor will be subject to the terms and conditions included in the Standard Agreement to be entered into with the State pursuant to Government Code section 15463, Part 3.9 of Division 5 of the Welfare and Institutions Code, and Welfare and Institutions Code section 5890; and

c. Authorizing a commitment by the Health Services Department to make mental health supportive services available to the project's NPLH tenants for at least twenty years.

FISCAL IMPACT:

The NPLH Competitive Allocation funds will be loaned directly to the Development Sponsors and secured by a Deed of Trust on the development property. The cost of providing mental health supportive services will be covered by existing Mental Health Services Act funds allocated to HSD.

BACKGROUND:

On September 18, 2018, the Board of Supervisors approved an advocacy position for Proposition 2 that authorized the issuance of bonds to fund existing housing programs for individuals with mental illness. The proposition was passed by voters on November 6, 2018. The proceeds of the Proposition 2 bond issuance are designated for the NPLH program to be provided as deferred payment loans for the development of permanent supportive housing for persons with a serious mental illness who are homeless, chronically homeless or at-risk of chronic homelessness. NPLH funds are administered by the California Department of Housing and Community Development (HCD) in two tranches:

1. Noncompetitive Allocation Funds - Funding available on an "over the counter" basis to specific cities and counties throughout the State. Contra Costa's allocation is $2,231,571. The County made its selection as part of the Round 3 Request for Proposals and Noncompetitive Allocation has been awarded by HCD to the selected bidder.

2. Competitive Allocation Funds - Funding available on a competitive per-project allocation basis. These funds will be available through four Notice of Funding Availability rounds with the current Round 4 being the last of the expected competitive rounds. The County may apply independently or with a development sponsor. Applications for the fourth round are due on January 19, 2022.
The funds may be used to acquire, design, construct, rehabilitate, or preserve permanent supportive housing, which may include a capitalized operating subsidy reserve.

The Development Sponsor will be the borrower of record for the loan; however the County will also be a party to documents associated with the application for and award of NPLH funds for the purpose of providing the supportive services. The maximum loan amount per project is $20,000,000 and the loan will be secured by a Deed of Trust on the project property. As a joint sponsor, the County shall be jointly and severally liable for all obligations of the Development Sponsor as set forth in the Standard Agreement.

HSD will work jointly with the Development Sponsor to apply to HCD for an allocation of NPLH competitive funds for one or more projects. Staff will review project applications for compliance with threshold requirements, development feasibility, competitiveness and eligibility, and participate on behalf of the County in the financing transaction. The Behavioral Health Services Division of HSD, in cooperation with the Development Sponsor, will write the project specific Supportive Services Plan that is included with the application, and enter into a Memorandum of Understanding for the county's 20-year commitment of mental health supportive services of the project's NPLH tenants. HCD will monitor the project for ongoing compliance.

The two projects are known as 699 YVR on Ygnacio Valley Road in Walnut Creek with Resources for Community Development (RCD) and Legacy Court on Fred Jackson Way in Richmond with Community Housing Development Corporation (CHDC) and Eden Housing.

CONSEQUENCE OF NEGATIVE ACTION:

If not approved, the County’s ability to secure permanent supportive housing for persons with a serious mental illness who are Homeless, Chronically Homeless or At-Risk of Chronic Homelessness will be diminished.

AGENDA ATTACHMENTS

Resolution 2022/11

Resolution No. 2022/34

MINUTES ATTACHMENTS

Signed Resolution No. 2022/11

Signed Resolution No. 2022/34

THE BOARD OF SUPERVISORS OF CONTRA COSTA COUNTY, CALIFORNIA

and for Special Districts, Agencies and Authorities Governed by the Board

Adopted this Resolution on 01/18/2022 by the following vote:

AYE:	5	**John Gioia** **Candace Andersen** **Diane Burgis** **Karen Mitchoff** **Federal D. Glover**
NO:		
ABSENT:		
ABSTAIN:		
RECUSE:		

Resolution No. 2022/11

IN THE MATTER OF: AUTHORIZATION TO PARTICIPATE IN THE NO PLACE LIKE HOME PROGRAM

WHEREAS, the State of California, Department of Housing and Community Development ("Department") issued a Notice of Funding Availability for Round 4 funds dated October 29, 2021, as may be amended from time to time, ("NOFA"), under the No Place Like Home Program ("NPLH" or "Program") authorized by Government Code section 15463, Part 3.9 of Division 5 (commencing with Section 5849.1) of the Welfare and Institutions Code, and Welfare and Institutions Code section 5890; WHEREAS, the NOFA relates to the availability of a minimum of $486 million in Competitive Allocation funds under the NPLH Program; and WHEREAS, the County of Contra Costa is a County and an Applicant ("County"), as those terms are defined in the NPLH Program Guidelines, enacted in 2020 ("Guidelines").

NOW, THEREFORE, BE IT RESOLVED: That County is hereby authorized and directed to apply for and if awarded, accept funds from the NPLH Program not to exceed $20,000,000 ("NPLH Loan"). That Anna Roth, Director of Health Services, or her designee, is hereby authorized and directed to act on behalf of County in connection with an award of the NPLH Loan, and to enter into, execute, and deliver any and all documents required or deemed necessary or appropriate to evidence the NPLH Loan, the County's obligations related thereto, and the Department's security therefore. These documents may include, but are not limited to, a State of California Standard Agreement ("Standard Agreement"), a regulatory agreement, a promissory note, a deed of trust and security agreement, a capitalized operating subsidy reserve agreement and any and all other documents required or deemed necessary or appropriate by the Department as security for, evidence of, or pertaining to the NPLH Loan, and all amendments thereto (collectively, the "NPLH Program Documents"). That County shall be subject to the terms and conditions that are specified in the Standard Agreement; that the application in full is incorporated as part of the Standard Agreement; that any and all activities funded, information provided, and timelines represented in the application are enforceable through the Standard Agreement; and that County will use the NPLH Loan in accordance with the Guidelines, other applicable rules and laws, the NPLH Program Documents, and any and all NPLH Program requirements. That County will make mental health supportive services available to each project's NPLH tenants for at least 20 years and will coordinate the provision of or referral to other services (including, but not limited to, substance use services) in accordance with the County's relevant supportive services plan, and as specified in Section 202 of the Guidelines.

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

Contact: Suzanne Tavano, Ph.D., 925-957-5201

cc: Marcy Wilhelm, Adam Down

THE BOARD OF SUPERVISORS OF CONTRA COSTA COUNTY, CALIFORNIA

and for Special Districts, Agencies and Authorities Governed by the Board

Adopted this Resolution on 01/18/2022 by the following vote:

AYE:	5	**John Gioia** **Candace Andersen** **Diane Burgis** **Karen Mitchoff** **Federal D. Glover**
NO:	0	
ABSENT:	0	
ABSTAIN:	0	
RECUSE:	0	

Resolution No. 2022/11

IN THE MATTER OF: AUTHORIZATION TO PARTICIPATE IN THE NO PLACE LIKE HOME PROGRAM

WHEREAS, the State of California, Department of Housing and Community Development ("Department") issued a Notice of Funding Availability for Round 4 funds dated October 29, 2021, as may be amended from time to time, ("NOFA"), under the No Place Like Home Program ("NPLH" or "Program") authorized by Government Code section 15463, Part 3.9 of Division 5 (commencing with Section 5849.1) of the Welfare and Institutions Code, and Welfare and Institutions Code section 5890; WHEREAS, the NOFA relates to the availability of a minimum of $486 million in Competitive Allocation funds under the NPLH Program; and WHEREAS, the County of Contra Costa is a County and an Applicant ("County"), as those terms are defined in the NPLH Program Guidelines, enacted in 2020 ("Guidelines").

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ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

Contact: Suzanne Tavano, Ph.D., 925-957-5201

cc: Marcy Wilhelm, Adam Down

THE BOARD OF SUPERVISORS OF CONTRA COSTA COUNTY, CALIFORNIA

and for Special Districts, Agencies and Authorities Governed by the Board

Adopted this Resolution on 01/18/2022 by the following vote:

AYE:

NO:

ABSENT:

ABSTAIN:

RECUSE:

Resolution No. 2022/34

IN THE MATTER OF: AUTHORIZATION TO PARTICIPATE IN THE NO PLACE LIKE HOME PROGRAM

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I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: , Deputy

Contact: Suzanne Tavano, Ph.D., 925-957-5201

cc: Marcy Wilhelm, Adam Down

THE BOARD OF SUPERVISORS OF CONTRA COSTA COUNTY, CALIFORNIA

and for Special Districts, Agencies and Authorities Governed by the Board

Adopted this Resolution on 01/18/2022 by the following vote:

AYE:	5	John Gioia, Candace Andersen, Diane Burgis, Karen Mitchoff, Federal Glover
NO:	0	
ABSENT:	0	
ABSTAIN:	0	
RECUSE:	0	

Resolution No. 2022/34

IN THE MATTER OF: AUTHORIZATION TO PARTICIPATE IN THE NO PLACE LIKE HOME PROGRAM

WHEREAS, the State of California, Department of Housing and Community Development ("Department") issued a Notice of Funding Availability for Round 4 funds dated October 29, 2021, as may be amended from time to time, ("NOFA"), under the No Place Like Home Program ("NPLH" or "Program") authorized by Government Code section 15463, Part 3.9 of Division 5 (commencing with Section 5849.1) of the Welfare and Institutions Code, and Welfare and Institutions Code section 5890; WHEREAS, the NOFA relates to the availability of a minimum of $486 million in Competitive Allocation funds under the NPLH Program; and WHEREAS, the County of Contra Costa is a County and an Applicant ("County"), as those terms are defined in the NPLH Program Guidelines, enacted in 2020 ("Guidelines").

NOW, THEREFORE, BE IT RESOLVED: That County is hereby authorized and directed to apply for and if awarded, accept funds from the NPLH Program not to exceed $20,000,000 ("NPLH Loan"). That Anna Roth, Director of Health Services, or her designee, is hereby authorized and directed to act on behalf of County in connection with an award of the NPLH Loan, and to enter into, execute, and deliver any and all documents required or deemed necessary or appropriate to evidence the NPLH Loan, the County's obligations related thereto, and the Department's security therefore. These documents may include, but are not limited to, a State of California Standard Agreement ("Standard Agreement"), a regulatory agreement, a promissory note, a deed of trust and security agreement, a capitalized operating subsidy reserve agreement and any and all other documents required or deemed necessary or appropriate by the Department as security for, evidence of, or pertaining to the NPLH Loan, and all amendments thereto (collectively, the "NPLH Program Documents"). That County shall be subject to the terms and conditions that are specified in the Standard Agreement; that the application in full is incorporated as part of the Standard Agreement; that any and all activities funded, information provided, and timelines represented in the application are enforceable through the Standard Agreement; and that County will use the NPLH Loan in accordance with the Guidelines, other applicable rules and laws, the NPLH Program Documents, and any and all NPLH Program requirements. That County will make mental health supportive services available to each project's NPLH tenants for at least 20 years and will coordinate the provision of or referral to other services (including, but not limited to, substance use services) in accordance with the County's relevant supportive services plan, and as specified in Section 202 of the Guidelines.

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McCleen, Deputy

Contact: Suzanne Tavano, Ph.D., 925-957-5201

cc: Marcy Wilhelm, Adam Down

Contra Costa County

To: Board of Supervisors

From: Kathy Gallagher, Employment & Human Services Director

Date: January 18, 2022

Subject: Continued Funding Application for FY 2022-23 for General Childcare and Development Program, CalWORKs Stage 2, and Alternative Payment Program

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Employment and Human Services Director, or designee, to execute the Continued Funding Application (CFA) with the California Department of Social Services (CDSS) for General Child Care and Development Program, CalWORKs Stage 2, and California Alternative Payment Program for Fiscal Year 2022-23.

FISCAL IMPACT:
The Board Order will authorize the EHSD Director, or designee, to execute the CFA on behalf of the County to be considered for continued funding from the California Department of Social Services for Fiscal Year 2022-23. The intent of the CFA is to notify the CDSS of the County's interest to continue to receive the funding.

The anticipated award amount was not listed in the application.

County contract numbers:
39-801 for General Child Care and Development Program;
29-212 for California Alternative Payment Program;
29-213 for CalWORKs Stage 2.

- [x] APPROVE
- [ ] OTHER
- [ ] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

Contact: Noppol Keeratiyakul (925) 608-4961

By: Antonia Welty, Deputy

cc: Nelly Ige, Nancy Sparks, Ali Vahidizadeh, Theodore Trinh

BACKGROUND:

In accordance with Senate Bill (SB) 98 (Chapter 24, Statutes of 2020), effective July 1, 2021, the following programs transferred from the California Department of Education to the California Department of Social Services: General Child Care and Development Program, CalWORKs Stage 2, California Alternative Payment Program.

California Code of Regulations, Title 5 (5 *CCR*), Division 1, Chapter 19, Subchapter 1, Article 5, Section 18010 (d) states, "contractors that intend to accept the offer to continue services in the subsequent contract period shall respond to a Continued Funding Application (CFA) request from the Child Development Division in accordance with the instructions and timelines specified in the request." On December 10, 2021, the California Department of Social Services issued Child Care Bulletin 21-23 notifying Executive Officers and Program Directors regarding the Continued Funding Application (CFA) process for Fiscal Year (FY) 2022-23.

As part of the CFA requirements, a Board Order is required if the governing board requires approval prior to application submittal. By authorizing the signature of the Employment and Human Services Director, the application will meet all requirements for submission to execute FY 2022-23 CFA to CDSS.

Approval of this Board Order will allow the continued provision of the General Child Care and Development Program, CalWORKs Stage 2, and Alternative Payment Program services to program eligible children and families.

CONSEQUENCE OF NEGATIVE ACTION:

If not approved, the County will not receive funding to operate General Child Care and Development Program, CalWORKs Stage 2, and California Alternative Payment Program.

CHILDREN'S IMPACT STATEMENT:

This board order supports three of the community outcomes established in the Children's Report Card: 1) "Children Ready for and Succeeding in School"; 3) "Families that are Economically Self-sufficient"; and 4) "Families that are Safe, Stable, and Nurturing" by offering comprehensive services, including high quality early childhood education, nutrition, and health services to low-income children throughout Contra Costa County.

ATTACHMENTS

Continued Funding Application Fiscal Year 2022-23

CONTINUED FUNDING APPLICATION FISCAL YEAR 2022-23

Contractor Name: Contra Costa County Employment and Human Services Department

Vendor Number: 2207

County: 07 Contra Costa

Contractors who wish to be considered for continued funding for Fiscal Year (FY) 2022-23 must read the accompanying instructions and fully and accurately complete this application for continued funding. Please note that contractors have no vested right to a subsequent contract. Failure to respond to this application by the noted due date shall constitute notice to the Child Care and Development Division (CCDD) of the intent to discontinue services at the end of the current contract year unless the contractor has received a written notice of extension of time from the CCDD. If this application is returned to the CCDD by the noted due date, but is not fully and accurately completed, funding for FY 2022-23, if awarded, may be delayed. Completion of this Continued Funding Application (CFA) does not guarantee a renewal of funding. Any contractors who are approved for continued funding will be expected to execute a contract with the California Department of Social Services (CDSS) and comply with all applicable federal and state laws as well as all Funding Terms and Conditions and applicable Program Requirements incorporated into the contract. Please contact your Program Quality and Improvement (PQI) Assigned Consultant if your agency does not intend to continue services. PQI Assigned Consultants may be contacted at the information on the CDSS Child Care and Development Contractor Landing web page. Please note that PQI Assigned Consultant assignments may have changed from previous fiscal years.

Instructions may be accessed on the Child Care and Development CFA Webpage.

Contractor Name: Contra Costa County Employment and Human Services Department

Vendor Number: 2207

County: 07 Contra Costa

Section I – Contractor Information	
Legal Name of Contractor:	Contra Costa County Employment and Human Services Department
Contractor "Doing Business As" (DBA):	
Headquartered County:	07 Contra Costa
Vendor Number:	2207
Executive Director Name:	Kathy Gallagher
Executive Director Telephone Number:	925-608-4801
Executive Director Email Address:	kgallagher@ehsd.cccounty.us
Program Director Name:	Amy Wells
Program Director Telephone Number:	(925) 405-7771
Program Director Email Address:	awells@ehsd.cccounty.us
Legal Business Address:	40 Doughlas
City:	Martinez
Zip Code:	94553
Mailing Address (if different from above):	1470 Civic Court, Suite 200
City:	Concord
Zip Code:	94520
Name of Person Completing Application:	Nelly Ige
Title of Contact Person Completing Application:	Administrative Services Assistant III
Contact Person Telephone Number:	(925) 681-6334
Contact Person Email Address:	nescobar@ehsd.cccounty.us

Contractor Name: Contra Costa County Employment and Human Services Department

Vendor Number: 2207

County: 07 Contra Costa

Section II – Contract Types	
Check all applicable boxes indicating the programs the contractor intends to continue to administer for FY 2022-23. The contractor agrees to continue implementation of these programs with funds provided by the CDSS.	
Center-Based Programs	**Alternative Payment Programs**
☑ General Child Care and Development (CCTR)	☑ Alternative Payment Program (CAPP)
☑ Infant/Toddler	☑ CalWORKs Stage 2 (C2AP)
☐ School-age	☐ CalWORKs Stage 3 (C3AP)
☐ Program for Special Needs (Handicapped) Children (CHAN)	☐ Migrant Alternative Payment (CMAP)
	Resource and Referral Programs
☐ Migrant Center-Based (CMIG) and Migrant Special Services (CMSS)	☐ Resource and Referral (CRRP)
	Family Child Care Home Programs
	☐ Family Child Care Home Education Network (CFCC)

For informational purposes only, please indicate if your agency has one of the following programs:

☑ CalWORKs Stage 1

☑ Child Care Bridge Program

Contractor Name: Contra Costa County Employment and Human Services Department

Vendor Number: 2207

County: 07 Contra Costa

Section III – Contractor's Officers and Board of Directors Information	
Does the contractor have a board of directors?	☑ Yes ☐ No
If no, please explain the entity type and the governance structure (i.e., number of owners and partnership):	
Have any of the listed officers, board members, owners or other governing individuals ever served as an officer, board member, owner or governing individual with an agency that received state or federal funding and which agency funding was terminated or involuntarily non-renewed, or the agency was debarred from funding for any period of time? ☐ Yes ☑ No If yes, list the officer(s), board member(s), owner(s) or other governing individual(s) to which this applies and include the former agency(ies) with which the individual(s) was/were previously affiliated and the circumstances leading to the termination, involuntary non-renewal or debarment.	

Contractor Name: Contra Costa County Employment and Human Services Department

Vendor Number: 2207

County: 07 Contra Costa

Section III – Contractor's Officers and Board of Directors Information (Continued)	
List all officers and board members/governing individuals (i.e., owner, director, etc.). Attach additional sheets as necessary.	
1. Officer, Board Member, Owner or Governing Individual	
Name: Candace Anderson	Title: Board of Supervisors
Telephone Number: (925) 957-8860	Email Address: supervisoranderson@bos.cccounty.us
Address: 309 Diablo Road, Danville, CA 94526	
2. Officer, Board Member, Owner or Governing Individual	
Name: Diane Burgis	Title: Board of Supervisors
Telephone Number: (925) 252-4500	Email Address: supervisor_burgis@bos.cccounty.us
Address: 3361 Walnut Boulevard, Suite 140 Brentwood, CA 94513	
3. Officer, Board Member, Owner or Governing Individual	
Name: John M. Gioia	Title: Board of Supervisors
Telephone Number: (510) 231-8686	Email Address: john.gioia@bos.cccounty.us
Address: 11780 San Pablo Avenue, Suite D El Cerrito, CA 94530	
4. Officer, Board Member, Owner or Governing Individual	
Name: Federal D. Glover	Title: Board of Supervisors
Telephone Number: (925) 608-4200	Email Address: district5@bos.cccounty.us
Address: 190 E. 4th Street, Pittsburg, CA 94565	

Contractor Name: Contra Costa County Employment and Human Services Department

Vendor Number: 2207

County: 07 Contra Costa

Section III – Contractor's Officers and Board of Directors Information (Continued)	
List all officers and board members/governing individuals (i.e., owner, director, etc.). Attach additional sheets as necessary.	
1. Officer, Board Member, Owner or Governing Individual	
Name: Karen Mitchoff	Title: Board of Supervisors
Telephone Number: (925) 521-7100	Email Address: Supervisormitchoff@bos.cccounty.us
Address: 2151 Salvio St, Suite R, Concord, CA 94520	
2. Officer, Board Member, Owner or Governing Individual	
Name:	Title:
Telephone Number:	Email Address:
Address:	
3. Officer, Board Member, Owner or Governing Individual	
Name:	Title:
Telephone Number:	Email Address:
Address:	
4. Officer, Board Member, Owner or Governing Individual	
Name:	Title:
Telephone Number:	Email Address:
Address:	

Contractor Name: Contra Costa County Employment and Human Services Department

Vendor Number: 2207

County: 07 Contra Costa

Section IV – Subcontractor Certification
A. The following types of contracts do not have subcontractors (check all that apply): ☑ Alternative Payment Programs (C2AP, C3AP, CAPP, CMAP) ☐ General Child Care and Development (CCTR) ☐ Program for Special Needs (Handicapped) Children (CHAN) ☐ Migrant Center-Based (CMIG)
B. The following types of contracts do have subcontractors (check all that apply). For each contract type selected, submit a separate form CCD 30B. The form is available on the CFA web page. ☐ Alternative Payment Programs (C2AP, C3AP, CAPP, CMAP) ☑ General Child Care and Development (CCTR) ☐ Program for Special Needs (Handicapped) Children (CHAN) ☐ Migrant Center-Based (CMIG)

Signature of Contractor's Authorized Representative:	
Printed Name and Title of Contractor's Authorized Representative:	Kathy Gallagher, Executive Director
Date of Signature:	
Authorized Representative's Telephone Number:	(925) 608-4801
Authorized Representative's Email Address:	kgallagher@ehsd.cccounty.us

Contractor Name: Contra Costa County Employment and Human Services Department

Vendor Number: 2207

County: 07 Contra Costa

Section V – Contractor Certifications

INSTRUCTIONS: Please indicate "Yes" or "No" to the following as they apply to your agency. By providing a signature at the end of this section, the signer certifies and understands the following:

Personnel Certification

Applies only to agencies who are Center-Based Programs and Family Child Care Home Education Networks.

The State of California requires any contractor receiving child care and development funds, disbursed by the CDSS to employ fully qualified personnel as stipulated in California Education Code (EC); California Code of Regulations, Title 5 (5 CCR); and Funding Terms and Conditions.

I certify, as the authorized agent representing this contractor, that I have read and understand the staffing requirements for Program Director, Site Supervisor, and Teacher as stipulated in Welfare and Institution Code (WIC), EC, 5 CCR, and Funding Terms and Conditions. All child care staff employed in CDSS funded program(s) are fully qualified for their respective positions. The exception to this certification is a person employed as Program Director or Site Supervisor who possesses a current Staffing Qualifications Waiver approved by the CCDD.

I am a Center-Based Program or a Family Child Care Home Education Network.

☑ YES ☐ NO

Contractors with Subcontracts

Applies only to agencies with subcontracts.

I certify that the contractual arrangement(s) listed in Section IV – Subcontract Certification are made in adherence to the required subcontract provisions contained in the 5 CCR, and the Funding Terms and Conditions.

I understand that signing this certificate does not lessen the legal responsibility for the child care and development service contract requirements. As the contractor, it is my responsibility to monitor the performance of the subcontractor to ensure services are provided appropriately through the entire contract term.

I understand the subcontracting requirements, including competitive bidding, CDSS approval, and audit requirements in 5 CCR section 18026 et. seq.

I subcontract part of my subsidized funding.

☑ YES ☐ NO

Contractor Name: Contra Costa County Employment and Human Services Department

Vendor Number: 2207

County: 07 Contra Costa

Board of Directors

Applies only to agencies with a Board of Directors.

I am authorized by the Contractor's Board of Directors or other governing authority to execute this CFA.

On behalf of the Contractor and its governing authority, we understand some information requested in this application is intended for use by CDSS auditors in connection with future audit work and performance reviews and may not be used or even reviewed or considered by the CDSS until well after the contract has expired, if ever. Therefore, we further understand that the information (and any underlying transactions) disclosed by this Application shall not be considered properly noticed to the CDSS nor approved, accepted or authorized by the CDSS, even if our request for continued funding by the CDSS is subsequently approved.

The governing board members have been trained in understanding conflict of interest requirements associated with their positions on the board and have reported all known conflicts of interest.

I have a board of directors or other governing authority to execute this CFA.

☑ YES ☐ NO

Program and Fiscal Operations

Applies to all applying agencies.

I have supervisory authority over the child development program, have actual, personal knowledge of the information provided in this Application and certify that it is true and correct in all material respects.

I am familiar with and will ensure that the Contractor complies with all applicable program statutes and regulations, including:

- Prohibitions on conflicts of interests, including (i) the assurances required to establish that transactions with officers, directors and other related party transactions are conducted at arm's length, and (ii) employment limitations stated in WIC 10399.
- Cost reimbursement requirements, including reimbursable and non-reimbursable costs, documentation requirements, the provisions for determining the reimbursable amount and other provisions in 5 CCR section 18033 et. seq.
- Accounting and reporting requirements in 5 CCR section 18063 et. seq.
- Operational and programmatic requirements.

Contractor Name: Contra Costa County Employment and Human Services Department

Vendor Number: 2207

County: 07 Contra Costa

By providing a signature at the end of this section, I certify that all of the above (pages 7 and 8) is true.

Signature of Contractor's Authorized Representative:	
Printed Name and Title of Contractor's Authorized Representative:	Kathy Gallagher, Executive Director
Date of Signature:	
Authorized Representative's Telephone Number:	(925) 608-4801
Authorized Representative's Email Address:	kgallagher@ehsd.cccounty.us

Contractor Name: Contra Costa County Employment and Human Services Department

Vendor Number: 2207

County: 07 Contra Costa

Section VI – Certification of Contractor Information in the CDMIS

Contractors are required to review all information in the Child Development Management Information System (CDMIS) and update any outdated information. To review the information and submit changes, log on to the CDMIS.

I certify, as the authorized representative of the agency listed below, I have reviewed all the information for Contra Costa County Employment and Human Services Department

(Contractor Name)

and updates, additions, or deletions have been submitted as needed for information in all of the areas below:

- Executive Director/Superintendent information
- Program Director information
- Sites and Licenses and/or Office information
- Family Child Care Home summary information

To the best of my knowledge, the information on the CDMIS Web site reflects accurate information for Contra Costa County Employment and Human Services Department

(Contractor Name)

as of the date this certification was signed.

_____ Date Signed: _____

(Program Director/Authorized Representative Signature)

Kathy Gallagher

(Printed Name of Program Director/Authorized Representative)

For technical assistance with CDMIS, please contact CDMIS@cde.ca.gov.

Contractor Name: Contra Costa County Employment and Human Services Department

Vendor Number: 2207

County: 07 Contra Costa

Section VII – Required Attachments
All attachments must be completed and attached to the application. These attachments are located on the CFA web page.
A. Continued Funding Application Fiscal Year 2022-23 Program Calendar (CCD 33)
B. Payee Data Record (STD. 204) (Non-public agencies only)
C. Secretary of State (Non-public agencies only)
D. Verification of School District Name and Address
E. Subcontract Certification (CCD 30B)

CONTINUED FUNDING APPLICATION PROGRAM CALENDAR FOR FISCAL YEAR 2022-23

CONTRACTOR NAME	VENDOR NUMBER	COUNTY NAME	CONTRACT TYPE
Contra Costa County	2207	Contra Costa	CalWORKs Stage 2 (C

Instructions: Enter an uppercase "X" on each day your program will operate. The totals for "Days of Operation," "Quarter Subtotals," and "Total Days of Operation" will then automatically calculate. Please verify accuracy.

JULY 2022 — DAYS OF OPERATION: 20

S	M	T	W	T	F	S
					1 X	2
3	4	5 X	6 X	7 X	8 X	9
10	11 X	12 X	13 X	14 X	15 X	16
17	18 X	19 X	20 X	21 X	22 X	23
24	25 X	26 X	27 X	28 X	29 X	30
31						

AUGUST 2022 — DAYS OF OPERATION: 23

S	M	T	W	T	F	S
	1 X	2 X	3 X	4 X	5 X	6
7	8 X	9 X	10 X	11 X	12 X	13
14	15 X	16 X	17 X	18 X	19 X	20
21	22 X	23 X	24 X	25 X	26 X	27
28	29 X	30 X	31 X			

SEPTEMBER 2022 — DAYS OF OPERATION: 21

S	M	T	W	T	F	S
				1 X	2 X	3
4	5	6 X	7 X	8 X	9 X	10
11	12 X	13 X	14 X	15 X	16 X	17
18	19 X	20 X	21 X	22 X	23 X	24
25	26 X	27 X	28 X	29 X	30 X	

FIRST QUARTER SUBTOTAL 64

OCTOBER 2022 — DAYS OF OPERATION: 21

S	M	T	W	T	F	S
						1
2	3 X	4 X	5 X	6 X	7 X	8
9	10 X	11 X	12 X	13 X	14 X	15
16	17 X	18 X	19 X	20 X	21 X	22
23	24 X	25 X	26 X	27 X	28 X	29
30	31 X					

NOVEMBER 2022 — DAYS OF OPERATION: 19

S	M	T	W	T	F	S
		1 X	2 X	3 X	4 X	5
6	7 X	8 X	9 X	10 X	11	12
13	14 X	15 X	16 X	17 X	18 X	19
20	21 X	22 X	23 X	24	25	26
27	28 X	29 X	30 X			

DECEMBER 2022 — DAYS OF OPERATION: 21

S	M	T	W	T	F	S
				1 X	2 X	3
4	5 X	6 X	7 X	8 X	9 X	10
11	12 X	13 X	14 X	15 X	16 X	17
18	19 X	20 X	21 X	22 X	23 X	24
25	26	27 X	28 X	29 X	30 X	31

SECOND QUARTER SUBTOTAL 61

JANUARY 2023 — DAYS OF OPERATION: 20

S	M	T	W	T	F	S
1	2	3 X	4 X	5 X	6 X	7
8	9 X	10 X	11 X	12 X	13 X	14
15	16	17 X	18 X	19 X	20 X	21
22	23 X	24 X	25 X	26 X	27 X	28
29	30 X	31 X				

FEBRUARY 2023 — DAYS OF OPERATION: 19

S	M	T	W	T	F	S
			1 X	2 X	3 X	4
5	6 X	7 X	8 X	9 X	10 X	11
12	13 X	14 X	15 X	16 X	17 X	18
19	20	21 X	22 X	23 X	24 X	25
26	27 X	28 X				

MARCH 2023 — DAYS OF OPERATION: 23

S	M	T	W	T	F	S
			1 X	2 X	3 X	4
5	6 X	7 X	8 X	9 X	10 X	11
12	13 X	14 X	15 X	16 X	17 X	18
19	20 X	21 X	22 X	23 X	24 X	25
26	27 X	28 X	29 X	30 X	31 X	

THIRD QUARTER SUBTOTAL 62

APRIL 2023 — DAYS OF OPERATION: 20

S	M	T	W	T	F	S
						1
2	3 X	4 X	5 X	6 X	7 X	8
9	10 X	11 X	12 X	13 X	14 X	15
16	17 X	18 X	19 X	20 X	21 X	22
23	24 X	25 X	26 X	27 X	28 X	29
30						

MAY 2023 — DAYS OF OPERATION: 22

S	M	T	W	T	F	S
	1 X	2 X	3 X	4 X	5 X	6
7	8 X	9 X	10 X	11 X	12 X	13
14	15 X	16 X	17 X	18 X	19 X	20
21	22 X	23 X	24 X	25 X	26 X	27
28	29	30 X	31 X			

JUNE 2023 — DAYS OF OPERATION: 22

S	M	T	W	T	F	S
				1 X	2 X	3
4	5 X	6 X	7 X	8 X	9 X	10
11	12 X	13 X	14 X	15 X	16 X	17
18	19 X	20 X	21 X	22 X	23 X	24
25	26 X	27 X	28 X	29 X	30 X	

FOURTH QUARTER SUBTOTAL 64

TOTAL DAYS OF OPERATION 251

IF THERE ARE CHANGES TO THE MINIMUM DAYS OF OPERATION (MDO), PLEASE EXPLAIN WHY.

CCDD CONSULTANT INITIALS (FOR CDSS USE ONLY)
DATE APPROVED BY CCDD CONSULTANT (FOR CDSS USE ONLY)

CONTINUED FUNDING APPLICATION PROGRAM CALENDAR FOR FISCAL YEAR 2022-23

CONTRACTOR NAME	VENDOR NUMBER	COUNTY NAME	CONTRACT TYPE
Contra Costa County	2207	Contra Costa	Alternative Payment Pr

Instructions: Enter an uppercase "X" on each day your program will operate. The totals for "Days of Operation," "Quarter Subtotals," and "Total Days of Operation" will then automatically calculate. Please verify accuracy.

JULY 2022 — DAYS OF OPERATION: 20

S	M	T	W	T	F	S
					1 X	2
3	4	5 X	6 X	7 X	8 X	9
10	11 X	12 X	13 X	14 X	15 X	16
17	18 X	19 X	20 X	21 X	22 X	23
24	25 X	26 X	27 X	28 X	29 X	30
31						

AUGUST 2022 — DAYS OF OPERATION: 23

S	M	T	W	T	F	S
	1 X	2 X	3 X	4 X	5 X	6
7	8 X	9 X	10 X	11 X	12 X	13
14	15 X	16 X	17 X	18 X	19 X	20
21	22 X	23 X	24 X	25 X	26 X	27
28	29 X	30 X	31 X			

SEPTEMBER 2022 — DAYS OF OPERATION: 21

S	M	T	W	T	F	S
				1 X	2 X	3
4	5	6 X	7 X	8 X	9 X	10
11	12 X	13 X	14 X	15 X	16 X	17
18	19 X	20 X	21 X	22 X	23 X	24
25	26 X	27 X	28 X	29 X	30 X	

FIRST QUARTER SUBTOTAL 64

OCTOBER 2022 — DAYS OF OPERATION: 21

S	M	T	W	T	F	S
						1
2	3 X	4 X	5 X	6 X	7 X	8
9	10 X	11 X	12 X	13 X	14 X	15
16	17 X	18 X	19 X	20 X	21 X	22
23	24 X	25 X	26 X	27 X	28 X	29
30	31 X					

NOVEMBER 2022 — DAYS OF OPERATION: 19

S	M	T	W	T	F	S
		1 X	2 X	3 X	4 X	5
6	7 X	8 X	9 X	10 X	11	12
13	14 X	15 X	16 X	17 X	18 X	19
20	21 X	22 X	23 X	24	25	26
27	28 X	29 X	30 X			

DECEMBER 2022 — DAYS OF OPERATION: 21

S	M	T	W	T	F	S
				1 X	2 X	3
4	5 X	6 X	7 X	8 X	9 X	10
11	12 X	13 X	14 X	15 X	16 X	17
18	19 X	20 X	21 X	22 X	23 X	24
25	26	27 X	28 X	29 X	30 X	31

SECOND QUARTER SUBTOTAL 61

JANUARY 2023 — DAYS OF OPERATION: 20

S	M	T	W	T	F	S
1	2	3 X	4 X	5 X	6 X	7
8	9 X	10 X	11 X	12 X	13 X	14
15	16	17 X	18 X	19 X	20 X	21
22	23 X	24 X	25 X	26 X	27 X	28
29	30 X	31 X				

FEBRUARY 2023 — DAYS OF OPERATION: 19

S	M	T	W	T	F	S
			1 X	2 X	3 X	4
5	6 X	7 X	8 X	9 X	10 X	11
12	13 X	14 X	15 X	16 X	17 X	18
19	20	21 X	22 X	23 X	24 X	25
26	27 X	28 X				

MARCH 2023 — DAYS OF OPERATION: 23

S	M	T	W	T	F	S
			1 X	2 X	3 X	4
5	6 X	7 X	8 X	9 X	10 X	11
12	13 X	14 X	15 X	16 X	17 X	18
19	20 X	21 X	22 X	23 X	24 X	25
26	27 X	28 X	29 X	30 X	31 X	

THIRD QUARTER SUBTOTAL 62

APRIL 2023 — DAYS OF OPERATION: 20

S	M	T	W	T	F	S
						1
2	3 X	4 X	5 X	6 X	7 X	8
9	10 X	11 X	12 X	13 X	14 X	15
16	17 X	18 X	19 X	20 X	21 X	22
23	24 X	25 X	26 X	27 X	28 X	29
30						

MAY 2023 — DAYS OF OPERATION: 22

S	M	T	W	T	F	S
	1 X	2 X	3 X	4 X	5 X	6
7	8 X	9 X	10 X	11 X	12 X	13
14	15 X	16 X	17 X	18 X	19 X	20
21	22 X	23 X	24 X	25 X	26 X	27
28	29	30 X	31 X			

JUNE 2023 — DAYS OF OPERATION: 22

S	M	T	W	T	F	S
				1 X	2 X	3
4	5 X	6 X	7 X	8 X	9 X	10
11	12 X	13 X	14 X	15 X	16 X	17
18	19 X	20 X	21 X	22 X	23 X	24
25	26 X	27 X	28 X	29 X	30 X	

FOURTH QUARTER SUBTOTAL 64

TOTAL DAYS OF OPERATION 251

IF THERE ARE CHANGES TO THE MINIMUM DAYS OF OPERATION (MDO), PLEASE EXPLAIN WHY.

CCDD CONSULTANT INITIALS (FOR CDSS USE ONLY)
DATE APPROVED BY CCDD CONSULTANT (FOR CDSS USE ONLY)

CONTINUED FUNDING APPLICATION PROGRAM CALENDAR FOR FISCAL YEAR 2022-23

CONTRACTOR NAME	VENDOR NUMBER	COUNTY NAME	CONTRACT TYPE
Contra Costa County	2207	Contra Costa	California Center-Base

Instructions: Enter an uppercase "X" on each day your program will operate. The totals for "Days of Operation," "Quarter Subtotals," and "Total Days of Operation" will then automatically calculate. Please verify accuracy.

JULY 2022 — DAYS OF OPERATION: 20

S	M	T	W	T	F	S
					1 X	2
3	4	5 X	6 X	7 X	8 X	9
10	11 X	12 X	13 X	14 X	15 X	16
17	18 X	19 X	20 X	21 X	22 X	23
24	25 X	26 X	27 X	28 X	29 X	30
31						

AUGUST 2022 — DAYS OF OPERATION: 23

S	M	T	W	T	F	S
	1 X	2 X	3 X	4 X	5 X	6
7	8 X	9 X	10 X	11 X	12 X	13
14	15 X	16 X	17 X	18 X	19 X	20
21	22 X	23 X	24 X	25 X	26 X	27
28	29 X	30 X	31 X			

SEPTEMBER 2022 — DAYS OF OPERATION: 21

S	M	T	W	T	F	S
				1 X	2 X	3
4	5	6 X	7 X	8 X	9 X	10
11	12 X	13 X	14 X	15 X	16 X	17
18	19 X	20 X	21 X	22 X	23 X	24
25	26 X	27 X	28 X	29 X	30 X	

FIRST QUARTER SUBTOTAL 64

OCTOBER 2022 — DAYS OF OPERATION: 21

S	M	T	W	T	F	S
						1
2	3 X	4 X	5 X	6 X	7 X	8
9	10 X	11 X	12 X	13 X	14 X	15
16	17 X	18 X	19 X	20 X	21 X	22
23	24 X	25 X	26 X	27 X	28 X	29
30	31 X					

NOVEMBER 2022 — DAYS OF OPERATION: 19

S	M	T	W	T	F	S
		1 X	2 X	3 X	4 X	5
6	7 X	8 X	9 X	10 X	11	12
13	14 X	15 X	16 X	17 X	18 X	19
20	21 X	22 X	23 X	24	25	26
27	28 X	29 X	30 X			

DECEMBER 2022 — DAYS OF OPERATION: 21

S	M	T	W	T	F	S
				1 X	2 X	3
4	5 X	6 X	7 X	8 X	9 X	10
11	12 X	13 X	14 X	15 X	16 X	17
18	19 X	20 X	21 X	22 X	23 X	24
25	26	27 X	28 X	29 X	30 X	31

SECOND QUARTER SUBTOTAL 61

JANUARY 2023 — DAYS OF OPERATION: 21

S	M	T	W	T	F	S
1	2	3 X	4 X	5 X	6 X	7
8	9 X	10 X	11 X	12 X	13 X	14
15	16 X	17 X	18 X	19 X	20 X	21
22	23 X	24 X	25 X	26 X	27 X	28
29	30 X	31 X				

FEBRUARY 2023 — DAYS OF OPERATION: 19

S	M	T	W	T	F	S
			1 X	2 X	3 X	4
5	6 X	7 X	8 X	9 X	10 X	11
12	13 X	14 X	15 X	16 X	17 X	18
19	20	21 X	22 X	23 X	24 X	25
26	27 X	28 X				

MARCH 2023 — DAYS OF OPERATION: 23

S	M	T	W	T	F	S
			1 X	2 X	3 X	4
5	6 X	7 X	8 X	9 X	10 X	11
12	13 X	14 X	15 X	16 X	17 X	18
19	20 X	21 X	22 X	23 X	24 X	25
26	27 X	28 X	29 X	30 X	31 X	

THIRD QUARTER SUBTOTAL 63

APRIL 2023 — DAYS OF OPERATION: 20

S	M	T	W	T	F	S
						1
2	3 X	4 X	5 X	6 X	7 X	8
9	10 X	11 X	12 X	13 X	14 X	15
16	17 X	18 X	19 X	20 X	21 X	22
23	24 X	25 X	26 X	27 X	28 X	29
30						

MAY 2023 — DAYS OF OPERATION: 22

S	M	T	W	T	F	S
	1 X	2 X	3 X	4 X	5 X	6
7	8 X	9 X	10 X	11 X	12 X	13
14	15 X	16 X	17 X	18 X	19 X	20
21	22 X	23 X	24 X	25 X	26 X	27
28	29	30 X	31 X			

JUNE 2023 — DAYS OF OPERATION: 22

S	M	T	W	T	F	S
				1 X	2 X	3
4	5 X	6 X	7 X	8 X	9 X	10
11	12 X	13 X	14 X	15 X	16 X	17
18	19 X	20 X	21 X	22 X	23 X	24
25	26 X	27 X	28 X	29 X	30 X	

FOURTH QUARTER SUBTOTAL 64

TOTAL DAYS OF OPERATION 252

IF THERE ARE CHANGES TO THE MINIMUM DAYS OF OPERATION (MDO), PLEASE EXPLAIN WHY.

One of our subcontractors will be open on January 16th, 2023 and therefore total days of operation increased by one compared to FY 2021-2022.

CCDD CONSULTANT INITIALS (FOR CDSS USE ONLY)
DATE APPROVED BY CCDD CONSULTANT (FOR CDSS USE ONLY)

SUBCONTRACT CERTIFICATION

INSTRUCTIONS: Please complete one form per subcontractor.

Contractor Name: Employment and Human Services Depart.

Vendor Number: 2207

County: 07 Contra Costa

Contract Type: California Center-Based (CCTR)

Contract MRA: $3,855,946.00

Total Percentage of MRA Subcontracted: 8.5%

Subcontractor

Subcontractor Legal Name: Kindercare Learning Centers LLC

Does this subcontractor also contract with CCDD? ☐ Yes ☑ No

Site #	Site Name	Site Address	Service County	Percentage of MRA Subcontracted
1.	Kindercare Learning Center	2300 Mahogany Way, Antioch, CA 94509	07 Contra Costa	8%
2.				
3.				
4.				

SUBCONTRACT CERTIFICATION

INSTRUCTIONS: Please complete one form per subcontractor.

Contractor Name: Employment and Human Services Depart.

Vendor Number: 2207

County: 07 Contra Costa

Contract Type: California Center-Based (CCTR)

Contract MRA: $3,855,946.00

Total Percentage of MRA Subcontracted: 8.5%

Subcontractor

Subcontractor Legal Name: Orantes LLC dba Tiny Toes

Does this subcontractor also contract with CCDD? ☐ Yes ☑ No

Site #	Site Name	Site Address	Service County	Percentage of MRA Subcontracted
1.	Tiny Toes	1284 Dainty Avenue, Brentwood, CA 94513	07 Contra Costa	.50
2.				
3.				
4.				

Contractor Name: Contra Costa County Employment and Human Services Department

Vendor Number: 2207

County: 07 Contra Costa

Section VIII – Application Checklist
Sections listed below with the asterisk (*) require a signature.

Section Number*	Section Description	Page Number	Check Box
Section I	Contractor Information	2	☑
Section II	Contract Types	3	☑
Section III	Contractor's Officers and Board of Directors Information	4 & 5	☑
Section IV*	Subcontractor Certification	6	☑
Section V*	Contractor Certifications	7-9	☑
Section VI*	Certification of Contractor Information in the CDMIS Database	10	☑
Section VII A.	Continued Funding Application Fiscal Year 2022-23 Program Calendar (CCD 33) (one for each contract type)	11	☑
Section VII B.*	State of California, Payee Data Record (STD. 204) (non-public agencies only)	11	☐
Section VII C.	Secretary of State search results (non-public agencies only)	11	☐
Section VII D.	Verification of School District Name and Address search	11	☐
Section VII E.	Subcontract Certification (CCD 30B)	Insert after page 6	☑

Contra
Costa
County

To: Board of Supervisors
From: Marc Shorr, Chief Information Officer
Date: January 18, 2022

Subject: APPROVE and AUTHORIZE the Chief Information Officer, Department of Information Technology, to execute an Interagency Agreement with Delta Diablo.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Chief Information Officer, Department of Information Technology, or designee, to execute an Interagency Agreement including indemnification changes with Delta Diablo to pay the County an amount not to exceed $140,000 to provide information technology services for the period of November 17, 2021 through June 30, 2022.

FISCAL IMPACT:
The execution of this agreement will result in revenue for the Department of Information Technology. (100% General Fund)

BACKGROUND:
In November 2021, Delta Diablo's Information Technology Manager resigned leaving a critical void in their staffing. To assist with the operation of their vital information technology systems, the Department of Information Technology (DoIT) was able to begin performing services to ensure uninterrupted services to the district's technology services. DoIT has qualified staff to perform these services and is willing to assist the district until a new IT Manager is hired.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

Contact: Marc Shorr, 608-4071

cc:

CONSEQUENCE OF NEGATIVE ACTION:

If this agreement is not approved, Delta Diablo will be without the necessary staffing to perform critical IT functions and would have a detrimental impact on their services.

CHILDREN'S IMPACT STATEMENT:

Contra Costa County

To: Board of Supervisors

From: Alison McKee, County Librarian

Date: January 18, 2022

Subject: California State Library Grant for English as a Second Language Services for FY 2021 - 2022

RECOMMENDATION(S):
APPROVE and AUTHORIZE the County Librarian, or designee, to apply for and accept California State Library grant funding in the amount not to exceed $20,000 to meet the operational and services expenses required by Project Second Chance, the Contra Costa County Library adult literacy program, to provide English as a Second Language (ESL) services for the period of January 1 to June 30, 2022.

FISCAL IMPACT:
Funds committed to Project Second Chance by the Contra Costa County Library will be matched by the California State Library. For fiscal year 2021/22, the Library has pledged ESL funds currently budgeted in the amount of $26,821 (63% Library fund and 37% California State Library).

BACKGROUND:
Project Second Chance was founded in 1984 with a grant from the California State Library. In 2003, AB 1266 was passed. Article 4.6, Section 18880-18884 of that bill, established the California Library Literacy and English Acquisition Services Program and the formula that determines how local funds, generated by individual library jurisdictions, are matched by the California State Library, using funds legislated specifically for this purpose. The 2021-22 California State Budget included $15 million in supplemental

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Walt Beveridge 925-608-7730

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc:

BACKGROUND: (CONT'D)

funding for ESL services to be awarded by the California State Library through grants to existing California Library Literacy Services programs over a five-year period.

CONSEQUENCE OF NEGATIVE ACTION:

The Library will not receive California State Library funding for English as a Second Language services, reducing the number of community members who can be served.

Contra Costa County

To: Board of Supervisors

From: David O. Livingston, Sheriff-Coroner

Date: January 18, 2022

Subject: 2021 Urban Area Security Initiative Grant

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Sheriff-Coroner, or designee, to execute a contract with the City and County of San Francisco, in an amount not to exceed $634,686 as part of the 2021 U.S. Department of Homeland Security, Urban Area Security Initiative (UASI) Grant for homeland security related projects for the period November 1, 2021 through the end of the grant funding. (100% Federal)

FISCAL IMPACT:
No County Costs. $634,686; 100% 2021 Urban Area Security Initiative Grant from the City and County of San Francisco acting as fiscal agent for the Bay Area Urban Area Security Initiative. (CFDA # 97.067)

BACKGROUND:
The U.S. Department of Homeland Security Urban Area Security Initiative Grant Program funds the unique planning, equipment, training, and exercise needs of high threat, high density urban areas. This grant assists designated regions in building an enhanced and sustainable capacity to prevent, protect against, respond to, and recover from acts of terrorism. California is home to five of these urban areas and the U.S. Department of Homeland Security designated the City and County of San Francisco as the fiscal agent for the Bay Area Urban Area Security Initiative (UASI).

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
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Federal D. Glover, District V Supervisor

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ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

Contact: Chrystine Robbins, 925-655-0008

cc:

BACKGROUND: (CONT'D)

The County, as a member of the Bay Area UASI, will receive $634,686. Funds will be used to enhance public safety capabilities of law enforcement agencies throughout the region by aggregating discrete criminal information sources into a unified platform. Without a regional system, there exists no active solution for connecting data across jurisdictions. Expand existing systems to participate in other state, regional, and national initiatives. Funding will also be used to: fund three prime movers for the Office of the Sheriff to assist with the movement of critical equipment during mutual aid deployments, search and rescue missions and other disasters; to purchase 80 Class 1 and 2 Hazmat suits for the County's four participating Hazmat teams.

As the fiscal agent for the grant, the City and County of San Francisco has developed a standard form contract for use with all Bay Area UASI partner agencies requiring full indemnification of the City and County of San Francisco. The County has agreed to previous inter-agency agreements with the City and County of San Francisco, which contained the same language, to participate in regional homeland security efforts and access important Federal funding.

CONSEQUENCE OF NEGATIVE ACTION:

If unapproved, the County will not receive its share of the 2021 UASI Grant funds, and risk management and planning for regional response capabilities will need to be funded through another source or not performed at all.

Contra Costa County

To: Board of Supervisors

From: Brian M. Balbas, Public Works Director/Chief Engineer

Date: January 18, 2022

Subject: ADVERTISE for Bids for the 2022 Uninterrupted Power Supply Services Contract(s)

RECOMMENDATION(S):
AUTHORIZE the Public Works Director, or designee, to advertise for bids for the 2022 Uninterrupted Power Supply (UPS) Services Contract(s) for maintenance and emergency repairs to County UPS units at various County facilities, Countywide.

FISCAL IMPACT:
Facilities Maintenance Budget. (100% General Fund)

BACKGROUND:
Public Works Facilities Services is responsible for the maintenance and emergency repairs of the County's Uninterruptible Power Supply (UPS) units. These units are put inline of incoming power to the buildings. In the case of a power outage, UPS units will allow the facility to continue functioning without losing power. Facilities Services has several of these units protecting facilities at various locations such as 30 Douglas for the Department of Information Technology's (DOIT's) computer servers, detention centers and several Health Services facilities.

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Kevin Lachapelle, (925) 313-7082

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ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc:

BACKGROUND: (CONT'D)

The Public Works Department is requesting authorization to advertise and conduct a formal solicitation for Maintenance and Repair UPS services. A Notice to Bidders would be placed in the Contra Costa Times and several building exchanges in accordance with the Cost Accounting Policies and Procedures Manual of the California Uniform Construction Cost Accounting Commission.

The Public Works Department intends to award at least one (1) but not more than two (2) contracts, total of contracts not to exceed $600,000. Each contract will have a term of three (3) years with the option of two (2) one-year extensions, and will be used as needed with no minimum amount that has to be spent.

CONSEQUENCE OF NEGATIVE ACTION:

If the request to advertise is not approved, the Public Works Department will not be able to advertise for UPS services.

Contra
Costa
County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Contract #23-724 with Wellsky Corporation

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract #23-724 and Order Forms with Wellsky Corporation, a corporation, in an amount not to exceed $1,815,883, to provide hosted software services, and maintenance, and support to Contra Costa Regional Medical Center for Wellsky's hosted blood bank system and skilled nursing facility care management system for the period from January 18, 2022 through January 10, 2027.

FISCAL IMPACT:
This contract will result in contractual service expenditures of up to $1,815,883 over a 5-year period and will be funded 100% by COVID-19 Enhancing Learning Capacity Supplemental Funding (No rate increase)

BACKGROUND:
Contra Costa Health Services (CCHS) does not have an integrated blood bank system. This contract meets the needs of CCHS patients by providing an integrated blood bank and skilled nursing facility care - management system for Contra Costa Regional Medical Center. Wellsky's Cloud Services Transfusion Suite is FDA approved and was chosen because of its extensive integration with our Electronic Health Records system, Epic, replacing our legacy blood bank system, Meditech's Laboratory Information System (LIS).

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
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Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Pat Wilson (925) 335-8777

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ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc: Fern Carroll, M Wilhelm

BACKGROUND: (CONT'D)

After looking at the limited number of FDA-approved blood bank LIS solutions, Wellsky's Cloud Services Transfusion Suite was determined to be the most suitable and secure solution. Also, through demonstrations, we found that it had the best user experience. The demonstrators were better able to answer questions about their product than other vendors considered. Wellsky's CarePort, skilled nursing facility care - management system allows for coordination between providers and payers across the continuum to track and manage patients in real-time with an established national network. Through a vast national network of hospital and post-acute providers, this care management system allows for the seamless transition of patients to the next level of care with increased efficiency.

This contract obligates the County to indemnify Wellsky against third-party claims that arise out of County's use of the software and services. The County may only terminate the contract due to a material breach by Wellsky, or in the event, the County does not appropriate funds in any fiscal year for payments under the contract. The contract includes a limitation of liability limiting Wellsky's liability to County to an amount equal to twelve months of payments.

Approval of this new Contract #23-724 allows the contractor to provide services through January 10, 2027.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, Contra Costa Regional Medical Center’s laboratory unit will not have an integrated blood bank system, resulting in potential errors caused by manually entering data. Further, absent the automated care management process, requests from CCHS to skilled nursing facilities for inpatient discharge are processed manually, jeopardizing patient care by putting CCHS at a disadvantage by the hospitals who process their submissions electronically.

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Novation Contract #74-586-7 with A Better Way, Inc.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Novation Contract #74-586-7 with A Better Way, Inc., a non-profit corporation, in an amount not to exceed $700,000, to provide mental health, case management, crisis intervention, intensive coordinated care and in-home behavioral services for children ages birth to twenty-one and their families who are residents of Contra Costa County, for the period from July 1, 2021 through June 30, 2022, which includes a six-month automatic extension through December 31, 2022, in an amount not to exceed $350,000.

FISCAL IMPACT:
Approval of this contract will result in budgeted expenditures of up to $700,000 and will be funded by 50% Federal Medi-Cal ($350,000) and 50% Employment and Human Services Department ($350,000). (No rate increase)

BACKGROUND:
This contract meets the social needs of the County's population by providing mental health services to adolescents with emotional and behavioral problems to improve school performance, reduce unsafe behavioral practices, and reduce the need for out-of-home placements.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

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ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

Contact: Suzanne Tavano, PhD., 925-957-5212

By: Antonia Welty, Deputy

cc: Alaina Floyd, marcy.wilham

BACKGROUND: (CONT'D)

The County has been contracting with A Better Way, Inc. since July 2018.

On December 8, 2020, the Board of Supervisors approved Novation Contract #74-586-5 with A Better Way, Inc., in an amount not to exceed $290,233, for the provision of mental health services to children and adolescents, and their families, who are residents of Contra Costa County, referred by Child Family Services and placed for the period from January 1, 2021 through June 30, 2021, which included a six-month automatic extension through December 31, 2021.

On July 13, 2021, the Board of Supervisors approved Contract Amendment Agreement #74-586-6 to allow rate adjustments to provide cash flow and budget predictability due to COVID-19 with no change in the payment limit or term.

Approval of Novation Contract #74-586-7 replaces the automatic extension under the prior contract and allows the contractor to continue providing services through June 30, 2022.

The contract renewal request was delayed due to pending approval of new contract language, which has been added to all contracts to ascertain cohesiveness and alignment with State regulations.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, Contra Costa County children and their families will not have access to the contractor's services.

CHILDREN'S IMPACT STATEMENT:

This program supports the following Board of Supervisors' community outcomes: "Families that are Safe, Stable, and Nurturing"; and "Communities that are Safe and Provide a High Quality of Life for Children and Families". Expected program outcomes include an increase in positive social and emotional development as measured by the Child and Adolescent Functional Assessment Scale (CAFAS).

ATTACHMENTS

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Novation Contract #74-218-23 with Desarrollo Familiar, Inc. (dba Familias Unidas)

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Novation Contract #74-218-23 with Desarrollo Familiar, Inc. (dba Familias Unidas), a non-profit corporation, in an amount not to exceed $431,158, to provide community based mental health services for children and their families in West Contra Costa County, for the period from July 1, 2021 through June 30, 2022, which includes a six-month automatic extension through December 31, 2022, in an amount not to exceed $215,579.

FISCAL IMPACT:
Approval of this contract will result in budgeted expenditures of up to $431,158 for FY 2021-2022 and will be funded by 50% Federal Medi-Cal ($215,579) and 50% Mental Health Realignment ($215,579) revenues. (No rate increase)

BACKGROUND:
This contract meets the social needs of the County's population by providing community-based mental health services, including assessments; individual, group, and family counseling; case management; and outreach to an underserved Latino population in West Contra Costa County, which will result in greater home, community, and school success. Desarrollo Familiar, Inc. (dba Familias Unidas) has provided community based mental health services for the County since October 1, 2003.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

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ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

Contact: Suzanne Tavano, PhD., 925-957-5169

By: Antonia Welty, Deputy

cc: Alaina Floyd, marcy.wilham

BACKGROUND: (CONT'D)

On January 5, 2021, the Board of Supervisors approved Contract #74-218-21 with Desarrollo Familiar, Inc. (dba Familias Unidas), in an amount not to exceed $204,933 for the provision of community-based mental health services, including assessments; individual, group, and family counseling; case management; and outreach to an underserved Latino population in West Contra Costa County, for the period from January 1, 2021 through June 30, 2021, which included a six-month automatic extension through December 31, 2021.

On July 13, 2021, the Board of Supervisors approved Amendment #74-218-22, with Desarrollo Familiar, Inc. (dba Familias Unidas)., to modify the billing rates due to service delivery disruptions caused by COVID-19 with no change in the payment limit of $204,933 or term of January 1, 2021 through June 30, 2021 and no change in the six-month automatic extension through December 31, 2021 in an amount not to exceed $204,933.

Approval of Novation Contract #74-218-23 replaces the automatic extension under the prior contract and allows the contractor to continue providing services through June 30, 2022.

The contract renewal request was delayed due to pending approval of the new contract language, which has been added to specific contracts to ascertain cohesiveness and alignment with State regulations.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, children in West Contra Costa County will have reduced access to community-based mental health services and may require higher levels of service.

CHILDREN'S IMPACT STATEMENT:

This program supports the following Board of Supervisors' community outcomes: "Children Ready For and Succeeding in School"; "Families that are Safe, Stable, and Nurturing"; and "Communities that are Safe and Provide a High Quality of Life for Children and Families". Expected program outcomes include an in-crease in positive social and emotional development as measured by the Child and Adolescent Function-al Assessment Scale (CAFAS).

ATTACHMENTS

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Novation Contract #24-928-34 with Fred Finch Youth Center

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Novation Contract #24-928-34 with Fred Finch Youth Center, a non-profit corporation, in an amount not to exceed $1,439,194, to provide school and community based mental health services to adolescent children, including Therapeutic Behavioral Services (TBS), for the period from July 1, 2021 through June 30, 2022, which includes a six-month automatic extension through December 31, 2022, in an amount not to exceed $709,597.

FISCAL IMPACT:
Approval of this contract will result in budgeted expenditures of up to $1,439,194 and will be funded by 49% Federal Medi-Cal ($709,597), 49% Mental Health Realignment Funds ($709,597) and 2% by Mt. Diablo Unified School District ($20,000). (No rate increase)

BACKGROUND:
This contract meets the social needs of the County's population by providing school and community-based mental health services including: assessments, individual, group and family therapy, medication support, case management, outreach, TBS and crisis intervention services for Seriously Emotionally

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

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ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

Contact: Suzanne Tavano, Ph.D., 925-957-5212

By: Antonia Welty, Deputy

cc: Alaina Floyd, marcy.wilham

BACKGROUND: (CONT'D)

Disturbed (SED) middle and high school aged children and their families. Fred Finch Youth Center has been providing school-based mental health services to the county since January 1988.

On January 5, 2021, the Board of Supervisors approved Novation Contract #24-928-32, with Fred Finch Youth Center, in an amount not to exceed $695,088, for the provision of school-based mental health services and a multi-dimensional family treatment program for SED students and their families, for the period January 1, 2021 through June 30, 2021, which included a six-month automatic extension through December 31, 2021, in an amount not to exceed $695,088.

On July 13, 2021, the Board of Supervisors approved Contract Amendment #24-928-33 to increase the per minute billing rates due to COVID-19, with no change in the original payment limit or term.

Approval of Novation Contract #24-928-34 replaces the automatic extension under the prior contract and allows the contractor to continue providing services through June 30, 2022.

The contract renewal request was delayed due to pending approval of the new contract language, which was added to certain contracts to ascertain cohesiveness and alignment with State regulations.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, SED children within the Mt. Diablo Unified School District will not receive the school-based day treatment and mental health services that they need and may require higher and more costly levels of treatment.

CHILDREN'S IMPACT STATEMENT:

This program supports the following Board of Supervisors' community outcomes: "Children Ready For and Succeeding in School"; "Families that are Safe, Stable, and Nurturing"; and "Communities that are Safe and Provide a High Quality of Life for Children and Families". Expected program outcomes include an increase in positive social and emotional development as measured by the Child and Adolescent Functional Assessment Scale (CAFAS).

ATTACHMENTS

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Novation Contract #74-575-9 with Lincoln

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Novation Contract #74-575-9 with Lincoln, a non-profit corporation, in an amount not to exceed $1,612,202, to provide mental health services and multi-dimensional family therapy for Seriously Emotionally Disturbed (SED) adolescents and their families, for the period from July 1, 2021 through June 30, 2022, which includes a six-month automatic extension through December 31, 2022, in an amount not to exceed $806,101.

FISCAL IMPACT:
Approval of this contract will result in budgeted expenditures of up to $1,612,202 and will be funded by 34% Federal Medi-Cal ($546,283), 32% Mental Health Services Act Uninsured ($519,636), 26% Mental Health Services Act ($424,735), and 8% Mental Health Realignment ($121,548). (No rate increase)

BACKGROUND:
This contract meets the social needs of the County's population by providing mental health and multi-dimensional family therapy services including: assessments, individual, group and family therapy, case management, and crisis intervention for SED adolescents and their families. Lincoln has been providing mental health services to the county since July 2018.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

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ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

Contact: Suzanne Tavano, PhD., 925-957-5212

By: Antonia Welty, Deputy

cc: Alaina Floyd, marcy.wilham

BACKGROUND: (CONT'D)

On March 31, 2020, the Board of Supervisors approved Contract #74–575-3 with Lincoln, in an amount not to exceed $2,139,128, to provide mental health services and multi-dimensional family therapy for SED adolescents and their families, for the period from March 1, 2020 through June 30, 2021 which included a six-month automatic extension through December 31, 2021, in an amount not to exceed $800,864.

On April 28, 2020, the Board of Supervisors approved Amendment Agreement #74-575-4 to modify the rate schedule for the period April 1, 2020 through June 30, 2020, due to COVID-19 with no change in the payment limit or term of March 1, 2020 through June 30, 2021.

On July 28, 2020, the Board of Supervisors approved Amendment Agreement #74-575-5 to modify the rate schedule for the period July 1, 2020 through December 31, 2020, due to COVID-19 with no change in the payment limit or term.

On June 8, 2021, the Board of Supervisors approved Amendment Agreement #74-575-7 to decrease the payment limit from $2,139,128 to a new payment limit of $1,886,585, with no change in the term of March 1, 2020 through June 30, 2021, and to decrease the automatic extension payment limit from $800,864 to a new payment limit of $754,634 through December 31, 2021.

On July 13, 2021, the Board of Supervisors approved Amendment Agreement #74-575-8 to modify the rate schedule for the period April 1, 2021 through December 31, 2021, due to COVID-19 with no change in the payment limit or term.

Approval of Novation Contract #74-575-9 replaces the automatic extension under the prior contract and allows the contractor to continue to provide mental health services through June 30, 2022.

The contract renewal request was delayed due to pending approval of the new contract language, which has been added to certain contracts to ascertain cohesiveness and alignment with State regulations.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, SED adolescents and their families may experience reduced or discontinued behavioral health services.

CHILDREN'S IMPACT STATEMENT:

This contract supports the following Board of Supervisors' community outcomes: "Children Ready for and Succeeding in School"; "Families that are Safe, Stable, and Nurturing"; and "Communities that are Safe and Provide a High Quality of Life for Children and Families". Expected program outcomes include an increase in positive social and emotional development as measured by the Child and Adolescent Functional Assessment Scale (CAFAS) and placement at discharge to a lower level of care.

ATTACHMENTS

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Novation Contract #24-773-33 with Mountain Valley Child and Family Services, Inc.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Novation Contract #24-773-33 with Mountain Valley Child and Family Services, Inc., a non-profit corporation, in an amount not to exceed $1,852,100, to provide mental health services, case management and Therapeutic Behavioral Services (TBS) for Seriously Emotionally Disturbed (SED) youth and dependents, for the period from July 1, 2021 through June 30, 2022, which includes a six-month automatic extension through December 31, 2022, in an amount not to exceed $926,050.

FISCAL IMPACT:
Approval of this contract will result in budgeted expenditures of up to $1,852,100 and will be funded by 50% Mental Health Realignment ($926,050) and 50% by Federal Medi-Cal ($926,050) revenues. (No rate increase)

BACKGROUND:
This contract meets the social needs of the County's population by providing a comprehensive range of services and supports, including intensive individualized mental health services to Contra Costa dependents who are experiencing serious mental illness, likely to exhibit co-occurring disorders, and from underserved populations.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

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I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

Contact: Suzanne Tavano, Ph.D., 925-957-5212

By: Antonia Welty, Deputy

cc: Alaina Floyd, marcy.wilham

BACKGROUND: (CONT'D)

The Behavioral Health Services Department has been contracting with Mountain Valley Child and Family Services, Inc. since July 1, 1994.

On July 1, 2020, the Board of Supervisors approved Novation Contract #24-773-31, as amended by Amendment Agreement #24–773–32, with Mountain Valley Child and Family Services, Inc., in an amount not to exceed $2,482,828, for the provision of TBS, and mental health services for SED youth and dependents, for the period from July 1, 2020 through June 30, 2021, which included a six-month automatic extension through December 31, 2021, in an amount not to exceed $1,241,414.

On July 13, 2021, the Board of Supervisors approved Contract Amendment Agreement #24-773-32 to allow rate adjustments to provide cash flow and budget predictability due to COVID-19 with no change in the original payment limit or term.

Approval of Novation Contract #24-773-33 replaces the prior contact and allows the contractor to continue providing comprehensive mental health services through June 30, 2022.

The contract renewal request was delayed due to pending approval of the new contract language, which has been added to certain contracts to ascertain cohesiveness and alignment with State regulations.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, transitional-aged youth in Contra Costa County will not have access to contractor's mental health services, which will lead to reduced levels of service to the community and potential placement in higher levels of care.

CHILDREN'S IMPACT STATEMENT:

This program supports the following Board of Supervisors' community outcomes: "Children Ready For and Succeeding in School"; "Families that are Safe, Stable, and Nurturing"; and "Communities that are Safe and Provide a High Quality of Life for Children and Families". Expected program outcomes include an increase in positive social and emotional development as measured by the Child and Adolescent Functional Assessment Scale (CAFAS).

ATTACHMENTS

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Novation Contract #24-409-45 with Contra Costa Youth Services Bureau

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Novation Contract #24-409-45 with Contra Costa Youth Services Bureau, a non-profit corporation, in an amount not to exceed $3,846,000, to provide mental health services including wraparound and outpatient treatment to children in West County for the period from July 1, 2021 through June 30, 2022, which includes a six-month automatic extension through December 31, 2022, in an amount not to exceed $1,923,000.

FISCAL IMPACT:
Approval of this contract will result in an annual budgeted expenditure of up to $3,846,000 for Fiscal Year 2021/2022 and will be funded by 50% by Federal Medi-Cal and 50% Mental Health Realignment. (No rate increase)

BACKGROUND:
This contract meets the social needs of the County's population by providing school and community based mental health services, including: assessments, individual, group and family therapy; medication support, case management, outreach, and crisis intervention services, to an underserved population and will result in greater home, community, and school success.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

Contact: Suzanne Tavano, Ph.D., 925-957-5212

By: Antonia Welty, Deputy

cc: Alaina Floyd, marcy.wilham

BACKGROUND: (CONT'D)

Contra Costa Youth Services Bureau has been providing mental health service to the county since May 1987.

On January 19, 2021, the Board of Supervisors approved Contract #24-409-43 with Contra Costa Youth Services Bureau, in an amount not to exceed $1,783,741 for the provision of specialized mental health service including in-home behavioral health services to children and their families in West Contra Costa County for the period from January 1, 2021 through June 30, 2021, which included a six month automatic extension through December 31, 2021, in an amount not to exceed $1,783,741.

On July 13, 2021, the Board of Supervisors approved Amendment Agreement #24-409-44 with Contra Costa Youth Services Bureau, to modify the rate schedule due to COVID-19 with no change in the payment limit of $1,783,741 or term January 1, 2021 through June 30, 2021, including an automatic extension through December 31, 2021, in an amount not to exceed $1,783,741.

Approval of Novation Contract #24-409-45 replaces the automatic extension under the prior contract and allows the contractor to continue providing services through June 30, 2022.

The contract renewal request was delayed due to pending approval of the new contract language, which has been added to certain contracts to ascertain cohesiveness and alignment with State regulations.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, Contra Costa Youth Services Bureau and other ethnic groups receiving services at four programs in West County would have reduced access to mental health services in school, drug court and clinic settings.

CHILDREN'S IMPACT STATEMENT:

This Early and Periodic Screening Diagnostic and Treatment Program supports the following Board of Supervisors' community outcomes: "Children Ready for and Succeeding in School"; "Families that are Safe, Stable, and Nurturing"; and "Communities that are Safe and Provide a High Quality of Life for Children and Families". Expected program outcomes include an increase in positive social and emotional development as measured by the Child and Adolescent Functional Assessment Scale (CAFAS) and a decrease in juvenile offender recidivism as measured by probation database information.

ATTACHMENTS

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Novation Contract #74–363-12 with La Clinica de La Raza, Inc

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Novation Contract #74–363-12 which includes mutual indemnification with La Clinica de La Raza, Inc., a non-profit corporation, in an amount not to exceed $297,644, to provide Mental Health Services Act (MHSA) Prevention and Early Intervention (PEI) services for the period from July 1, 2021 through June 30, 2022, which includes a six-month automatic extension through December 31, 2022, in an amount not to exceed $148,822.

FISCAL IMPACT:
Approval of this contract will result in an annual expenditure of up to $297,644 for FY 2021-2022 and will be funded 100% by Mental Health Services Act. (Rate increase)

BACKGROUND:
This contract meets the social needs of the County's population by providing MHSA PEI services to families of Native American heritage. La Clinica de La Raza, Inc. has been providing MHSA PEI services to the county since July 1, 2009.

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

Contact: Suzanne Tavano, Ph.D., 925-957-5169

By: Antonia Welty, Deputy

cc: Alaina Floyd, marcy.wilham

BACKGROUND: (CONT'D)

On November 3, 2020, the Board of Supervisors approved Novation Contract #74-363-11 with La Clinica de La Raza, Inc., in an amount not to exceed $288,975 to provide MHSA PEI services for the period from July 1, 2020 through June 30, 2021, which included a six-month automatic extension through December 31, 2021.

Approval of Novation Contract #74–363-12 replaces the automatic extension under the prior contract and allows the contractor to continue providing services through June 30, 2022. This contract includes mutual indemnification to hold harmless both parties for any claims arising out of the performance of this contract.

The contract renewal request was delayed due to pending approval of the new contract language, which has been added to certain contracts to ascertain cohesiveness and alignment with State regulations.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, the County will not have access to this contractor's PEI program.

CHILDREN'S IMPACT STATEMENT:

This MHSA PEI program supports the following Board of Supervisors' community outcomes: "Families that are Safe, Stable, and Nurturing"; and "Communities that are Safe and Provide a High Quality of Life for Children and Families". Expected program outcomes include an increase in positive social and emotional development as measured by the Child and Adolescent Functional Assessment Scale (CAFAS).

ATTACHMENTS

Contra
Costa
County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Contract #26-644-26 with Covelo Group, Inc.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract #26-644-26 with Covelo Group, Inc., a corporation, in an amount not to exceed $450,000, to provide temporary medical staffing and recruitment services, including clinical laboratory scientist supervisor, medical/clinical analyst and pharmacy inventory specialists, at Contra Costa Regional Medical Center (CCRMC) and Contra Costa Health Centers, for the period from January 1, 2022 through December 31, 2022.

FISCAL IMPACT:
Approval of this contract will result in annual expenditures of up to $450,000 and will be funded as budgeted by the Department in FY 2021-2022 by 100% by Hospital Enterprise Fund I. (No rate increase)

BACKGROUND:
CCRMC and Contra Costa Health Centers have an obligation to provide medical staffing services to patients. Therefore, the County contracts with temporary help firms to ensure patient care is provided during peak loads, temporary absences, vacations and emergency situations where additional staffing is required. The County has been using the contractor's temporary staffing services since January 1, 2009.

On November 3, 2020, the Board of Supervisors approved Contract #26-644-25 with Covelo Group, Inc., in an amount not to exceed $450,000 to provide temporary medical staffing and recruitment services for clinical laboratory scientist supervisor, medical/clinical analyst and pharmacy inventory specialists at CCRMC and Contra Costa Health Centers, to provide coverage during peak loads, temporary absences and emergencies, for the period from January 1, 2021 through December 31, 2021.

Approval of Contract #26-644-26 will allow the contractor to continue providing temporary medical staffing and recruitment services at CCRMC and Contra Costa Health Centers, through December 31, 2022.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Samir Shah, M.D., 925-370-5525

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc: K Cyr, M Wilhelm

BACKGROUND: (CONT'D)

This contract includes services provided by represented classifications and the County has met its obligations with the respective labor partner(s).

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, the County will not have access to this contractor's temporary medical staffing services.

Contra
Costa
County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Contract #76-561-8 with The Sun Healthcare and Surgery Group, Inc.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract #76-561-8 with The Sun Healthcare and Surgery Group, Inc., a corporation, in an amount not to exceed $538,000, to provide podiatry services for Contra Costa Regional Medical Center (CCRMC) and Health Centers patients for the period October 1, 2021 through September 30, 2023.

FISCAL IMPACT:
Approval of this contract will result in contractual service expenditures of up to $538,000 over a 2-year period and will be funded 100% by Hospital Enterprise Fund I revenues. (No rate increase)

BACKGROUND:
The County has been contracting with The Sun Healthcare and Surgery Group, Inc., since October 2016 to provide podiatry services for CCRMC and Health Center patients.

On October 22, 2019, the Board of Supervisors approved Contract #76-561-7 with The Sun Healthcare and Surgery Group, Inc., in an amount not to exceed $538,000, to provide podiatry services at CCRMC and Health Centers for the period October 1, 2019 through September 30, 2021.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Samir Shah, M.D., 925-370-5525

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ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc: E Suisala , M Wilhelm

BACKGROUND: (CONT'D)

Approval of Contract #76-561-8 will allow the contractor to continue to provide podiatry services at CCRMC and Health Centers through September 30, 2023. Due to an administrative oversight and delayed negotiations with the contractor, the contract renewal and Board authorization are requested retroactively.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, patients requiring podiatry services at CCRMC and Contra Costa Health Centers will not have access to this contractor's services.

Contra
Costa
County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Amendment/Extension Agreement #72-147-1 with American Medical Response West

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Amendment/Extension Agreement #72-147-1 with American Medical Response West, a corporation, to amend Contract #72-147, effective October 1, 2021, to decrease the payment limit by $116,231, from $233,816 to a new total payment limit of $117,585 and extend the termination date from August 31, 2022 to September 30, 2022.

FISCAL IMPACT:
Approval of this amendment/extension agreement will result in a decrease of budgeted expenditures of $116,231 and is funded 100% by State Public Health grants.

BACKGROUND:
The contractor collaborates with Contra Costa Public Health (CCPH) to implement the Choosing Change three-year pilot program. The contractor services include providing education to patients, family members and bystanders involved in 9-1-1 overdose emergency calls on the proper administration of Narcan, distributing Narcan for future use for patients post Narcan administration and for family members or bystanders in high-risk situations, and administer first dose of Buprenorphine to patients in acute withdrawal.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Ori Tzvieli, M.D., 925-608-5267

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc: L Walker, M Wilhelm

BACKGROUND: (CONT'D)

On April 28, 2020, the Board of Supervisors approved Contract #72-147 with American Medical Response West, in an amount not to exceed $233,816, to implement the Choosing Change Program, an overdose prevention program, which allows emergency responders to provide opioid overdose medication to patients and bystanders and education services on same for the period from January 1, 2020 through August 31, 2022.

Approval of Amendment/Extension Agreement #72-147-1 will allow the contractor to decrease funds and reduce the amount needed for supplies and eliminate the contractor's prehospital coordinator position and continue to provide education to patients, family members and bystanders involved in 9-1-1 overdose emergency calls and administration of Narcan and Buprenorphine, through September 30, 2022. This amendment/extension was submitted late by the division due to an administrative oversight.

CONSEQUENCE OF NEGATIVE ACTION:

If this amendment/extension is not approved, CCPH will not be able to decrease the payment limit and allocate the State Public Health grant funds elsewhere.

ATTACHMENTS

Contra
Costa
County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Contract #27-898-6 with Wanyi He, LAC (dba Bay Oriental Medical Clinic)

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute, on behalf of the County Contract #27-898-6, with Wanyi He, LAC, a sole proprietor, in an amount not to exceed $300,000, to provide acupuncture services to Contra Costa Health Plan (CCHP) members and County recipients for the period February 1, 2022 through January 31, 2025.

FISCAL IMPACT:
This contract will result in contractual service expenditures of up to $300,000 over a 3-year period and will be funded 100% by CCHP Enterprise Fund II revenues. (Rate increase)

BACKGROUND:
CCHP has an obligation to provide certain specialized acupuncture health care services for its members under the terms of their Individual and Group Health Plan membership contracts with the County. This contractor has been in the CCHP Provider Network and has been providing acupuncture services since February 1, 2013.

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Sharron Mackey, 925-313-6104

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc: Noel Garcia, Marcy Wilhelm

BACKGROUND: (CONT'D)

In January 2020, the County Administrator approved and the Purchasing Services Manager executed Contract #27-898-5 with Wanyi He, LAC, (dba Bay Oriental Medical Clinic), in an amount not to exceed $200,000 for the provision of acupuncture services to CCHP members and County recipients for the period February 1, 2020 through January 31, 2022.

Approval of Contract #27-898-6 will allow the contractor to continue providing acupuncture services through January 31, 2025.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, certain specialized acupuncture health care services for CCHP members under the terms of their Individual and Group Health Plan membership contract with the County will not be provided.

Contra
Costa
County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Contract #23-441-7 with DJR Healthcare Consulting, Inc.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract #23-441-7 with DJR Healthcare Consulting, Inc., a corporation, in an amount not to exceed $307,464, to provide consultation and technical assistance to the Contra Costa Regional Medical Center (CCRMC) and Health Centers, for the period from January 1, 2022 through December 31, 2022.

FISCAL IMPACT:
Approval of this contract will result in annual expenditures of up to $307,464 and will be fully funded as budgeted by Hospital Enterprise Fund I revenues. (Rate increase)

BACKGROUND:
DJR Healthcare Consulting, Inc. has been contracting with the Health Services Department since 2009 to coordinate with the CCRMC executive team in designing, implementing and analyzing of monitoring systems that assure quality outcomes at CCRMC; design and implement policies, procedures, and processes that will be effective and efficient in providing health care to the patient population at CCRMC; and provide advice and strategic planning to the Health Services Department's Chief Executive Officer.

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Patrick Godley, 925-957-5405

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc: Marcy Wilhelm

BACKGROUND: (CONT'D)

On December 17, 2019, the Board of Supervisors approved Contract #23-441-6 with the DJR Healthcare Consulting, Inc. in an amount not to exceed $597,000 to provide professional consultation and technical assistance to the CCRMC and Health Centers with regard to planning, organizing, directing and evaluating systems for quality care, for the period from January 1, 2020 through December 31, 2021.

Approval of Contract #23-441-7 will allow the contractor to provide consultation and technical assistance to the CCRMC and Health Centers as requested by the CCRMC Chief Executive Officer or the Health Services Chief Executive Officer, through December 31, 2022.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, the Department would not have appropriate consultation and technical assistance to plan, organize direct and evaluate operations at CCRMC and Health Centers.

Contra
Costa
County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Contract #77-409 with Center for Behavioral Solutions

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract #77-409 with Center for Behavioral Solutions, a non-profit corporation, in an amount not to exceed $675,000, to provide applied behavioral analysis (ABA) services for Contra Costa Health Plan (CCHP) members for the period January 1, 2022 through December 31, 2024.

FISCAL IMPACT:
This contract will result in contractual service expenditures of up to $675,000 over a three-year period and will be funded 100% by CCHP Enterprise Fund II allocations.

BACKGROUND:
CCHP has an obligation to provide certain specialized ABA services for its members under the terms of their Individual and Group Health Plan membership contracts with the County, providing services for members with pervasive developmental disorders or autism including, but not limited to, treatment plans and staff to provide services in the following licensed categories: licensed family therapy, social work, speech and language pathology, educational psychology, and audiology to improve the functioning of members.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Sharron Mackey, 925-313-6104

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc: K Cyr, M Wilhelm

BACKGROUND: (CONT'D)

Under new Contract #77-409, the contractor will provide ABA services for CCHP members for the period January 1, 2022 through December 31, 2024.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, certain specialized ABA health care services for CCHP members under the terms of their Individual and Group Health Plan membership contracts with the County will not be provided.

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Contract #24-086-145(19) with Crestwood Behavioral Health, Inc.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract #24-086-145(19) containing mutual indemnification with Crestwood Behavioral Health, Inc., a corporation, in an amount not to exceed $95,000, to provide adult residential care and mental health services for the period from January 1, 2022 through December 31, 2022.

FISCAL IMPACT:
Approval of this contract will result in budgeted expenditures of up to $95,000 and will be funded 100% by Mental Health Realignment funding.

BACKGROUND:
The Health Services Department has been contracting with Crestwood Behavioral Health, Inc., since September 2006 to provide residential care and mental health services to adults. This contract meets the social needs of the County's population by providing a multi-disciplinary treatment program to adults who need active psychiatric treatment, including medication support and individual and group therapy services, as an alternative to hospitalization at a State Hospital.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

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ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

Contact: Suzanne Tavano, PhD., 925-957-5169

By: Antonia Welty, Deputy

cc: Alaina Floyd, marcy.wilham

BACKGROUND: (CONT'D)

On November 3, 2020, the Board of Supervisors approved Contract #24-086-145(18) with Crestwood Behavioral Health, Inc., in an amount not to exceed $95,000, to provide adult residential care and mental health services for the period from January 1, 2021 through December 31, 2021.

Approval of Contract #24-086-145(19) will allow the contractor to continue providing services through December 31, 2022. This contract includes mutual indemnification to hold harmless both parties for any claims arising out of the performance of this contract.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, the County's mental health clients will not receive the inpatient psychiatric treatment they need from this contractor and may require hospitalization at a State Hospital.

Contra
Costa
County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Amendment #76-577-9 with Hobbs Investments, Inc. (dba Am-Tran)

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract Amendment Agreement #76-577-9 with Hobbs Investments, Inc.(dba Am-Tran), a corporation, effective October 1, 2021, to amend Contract #76-577-7 to increase the payment limit by $85,000, from $375,000 to a new payment limit of $460,000, with no change in the original term of February 1, 2021 through January 31, 2022.

FISCAL IMPACT:
Approval of this amendment will result in additional expenditures in an amount not to exceed $85,000 and will be funded 100% by Hospital Enterprise Fund I. (No rate increase)

BACKGROUND:
The contractor provides routed courier services and on demand courier services to Costa Regional Medical Center (CCRMC) and Contra Costa Health Centers. The contractor provides qualified vehicles and California-licensed drivers to pick up, transport, and deliver laboratory specimens, transmittals, pharmacy medications, and other items. The contractor provides vehicles, equipment, and facilities that meet the construction, safety, sanitary, and other standards prescribed by the statutes and administrative regulations of the State of California, and by the applicable ordinances and regulations of local governmental agencies and entities.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Jaspreet Benepal, 925-370-5100

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc: L Walker, M Wilhelm

BACKGROUND: (CONT'D)

The contractor has been providing courier services for the County since February 2017.

On January 5, 2021, the Board of Supervisors approved Contract #76-577-7 with Hobbs Investments, Inc. (dba Am-Tran) in an amount not to exceed $375,000 for the provision of courier services including specimens, film and other items used for health services at CCRMC and Health Centers for the period from February 1, 2021 through January 31, 2022.

Approval of Amendment Agreement #76-577-9 will allow this contractor to provide additional courier services through January 31, 2022. There was a delay in the Division's administrative approval for this amendment request, therefore, it was not submitted in a timely manner.

CONSEQUENCE OF NEGATIVE ACTION:

If this amendment is not approved, CCRMC and Health Centers will not have access to this contractor’s additional courier services.

ATTACHMENTS

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Contract #27-924-4 with Animate Consulting, LLC (dba Animate Behavior)

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract #27-924-4 with Animate Consulting LLC (dba Animate Behavior, LLC), a limited liability company, in an amount not to exceed $900,000, to provide applied behavior analysis (ABA) services to Contra Costa Health Plan (CCHP) members for the period from December 1, 2021 through November 30, 2024.

FISCAL IMPACT:
Approval of this contract will result in contractual service expenditures of up to $900,000 over a three-year period and will be funded 100% by CCHP Enterprise Fund II. (Rate increase)

BACKGROUND:
CCHP has an obligation to provide certain specialized ABA services including, but not limited to: treatment plans to improve the functioning of CCHP members with pervasive developmental disorder or autism under the terms of their Individual and Group Health Plan membership contracts with the County. This contractor has been providing ABA services to CCHP members as part of the CCHP Provider Network December 1, 2013.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Sharron Mackey, 925-313-6104

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc: K Cyr, M Wilhelm

BACKGROUND: (CONT'D)

On November 5, 2019, the Board of Supervisors approved Contract #27-924-3 with Animate Consulting, LLC (dba Animate Behavior, LLC), in the amount of $1,250,000 for the provision of ABA services for CCHP members for the period from December 1, 2019 through November 30, 2021.

Approval of Contract #27-924-4 will allow the contractor to continue to provide ABA services to CCHP members through November 30, 2024. Contract submittal was delayed by additional review and approval processes.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, certain specialized ABA services for CCHP members under the terms of their Individual and Group Health Plan membership contracts with the County will not be provided.

Contra
Costa
County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Contract #26-602-16 with Traditions Psychology Group, Inc. (dba Traditions Behavioral Health)

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract #26-602-16 with Traditions Psychology Group, Inc. (dba Traditions Behavioral Health), a corporation, in an amount not to exceed $18,000,000 to provide physician management and psychiatric staffing for the Inpatient Psychiatric Crisis Stabilization Unit at Contra Costa Regional Medical Center, the County's Main Detention Facility and Mental Health Clinics, for the period from December 1, 2021 through November 30, 2022.

FISCAL IMPACT:
Approval of this contract will result in annual expenditures of up to $18,000,000 and will be funded as budgeted by 100% Hospital Enterprise Fund I. As appropriate, patients and/or third party payors will be billed for services. This contract provides cost savings compared to using contracts with individual psychiatrists and temporary staffing companies.

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Samir Shah, M.D., 925-370-5475

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ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc: Marcy Wilhelm

BACKGROUND:

This contractor has provided staffing and medical staff leadership of the Inpatient Psychiatric and Crisis and Stabilization Units, George and Cynthia Miller Wellness Center at Contra Costa Regional Medical Center and Contra Costa Health Centers, the Main Detention Facility and Mental Health Clinics including, but not limited to, providing a required number of psychiatrists necessary for clinical coverage of patients twenty-four hours a day, seven days a week, a lead psychiatrist to direct administrative and clinical supervision and supervision of all non-clinical areas related to the medical staff of the Department of Psychiatry, since 2007.

On December 8, 2020, the Board of Supervisors approved Contract #26-602-15 with Traditions Psychology Group, Inc. (dba Traditions Behavioral Health), in an amount not to exceed $18,000,000 to provide physician management and psychiatric staffing at the Inpatient Psychiatric Crisis Stabilization Unit at CCRMC, Main Dentition Facility and Mental Health Clinics, for the period from December 1, 2020 through November 30, 2021.

Approval of Contract #26-602-16 will allow the contractor to continue providing psychiatric staffing and leadership at Contra Costa Regional Medical Center and Health Centers, the County's Main Detention Facility and Mental Health Clinics, through November 30, 2022.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, the Department would not have adequate psychiatric coverage and quality and performance compliance in the County's Inpatient Psychiatric and Crisis Stabilization Units at Contra Costa Regional Medical Center and Health Centers, the County's Main Detention Facility and Mental Health Clinics.

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Amendment Agreement #26-583-31 with Specialty Laboratories, Inc. (dba Quest Diagnostics Nichols Institute)

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract Amendment Agreement #26-583-31 with Specialty Laboratories, Inc. (dba Quest Diagnostic Nichols Institute), a corporation, effective May 1, 2021, to amend Contract #26-583-30, to include additional tests for outside laboratory testing services with no change to the payment limit of $7,000,000 or term of January 1, 2021 through December 31, 2022.

FISCAL IMPACT:
There is no change to the original payment limit of $7,000,000 which is funded by 71% Hospital Enterprise Fund I and 29% Federal Coronavirus Aid, Relief and Economic Security (Cares) Act and other federal and state emergency funding. (New rates added)

BACKGROUND:
Specialty Laboratories, Inc. (dba Quest Diagnostics Nichols Institute) provides outside clinical laboratories testing for tests that are rarely requested and require special equipment which CCRMC does not have onsite. This contract also includes COVID-19 testing which helps to serve as a backup if needed. The contractor has been

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

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ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

Contact: Jaspreet Benepal, 925-370-5501

cc: L Walker, M Wilhelm

BACKGROUND: (CONT'D)

providing outside clinical laboratory testing for CCRMC since January 2007.

On January 19, 2021, the Board of Supervisors approved Contract #26-583-30 with Specialty Laboratories, Inc. (dba Quest Diagnostic Nichols Institute), in an amount not to exceed $7,000,000 for the provision of outside clinical laboratory services, for the period from of January 1, 2021 through December 31, 2022.

Approval of Contract Amendment Agreement #26-583-31 will allow the contractor to provide additional laboratory testing services through December 31, 2022. This amendment agreement was delayed due to CCRMC Clinical Lab recently acquiring the new test panels, pricing and CPT codes for billing. The effective date needs to be May 1, 2021 which is when the new testing was made available to the laboratory. This will assure any outstanding invoices will be paid under the contract.

CONSEQUENCE OF NEGATIVE ACTION:

If this amendment is not approved, patients requiring certain outside laboratory testing services will not have access to this contractor's services.

ATTACHMENTS

Contra Costa County

To: Board of Supervisors

From: Brian M. Balbas, Public Works Director/Chief Engineer

Date: January 18, 2022

Subject: Contract with Bay City Boiler and Engineering Company Incorporated, a California Corporation, Countywide.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Public Works Director, or designee, to execute a contract with Bay City Boiler and Engineering Company Incorporated, in an amount not to exceed $750,000 to provide on-call boiler maintenance and repair services at various County buildings, for the period February 1, 2022 through January 31, 2025, Countywide.

FISCAL IMPACT:
Facilities Maintenance Budget. (100% General Fund)

BACKGROUND:
Public Works Facilities Services is responsible for maintenance and repairs to all hot water, boiler furnace and heat pump systems, which provide hot water and heating to County buildings. Scheduling this maintenance is done by Facilities Services, but the actual maintenance is performed by outside vendors. The existing contract for boiler services is set to expire January 31, 2022.

Government Code Section 25358 authorizes the County to contract for maintenance and upkeep of County Facilities. The Public Works Department recently conducted a formal solicitation for boiler maintenance and repair services.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Kevin Lachapelle, (925) 313-7082

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ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc:

BACKGROUND: (CONT'D)

Originally bid on Bidsync #2107-497, Bay City Boiler and Engineering Company Incorporated, was one of two contractors awarded for this contract.

The Public Works Department is requesting authorization to execute a contract with Bay City Boiler and Engineering Company Incorporated. The contract will have a limit of $750,000 and a term of three (3) years with the option of two (2) one-year extensions and will pay for services according to the rates set forth in the contract. Bay City Boiler and Engineering Company Incorporated, will be able to request rate increases equal to the rate of increase in the Consumer Price Index for the San Francisco - Oakland area as published by the Bureau of Labor Statistics, plus two percent, on each anniversary of the effective date of this contract. The contract will be used on an as-needed basis, with no minimum amount that must be spent. Facilities Services is requesting a contract with Bay City Boiler and Engineering Company Incorporated, to be approved for a period covering three years.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, boiler services with Bay City Boiler and Engineering Company Incorporated, will not happen.

Contra Costa County

To: Board of Supervisors

From: Brian M. Balbas, Public Works Director/Chief Engineer

Date: January 18, 2022

Subject: Consulting Services Agreement Amendment with Fehr & Peers, Countywide.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Public Works Director, or designee, to execute a Consulting Services Agreement (contract) Amendment with Fehr & Peers (F&P), effective February 28, 2022, to extend the term from February 28, 2022 through June 30, 2022, to provide transportation planning services to the County in preparation of the County's first Active Transportation Plan (Plan), with no change to the payment limit of $300,000, Countywide. (Project No. 0676-6P1099) (All Districts)

FISCAL IMPACT:
There is no fiscal impact with this action as it is only to extend the term of the contract. This project, including the contract, will be funded by 88.4% Sustainable Communities Planning Grant Funds (State) and 11.6% Transportation Development Act Funds.

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
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ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

Contact: Jerry Fahy, 925.313.2276

cc:

BACKGROUND:

The original Agreement to provide transportation planning services to the County was approved by the Board on August 11, 2020.

On September 30, 2021, Administrative Amendment No. 1 was approved by the Public Works Director, effective January 1, 2021 to update the County's contact information and to correct errors in the original Personnel and Billing Rates of the contract. On November 2, 2021, Amendment No. 2 was approved by the Board of Supervisors, effective November 9, 2021, to increase the payment limit from $250,000 to $300,000 and replace Personnel and Billing Rates of the contract to reflect changes in the allocation of funding by task.

Proposed Amendment No. 3 will extend the term of the contract from February 28, 2022 to June 30, 2022.

CONSEQUENCE OF NEGATIVE ACTION:

Without approval from the Board of Supervisors, the Consultant will not have sufficient time to complete the Plan.

Contra Costa County

To: Board of Supervisors

From: Brian M. Balbas, Public Works Director/Chief Engineer

Date: January 18, 2022

Subject: Contract with Charles Kopp Inc. d/b/a Continental Electric, a California Corporation, Countywide.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Public Works Director, or designee, to execute a contract with Charles Kopp Inc. d/b/a Continental Electric, in an amount not to exceed $2,250,000 to provide on-call electrical maintenance and repair services at various County sites and facilities, for the period February 1, 2022 through January 31, 2025, Countywide.

FISCAL IMPACT:
Facilities Maintenance Budget. (100% General Fund)

BACKGROUND:
The Public Works Facilities Services Division is responsible for the electrical repair of all County sites and facilities. Electrical contracts are divided among specialized fields which include but are not limited to: building electrical, airport electrical, traffic signals and traffic loop installation. On-call electrical contracts are on an as-needed basis and utilized for repairs. The existing contracts for electrical services are set to expire January 31, 2022.

Government Code Section 25358 authorizes the County to contract for maintenance and upkeep of County Facilities. The Public Works Department recently conducted

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Kevin Lachapelle, (925) 313-7082

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ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc:

BACKGROUND: (CONT'D)

a formal solicitation for on-call electrical services. Originally bid on Bidsync #2107-493, Charles Kopp Inc. d/b/a Continental Electric, was one of three contractors awarded for this contract.

The Public Works Department is requesting authorization to execute a contract with Charles Kopp Inc. d/b/a Continental Electric. The contract will have a limit of $2,250,000 and a term of three (3) years with the option of two (2) one-year extensions and will pay for services according to the rates set forth in the contract. Charles Kopp Inc. d/b/a Continental Electric, will be able to request rate increases equal to the rate of increase in the Consumer Price Index for the San Francisco - Oakland area as published by the Bureau of Labor Statistics, plus two percent, on each anniversary of the effective date of this contract. The contract will be used on an as-needed basis, with no minimum amount that must be spent. Facilities Services is requesting a contract with Charles Kopp Inc. d/b/a Continental Electric, to be approved for a period covering three years.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, electrical services with Charles Kopp Inc. d/b/a Continental Electric, will be discontinued.

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Contract #27-896-5 with Serramonte Pulmonary Asthma Sleep Clinic, Inc.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract #27-896-5, with Serramonte Pulmonary Asthma Sleep Clinic, Inc., a corporation, in an amount not to exceed $1,200,000, to provide pulmonary and sleep study services for Contra Costa Health Plan (CCHP) members for the period December 1, 2021 through November 30, 2024.

FISCAL IMPACT:
This contract will result in contractual service expenditures of up to $1,200,000 over a three-year period and will be funded 100% by CCHP Enterprise Fund II. (No rate increase)

BACKGROUND:
CCHP has an obligation to provide certain specialized pulmonary and sleep study services for its members under the terms of their Individual and Group Health Plan membership contracts with the County. This contractor has been a part of the CCHP Provider Network since December 1, 2012.

On December 10, 2019, the Board of Supervisors approved Contract #27-896-4 with Serramonte Pulmonary Asthma Sleep Clinic,

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Sharron Mackey, 925-313-6104

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Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc: K Cyr, M Wilhelm

BACKGROUND: (CONT'D)

Inc., in an amount not to exceed $1,000,000 to provide pulmonary and sleep study services for CCHP members for the period December 1, 2019 through November 30, 2021.

Approval of Contract #27-896-5 will allow the contractor to continue providing pulmonary and sleep study services for CCHP members through November 30, 2024. This contract submission was delayed due to staffing shortages in the Contracts and Grants Unit.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, certain specialized pulmonary and sleep study services for CCHP members under the terms of their Individual and Group Health Plan membership contract with the County will not be provided.

Contra Costa County

To: Board of Supervisors

From: Brian M. Balbas, Public Works Director/Chief Engineer

Date: January 18, 2022

Subject: Contract with Bear Electrical Solutions, Inc., a California Corporation, Countywide.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Public Works Director, or designee, to execute a contract with Bear Electrical Solutions, Inc., in an amount not to exceed $500,000 to provide on-call electrical maintenance and repair services at various County sites and facilities, for the period February 1, 2022 through January 31, 2025, Countywide.

FISCAL IMPACT:
Facilities Maintenance Budget. (100% General Fund)

BACKGROUND:
The Public Works Facilities Services Division is responsible for the electrical repair of all County sites and facilities. Electrical contracts are divided among specialized fields which include but are not limited to: building electrical, airport electrical, traffic signals and traffic loop installation. On-call electrical contracts are on an as-needed basis and utilized for repairs. The existing contracts for electrical services are set to expire January 31, 2022.

Government Code Section 25358 authorizes the County to contract for maintenance and upkeep of County Facilities. The Public Works Department

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Kevin Lachapelle, (925) 313-7082

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc:

BACKGROUND: (CONT'D)

recently conducted a formal solicitation for on-call electrical services. Originally bid on Bidsync #2107-493, Bear Electrical Solutions, Inc., was one of three contractors awarded for this contract.

The Public Works Department is requesting authorization to execute a contract with Bear Electrical Solutions, Inc. The contract will have a limit of $500,000 and a term of three (3) years with the option of two (2) one-year extensions and will pay for services according to the rates set forth in the contract. Bear Electrical Solutions, Inc., will be able to request rate increases equal to the rate of increase in the Consumer Price Index for the San Francisco - Oakland area as published by the Bureau of Labor Statistics, plus two percent, on each anniversary of the effective date of this contract. The contract will be used on an as-needed basis, with no minimum amount that must be spent. Facilities Services is requesting a contract with Bear Electrical Solutions, Inc., to be approved for a period covering three years.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, electrical services with Bear Electrical Solutions, Inc., will be discontinued.

Contra Costa County

To: Board of Supervisors

From: Brian M. Balbas, Public Works Director/Chief Engineer

Date: January 18, 2022

Subject: Contract with St Francis Electric, LLC, a California Corporation, Countywide.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Public Works Director, or designee, to execute a contract with St Francis Electric, LLC, in an amount not to exceed $2,250,000 to provide on-call electrical maintenance and repair services at various County sites and facilities, for the period February 1, 2022 through January 31, 2025, Countywide.

FISCAL IMPACT:
Facilities Maintenance Budget. (100% General Fund)

BACKGROUND:
The Public Works Facilities Services Division is responsible for the electrical repair of all County sites and facilities. Electrical contracts are divided among specialized fields which include but are not limited to: building electrical, airport electrical, traffic signals and traffic loop installation. On-call electrical contracts are on an as-needed basis and utilized for repairs. The existing contracts for electrical services are set to expire January 31, 2022.

Government Code Section 25358 authorizes the County to contract for maintenance and upkeep of County Facilities. The Public Works Department

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Kevin Lachapelle, (925) 313-7082

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ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc:

BACKGROUND: (CONT'D)

recently conducted a formal solicitation for on-call electrical services. Originally bid on Bidsync #2107-493, St Francis Electric, LLC, was one of three contractors awarded for this contract.

The Public Works Department is requesting authorization to execute a contract with St Francis Electric, LLC. The contract will have a limit of $2,250,000 and a term of three (3) years with the option of two (2) one-year extensions and will pay for services according to the rates set forth in the contract. St Francis Electric, LLC, will be able to request rate increases equal to the rate of increase in the Consumer Price Index for the San Francisco - Oakland area as published by the Bureau of Labor Statistics, plus two percent, on each anniversary of the effective date of this contract. The contract will be used on an as-needed basis, with no minimum amount that must be spent. Facilities Services is requesting a contract with St Francis Electric, LLC, to be approved for a period covering three years.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, electrical services with St Francis Electric, LLC, will be discontinued.

Contra Costa County

To: Board of Supervisors

From: Kathy Gallagher, Employment & Human Services Director

Date: January 18, 2022

Subject: Amend Contract with Social Service Staffing & Recruiting, Inc. for Temporary Social Worker Staffing, FY 2021-22

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Employment and Human Services Director, or designee, to execute a contract amendment with Social Service Staffing & Recruiting, Inc., a corporation, effective February 1, 2022 to increase the payment limit by $100,000 to a new payment limit of $500,000 to provide additional qualified temporary social worker services for clients of Children and Family Services, with no change to term July 1, 2021 through June 30, 2022.

FISCAL IMPACT:
This contract amendment will increase expenditures by $100,000. The cost of the contract is covered as Administrative Overhead. (60% Federal, 34% State, and 6% County)

BACKGROUND:
Children & Family Services (CFS) has experienced difficulties in recruiting and retaining qualified social workers. Currently, there are 24 vacancies in addition to staff on LOA, FMLA and COVID related absences, resulting in a higher than optimal caseload. Recruitment efforts through Human Resources have produced

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

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ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

Contact: Noppol Keeratiyakul (925) 608-4961

By: Antonia Welty, Deputy

cc: Jessica Laumann, Vicky Quinto , Laura Volante

BACKGROUND: (CONT'D)

candidates but not adequate numbers to fill all vacancies. Even when new social workers are recruited, they require extensive training to be ready to assume a caseload. Social Service Staffing & Recruiting, Inc. ensures a ready source of temporary, fully qualified social workers to immediately address this situation and ensure child safety. Additionally, social workers obtained through this contractor may become interested in permanent County positions and apply for current vacancies, which would support the Department's efforts to fill permanent positions with qualified and well-trained applicants familiar with CFS programs, clients and procedures.

The original contract, in the amount of $400,000, was approved by the Board of Supervisors at the June 8, 2021 meeting (c.79). This contract amendment will increase the payment limit to ensure funding to support qualified temporary social workers under the current contract does not deplete before the contract term's end date of June 30, 2022. Under the current contract, funding is projected to be exhausted by March 2022.

CONSEQUENCE OF NEGATIVE ACTION:

Clients in CFS programs will not be served efficiently by qualified social workers.

CHILDREN'S IMPACT STATEMENT:

The services provided under this contract support all five of Contra Costa County's community outcomes: (1) "Children Ready for and Succeeding in School"; (2) "Children and Youth Healthy and Preparing for Productive Adulthood"; (3) "Families that are Economically Self-Sufficient"; (4) "Families that are Safe, Stable and Nurturing"; and (5) "Communities that are Safe and Provide a High Quality of Life for Children and Families" by ensuring children and families in CFS programs are working with qualified staff on a consistent basis.

Contra
Costa
County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Contract #77-413 with Bay Medic Transportation, Inc.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract #77-413 with Bay Medic Transportation, Inc., a corporation, in an amount not to exceed $375,000, to provide non-emergency medical transportation services for Contra Costa Health Plan (CCHP) and Medi-Cal members for the period January 1, 2022 through December 31, 2024.

FISCAL IMPACT:
This contract will result in contractual service expenditures of up to $375,000 over a three-year period and will be funded 100% by CCHP Enterprise Fund II revenues. (No rate increase)

BACKGROUND:
CCHP has an obligation to provide certain non-emergency medical health care transportation services for its Medi-Cal members under the terms of their Individual and Group Health Plan membership contracts with the County. This contractor has been a part of the CCHP Provider Network formerly under a Memorandum of Understanding (MOU) with CCHP, and was required to convert to a County contract.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Sharron Mackey, 925-313-6104

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc: K Cyr, M Wilhelm

BACKGROUND: (CONT'D)

Under new Contract #77-413, the contractor will provide non-emergency medical transportation services for Contra Costa Health Plan (CCHP) Medi-Cal members for the period January 1, 2022 through December 31, 2024.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, certain non-emergency medical health care transportation services for CCHP Medi-Cal members under the terms of their Individual and Group Health Plan membership contracts with the County will not be provided.

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Contract #23-648-6 with Vickie Lee Scharr

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract #23-648-6 with Vickie Lee Scharr, an individual, in an amount not to exceed $260,000, to provide consultation, technical support and planning services with regard the West Contra Costa Health Care District (WCCHCD) for the period from January 1, 2022 through December 31, 2022.

FISCAL IMPACT:
Approval of this contract will result in expenditures of up to $260,000 and will be funded 100% by West Contra Costa Health Care District funding.

BACKGROUND:
The contractor has provided consultation, technical support and planning services to the Chief Operating Officer with regard to the transition of the WCCHCD to Contra Costa County, as well as having assisted with its financial planning and operational improvement. The contractor has been contracting with the County since January 1, 2019.

On October 13, 2020, the Board of Supervisors approved Contract #23-648-4 with Vickie Lee Scharr, in an amount not to exceed $205,000 to provide consultation, technical support and planning services to the Chief Operating Officer for the period January 1, 2021 through December 31, 2021.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

Contact: Patrick Godley, 925-957-5405

cc: L Walker, M Wilhelm

BACKGROUND: (CONT'D)

On September 21, 2021, the Board of Supervisors approved Amendment Agreement #23-648-5 to increase the payment limit by $55,000, from $205,000 to a new payement limit of $260,000, with no change in the term of January 1, 2021 through December 31, 2021.

Approval of Contract #23-648-6 will allow the contractor to continue to provide services through December 31, 2022.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, the Health Services Department will not be able to use this contractor's consultation, technical support and planning services.

Contra
Costa
County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Novation Contract Renewal #23-681-1 with Well Health, Inc.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County novation Contract Agreement #23-681-1 with Well Health, Inc., a corporation, in an amount not to exceed $578,094 for the continued use of Well Health's patient engagement application for the period from May 1, 2021 through May 19, 2022.

FISCAL IMPACT:
Approval will result in annual expenditures of up to $578,094 and will be funded as budgeted by the department in FY 2021-22, by Hospital Enterprise Fund I. (No rate increase).

BACKGROUND:
Before contracting with Well Health, Inc. in May 2020, the patient engagement system utilized by Contra Costa Health Services (CCHS) processed batches daily. As such, CCHS was only able to outreach to patients daily. WellApp, a patient engagement application, solves this by providing built-in real-time integration within Epic. WellApp is a HIPAA-compliant messaging and patient engagement platform that connects healthcare patient staff and patients on their existing text and messaging applications. Thus, allowing case managers, providers, and others the ability to directly engage a single patient, a patient cohort, or our entire patient population. The past tool caused delays in patient outreach during the COVID-19 pandemic. Since using WellApp, CCHS has strived for better communication which helps to improve patient outcomes.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Patrick Wilson, 925-335-8777

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc: F Carroll, M Wilhelm

BACKGROUND: (CONT'D)

On April 28, 2020, the Board of Supervisors approved Contract #23-681 with Well Health, Inc. for the provision of their WellApp, patient engagement application including, software licensing and support, for the period from May 1, 2020 through April 30, 2021.

Approval of novation Contract Agreement #23-681-1 will allow the contractor to continue providing services through May 19, 2022 and is retroactive due to administrative delays caused by the pandemic during the public health emergency.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, the contractor's patient engagement services will be discontinued and past invoices will not be paid, affecting CCHS patient services.

ATTACHMENTS

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Contract #26-699-10 with Semon Bader, M.D.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract #26-699-10 with Semon Bader, M.D., an individual, in an amount not to exceed $300,000, to provide orthopedic services at Contra Costa Regional Medical Center (CCRMC) and Contra Costa Health Centers, for the period January 1, 2022 through December 31, 2022.

FISCAL IMPACT:
Approval of this contract will result in budgeted annual expenditures of up to $300,000 and will be funded 100% by Hospital Enterprise Fund I revenues. (No rate increase)

BACKGROUND:
The County has been contracting with Semon Bader, M.D., since August 2011 to provide orthopedic services including, but not limited to clinical coverage, consultation, training, on-call and administrative services for CCRMC and Contra Costa Health Centers.

On November 3, 2020, the Board of Supervisors approved Contract #26-699-9 with Semon Bader, M.D., in an amount not to exceed $300,000, to provide orthopedic services, for the period January 1, 2021 through December 31, 2021.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

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ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

Contact: SAMIR SHAH, M.D., 925-370-5525

By: Antonia Welty, Deputy

cc: E Suisala , M Wilhelm

BACKGROUND: (CONT'D)

Approval of Contract #26-699-10 will allow the contractor to continue providing orthopedic services at CCRMC and Contra Costa Health Centers, through December 31, 2022.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, patients requiring orthopedic services at CCRMC and Contra Costa Health Centers will not have access to this contractor's services.

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Contract #72-087-4 with Randell Lee Wilferd Jr. (dba Randy's Mobile Mechanical Service)

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract #72-087-4 with Randell Lee Wilferd Jr. (dba Randy's Mobile Mechanical Service), a sole proprietor, in an amount not to exceed $310,000, to provide consultation, vehicle inspections, maintenance and repair services to the Public Health Division's Mobile Satellite Health Centers for the period from January 1, 2022 through December 31, 2022.

FISCAL IMPACT:
Approval of this contract will result in budgeted annual expenditures of up to $310,000 and will be funded 100% by Hospital Enterprise Fund I revenues. (No rate increase)

BACKGROUND:
The County has been contracting with Randell Lee Wilferd Jr. (dba Randy's Mobile Mechanical Service) since January 2017 to provide consultation, vehicle inspections, maintenance and repair services to the Public Health Division's Mobile Satellite Health Centers.

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Dr. Ori Tzvieli, 925-608-5267

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc: E Suisala , M Wilhelm

BACKGROUND: (CONT'D)

On January 14, 2020, the Board of Supervisors approved Contract #72-087-3 with Randell Lee Wilferd Jr. (dba Randy's Mobile Mechanical Service), in an amount not to exceed $575,000, to provide vehicle inspections, repairs and maintenance to Public Health Division's Mobile Satellite Health Center vehicles for the period January 1, 2020 through December 31, 2021.

Approval of Contract #72-087-4 will allow the contractor to continue to provide consultation, vehicle inspections at specified intervals, and repairs and maintenance through December 31, 2022.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, this contractor will not provide safety inspections or maintenance service on County owned Mobile Satellite Health Centers vehicles.

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Contract #76-575-7 with Signature Parking, LLC

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract #76-575-7 with Signature Parking, LLC, a limited liability company, in an amount not to exceed $420,849, to provide parking management services for Contra Costa Regional Medical Center (CCRMC), for the period January 1, 2022 through December 31, 2022.

FISCAL IMPACT:
Approval of this contract will result in budgeted annual expenditures of up to $420,849 and will be funded 100% by Hospital Enterprise Fund I. (No rate increase)

BACKGROUND:
The County has been contracting with Signature Parking, LLC since January 2017 to provide parking management services for CCRMC including stack parking and parking management to ease parking and eliminate patients missing appointments due to the lack of parking.

On December 15, 2020, the Board of Supervisors approved Contract #76-575-5 with Signature Parking, LLC, in an amount not to exceed $479,772, to provide parking management services at CCRMC, for the period January 1, 2021 through December 31, 2021.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Jaspreet Benepal, 925-370-5741

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc: E Suisala , M Wilhelm

BACKGROUND: (CONT'D)

In October 2021, the County Administrator approved and the Purchasing Services Manager executed Administrative Amendment Agreement #76-575-6, to make necessary technical adjustments to the hourly rates due to an administrative error, with no change in term or payment limit.

Approval of Contract #76-575-7 will allow the contractor to continue to provide parking management services for CCRMC through December 31, 2022.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, patients at CCRMC will continue to miss medical appointments due to lack of parking.

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Contract #74-438-16 with Vasanta Venkat Giri, M.D.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract #74-438-16 with Vasanta Venkat Giri, M.D., an individual, in an amount not to exceed $376,320, to provide telepsychiatry services to children in Central County, for the period from January 1, 2022 through December 31, 2022.

FISCAL IMPACT:
Approval of this contract will result in budgeted expenditures of up to $376,320 and will be funded by 50% Federal Medi-Cal ($188,160) and 50% Mental Health Realignment ($188,160) revenues. (No rate increase)

BACKGROUND:
The County has been contracting with Vasanta Venkat Giri, M.D., since February 2012 to provide telepsychiatry services, including diagnosing, counseling, evaluating and medical and therapeutic treatment to children.

On November 17, 2020, the Board of Supervisors approved Contract #74-438-14, with Vasanta Venkat Giri, M.D., in an amount not to exceed $240,000, for the provision of telepsychiatry services to children for the period from January 1, 2021 through December 31, 2021.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

Contact: Suzanne Tavano, Ph.D., 925-957-5212

By: Antonia Welty, Deputy

cc: E Suisala , M Wilhelm

BACKGROUND: (CONT'D)

Approval of Contract #74-438-16 will allow the contractor to continue providing telepsychiatry services, through December 31, 2022.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, the County's clients will not have access to this contractor's telepsychiatry services.

CHILDREN'S IMPACT STATEMENT:

This program supports the following Board of Supervisors' community outcomes: "Children Ready for and Succeeding in School"; "Families that are Safe, Stable, and Nurturing"; and "Communities that are Safe and Provide a High Quality of Life for Children and Families". Expected program outcomes include an increase in positive social and emotional development as measured by the Child and Adolescent Functional Assessment Scale (CAFAS).

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Contract #26-616-9 with InfoImage of California, Inc.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract #26-616-9 with InfoImage of California, Inc., a corporation, in an amount not to exceed $330,000, to provide patient billing services at Contra Costa Regional Medical Center (CCRMC) and Contra Costa Health Centers, for the period from January 1, 2022 through December 31, 2023.

FISCAL IMPACT:
Approval of this contract will result in budgeted expenditures of up to $330,000 over a 2-year period and will be funded 100% by Hospital Enterprise Fund I revenues. (No rate increase)

BACKGROUND:
The County has been contracting with InfoImage of California, Inc., since January 2008 to provide patient billing services at CCRMC and Contra Costa Health Centers.

On April 14, 2020, the Board of Supervisors approved Contract #26-616-8 with InfoImage of California, Inc., in an amount not to exceed $330,000, to provide patient billing services at CCRMC and Contra Costa Health Centers for the period from January 1, 2020 through December 31, 2021.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Jaspreet Benepal, 925-370-5100

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc: E Suisala , M Wilhelm

BACKGROUND: (CONT'D)

Approval of Contract #26-616-9 will allow contractor to continue providing patient billing services through December 31, 2023.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, the County will not have access to this contractor's patient billing services.

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Contract #77-430 with Jiva Health, Inc.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract #77-430 with Jiva Health, Inc., a corporation, in an amount not to exceed $2,000,000, to provide endocrinology, diabetes, and allergy specialty services for Contra Costa Health Plan (CCHP) members for the period January 1, 2022 through December 31, 2022.

FISCAL IMPACT:
This contract will result in annual contractual service expenditures of up to $2,000,000 and will be funded 100% by CCHP Enterprise Fund II allocations.

BACKGROUND:
CCHP has an obligation to provide certain specialized endocrine, diabetes and allergy specialty services for its members under the terms of their Individual and Group Health Plan membership contracts with the County. The contractor is providing endocrinology, diabetes, and allergy specialty services as a part of the CCHP Provider network effective January 1, 2022.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Sharron Mackey, 925-313-6104

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ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc: K Cyr, M Wilhelm

BACKGROUND: (CONT'D)

Under new Contract #77-430, contractor will provide endocrine, diabetes, and allergy specialty services for CCHP members for the period January 1, 2022 through December 31, 2022.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, certain specialized endocrine, diabetes, and allergy specialty services for CCHP members under the terms of their Individual and Group Health Plan membership contracts with the County will not be provided.

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Contract #74–322–22 with Youth Homes Incorporated

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract #74–322–22 with Youth Homes Incorporated, a non-profit corporation, in an amount not to exceed $2,205,290, to provide residential treatment and Therapeutic Behavioral Services (TBS) to children who are Seriously Emotionally Disturbed (SED), for the period from January 1, 2022 through June 30, 2022, which includes a six-month automatic extension through December 31, 2022, in an amount not to exceed $2,205,290.

FISCAL IMPACT:
Approval of this contract will result in annual budgeted expenditures of up to $2,205,290 and will be funded by 50% Federal Medi-Cal and 50% Mental Health Realignment funding. (No rate increase)

BACKGROUND:
This contract meets the social needs of the County's population by providing residential day treatment therapeutic behavioral services, including medication, support, crisis intervention and other mental health services to children who are seriously emotionally disturbed, and their families in order to keep them out of higher levels of placement. The contractor has been providing residential treatment services and TBS to SED children for the County since September 2007.

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

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ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

Contact: Suzanne Tavano, Ph.D., 925-957-5212

By: Antonia Welty, Deputy

cc: L Walker, M Wilhelm

BACKGROUND: (CONT'D)

On January 19, 2021, the Board of Supervisors approved Contract #74–322–20, with Youth Homes Incorporated, in an amount not to exceed $2,096,386 for the provision of residential treatment and TBS to SED children for the period from January 1, 2021 through June 30, 2021, including a six-month automatic extension through December 31, 2021, in an amount not to exceed $2,096,386.

On July 13, 2021, the Board of Supervisors approved Amendment Agreement #74-322-21 to allow rate adjustments to provide cash flow and budget predictability and allow services to continue through December 31, 2021 with no change to the payment limit of $2,096,386 or term January 1, 2021 through June 30, 2021, including a six-month automatic extension through December 31, 2021, in an amount not to exceed $2,096,386.

Approval of Contract #74-322-22 will allow the contractor to continue to provide services through June 30, 2022.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, there would be fewer step-down group home options available in the County and SED children who are requiring this level of care may experience out of State placement.

CHILDREN'S IMPACT STATEMENT:

This contract supports the following Board of Supervisors' community outcomes: "Children Ready For and Succeeding in School"; "Families that are Safe, Stable, and Nurturing"; and "Communities that are Safe and Provide a High Quality of Life for Children and Families". Expected program outcomes include an increase in positive social and emotional development as measured by the Child and Adolescent Functional Assessment Scale (CAFAS) and placement at discharge to a lower level of care.

Contra
Costa
County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Contract #76-766 with Kunwardeep Sohal, M.D.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract #76-766 with Kunwardeep Sohal, M.D., an individual, in an amount not to exceed $1,800,000, to provide gastroenterology services at Contra Costa Regional Medical Center (CCRMC) and Contra Costa Health Centers, for the period from January 1, 2022 through December 31, 2024.

FISCAL IMPACT:
This contract will result in contractual service expenditures of up to $1,800,000 over a 3-year period and will be funded 100% by Hospital Enterprise Fund I revenues.

BACKGROUND:
Due to the limited number of specialty providers available within the community, CCRMC and Contra Costa Health Centers relies on services provided by contractors, such as Kunwardeep Sohal, M.D. to provide necessary specialty health services to its patients.

Under Contract #76-766, the contractor will provide gastroenterology services, including but limited to clinic coverage, consultation, training, medical and/or surgical procedures and on-call coverage at CCRMC and Contra Costa Health Centers, for the period January 1, 2022 through December 31, 2024.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Samir Shah, M.D., 925-370-5525

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc: E Suisala , M Wilhelm

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, patients requiring gastroenterology services at CCRMC and Contra Costa Health Centers will not have access to this contractor's services.

Contra
Costa
County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Amendment #77-214-2 with America West Medical Transportation, Inc.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract Amendment Agreement #77-214-2, effective January 1, 2022, with America West Transportation, Inc., to amend Contract #77-214-1 effective January 1, 2022, to increase the payment limit by $150,000 from $525,000 to a new payment limit of $675,000 for additional non-emergency medical transportation services for CCHP Medi-Cal members requiring additional physical assistance in accordance with the California Advancing and Innovating Medi-Cal (CalAIM) initiative with no change in the original term of April 1, 2021 through March 31, 2024.

FISCAL IMPACT:
This amendment will result in additional contractual service expenditures up to $150,000 and will be funded 100% by Contra Cost Health Plan (CCHP) Enterprise Fund II. (Rate increase)

BACKGROUND:
CCHP has an obligation to provide certain specialized non-emergency medical transportation services for its members under the terms of their Individual and Group Health Plan membership contracts with the County. This contactor has been a part of the CCHP Provider Network since April 1, 2019.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Sharron Mackey, 925-313-6104

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc: K Cyr, M Wilhelm

BACKGROUND: (CONT'D)

On April 20, 2021, the Board of Supervisors approved Contract #77-214-1 in the amount of $525,000 for the provision of non-emergency medical transport services for CCHP Medi-Cal members for the period from April 1, 2021 through March 31, 2024.

Approval of Contract Amendment Agreement #77-214-2 will allow the contractor to provide additional non-emergency medical transportation services for CCHP Medi-Cal members requiring additional physical assistance to follow the CalAIM initiative which includes transportation services for members that are fragile and/or obese requiring transport by gurney requiring one additional attendant in the transport vehicle to provide the service as opposed to one attendant available during transport. The addition of staffing, complexity of transport and to meet network adequacy the compensation rates are being adjusted effective January 1, 2022 through March 31, 2024.

CONSEQUENCE OF NEGATIVE ACTION:

If this amendment is not approved, the contractor will not be able to provide additional non-emergency medical transport services to CCHP members as recommended by the CalAIM initiative.

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Novation Contract #74–369-12 with Native American Health Center, Inc.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Novation Contract #74–369-12 with Native American Health Center, Inc., a non-profit corporation, in an amount not to exceed $257,753, to provide Mental Health Services Act (MHSA) Prevention and Early Intervention (PEI) services for the period July 1, 2021 through June 30, 2022, which includes a six-month automatic extension through December 31, 2022, in an amount not to exceed $128,876.

FISCAL IMPACT:
Approval of this contract will result in an annual expenditure of up to $257,753 for FY 2021-2022 and will be funded 100% by MHSA-PEI Funds. (Rate increase)

BACKGROUND:
This contract meets the social needs of the County's population by providing MHSA PEI services to the County since July 1, 2009.

On December 15, 2020, the Board of Supervisors approved Novation Contract #74 369-11 with Native American Health Center, Inc., in an amount not to exceed $250,257, to provide

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

Contact: Suzanne Tavano, Ph.D., 925-957-5169

By: Antonia Welty, Deputy

cc: Alaina Floyd, marcy.wilham

BACKGROUND: (CONT'D)

MHSA PEI services for the period from July 1, 2020 through June 30, 2021, which included a six-month automatic extension through December 31, 2021.

Approval of Novation Contract #74–369-12 replaces the automatic extension under the prior contract and allows the contractor to continue providing services through June 30, 2022.

The contract renewal request was delayed due to pending approval of the new contract language, which has been added to certain contracts to ascertain cohesiveness and alignment with State regulations.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, the County's mental health clients will not have access to this contractor's PEI program.

CHILDREN'S IMPACT STATEMENT:

Children's Impact Statement: This program supports the following Board of Supervisors' community outcomes: "Children Ready For and Succeeding in School"; "Families that are Safe, Stable, and Nurturing"; and "Communities that are Safe and Provide a High Quality of Life for Children and Families". Expected program outcomes include an increase in positive social and emotional development as measured by the Child and Adolescent Functional Assessment Scale (CAFAS).

ATTACHMENTS

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Novation Contract #74-379-12 with People Who Care Children Association

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Novation Contract #74-379-12 with People Who Care Children Association, a non-profit corporation, in an amount not to exceed $236,689, to provide Mental Health Services Act (MHSA) Prevention and Early Intervention (PEI) services, for the period from July 1, 2021 through June 30, 2022, which includes a six-month automatic extension through December 31, 2022, in an amount not to exceed $118,344.

FISCAL IMPACT:
Approval of this contract will result in budgeted expenditures of up to $236,689 and will be funded 100% by Mental Health Services Act – PEI funds. (Rate increase)

BACKGROUND:
This contract meets the social needs of the County's population by providing work experience for 200 multicultural youth residing in the Pittsburg/Bay Point communities, as well as programs aimed at increasing educational success among youth who are either at-risk or high-risk of dropping out of school, or committing a repeat offense.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

Contact: Suzanne Tavano, Ph.D, 925-957-5212

By: Antonia Welty, Deputy

cc: afloyd , marcy.wilham

BACKGROUND: (CONT'D)

On November 3, 2020, the Board of Supervisors approved Novation Contract #74–379-11 with People Who Care Children Association, to provide MHSA PEI services for the period from July 1, 2020 through June 30, 2021, which included a six-month automatic extension through December 31, 2021.

Approval of Novation Contract #74–379–12 replaces the automatic extension under the prior contract and allows the contractor to continue providing services through June 30, 2022.

The contract renewal request was delayed due to pending approval of the new contract language, which has been added to certain contracts to ascertain cohesiveness and alignment with State regulations.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, at risk youth from East Contra Costa County will have reduced access to job training and other programs, aimed at increasing educational success.

ATTACHMENTS

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Novation Contract #74–378-15 with Contra Costa Interfaith Transitional Housing, Inc. (dba Hope Solutions)

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Novation Contract #74–378-15 with Contra Costa Interfaith Transitional Housing, Inc. (dba Hope Solutions), a non-profit corporation, in an amount not to exceed $397,041 to provide an on-site, on-demand and culturally appropriate Prevention and Early Intervention (PEI) program to help formerly homeless families, for the period from July 1, 2021 through June 30, 2022, which includes a six-month automatic extension through December 31, 2022, in an amount not to exceed $198,520.

FISCAL IMPACT:
Approval of this contract will result in an annual expenditure of up to $397,041 for FY 2021-2022 and will be funded 100% by Mental Health Services Act (MHSA) -PEI. (Rate increase)

BACKGROUND:
This contract meets the social needs of the County's population by providing an on-site, on-demand and culturally appropriate PEI program to help formerly homeless families. Contra Costa Interfaith Transitional Housing, Inc. (dba Hope Solutions) has been providing MHSA PEI services to the County since July 1, 2009.

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

Contact: Suzanne Tavano, Ph.D., 925-957-5169

By: Antonia Welty, Deputy

cc: Alaina Floyd, marcy.wilham

BACKGROUND: (CONT'D)

On December 15, 2020, the Board of Supervisors approved Novation Contract #74 378-14 with Contra Costa Interfaith Transitional Housing, Inc. (dba Hope Solutions), in an amount not to exceed $385,477 to provide an on-site, on-demand and culturally appropriate Prevention and Early Intervention program to help formally homeless families for the period from July 1, 2020 through June 30, 2021, which included a six-month automatic extension through December 31, 2021.

Approval of Novation Contract #74–378-15 replaces the automatic extension under the prior contract and allows the contractor to continue providing services through June 30, 2022.

The contract renewal request was delayed due to pending approval of the new contract language, which has been added to certain contracts to ascertain cohesiveness and alignment with State regulations.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, the County will not have access to this contractor's on-site, on-demand and culturally appropriate PEI program.

ATTACHMENTS

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Amendment #27-277-25 with Kaiser Foundation Health Plan, Inc.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Health Services Director, or designee, to execute on behalf of the County Contract Amendment Agreement #27-277-25 with Kaiser Foundation Health Plan, Inc., a non-profit corporation, effective July 1, 2021 to amend Contract #27-277-20 (as amended by Amendment Agreement #27-277-21 and Amendment/Extension Agreement #27-277-22) with no change in the payment limit of $600,000,000 to revise the Delegation Agreement, to include data exchange requirements per the Department of Health Care Services (DHCS) All Plan Letter APL20-017, and reporting requirements for continuing Medi-Cal services for Contra Costa Health Plan (CCHP) members enrolled in the Kaiser Health Plan with no change in the term.

FISCAL IMPACT:
Approval of this amendment will result in no additional contractual expenditures as funded 100% by CCHP Enterprise Fund II.

BACKGROUND:
CCHP has an obligation to provide certain specialized health care services for its members under the terms of their Individual and Group Health Plan membership contracts with the County. This contractor has been a part of the CCHP Provider Network since October 1, 2004, providing health care services for CCHP Medi-Cal recipients enrolled in the Kaiser Foundation Health Plan.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Sharron Mackey, 925-313-6104

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc: K Cyr, M Wilhelm

BACKGROUND: (CONT'D)

On September 27, 2016, the Board of Supervisors approved Contract #27-277-20 with Kaiser Foundation Health Plan, Inc., in an amount not to exceed $600,000,000 to provide health care services for Medi-Cal recipients enrolled in the Kaiser Foundation Health Plan, for the period from October 1, 2016 through September 30, 2019.

On July 10, 2018, the Board of Supervisors approved Contract Amendment Agreement #27-277-21, to add a Delegation Agreement with no change in the payment limit of $600,000,000 or term of October 1, 2016 through September 30, 2019.

On September 10, 2019, the Board of Supervisors approved Contract Amendment/Extension Agreement #27-277-22, to extend the term from September 30, 2019 to September 30, 2021, with no change in the payment limit of $600,000,000, to allow the contractor to continue to provide additional Medi-Cal services to Medi-Cal members enrolled in the Kaiser Health Plan through September 30, 2021.

On September 21, 2021 the Board of Supervisors approved item C.34 to clarify incorrect term language as previously approved by the Board on September 27, 2016, July 10, 2018 and September 10, 2019 to correct the term to match the agreement so it will automatically be renewed for successive two year periods, until such time it is terminated by either party.

Approval of Amendment Contract #27-277-25 will modify the Delegation Agreement, include data exchange requirements per the DHCS All Plan Letter 20-017, and revise reporting requirements for continuing Medi-Cal services for CCHP members enrolled in the Kaiser Health Plan with no change in the payment limit of $600,000,000 or term.

CONSEQUENCE OF NEGATIVE ACTION:

If this amendment is not approved, certain specialized health care services for Medi-Cal members may not be provided.

ATTACHMENTS

Contra Costa County

To: Board of Supervisors

From: Brian M. Balbas, Public Works Director/Chief Engineer

Date: January 18, 2022

Subject: Contract with Silicon Valley Fire, Inc., a California Corporation, Countywide.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Public Works Director, or designee, to execute a contract with Silicon Valley Fire, Inc., in an amount not to exceed $600,000 to provide fire suppression certification and repair services at various County facilities, for the period February 1, 2022 through January 31, 2025, Countywide.

FISCAL IMPACT:
Facilities Maintenance Budget. (100% General Fund)

BACKGROUND:
Public Works Fleet and Facilities Services are responsible for fire extinguisher and fire suppression system certification and repairs in County buildings and vehicles. By law, fire extinguishers must be inspected and certified annually. Fire suppression contractors also provide repair services and replacement extinguishers. The existing contract for these services is set to expire January 31, 2022.

Government Code Section 25358 authorizes the County to contract for maintenance and upkeep of County Facilities. The Public Works Department recently conducted a solicitation for fire extinguisher certification

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Kevin Lachapelle, (925) 313-7082

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc:

BACKGROUND: (CONT'D)

and repair services. The Request for Proposal was originally bid on Bidsync #2107-492 and Silicon Valley Fire, Inc., was the lowest, responsive and responsible bidder.

The Public Works Department is requesting authorization to execute a contract with Silicon Valley Fire, Inc. The contract will have a limit of $600,000 and a term of three (3) years with the option of two (2) one-year extensions and will pay for services according to the rates set forth in the contract. Silicon Valley Fire, Inc., will be able to request rate increases equal to the rate of increase in the Consumer Price Index for the San Francisco - Oakland area as published by the Bureau of Labor Statistics, plus two percent, on each anniversary of the effective date of this contract. The contract will be used on an as-needed basis, with no minimum amount that must be spent.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, fire extinguisher services with Silicon Valley Fire, Inc., will be discontinued.

Contra Costa County

To: Board of Supervisors

From: Brian M. Balbas, Public Works Director/Chief Engineer

Date: January 18, 2022

Subject: Contract with Diablo Boiler & Steam Inc., a California Corporation, Countywide.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Public Works Director, or designee, to execute a contract with Diablo Boiler & Steam Inc., in an amount not to exceed $750,000 to provide on-call boiler maintenance and repair services at various County buildings, for the period February 1, 2022 through January 31, 2025, Countywide.

FISCAL IMPACT:
Facilities Maintenance Budget. (100% General Fund)

BACKGROUND:
Public Works Facilities Services is responsible for maintenance and repairs to all hot water, boiler furnace and heat pump systems, which provide hot water and heating to County buildings. Scheduling this maintenance is done by Facilities Services, but the actual maintenance is performed by outside vendors. The existing contract for boiler services is set to expire January 31, 2022.

Government Code Section 25358 authorizes the County to contract for maintenance and upkeep of County Facilities. The Public Works Department recently conducted a formal solicitation for boiler maintenance and repair

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Kevin Lachapelle, (925) 313-7082

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: Antonia Welty, Deputy

cc:

BACKGROUND: (CONT'D)

services. Originally bid on Bidsync #2107-497, Diablo Boiler & Steam Inc., was one of two contractors awarded for this contract.

The Public Works Department is requesting authorization to execute a contract with Diablo Boiler & Steam Inc. The contract will have a limit of $750,000 and a term of three (3) years with the option of two (2) one-year extensions and will pay for services according to the rates set forth in the contract. Diablo Boiler & Steam Inc., will be able to request rate increases equal to the rate of increase in the Consumer Price Index for the San Francisco - Oakland area as published by the Bureau of Labor Statistics, plus two percent, on each anniversary of the effective date of this contract. The contract will be used on an as-needed basis, with no minimum amount that must be spent. Facilities Services is requesting a contract with Diablo Boiler & Steam Inc., to be approved for a period covering three years.

CONSEQUENCE OF NEGATIVE ACTION:

If this contract is not approved, boiler services with Diablo Boiler & Steam Inc., will be discontinued.

Contra Costa County

To: Board of Supervisors

From: Deborah R. Cooper, Clerk-Recorder

Date: January 18, 2022

Subject: ACCEPT CANVASS OF VOTES FOR TWO POLICE SERVICE ELECTIONS IN CSA-P6

RECOMMENDATION(S):
Accept the Canvass of Votes for the December 14, 2021 Elections for Police Services Measures in the following County Service Areas:

- P-6, Zone 3008, Supervisorial District 1 - Unincorporated area of San Pablo - DID PASS
- P-6, Zone 3114, Supervisorial District 1 - Unincorporated area of El Sobrante - DID PASS

FISCAL IMPACT:
All tax proceeds will accrue to the new County Service Areas.

BACKGROUND:
For the election results, see the attached Certificates of the County Clerk, providing results of the December 14, 2021 Election for County Service Areas, where each landowner of the affected area was allowed one vote for each acre or portion thereof:

P-6 Zone 3008, Resolution No. 2021/324
P-6 Zone 3114, Resolution No. 2021/325

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Rosa Mena, 925.335.7806

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc:

BACKGROUND: (CONT'D)

Each Resolution so as to authorize a special tax on said properties, located in unincorporated areas in San Pablo and El Sobrante, to maintain present level of police protection services and provide additional funding for increased police protection services.

CONSEQUENCE OF NEGATIVE ACTION:

If the Board of Supervisors does not accept the Canvass of Votes, Zones 3008 and 3114 will not be formed.

ATTACHMENTS

Zone 3008 Election Certificate

Zone 3114 Election Certificate

DEBORAH R. COOPER
COUNTY CLERK

HELEN NOLAN
ASSISTANT COUNTY REGISTRAR

CONTRA COSTA COUNTY
REGISTRATION-ELECTION DEPARTMENT
555 ESCOBAR STREET
MARTINEZ, CALIFORNIA 94553

December 15, 2021

TO: Department of Conservation and Development
Attention: Jennifer Cruz

FROM: Deborah R. Cooper, County Clerk-Recorder
By: Rosa Mena, Elections Processing Supervisor

SUBJECT: CANVASS OF VOTE-POLICE SERVICE AREA P-6, ZONE 3008, SUBDIVISION 9491

Enclosed please find the result of Canvass of Votes of the Police Service Area P-6, Zone 3008, Subdivision 9491 Election held on December 14, 2021.

CONTRA COSTA POLICE SERVICE AREA P-6,
ZONE 3008, SUBDIVISION 9491

OFFICIAL CANVASS

The Election was conducted on December 14, 2021, by Landowners of the effected area. Each Landowner was allowed one vote for each acre or portion thereof.

Total Landowners	Voted	Yes	No
1	3	3	0

CERTIFICATE OF COUNTY CLERK AS TO THE RESULTS OF THE CANVASS OF THE POLICE SERVICE AREA P-6, ZONE 3008, SUBDIVISION 9491 SPECIAL ELECTION

State of California }
} ss.
County of Contra Costa }

I, DEBORAH R. COOPER, County Clerk of Contra Costa County, State of California, do hereby certify that I did canvass the return of the votes cast in the December 14, 2021 Special Election. I further certify that the statement of the votes cast, to which this certificate is attached shows the whole number of votes cast in said County and the whole number of votes cast for and against the measure in said County and in each respective precinct therein, and that the totals of the respective columns and the totals as shown for and against the measure are full, true and correct.

WITNESS my hand and Official Seal this 15th day of December, 2021.

DEBORAH R. COOPER, County Clerk

By Rosa Mena
Rosa Mena

DEBORAH R. COOPER
COUNTY CLERK

HELEN NOLAN
ASSISTANT COUNTY REGISTRAR

CONTRA COSTA COUNTY
REGISTRATION-ELECTION DEPARTMENT
555 ESCOBAR STREET
MARTINEZ, CALIFORNIA 94553

December 15, 2021

TO: Department of Conservation and Development
Attention: Jennifer Cruz

FROM: Deborah R. Cooper, County Clerk-Recorder
By: Rosa Mena, Elections Processing Supervisor

SUBJECT: CANVASS OF VOTE-POLICE SERVICE AREA P-6, ZONE 3114, SUBDIVISION 9478

Enclosed please find the result of Canvass of Votes of the Police Service Area P-6, Zone 3114, Subdivision 9478 Election held on December 14, 2021.

CONTRA COSTA POLICE SERVICE AREA P-6,
ZONE 3114, SUBDIVISION 9478

OFFICIAL CANVASS

The Election was conducted on December 14, 2021, by Landowners of the effected area. Each Landowner was allowed one vote for each acre or portion thereof.

Total Landowners	Voted	Yes	No
1	7	7	0

CERTIFICATE OF COUNTY CLERK AS TO THE RESULTS OF THE CANVASS OF THE POLICE SERVICE AREA P-6, ZONE 3114, SUBDIVISION 9478 SPECIAL ELECTION

State of California }
} ss.
County of Contra Costa }

I, DEBORAH R. COOPER, County Clerk of Contra Costa County, State of California, do hereby certify that I did canvass the return of the votes cast in the December 14, 2021 Special Election. I further certify that the statement of the votes cast, to which this certificate is attached shows the whole number of votes cast in said County and the whole number of votes cast for and against the measure in said County and in each respective precinct therein, and that the totals of the respective columns and the totals as shown for and against the measure are full, true and correct.

WITNESS my hand and Official Seal this 15th day of December, 2021.

DEBORAH R. COOPER, County Clerk

By Rosa Mena
Rosa Mena

Contra Costa County

To: Board of Supervisors

From: Monica Nino, County Administrator

Date: January 18, 2022

Subject: Request for Relief of Cash Shortage

RECOMMENDATION(S):
AUTHORIZE relief of cash shortage in the Health Services - Alcohol & Other Drugs Services in the amount of $362.90.

FISCAL IMPACT:
Cash shortage in the amount of $362.90 will be funded with 100% General Fund.

BACKGROUND:
In accordance with provisions of Administrative Bulletin 207.7, the Auditor-Controller has verified and concurs with the report of a cash shortage in the amount of $362.90 in the Health Services - Alcohol & Other Drugs Services Division.

The shortage resulted from a need to use petty cash for off-site public laundry services from July - August 2020 due to a water leak at the Discovery House residential treatment program.

CONSEQUENCE OF NEGATIVE ACTION:
The shortage will not be relieved; cash will not be in balance.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Laura Strobel (925) 655-2058

cc:

ATTACHMENTS

Subject Report

Office of the Auditor-Controller
Contra Costa County

Robert R. Campbell
Auditor-Controller

625 Court Street
Martinez, California 94553-1282
Phone (925) 608-9300
Fax (925) 646-2649

Harjit S. Nahal
Assistant Auditor-Controller

December 30, 2021

TO: Monica Nino, County Administrator

FROM: Robert R. Campbell, Auditor-Controller
By: Joanne Bohren, CPA, Auditor-Controller Division Manager

SUBJECT: Department of Health Services-Alcohol & Other Drugs Services Report of $362.90 Shortage

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In accordance with Administrative Bulletin 207.7, Section VI.C *Relief of Shortages and Account Collections – For Shortages Greater than $250,* the attached copy of the subject report is being forwarded for your review and presentation to the Board of Supervisors for action.

The Office of the Auditor-Controller has verified and concurs with the contents of the report. Upon the Board's approval, the requested relief shall be authorized.

RRC/sk

cc: Fatima Matal Sol, Alcohol & Other Drugs Services Program Chief
Bud DeCesare, Health Services Fiscal Manager

CONTRA COSTA
HEALTH SERVICES

MEMORANDUM

Date: December 14, 2021

To: Robert Campbell, Auditor-Controller

From: Bud De Cesare, Health Services Fiscal Manager
By Sharon Zhao, Accountant III

Subject: Request for Relief of Cash Shortage

Please consider this memo as a request for the relief of a $362.90 shortage in the AODS Revolving Fund.

As described in the attached correspondence from Harrison Stewart, Discovery House Program Supervisor, and Fatima Matal Sol, AODS Program Chief, there was an urgent and unusual situation in which AODS needed to use petty cash during the summer of 2020 for off-site public laundry services. During this time, staff at the Discovery House was unable to use the on-site laundry facility because of a leak in one of the water pipes inside an interior wall on the second floor of the facility on July 6, 2020. The Restoration Management company contracted by County Public Works asked staff to discontinue the use of all showers, toilets, and laundry facilities at the Discovery House.

The restoration repairs were completed on August 11, 2020. Throughout the duration of the repairs, staff had no other option than to use public laundry services. As we were in the middle of a pandemic, with no alternative to clothes sanitation as required by Public Health guidance for congregate living situations. Failure to obtain off-site laundry services would have compromised the health and wellness of residents under our direct care.

The Program Chief, Fatima Matal Sol, verified under penalty of perjury that the shortage was not caused by fraud or gross negligence.

Similar shortages have not happened since. In the future, this kind of expense will be properly paid through a purchase order, so this will not happen again. The Division has been advised of the policy and procedures for petty cash reimbursement.

50 Douglas Dr. Ste. 310-B, Martinez, CA 94553
Phone: 925.957.5400 Fax: 925.957.5401

AODS 1/2

Please contact Sharon Zhao at sharon.zhao@cchealth.org with any questions.

Thank you!

Department Approval: Bud Allen Date: 12/14/21

Attachments: Letter from Harrison Stewart to Fatima Matal Sol
Letter from Fatima Matal Sol to Linh Huynh
Copy of Concord Laundromat Receipts

Cc: Linh Huynh, Kim Dao, Harrison Stewart, Fatima Matal Sol, Amy Huang

50 Douglas Dr. Ste. 310-B, Martinez, CA 94553
Phone: 925.957.5400 Fax: 925.957.5401

AODS 2/2

ANNA ROTH, RN, MS, MPH
HEALTH SERVICES DEPARTMENT

SUZANNE TAVANO, PHN, PHD
BEHAVIORAL HEALTH DIRECTOR

CONTRA COSTA
HEALTH SERVICES

CONTRA COSTA
BEHAVIORAL HEALTH
ALCOHOL & OTHER DRUGS SERVICES
1220 Morello Avenue, Suite 101
Martinez, CA94553
Ph (925) 335-3330
Fax (925) 335-3311

DT: August 18, 2021

TO: Linh Huynh, Accountant
Health Services FinanceDepartment

FR: Fatima MatalSol, AODS Program Chief

RE: Request for Reimbursement of Petty Cash Fund – **REVISED MEMORANDUM**

On September 17, 2020, we submitted several invoices for the cost of off-site public laundry services for Discovery House a 40 bed residential program for men and licensed by the Department of Health Care Services (DHCS), the clients are all Medi-Cal enrolled and under our care.

This letter seeks to explain the use of petty cash for off-site laundry services for Discovery House. On July 6, 2020, due to a leak in one of the water pipes inside an interior wall on the second floor of the facility, we were asked to discontinue the use of all showers, toilets and laundry facilities.

The Restoration Management company contracted by County Public Works disallowed access to the laundry room for approximately 2-3 more weeks. A substantial amount of restoration repairs were conducted at Discovery House and completed on August 11, 2020. Because of the duration of the repairs, we had no other option than to use public laundry services. As is customary, staff was advised by me to compare prices with other similar vendors prior to utilizing Concord laundromat. Since we were in the middle of a pandemic, not having an alternative to clothes sanitation, this issue could have compromised the health and wellness of residents under our direct care.

After the estimate was received the cost was projected the use of petty cash approved. Attached please find a letter dated July 18, 2020, submitted by staff with the breakdown of the charges. The company selected was Concord Laundromat, 3620 Willow Pass Road, Concord. Attached to this letter are copies of the receipts of services rendered, and we respectfully ask that the funds be reimbursed to our petty cash. If you have any further questions, please contact me at your earliest convenience, we are currently experiencing a very low fund balance, which could not support emergencies.

Amended Section December 7, 2021
As requested by the Office of the Auditor, below you will find the additional information needed for approval:

1) **I hereby state that the shortage of our Petty Cash funds was not caused by fraud or gross negligence.** This was simply an unexpected situation caused by a leak in a county building, where County Public Works was involved. This also occurred in the midst and thick of the COVID19 pandemic in 2020.

As first responders, our primary task in that moment was to protect the most vulnerable residents and the rehabilitation of our patients.
No fraud or gross negligence were committed. In fact, the goal was an immediate response with the most integrity in the process. We made sure that: a) we contacted various vendors. Even though there is a public laundry on Pacheco Ave. the Chief asked staff to compare 3 quotes in the surrounding area. b)We used the service for the exact and right time it was needed, not a day more. c)We collected invoices, as a business rule. d)Most importantly, we only used the service only when we had exhausted all other possibilities. e)The AOD Chief was involved every step to guide the process.

2) **Verification, under penalty of perjury, by the person requesting relief.**
I, Fatima Matal Sol attest that the information stated above is true and correct to the best of my ability under penalty of perjury

Fatima Matal Sol, AOD Program Chief

Signature: _____

Dated: December 7, 2021
Contra Costa County, Martinez CA 94553

ANNA M. ROTH, RN, MS, MPH
HEALTH SERVICES DIRECTOR
SUZANNE TAVANO, PHN, PHD
BEHAVIORAL HEALTH DIRECTOR
MATTHEW P. WHITE, MD
MEDICAL DIRECTOR

CONTRA COSTA
HEALTH SERVICES

CONTRA COSTA
BEHAVIORAL HEALTH
ALCOHOL & OTHER DRUGS SERVICES
1220 Morello Avenue, Suite 101
Martinez, CA 94553
Ph (925) 335-3330
Fax (925) 335-3318

Date: July 14, 2020

To: Fatima Matal Sol

From: Harrison Stewart, Discovery House Program Supervisor

Re: The Use of Petty Cash for Laundry at Discovery House

This letter is to request the use of petty cash to pay for laundry services at Discovery House for the current beneficiaries in the program. On July 6th, 2020 due to a leak in one of water pipes in the interior wall of the second floor of the facility, we were asked to discontinue the use of all showers, toilets and laundry facilities until further notified. There is a substantial restoration project currently taking place at Discovery House due to the leak and we are not able to access any of the bathrooms or the laundry room on the second floor. According to the Restoration Management company doing to the work we will be unable to access the laundry room for approximately 2-3 more weeks.

Due to the current work, I am requesting petty cash to pay for a laundry service for the next two weeks at Discovery House. This will be used so that the beneficiaries can wash their clothes while participating in residential treatment. The company that we will use is called Concord Laundromat and will charge $1.25 a pound for washing clothes and a $10 fee for pickup and delivery. This works out to $97.50 per week for two weeks bringing the total to $195. A breakdown of how these funds will be used can be found on the second page. Without these services the beneficiaries will be unable to wash their clothes which can create problems with sanitation and cleanliness. This could compromise the safety of the beneficiaries and the staff due to the fact that we are in the midst of a global pandemic where cleanliness and sanitation are of the utmost importance.

Thank you,
Harrison J. Stewart
Program Supervisor
Discovery House

Office of the Auditor-Controller
Contra Costa County

November 20, 2020

TO:	Amy Huang	Health Services
FROM:	Carol Blackburne Accounts Payable Section	335-8684
SUBJECT:	TC-52 for Petty Cash	

I contacted you on 11/18/20 at 2:00 with regard to this TC-52 Coding Slip (form D75) and either spoke with you directly or left a voicemail message. The TC-52 is being returned due to the reason indicated below.

- ☐ The preparer and authorizer cannot be the same person.
- ☐ Authorized signature is missing and is required.
- ☐ Correct coding is required for _____.
- ☐ The expense is prior to the start date of the Purchase Order.
- ☐ The expense is after the end date of the Purchase Order.
- ☐ There is no available balance on the Purchase Order.
- ☐ The terms of the Purchase Order do not authorize this expenditure.
- ☐ The total of the invoice(s) does not match the amount on the TC-52.
- ☐ Invoice(s) provided is not an original. We need the original invoice or a copy of the invoice with "Use as original" written on the copy with your signature.
- ☐ The Warrant Request (form M383) cannot be used to pay for _____.
- ☐ The invoice was previously paid with warrant _____. This TC-52 was not processed.
- ☐ Based on the shipping address, the vendor is charging an incorrect sales tax rate. The correct sales tax rate for _____ is _____ percent.
- ☒ Other reason for return: Laundry service is not an authorized expense under petty cash.

COUNTY OF CONTRA COSTA
CENTRAL ACCOUNTING SYSTEM

T/C 52 COUNTY CODING SLIP

AUDITOR-CONTROLLER
2021 DEC 10 P 4:47
2020 OCT 12 P 1:4

PREPARED BY: Amy Huang
DATE: 10/12/2020
ORIGINATING UNIT: HSD Finance 6567

SUM NO.	INV. DATE	DESCRIPTION	FUND/ORG.	ACCOUNT	ENCUMBRANCE NO.	P/C	PAYMENT AMT.
	10/12/2020	REVOLVING FUND CK#	5933	2100			362.90
				OPTION	ACTIVITY		DISCOUNT AMT. $
	10/12/2020	REVOLVING FUND CK#					
			TASK	OPTION	ACTIVITY		DISCOUNT AMT. $
	10/12/2020	REVOLVING FUND CK#					
				OPTION	ACTIVITY		DISCOUNT AMT. $
	10/12/2020	REVOLVING FUND CK#					
				OPTION	ACTIVITY		DISCOUNT AMT. $
	10/12/2020	REVOLVING FUND CK#					
				OPTION	ACTIVITY		DISCOUNT AMT. $
	10/12/2020	REVOLVING FUND CK#					
				OPTION	ACTIVITY		DISCOUNT AMT. $
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				OPTION	ACTIVITY		DISCOUNT AMT. $
	10/12/2020	REVOLVING FUND CK#					
				OPTION	ACTIVITY		DISCOUNT AMT. $
	10/12/2020	REVOLVING FUND CK#					
				OPTION	ACTIVITY		DISCOUNT AMT. $
	10/12/2020	REVOLVING FUND CK#					
				OPTION	ACTIVITY		DISCOUNT AMT. $

VENDOR NO. 00756

Page 1 of 1

PAGE TOTAL	362.90
GRAND TOTAL	362.90

T/C	C D
5 2	D
0 0 / 1 2	1 5

VENDOR

00756
Name HEALTH SERVICES
Address REVOLVING FUND
City, State

RECEIVED, ACCEPTED AND EXPENDITURE APPROVED:

Robert H. DeCesare 10/12/20

(Department Head or Chief Deputy)

CONTRA COSTA COUNTY

COMBINATION
DEMAND (1)
AND
CASH DISBURSEMENT VOUCHER

DEPARTMENT Behavioral Health Division
Alcohol & Other Drugs Administration

DATE	ORG	TASK	OPTION	ACTIVITY/ WORK AUTH.	SIGNATURE OF RECIPEINT (2)	DESCRIPTION	AMOUNT
7/16/202	5933					Laundry Servs for Disc. House	$50.00
					Harrison Stewart		
7/17/20	5933					Laundry Servs for Disc. House	$41.55
					Harrison Stewart		
7/23/20	5933					Laundry Servs for Disc. House	$91.55
					Harrison Stewart		
9/16/20	5933					Laundry Servs for Disc. House	$179.80
					Harrison Stewart		
					Fund Balance Check:		
					Cash on Hand	$137.10	
					Total Receipts	$362.90	
					Imprest Fund Balance	$ 500.00	
						TOTAL	$362.90

7/17/20 $ 91.55
7/24/20 $ 129.35
8/11/20 $ 142.00
Total $ 362.90

expenditures made from a Revolving Fund.

of the money, wherever possible (eg – the postman on postage due) in which
s slips, receipts and other supporting instruments should be cemented or taped
orm, when such documentation is required.

(3) Replenishment requests shall consist of the original D15-11 and the original receipts and a photocopy of each. **NOTE:** Photocopies are to be retained by the department. Do not send photocopies to the Auditor-Controller Accounts Payable section.

The undersigned under the penalty of perjury states: That the above claim and the items as therein set out are true and correct; that no part thereof has been heretofore paid, and that the amount therein is justly due, and that the same is presented within one year after the last item thereof has accrued.

Signed Maria Ramos CUSTODIAN Date 9/17/20

10.6.2020

Print your Name Maria Ramos CUSTODIAN Phone No. (925)-335-3339

VENDOR NO.

D15-11

Breakdown of funds:

$1.25 per pound of laundry.
14 Beneficiaries at 5 pounds of laundry per beneficiary= $6.25 per beneficiary.
14 x 6.25= $87.50 + $10 for delivery fee x 2 weeks
Total= $195.00

CONCORD LAUNDROMAT/ LAVANDERIA

NEW WASHERS & DRYERS, MACHINES TAKE CREDIT CARD & CASH, FREE WIFI, OPEN LATE - 6AM-11PM, WASH & FOLD SERVICE $1 PER POUND

510-329-9997 3620 Willow Pass Road Concord

[redacted]

Laundromat
Total $271.35
July 4, 2020

95 lb = Pounds at $1.25 per pound
$ 119.35 + 10.00 delivery

7/23/20 - $91.55
9/16/20 - 179.80
271.35

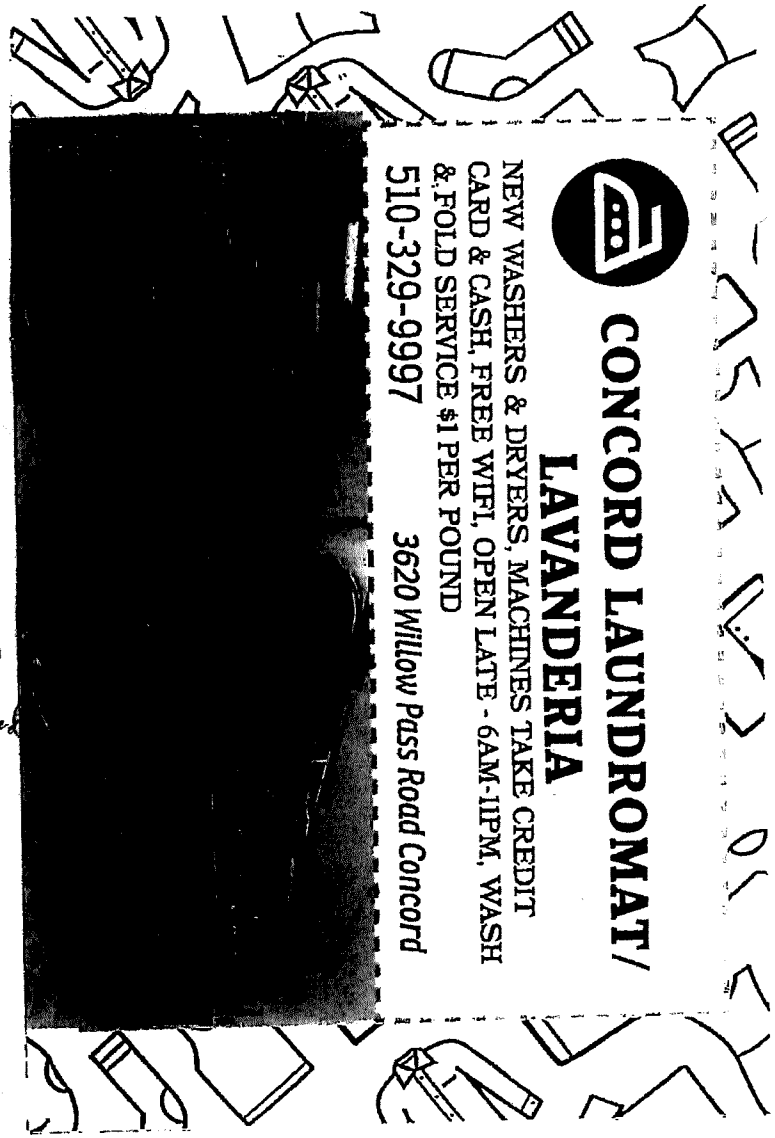
Laundry Services
July 17, 2020
53 lb 10 people
Total $91.55
paid

Thank you!

65.24 pounds at $1.25 per pound

$ 81.55 + 10 on delivery

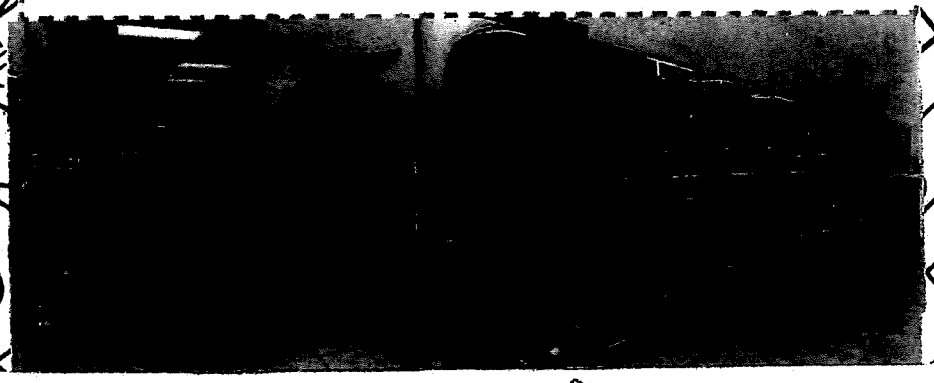
7/16/20 – 50.=
7/17/20 – 41.55
$ 91.55



CONCORD LAUNDROMAT/ LAVANDERIA

NEW WASHERS & DRYERS, MACHINES TAKE CREDIT CARD & CASH, FREE WIFI, OPEN LATE - 6AM-11PM, WASH & FOLD SERVICE $1 PER POUND

510-329-9997 *3620 Willow Pass Road Concord*



Laundry Services

$132.00 Paid August 11, 2020

105.60 pounds at $1.25 per pound

$132.00 + $10.00 delivery.

Contra Costa County
Public Works
Department

Brian M. Balbas, Director
Deputy Directors
Stephen Kowalewski, Chief
Warren Lai
Carrie Ricci
Joe Yee
Allison Knapp

July 10, 2020

Mary McLain
Contra Costa County
Health Services Department
Alcohol & Other Drug Services

Mary,

In response to Corrigo Work Request No.'(s) – 1839116 & 1839135 the estimated costs for the remediation work due to the facility water line break at 4645 Pacheco Boulevard is **$86,837.00**.

The remediation work included the following –

Asbestos & Mold testing, Remove water damaged sheetrock, insulation, & flooring as necessary, Repair waterline, Install dehumidifiers to dry out walls and floor, Install sheetrock as necessary, Tape, texture, & paint repaired walls & ceiling as necessary, Replace flooring & cove Base as necessary.

Please be aware that this is an **"estimate only"** and is not a bid or a firm price. It is based on experience with similar projects. The actual project cost will be determined by the market at the time of construction, site conditions and any changes in scope you might require.

If you have any questions, please contact me at (925) 313-7052.

Regards,

Joe Hotting
Public Works
Facility Maintenance Supervisor

Lead Estimates

6.61524E+12	Joe Hotting
1524.0015	7/10/20
Work order #	1839116/1839135
Charge #	X31153
Project	Facility flood rrepairs
Department	Health Services
Address	4645 Pacheco Boulevard

						sales tax		
						8.25%		
						Labor		
				Mtrl		**Hour**	**Labor**	
			Unit	**Total**	**Lbr**	**Rate**	**Hour**	**Sub**
	Qnty	**Unit**	**Cost**	**Cost**	**Hrs**		**Cost**	**Total**
Hazardous Material Testing.								
Hazardous Material Abatement								
Lead project follow up.								
Travel time								
Rental Equipt.								
Dump Run								
Dust control								
Update Shop Records								
Labor:								
• **Carpenter:** - Removed sheetrock			$330.00		3.0			
from walls for Steamfitters								
• **Electrican: Call-Out** - Checked			$1,026.00		9.0			
status of electrical & panels								
• **Painter:** - Tape,texture,&			$6,660.00	$437	60.0			
paint sheetrock repairs								
• **Steamfitter:** - Locate water leak			$1,524.00		12.0			
and repair water line								
• **All County Flooring:** Install			$16,882.00					
flooring on 1st & 2nd floor as necessary								
• **Restoration Management: -**			$59,978.00					
Remove water damaged sheetrock								
insulation & flooring,								
Remove moisture from								
walls & floor, Remove & Replace								
water damaged sheetrock								
							Grand Total:	**$86,837**

Does not include unknown obstacles such as pipes or electrical in hidden areas during demolition.

Does not include any work not mentioned in this estimate.

Notes:

Other crafts necessary to complete the project.

- **Estimate excludes unforeseen work not mentioned -**
- **Estimate fabricated on Fri. 7/10/2020**

Contra Costa County

To: Board of Supervisors

From: Brian M. Balbas, Public Works Director/Chief Engineer

Date: January 18, 2022

Subject: Disposal of Surplus Property

RECOMMENDATION(S):
DECLARE as surplus and AUTHORIZE the Purchasing Agent, or designee, to dispose of fully depreciated vehicles and equipment no longer needed for public use, as recommended by the Public Works Director, Countywide.

FISCAL IMPACT:
No fiscal impact.

BACKGROUND:
Section 1108-2.212 of the County Ordinance Code authorizes the Purchasing Agent to dispose of any personal property belonging to Contra Costa County and found by the Board of Supervisors not to be required for public use. The property for disposal is either obsolete, worn out, beyond economical repair, or damaged beyond repair.

CONSEQUENCE OF NEGATIVE ACTION:
Public Works would not be able to dispose of surplus vehicles and equipment.

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Nida Rivera, (925) 313-2124

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc:

ATTACHMENTS

Surplus Vehicles and
Equipment

22 ATTACHMENT TO BOARD ORDER JANUARY 18, 2022

Department	Description/Unit/Make/Model	Serial No.	Condition A. Obsolete B. Worn Out C. Beyond economical repair D. Damaged beyond repair
FIRE PROTECTION DISTRICT	2002 CLUBCAR PATHWAY # 897 (MILES)	NQ0399238777	C. BEYOND ECONOMICAL REPAIR
EHS / COMM SERVICES	2001 FORD TAURUS SEDAN # 0498 (72098 MILES)	1FAFP52251G241343	B. WORN OUT
SHERIFF	2009 TOYOTA PRIUS # 1120 (40691 MILES)	JTDKB20U393512686	B. WORN OUT
SHERIFF	2011 FORD CROWN VIC. # 2144 (25149 MILES)	2FABP7BV3BX179795	B. WORN OUT
EHS / COMM SERVICE	1998 FORD E-150 PASS. VAN # 4478 (83960 MILES)	1FMRE11L6WHA90395	B. WORN OUT
FIRE PROTECTION DISTRICT	2002 CHRYSLER GEM # ()	5ASAK27422F027764	D. DAMAGED BEYOND REPAIR
FIRE PROTECTION DISTRICT	2002 CHRYSLER GEM # 898 ()	5ASAK27462F027783	D. DAMAGED BEYOND REPAIR
FIRE PROTECTION DISTRICT	CUSHMAN SHUTTLE 2	S/N 3160998	C. BEYOND ECONIMICAL REPAIR
FIRE PROTECTION DISTRICT	2000 ISUZU NQR BOX TRUCK # 893 (82079 MILES)	JALC4B140Y7005152	C. BEYOND ECONOMICAL REPAIR
FIRE PROTECTION DISTRICT	1982 FORD L9000 WATER TENDER # 737 (33712 MILES)	1FDYK90R8CVA52754	B. WORN OUT
PUBLIC WORKS	1998 BROCE RC-350 # 7805 (1007 HOURS)	89070	B. WORN OUT
SHERIFF	2014 FORD INTERCEPTOR SUV # 3410 (112688 MILES)	1FM5K8AR5EGB02447	B. WORN OUT
EHS / COMM SERVICES	2008 FORD FUSION SEDAN # 0790 (107836 MILES)	3FAHP07158R123436	B. WORN OUT
AGRICULTURE	2005 FORD TAURUS SEDAN # 0749 (102389 MILES)	1FAFP53U35A216871	B. WORN OUT
SHERIFF	2000 GMC SAVANA VAN# 4545 (100657 MILES)	1GTHG39R5Y1166263	B. WORN OUT
ANIMAL SERVICES	2010 FORD F-250 TRUCK # 5477 (96288 MILES)	1FDSX2A50AEB37242	B. WORN OUT
SHERIFF	2017 FORD INTERCEPTOR SUV # 3621 (84095 MILES)	1FM5K8AT4HGD93068	D. DAMAGED BEYOND REPAIR
PUBLIC WORKS	2002 BRUSH BAND 250 CHIPPER # 8311 (3311 HOURS)	4FMUS15182R017850	B. WORN OUT
SHERIFF	2000 CHEVY 2500 TRUCK # 6148 (72637 MILES)	1GCGK29UXYE381428	B. WORN OUT
SHERIFF	2004 FORD E-350 VAN # 5742 (71652 MILES)	1FDWE35L54HA61542	B. WORN OUT
EHS / COMM SERVICES	2002 FORD TAURUS SEDAN # 0337 (86367 MILES)	1FAFP52U92G168304	B. WORN OUT
PUBLIC WORKS	2001 FREIGHTLIN FL112 D. TRUCK # 6857 (51150 MILES)	1FVXTECB11DH31571	B. WORN OUT

Contra Costa County

To: Board of Supervisors

From: John Kopchik, Director, Conservation & Development Department

Date: January 18, 2022

Subject: GP21-0004 General Plan Amendment Feasibility Study

RECOMMENDATION(S):
1. AUTHORIZE initiation of a General Plan Amendment (GPA) process to consider changing the General Plan land use designation from Agricultural Lands (AL) to Single-Family Residential Low-Density (SL) for a portion of a 23.9-acre parcel located at the intersection of Camino Pablo and Sanders Ranch Road in the Moraga area, Assessor's Parcel No. 258-290-029. (County File #GP21-0004)

2. ACKNOWLEDGE that granting this authorization does not imply any sort of endorsement for an application to amend the General Plan, but only that the matter is appropriate for consideration.

FISCAL IMPACT:
None. If the authorization is granted, the project applicant will pay application fees to cover the cost of processing the GPA.

BACKGROUND:
On November 17, 2021, the Department of Conservation and Development received documents from Wendell Rosen, LLP, describing a proposed 15-lot single-family residential subdivision in the Moraga area (Attachment A). The subject site is designated AL on the General Plan Land Use Element Map and zoned General Agricultural District (A-2). The applicant requests redesignation of a portion of the subject site from AL to SL with an accompanying rezoning of the same portion from A-2 to Planned Unit District (P-1). Attachment B illustrates the existing and proposed General Plan designations; Attachment C illustrates the existing and proposed zoning.

The subject site consists of one parcel totaling approximately 23.9 acres. The parcel fronts Camino Pablo and Sanders Ranch Road for approximately 2,750 feet and narrows from over 500 feet wide at the southern end to a tip at the northern end. The topography is severe, rising from an elevation of approximately 550 feet at Camino Pablo to over 700 feet at the parcel's highest point. The parcel is vacant and used for cattle grazing. To the south, west, and north are single-family homes and a stretch of Moraga Creek. To the east is an estate lot and vacant land designated for agriculture. Attachment D is an aerial photo of the site and its surroundings.

The proposed project involves development of up to 15 single-family homes with several incorporated accessory dwelling units (ADUs) on 7.9 acres at the parcel's southern end. The lots would be arranged along a new cul-de-sac that would intersect Camino Pablo opposite Tharp Drive

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: (925) 655-2898

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc:

BACKGROUND: (CONT'D)

and ascend the hill to an elevation of approximately 605 feet. Building pad elevations would range from approximately 570-618 feet. The homes would be a mix of single- and two-story, anticipated in the 3,500-5,500 square foot range. The project also proposes frontage improvements and landscaping along Camino Pablo.

The project site is inside the Urban Limit Line (ULL) and within the Town of Moraga's sphere of influence. In August 2021 the Town Council denied a similar proposal for a 13-unit subdivision that included a General Plan amendment and request for annexation of the residential lots. Primary reasons given for the denial included:

- The parcel is within a Wildland-Urban Interface and High Fire Hazard Severity Zone as mapped by CalFire.
- The parcel is geologically unstable. Numerous landslides are present, some being in the area proposed for development. Significant remediation grading, approximately 144,000 cubic yards, would be necessary.
- The parcel is topographically prominent and within a scenic corridor. The project would be perched on the hillside, making it highly visible and altering the area's character.
- Density increases should occur in the community's center, not at its periphery.

The Town of Moraga's existing General Plan designations allow for development of up to 6 units on 6.26 acres at the southern end of the parcel and 1-3 additional units on the remaining 17.64 acres, which are designated Open Space. The County General Plan designation of AL allows a maximum density of 1 dwelling unit per 5 acres. As the parcel is 23.9 acres, up to 4 units theoretically could be developed under the existing County General Plan. Thus, the proposed GPA requests a nearly 4-fold increase in units across the entirety of the parcel, with the proposed cluster at the southern end being significantly more dense than the 0.2 unit/net acre density currently allowed.

To amend the General Plan the Board of Supervisors must make several findings, one being that the proposed amendment is "in the public interest." The Town of Moraga's planning review has identified significant issues, particularly related to public safety. The project may run afoul of several County General Plan policies related to public safety and hillside development. Staff also notes that the draft policy language for the updated County General Plan limits subdivisions in High Fire Hazard Severity Zones to four parcels. Currently it is unclear how the "public interest" finding could be made given that the project's discernible benefits, marginally increased tax base and provision of several ADUs, seem minimal relative to the identified policy concerns.

However, except in rare cases where a project as proposed clearly conflicts with County policy, and no apparent avenue for resolution exists, it has been the County's practice to initiate the GPA process and provide the applicant an opportunity to demonstrate the merits of their proposal. Staff therefore recommends Board authorization to proceed with the GPA process with the understanding that authorization to proceed does not imply the Board's ultimate endorsement of the application to amend the General Plan, but only that this matter is appropriate for further evaluation.

CONSEQUENCE OF NEGATIVE ACTION:

If the Board decides not to authorize initiation of the GPA process, then an application to amend the General Plan cannot be filed and the subject site will retain its AL land use designation. The proposed residential project would not be able to proceed.

ATTACHMENTS

Attachment A - Submittal by Wendell Rosen, LLP

Attachment B - GP21-0004 Existing and Proposed General Plan Designations

Attachment C - GP21-0004 Existing and Proposed Zoning Designations

Attachment D - GP21-0004 Aerial Photo

WENDEL ROSEN
1111 Broadway, 24th Floor
Oakland, CA 94607-4036
T: 510.834.6600
F: 510.834.1928
www.wendel.com
ptuck@wendel.com

November 17, 2021

VIA ELECTRONIC SUBMISSION AND EMAIL

Will Nelson
Principal Planner
Contra Costa County Planning Dept.
30 Muir Rd
Martinez, CA 94553
E-mail: will.nelson@dcd.cccounty.us

Re: South Camino Pablo General Plan Amendment Feasibility Request (APN 725-829-001/258-290-029)

Dear Mr. Nelson:

As I previously discussed with you, we represent Dobbins Properties, LLC, the owners of an approximately 23.9-acre parcel along the southwestern edge of unincorporated Contra Costa County, bordering the Town of Moraga (APNs 725-829-001/258-290-029). This area is locally known as Carr Ranch, and we are referring to the proposed development as "South Camino Pablo." The subject parcel is currently designated as "AL-Agricultural Lands" in the County's land use element map, and is zoned "A-2-General Agricultural District" in the County's zoning map.

We are requesting a General Plan Amendment Feasibility analysis to amend the General Plan to designate the approximately 7.9-acre southernmost portion of this parcel with a single-family residential designation so that the owners may develop that portion of the property with 15 single family homes, and incorporated accessory dwelling units. We propose that the remaining approximately 16-acre northern portion of the property will remain designated as "AL-Agricultural Lands" in the General Plan. Specifically, we are proposing an amendment that would modify the designation in the County's General Plan for the 7.9-acre portion of the parcel to "SL-Single-Family Residential-Low Density," which allows 1.0 to 2.9 single-family units per net acre, and lot sizes up to 43,560 square feet. This would more than accommodate the proposed project in this section of the property, while leaving more than two-thirds of the property as designated agricultural land. Please see the attached site plan exhibit showing the existing General Plan designation for the property and neighboring parcels, as well as the proposed General Plan designations after the requested amendment.

If the County's General Plan is amended as requested, or in another manner such that the proposed development would be consistent with the General Plan's Land Use Element, we

would then intend to apply to have the relevant portion of the parcel rezoned in conformance with the County's "P-1-Planned Unit District" provisions, as indicated on the attached site plan.

We look forward to the County's analysis and feedback on this General Plan Amendment Feasibility request. Uploaded to the County's online planning application system along with this letter is the exhibit site plan referenced above, as well as payment of the $750 deposit required to initiate this feasibility review.

Please do not hesitate to reach out to me at ptuck@wendel.com or (510) 622-7605 or to my colleague Patricia Curtin at pcurtin@wendel.com or (510) 622-7660 if you have any other questions about the subject parcel, requested amendment, or the proposed development project, or would like us to submit any additional information as part of this General Plan Amendment Feasibility Request.

Thank you for your time and consideration.

Sincerely,

WENDEL ROSEN LLP

Patrick Tuck

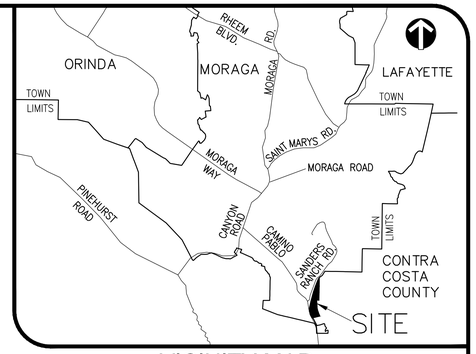
PAT/mh
Enclosures: General Plan Amendment Site Plan Exhibit; $750 Deposit
cc/enc: Matt Dobbins, Dobbins Properties, LLC (Via Email Only)

SUBDIVISION 9396

SOUTH CAMINO PABLO

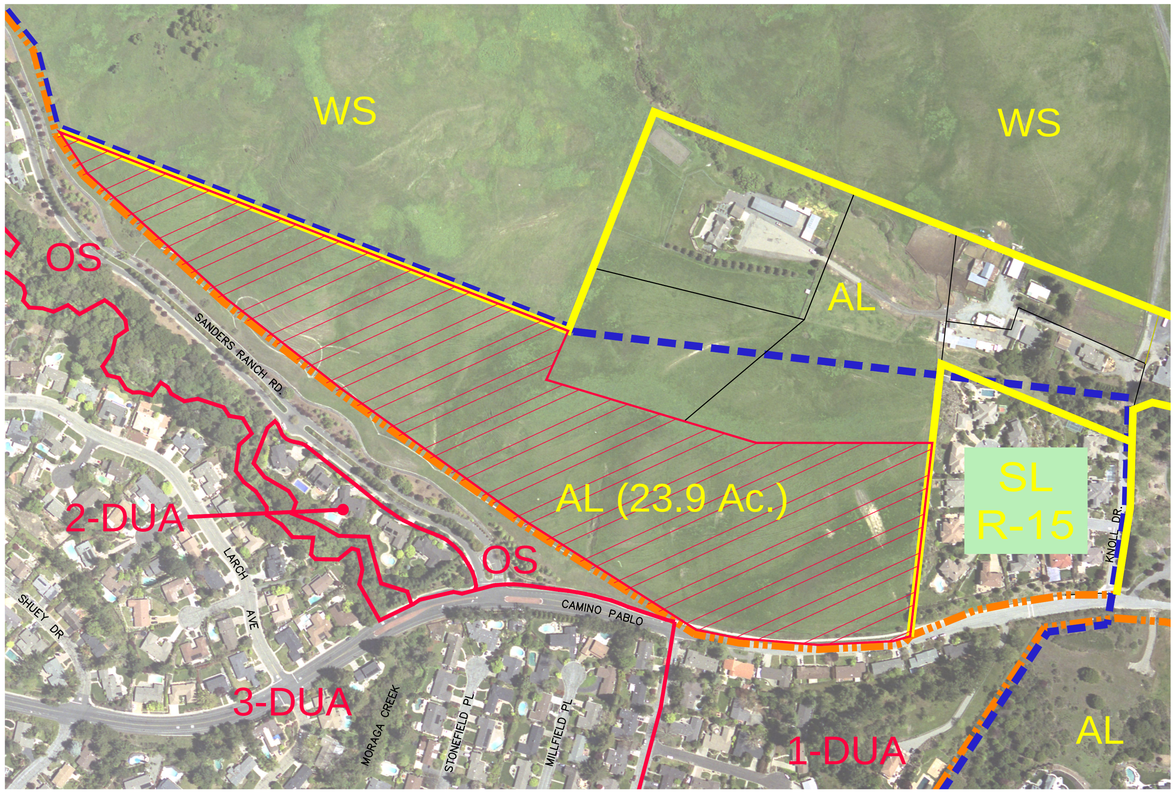
UNINCORPORATED MORAGA, CALIFORNIA
FOR
DOBBINS PROPERTIES, LLC
NOVEMBER, 2021

GENERAL PLAN AMENDMENT

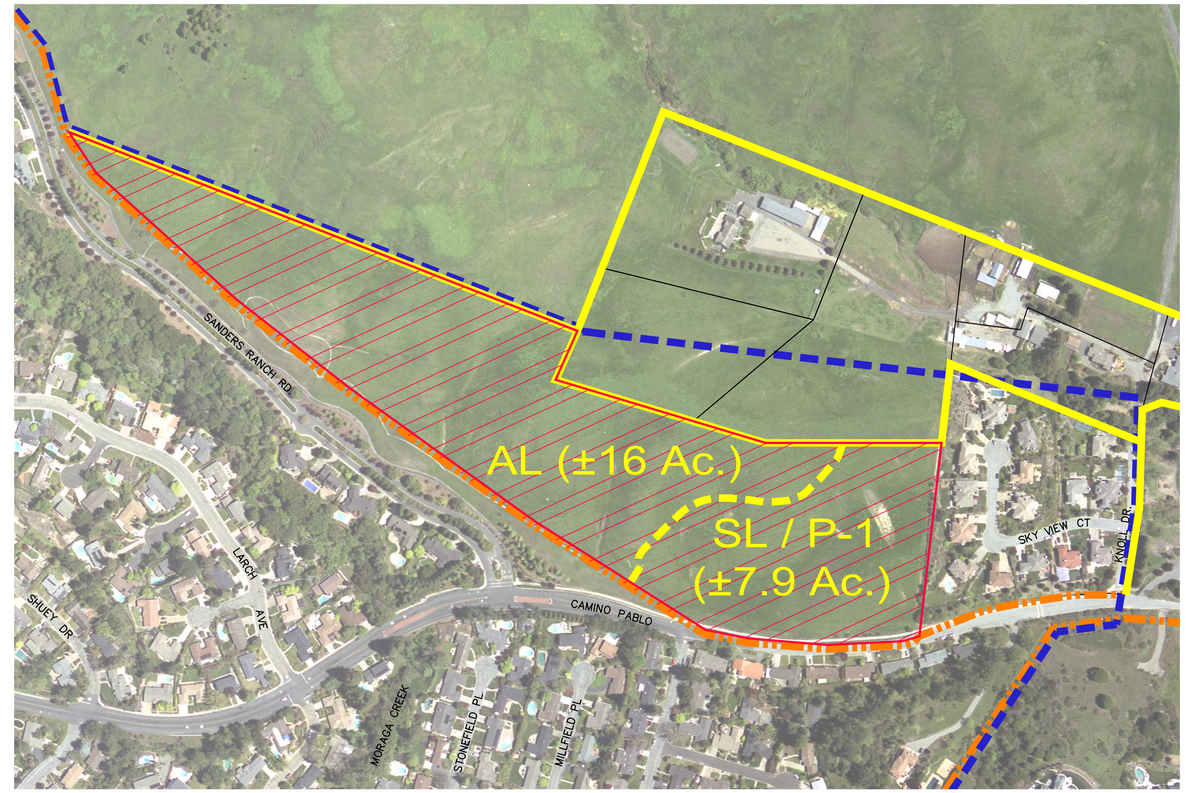


VICINITY MAP
NOT TO SCALE

EXISTING GENERAL PLAN



PROPOSED GENERAL PLAN AMENDMENT



LEGEND

PROJECT SITE	
COUNTY LAND USE BOUNDARY (EXISTING)	
COUNTY LAND USE BOUNDARY (PROPOSED)	
MORAGA LAND USE BOUNDARY	
CITY LIMIT LINE – TOWN OF MORAGA	
URBAN LIMIT LINE PER COUNTY	

COUNTY GENERAL PLAN LAND-USE DESIGNATIONS

AGRICULTURAL LANDS	AL
SINGLE FAMILY RESIDENTIAL – LOW	SL
WATERSHED	WS

COUNTY ZONING DESIGNATIONS

ZONING: PLANNED UNIT DISTRICT	P-1
ZONING: R-15	R-15

TOWN OF MORAGA GENERAL PLAN LAND-USE DESIGNATIONS

OPEN SPACE	OS
ALLOWABLE UNITS PER ACRE	1, 2, 3-DUA

SITE INFORMATION

PARCEL NUMBER:	725–829–001
EXISTING ZONE:	A–2 (GENERAL AGRICULTURE)
PROPOSED ZONE:	P–1 (PLANNED UNIT DEVELOPMENT)
EXISTING LAND USE:	AL (AGRICULTURAL LANDS)
PROPOSED LAND USE:	SL (SINGLE FAMILY RESIDENTIAL – LOW DENSITY)
SITE ACREAGE:	23.90 ACRES

200' 0' 100' 200' 400'
1 INCH = 200 FEET

PROJECT TEAM

OWNER / APPLICANT: DOBBINS PROPERTIES, LLC
1520 W. KETTLEMAN LANE, SUITE 1–A
LODI, CA 95242
(209) 339–4700
CONTACT: MATT DOBBINS

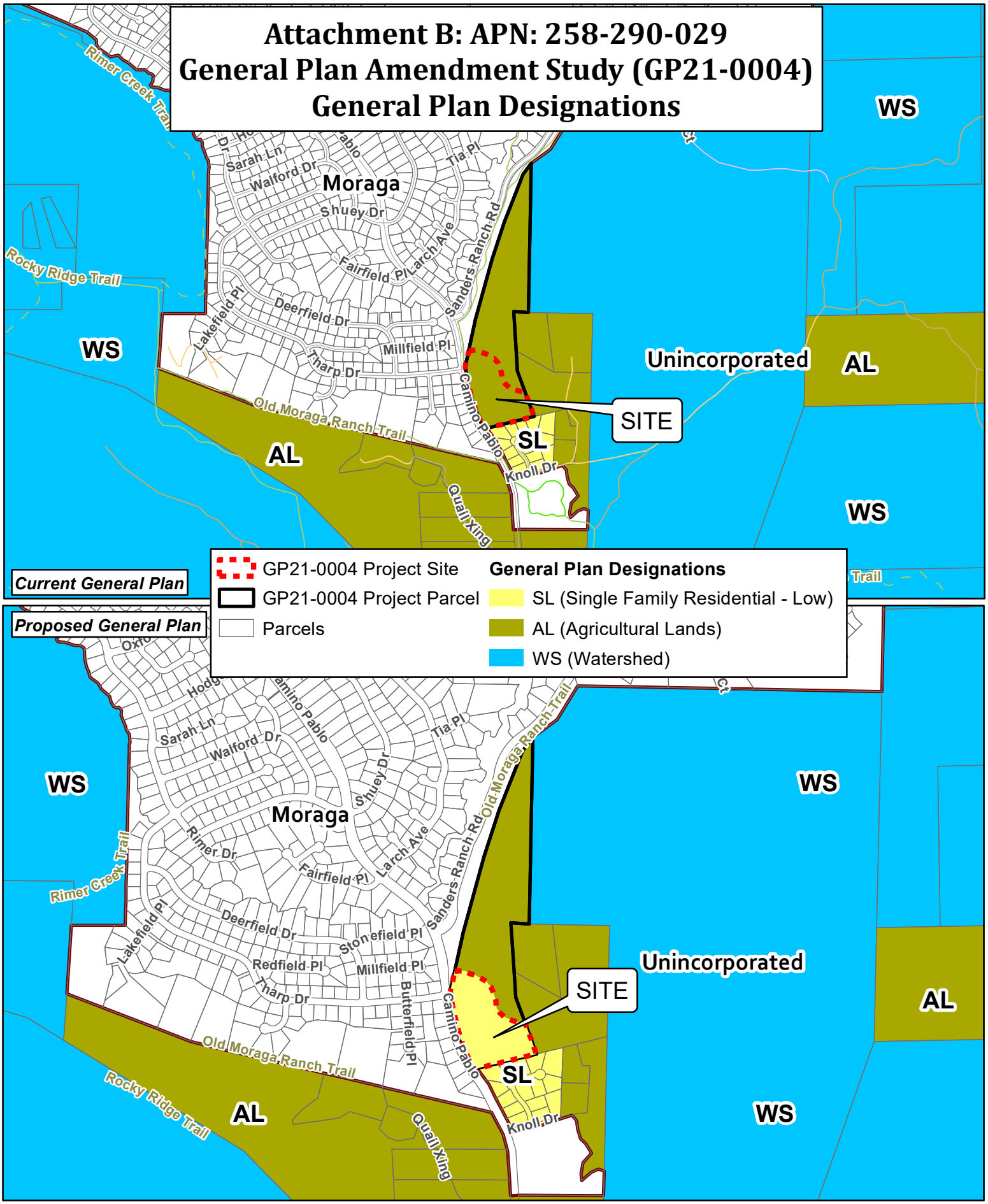
CIVIL ENGINEER: dk ENGINEERING
1931 SAN MIGUEL DRIVE, SUITE 100
WALNUT CREEK, CA 94596
(925) 932–6868
CONTACT: ANDREW PALFFY

dk ENGINEERING SURVEYING • PLANNING
1931 SAN MIGUEL DRIVE, SUITE 100, WALNUT CREEK, CALIFORNIA 94596, (925) 932-6868

PATH: F:\PROJECTS\2013\13-1060-CAMINO PABLO\DWG\COUNTY PLANNING\EXHIBIT GP AMENDMENT-1360.DWG

dk JOB# 13–1060–12

Attachment B: APN: 258-290-029
General Plan Amendment Study (GP21-0004)
General Plan Designations



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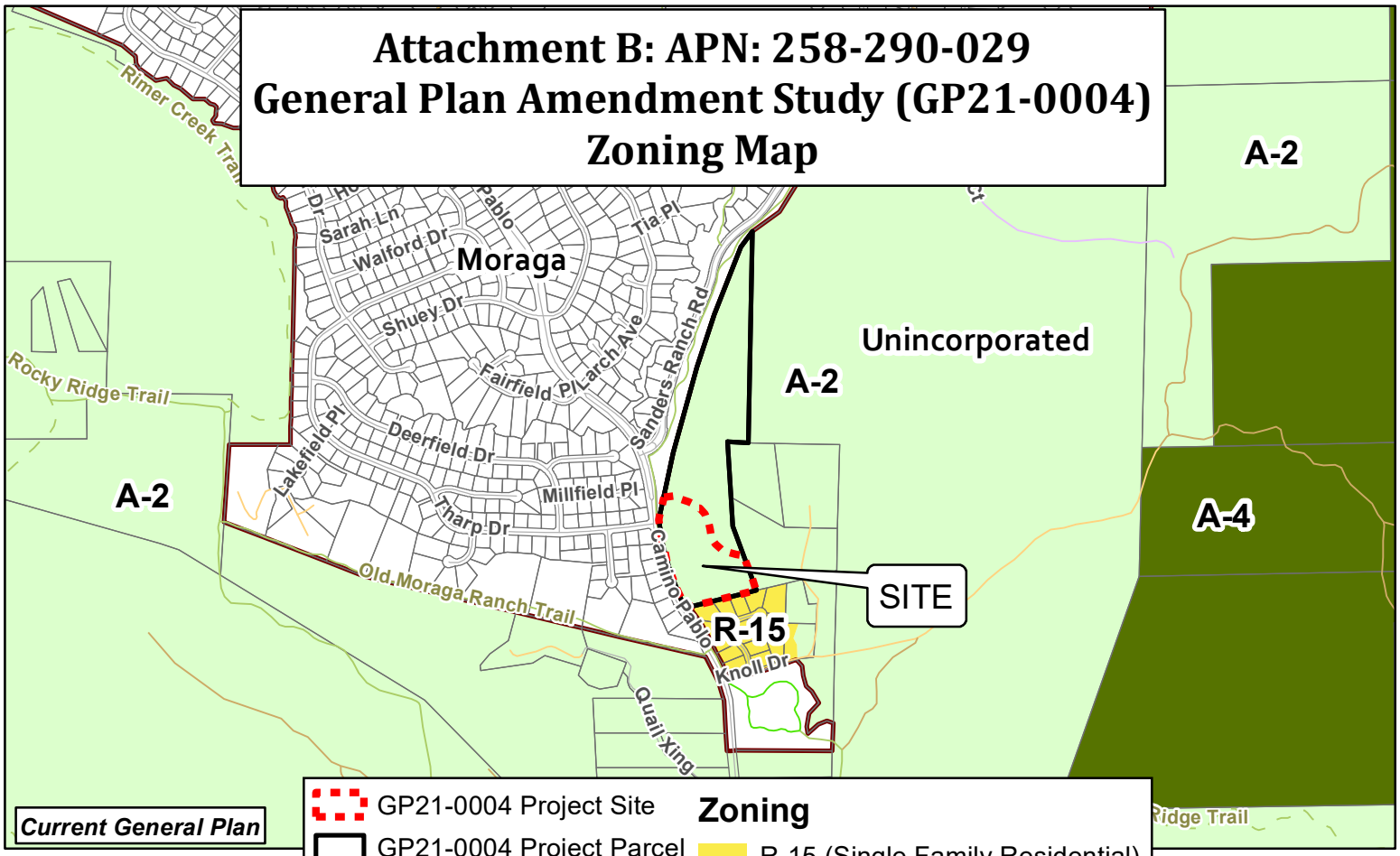
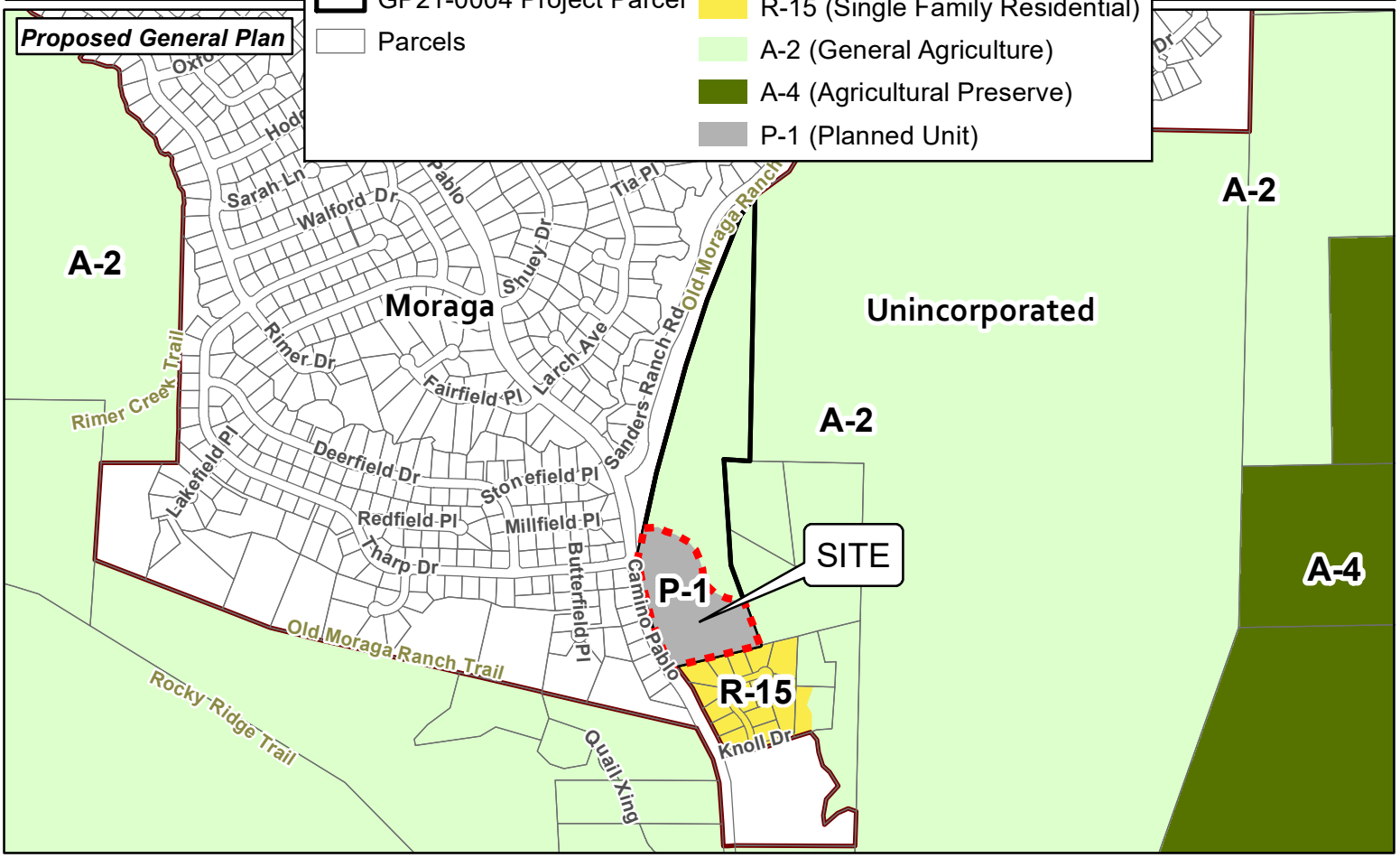
Map Created 8/26/2021
by Contra Costa County Department of Conservation and Development, GIS Group
30 Muir Road, Martinez, CA 94553
37:59:41.791N 122:07:03.756W

Attachment B: APN: 258-290-029
General Plan Amendment Study (GP21-0004)
Zoning Map





GP21-0004 Project Site
GP21-0004 Project Parcel
Parcels

Zoning
- R-15 (Single Family Residential)
- A-2 (General Agriculture)
- A-4 (Agricultural Preserve)
- P-1 (Planned Unit)

Feet
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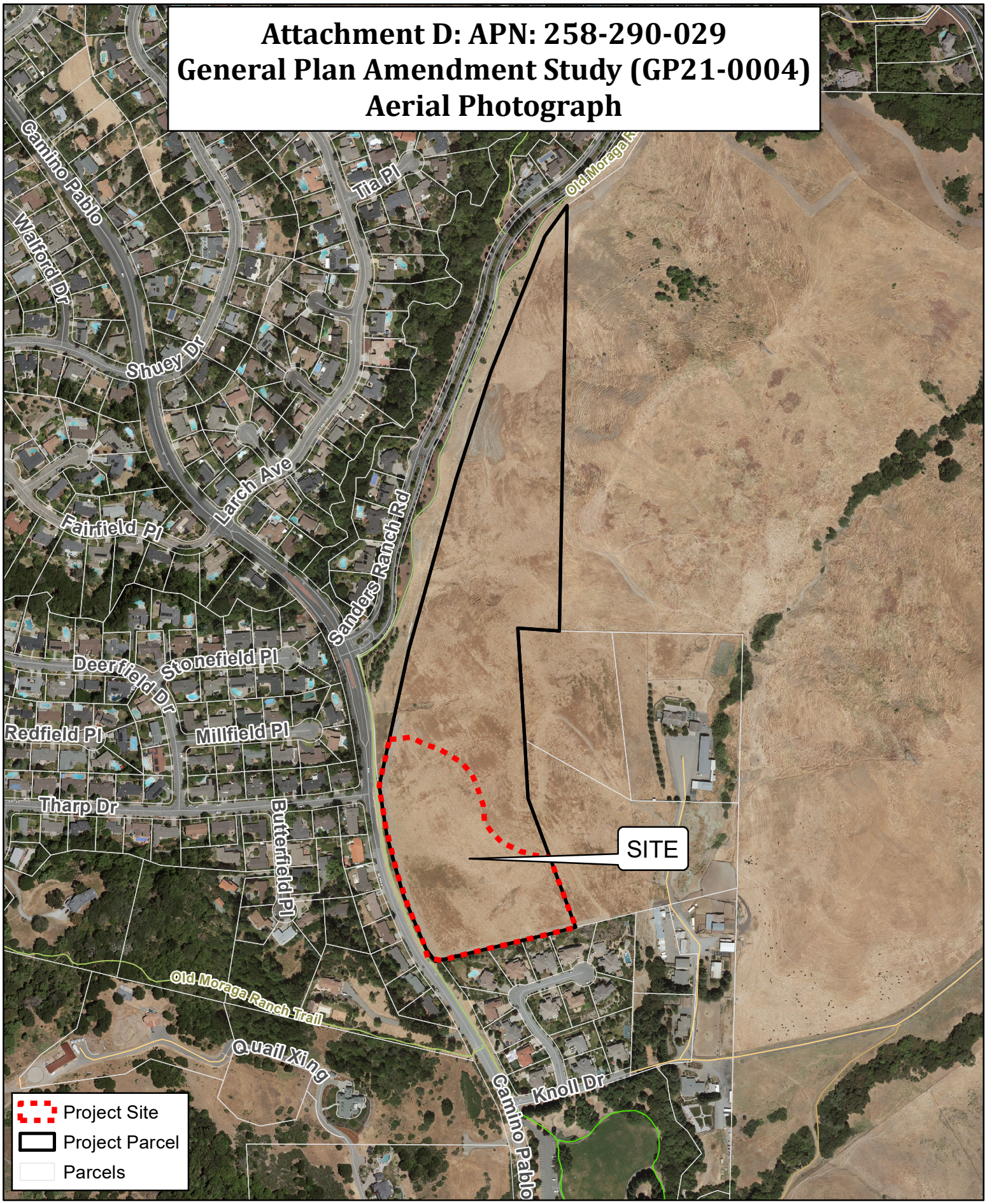
Map Created 1/12/2022
by Contra Costa County Department of Conservation and Development, GIS Group
30 Muir Road, Martinez, CA 94553
37:59:41.791N 122:07:03.756W

Attachment D: APN: 258-290-029
General Plan Amendment Study (GP21-0004)
Aerial Photograph



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Map Created 1/12/2022
by Contra Costa County Department of
Conservation and Development, GIS Group
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Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Payments for Services Provided by Tri Delta Transit

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Auditor-Controller to pay $113,867.91 to Tri Delta Transit for emergency transportation services provided to Contra Costa Regional Medical Center (CCRMC) for the period June 14, 2020 through July 3, 2021.

FISCAL IMPACT:
Approval of this action would result in a one-time expenditure of $113,867.91 and will be funded 100% by American Rescue Plan Act (ARPA) Funds.

BACKGROUND:
During the period between June 14, 2020 and July 3, 2021 Tri Delta Transit was activated during the County's ongoing response to COVID-19 in support of Emergency Function 1 (Transportation) as an asset to both the County's Emergency Operations Center (EOC) and Contra Costa Health Services Department Operations Center (DOC) to provide scalable transportation solutions to community members and groups affected by COVID-19 and to meet patient transportation needs at Contra Costa Regional Medical Center (CCRMC). Throughout most of their activation, Tri Delta Transit was covered by the County's emergency blanket purchase order and generated weekly invoices associated with services rendered during that period. However, due to administrative oversight, staff turnover, and a variety of other factors expressed by the vendor and HSD staff assigned to cover transportation,

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Erika Jenssen, 925-957-2670

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc: E Jenssen, M Wilhelm

BACKGROUND: (CONT'D)

the vendor was unable to receive payment for services rendered in good faith before the window to encumber funds through the County's Emergency PO had expired.

Due to the aforementioned administrative oversight, staff turnover and other factors that inhibited the vendor from submitting invoices for processing in a timely manner during the County's activation and response to COVID-19, the vendor was not paid by the CCRMC for services rendered in good faith. Therefore, the CCRMC has determined that Tri Delta Transit is entitled to payment for the reasonable value of services rendered under the equitable relief theory of quantum meruit. The theory provides that where a vendor has been asked to provide services without a valid purchase order, and the vendor does so to the benefit of the recipient, the vendor is entitled to recover the reasonable value of those services.

The vendor and CCRMC have ultimately decided to demobilize utilization of Tri Delta Transit at this time in support of the ongoing response to COVID-19 as a function of EF1 (Transportation) due to resource shortages on the vendor's end and availability of nominal service providers to meet the CCRMC's needs as of July 3, 2021.

CONSEQUENCE OF NEGATIVE ACTION:

If this board order is not approved, Tri Delta Transit will not be paid for transportation services rendered in good faith associated with the County's activation and response to Covid-19.

Contra Costa County

To: Board of Supervisors

From: Anna Roth, Health Services Director

Date: January 18, 2022

Subject: Amendment to Purchase Order with Metropolitan Van & Storage Inc.

RECOMMENDATION(S):
APPROVE and AUTHORIZE the Purchasing Agent to execute, on behalf of the Health Services Director, an amendment to purchase order #023100 with Metropolitan Van & Storage Inc., to increase the payment limit by $425,000 to a new payment limit of $624,000 for additional staging, storage, and delivery of emergency medical supplies as well as setup and demobilization support for community vaccination and testing sites associated with the department's ongoing response to COVID-19, for the period from August 1, 2021 through July 31, 2023.

FISCAL IMPACT:
Approval of this amendment will result in additional expenditures of up to $425,000 and will be funded 100% by American Rescue Plan Act (ARPA) allocations.

BACKGROUND:
Metropolitan Van & Storage has been providing support to the County's initial and ongoing response to COVID-19 in the staging, storage, and delivery of mutual aid supplies allocated from state and federal sources distributed to County departments, health systems, and community organizations. Additionally, Metropolitan Van & Storage Inc. has assisted with large scale setup and demobilization of testing and vaccination sites. This amendment request is required due to an unanticipated increase in utilization due to surges in need associated with the department's ongoing emergency response to COVID-19.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Erika Jenssen, 925-957-2670

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc: E Jenssen, M Wilhelm

CONSEQUENCE OF NEGATIVE ACTION:

If the recommended action is not approved, the department will not be able to provide Personal Protective Equipment (PPE) and other essential supplies as well as setup and demobilize large scale operational sites in a timely manner.

Contra Costa County

To: Board of Supervisors

From: David O. Livingston, Sheriff-Coroner

Date: January 18, 2022

Subject: Accept the Fiscal Year 2020-2021 Inmate Welfare Fund Expenditure Report

RECOMMENDATION(S):
ACCEPT the Office of the Sheriff report, in accordance with Penal Code Section 4025(e), illustrating an accounting of all Inmate Welfare Fund receipts and disbursements for Fiscal Year 2020/2021.

FISCAL IMPACT:
None.

BACKGROUND:
Penal Code Section 4025(e) states that money and property deposited in the Inmate Welfare Fund shall be expended by the Office of the Sheriff-Coroner primarily for the benefit, education, and welfare of inmates confined within the jail. Any funds not needed for the welfare of inmates may be expended for the maintenance of county jail facilities. Maintenance of county jail facilities may include, but is not limited to, the salary and benefits of personnel used in the programs to benefit the inmates, education, drug and alcohol treatment, welfare, library, accounting, and other programs deemed appropriate by the Sheriff. An itemized report of these expenditures shall be submitted annually to the Board of Supervisors.

This fund received the majority of its revenues from inmate telephone commissions

- [x] APPROVE
- [ ] OTHER
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

Contact: Heike Anderson, (925) 655-0023

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc: Heike Anderson, Alycia Rubio, Paul Reyes

BACKGROUND: (CONT'D)

and commissary sales. The Director of Inmate Services, working with the public members of the Inmate Welfare Committee, manages the delivery of professional services, establishes an annual budget and oversees expenditures for the Sheriff.

The Inmate Welfare Fund continues to provide valuable professional, educational, and recreational services to persons in custody at the Martinez Detention Facility, West County Detention Facility, and the Marsh Creek Detention Facility.

CONSEQUENCE OF NEGATIVE ACTION:

If unapproved, the County will not be in compliance with Penal Code section 4025(e).

ATTACHMENTS

IWF FY 20-21

Inmate Welfare Fund
Statement of Receipts, Disbursements, and Fund Balance
Fiscal Year Ended June 30, 2021

Receipts:

GTL Telephone Commissions	$144,000	
Canteen Commissions	843,794	
WCDF Inmate Industries	24,056	
WCDF Frame Shop	1,122	
Investment Interest	1,114	
Total Receipts		$1,014,086

Disbursements:

General Expenditures		
Maintenance/Equipment Lease	11,694	
Personal Care/Hygiene/Rewards	1,037	
BART/Bus Tickets	18,000 (AB-109 Funded)	
Telerus (Inmate information line)	18,000	
Other Svc/GSD, labor	244	
Entertainment (TV, Board Games, Etc.)	26,550	
AB-109 Sub-Total		$18,000
IWF Sub-Total		$57,525
Education and Welfare		
Bay Area Chaplains Contractual Services	$166,860	
Office of Education Contractual Services	180	
	874,815 (AB-109 Funded)	
Library Program	254,207	
Inmate Legal Services	15,944	
MCDF Landscape Program	38,679	
WCDF Inmate Industries	124,750	
	47,084 (AB-109 Funded)	
WCDF Frame Shop Program	30,827	
AB-109 Sub-Total		$921,899
IWF Sub-Total		$631,447
Other		
Staff Salaries/Benefits	$342,451	
Staff Travel Expenses	1,727	
Communication	0	

Office Supplies	53	
IWF Sub-Total		$ 344,231

Total Disbursements, IWF & AB109

939,899 (AB-109)
1,033,203 (IWF)
$1,973,102

Receipts less Disbursements (IWF Only)	$ 19,117
Cash & Investments	$2,967,681
Total	$2,986,798

Closing Date 12-31-2021

Contra Costa County

To: Board of Supervisors

From: Monica Nino, County Administrator

Date: January 18, 2022

Subject: FY 2022/23 Recommended Budget Development

RECOMMENDATION(S):

1. DECLARE the Board's intent to adopt a FY 2022/23 General Fund budget that balances annual expenses and revenues;
2. ACKNOWLEDGE that significant issues will continue to create financial pressure on the Board of Supervisors in its effort to provide essential services and programs which Contra Costa County residents need, or expect will be provided to them by the County;
3. ACKNOWLEDGE that, in addition to the effects on the provision of services for residents, that State and local economic issues have challenged the maintenance of the Board of Supervisors' reserve policy;
4. ACKNOWLEDGE that maintaining the County's reserve funds, maintaining an improved credit rating, and maintenance of the County's physical assets remain a priority of the Board of Supervisors;
5. RE-AFFIRM the Board of Supervisors' policy prohibiting the use of County General Purpose Revenue to back-fill State revenue cuts;
6. DIRECT Department Heads to work closely with the County Administrator to develop a Recommended Budget for consideration of the Board of Supervisors that balances expenses with revenues, minimizes net County cost and maintains core service levels;
7. ACKNOWLEDGE that the 2022/2023 assessment roll will be prepared using the maximum inflation factor of 1.02;
8. ACKNOWLEDGE that the employees of Contra Costa County have been affected as a result of the requirement to balance the County's expenses with available revenues;

☑ APPROVE ☐ OTHER

☑ RECOMMENDATION OF CNTY ADMINISTRATOR ☐ RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** ☑ APPROVED AS RECOMMENDED ☐ OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

Contact: Lisa Driscoll, County Finance Director (925) 655-2047

By: June McHuen, Deputy

cc: All County Departments (via CAO)

RECOMMENDATION(S): (CONT'D)

9. DIRECT the County Administrator to continue to meet with the County's union representatives and employees to explain the size, scope and anticipated length of the County's fiscal challenges and to gain their input/suggestions;
10. DIRECT the County Administrator to continue to make this information readily available to the residents of the County;
11. DIRECT Departments, in cooperation with Labor Relations and Union representatives, to begin, if necessary, the meet-and-confer process with employee representatives about the impact of potential program reductions on the terms and conditions of employment for affected employees;
12. DIRECT the County Administrator to return to the Board of Supervisors on April 12, 2022 with a FY 2022/2023 Recommended Budget that meets the above requirements;
13. DESIGNATE Tuesday, April 12, 2022 for FY 2022/2023 budget hearings and Tuesday, May 10, 2022 for the adoption of the FY 2022/23 Recommended County and Special District Budgets; and
14. DIRECT the Clerk of the Board to publish notice of the budget hearings and the availability of the Recommended Budget documents.

FISCAL IMPACT:

None at this time. However, the result of the recommendations herein, if implemented, are designed to maintain the County's fiscal stability in FY 2022/2023 and improve it in subsequent years.

BACKGROUND:

The Board of Supervisors, Department Heads, and our Employees worked and sacrificed to stabilize the County's finances during the last decade. Now our task will be to preserve this legacy so as to prevent a return to those years in which we were making painful cuts to programs and to the staff that was necessary to provide those services.

There are always factors over which the County has little or no control (such as a pandemic, federal and State budgets actions, economic changes, and demographics) that will affect the size of the baseline budget and ultimately challenge the County's budget. Over the next five years we can expect more fiscal volatility due to the Federal Tax plan, State legislative action, as well as negotiated wage and benefit increases.

The majority of the County's general purpose revenues are generated through property taxes. Revenue and Taxation Code section 51 provides that base year values determined under section 110.1 shall be compounded annually by an inflation factor not to exceed 2 percent. Section 51(a)(1)(C) provides that, for any assessment year commencing on or after January 1, 1998, the inflation factor shall be the percentage change, rounded to the nearest one-thousandth of 1 percent, from October of the prior fiscal year to October of the current fiscal year in the California Consumer Price Index (CCPI) for all items, as determined by the California Department of Industrial Relations. Information from the Department of Industrial Relations shows that the CCPI increased from 286.843 in October 2020 to 302.793 in October 2021. Rounded to the nearest one-thousandth of 1 percent, this is an increase of 5.561 percent. Accordingly, we will prepare our 2022 assessment roll using the maximum inflation factor of 1.02 (base year value change of 2%).

The Board of Supervisors has authorized the establishment of an Office of Racial Equity and Social Justice (D. 4, 11/10/20). Although the Office has not yet been established, departments are encouraged to include the voices of diverse communities in budget development discussions with the goal of advancing racial equity and/or social justice through County programs.

As per the norm, Department Heads will be expected to work closely with the County Administrator to design a balanced budget that restricts the growth in net County cost while minimizing service delivery cuts. Wherever possible, categorical/program revenues will be increased to offset the increased cost of doing business. Restrictions on increases in net County cost needed to balance the budget may result in the loss of federal and State program revenues, and this added loss may cause program reductions.

Meet and Confer

Departmental budget requests are due to the County Administrator's Office on February 4. At that time Department Heads will know which, if any, positions may be affected by reductions necessary to balance the budget. Departments, in cooperation with Labor Relations, will if necessary, begin the meet-and-confer process with employee representatives regarding the impact of potential program reductions on the terms and conditions of employment for affected employees. Early planning will allow Departments a reasonable period of time to meet and confer, and permit them to implement all budgetary required actions prior to July 1, 2022. Per the norm, this progress will allow the County to adopt a budget that is balanced from the first day of the new fiscal year.

Public Notice

The County Budget Act requires that the Board of Supervisors publish a notice in a newspaper of general circulation throughout the county, stating when budget documents will be available and the date of Budget Hearings. The FY 2022/23 Recommended Budget document will be available to the public approximately April 1, 2022.

Conclusion

The County Administrator will return to the Board on April 12 with a FY 2022/23 Recommended Budget that meets the requirements listed above. Tuesday, April 12 will be reserved for FY 2022/23 budget hearings. Additionally, it is recommended that the County Administrator return to the Board of Supervisors on Tuesday, May 10 for adoption of the FY 2022/23 Recommended County and Special District Budgets, including any changes the Board makes on April 12.

CONSEQUENCE OF NEGATIVE ACTION:

Delayed processing of the FY 2022/23 Recommended Budget and potential impact on the fiscal stability of the County and Special Districts.

ATTACHMENTS

2022-23 California Consumer Price Index

STATE OF CALIFORNIA

STATE BOARD OF EQUALIZATION
PROPERTY TAX DEPARTMENT
PO BOX 942879, SACRAMENTO, CALIFORNIA 94279-0064
1-916-274-3350 ● FAX 1-916-285-0134
www.boe.ca.gov

December 27, 2021

No. 2021/065

TO COUNTY ASSESSORS:

2022-23 CALIFORNIA CONSUMER PRICE INDEX

Revenue and Taxation Code section 51 provides that base year values determined under section 110.1 shall be compounded annually by an inflation factor, not to exceed 2 percent. Section 51(a)(1)(C) provides that for any assessment year commencing on or after January 1, 1998, the inflation factor shall be the percentage change, rounded to the nearest one-thousandth of 1 percent, from October of the prior fiscal year to October of the current fiscal year in the California Consumer Price Index (CCPI) for all items, as determined by the California Department of Industrial Relations.

Information from the Department of Industrial Relations shows that the CCPI increased from 286.843 in October 2020 to 302.793 in October 2021. Rounded to the nearest one-thousandth of 1 percent, this is an increase of 5.561 percent.

Accordingly, please prepare your **2022** assessment roll using an inflation factor of **1.02**.

A list of the final inflation factors announced for current and prior years is enclosed. If you have any questions, please contact our County-Assessed Properties Division at 1-916-274-3350.

Sincerely,

/s/ David Yeung

David Yeung
Deputy Director
Property Tax Department

DY:gs
Enclosure

FINAL INFLATION FACTORS FOR CURRENT AND PRIOR YEARS

Year	CCPI % Change	Base Year Value Change[1]	Factor
1976-77	6.250	2%	1.02
1977-78	7.169	2%	1.02
1978-79	8.233	2%	1.02
1979-80	9.826	2%	1.02
1980-81	17.316	2%	1.02
1981-82	7.134	2%	1.02
1982-83	11.137	2%	1.02
1983-84	1.033	1%	1.01
1984-85	5.034	2%	1.02
1985-86	5.089	2%	1.02
1986-87	4.374	2%	1.02
1987-88	2.095	2%	1.02
1988-89	5.160	2%	1.02
1989-90	4.730	2%	1.02
1990-91	4.758	2%	1.02
1991-92	6.390	2%	1.02
1992-93	3.039	2%	1.02
1993-94	3.441	2%	1.02
1994-95	2.308	2%	1.02
1995-96	1.194	1.19%	1.0119
1996-97	1.115	1.11%	1.0111
1997-98	2.399	2%	1.02
1998-99	2.081	2%	1.02
1999-2000	1.853	1.85%	1.01853
2000-01	3.214	2%	1.02
2001-02	4.172	2%	1.02
2002-03	3.215	2%	1.02
2003-04	2.459	2%	1.02
2004-05	1.867	1.87%	1.01867
2005-06	3.665	2%	1.02
2006-07	4.596	2%	1.02
2007-08	2.269	2%	1.02
2008-09	3.380	2%	1.02
2009-10	3.477	2%	1.02
2010-11	-0.237	-0.24%	0.99763
2011-12	0.753	0.75%	1.00753
2012-13	2.889	2%	1.02
2013-14	3.081	2%	1.02
2014-15	0.454	0.45%	1.00454
2015-16	1.998	2.00%	1.01998
2016-17	1.525	1.53%	1.01525

Year	CCPI % Change	Base Year Value Change	Factor
2017-18	2.619	2%	1.02
2018-19	2.962	2%	1.02
2019-20	3.847	2%	1.02
2020-21	2.980	2%	1.02
2021-22	1.036	1.04%	1.01036
2022-23	5.561	2%	1.02

[1] Increase to base year value is limited to 2 percent pursuant to California Constitution, article XIII A, section 2(b).

Contra Costa County

To: Board of Supervisors

From: Maureen Toms, Oversight Board Secretary

Date: January 18, 2022

Subject: Recognized Obligation Payment Schedule (ROPS) July 1, 2022 - June 30, 2023

RECOMMENDATION(S):
ADOPT Resolution No. 2022/24 approving the Recognized Obligation Payment Schedule ("ROPS 22-23") for the period of July 1, 2022 through June 30, 2023.

FISCAL IMPACT:
No impact to the General Fund. Since the Contra Costa County Redevelopment Agency dissolved (the "Dissolved RDA"), the tax allotment is now deposited in the Redevelopment Property Tax Trust Fund ("RPTTF"), which is administered by the County Auditor-Controller. Distributions are made semi-annually from the RPTTF to the Successor Agency by the County Auditor-Controller to fund the Successor Agency's administrative budget and Recognized Obligation Payment Schedule. These funds are distinct and separate from other funds used by the Department of Conservation and Development. According to State law, any obligation of the Successor Agency that cannot be funded by the RPTTF would not be an obligation of the County.

BACKGROUND:
Resolution No. 2022-24 adopts ROPS 22-23, which is included as Exhibit A to this report. After adoption by the Successor Agency, ROPS 22-23 will be submitted to the Countywide Oversight Board for approval. The Oversight Board is scheduled to meet on January 24, 2022. As required under Health and Safety Code Section 34179.6, ROPS 22-23 will be submitted to the State Controller's Office, Department of Finance (DOF) and the County Auditor-Controller and will be posted on the Successor Agency's website. The DOF must receive ROPS 22-23 no later than February 1, 2022.

ROPS 22-23 authorizes all payments to be made by the Successor Agency for enforceable obligations for the twelve-month time period between July 1, 2022, and June 30, 2023. The payments noted on the ROPS are estimates. In most cases, assumptions made for ROPS 22-23 were based on actual expenditures in the prior ROPS and expected expenditures in the upcoming period.

- [x] APPROVE
- [x] RECOMMENDATION OF CNTY ADMINISTRATOR
- [ ] OTHER
- [ ] RECOMMENDATION OF BOARD COMMITTEE

Action of Board On: **01/18/2022** [x] APPROVED AS RECOMMENDED [ ] OTHER

Clerks Notes:

VOTE OF SUPERVISORS

AYE: John Gioia, District I Supervisor
Candace Andersen, District II Supervisor
Diane Burgis, District III Supervisor
Karen Mitchoff, District IV Supervisor
Federal D. Glover, District V Supervisor

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.
ATTESTED: January 18, 2022
Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

Contact: Maureen Toms, 925-655-2895

cc:

BACKGROUND: (CONT'D)

The title page of ROPS 22-23 shows that enforceable obligations require $8,287,374 from the Redevelopment Property Tax Trust Fund (the "RPTTF") and $250,000 for Administrative RPTTF. This amount assumes the RPTTF has already set aside pass-through payments to taxing entities and administrative costs for the County Auditor-Controller.

CONSEQUENCE OF NEGATIVE ACTION:

Without approving the Recognized Obligation Payment Schedule, the County Auditor-Controller would not be able to allocate funds to the Successor Agency for staffing services and payment of recognized obligations during this twelve-month period, and the Successor Agency would risk defaulting on enforceable obligations.

AGENDA ATTACHMENTS

Resolution 2022/24

ROPS 22-23

MINUTES ATTACHMENTS

Signed Resolution No. 2022/24

THE BOARD OF SUPERVISORS OF CONTRA COSTA COUNTY, CALIFORNIA

and for Special Districts, Agencies and Authorities Governed by the Board

Adopted this Resolution on 01/18/2022 by the following vote:

AYE:	5	**John Gioia** **Candace Andersen** **Diane Burgis** **Karen Mitchoff** **Federal D. Glover**
NO:		
ABSENT:		
ABSTAIN:		
RECUSE:		

Resolution No. 2022/24

THE SUCCESSOR AGENCY FOR THE FORMER CONTRA COSTA COUNTY REDEVELOPMENT AGENCY APPROVING THE RECOGNIZED OBLIGATION PAYMENT SCHEDULE FOR THE PERIOD JULY 2022 THROUGH JUNE 2023 FOR CONTRA COSTA COUNTY SUCCESSOR AGENCY.

WHEREAS, the California state legislature enacted Assembly Bill x1 26 (the "Dissolution Act") to dissolve redevelopment agencies formed under the Community Redevelopment Law (Health and Safety Code Section 33000 et seq.); and

WHEREAS, on January 17, 2012 and pursuant to Health and Safety Code Section 34173, the Board of Supervisors of the County of Contra Costa (the "Board of Supervisors") declared that the County of Contra Costa, a political subdivision of the State of California (the "County"), would act as successor agency (the "Successor Agency") for the dissolved Redevelopment Agency of the County of Contra Costa (the "Dissolved RDA") effective February 1, 2012; and

WHEREAS, on February 1, 2012, the RDA was dissolved pursuant to Health and Safety Code Section 34172; and

WHEREAS, the Dissolution Act provides for the appointment of an oversight board (the "Oversight Board") with specific duties to approve certain Successor Agency actions pursuant to Health and Safety Code Section 34180 and to direct the Successor Agency in certain other actions pursuant to Health and Safety Code Section 34181; and

WHEREAS, pursuant to Assembly Bill 1484 enacted June 27, 2012 to amend various provisions of the Dissolution Act, the Successor Agency is now declared to be a separate legal entity from the County of Contra Costa; and

WHEREAS, on July 18, 2013, the Department of Finance issued the Successor Agency a "finding of completion" pursuant to Health and Safety Code Section 34179.7 and as a result of the issuance of the finding of completion, pursuant to 34191.4 the Successor Agency is authorized to: (1) place loan agreements between the Dissolved RDA and the County on the Recognized Obligation Payment Schedule ("ROPS ") and (2) utilize proceeds derived from bonds issued prior to January 1, 2011, in a manner consistent with the original bond covenants; and

WHEREAS, the ROPS 22-23 must be submitted by the Successor Agency to the Countywide Oversight Board for their approval in accordance with the Dissolution Act; and

WHEREAS, in accordance with Health and Safety Section 34179.6, the ROPS 22-23 will be submitted by the Successor Agency to the Countywide Oversight Board, Contra Costa County Administrative Officer, the Contra Costa County Auditor-Controller, and the State Department of Finance; and

WHEREAS, the Successor Agency is charged with paying for and completing the enforceable obligations of the Dissolved RDA (each as further defined in Health and Safety Code Section 34171(d)), disposing of the properties and other assets of the Dissolved RDA, and unwinding the affairs of the Dissolved RDA; and

WHEREAS, the accompanying staff report provides supporting information upon which the actions set forth in this Resolution are based.

NOW, THEREFORE, the Successor Agency to the Contra Costa County Redevelopment Agency does hereby finds, resolves, approves, and determines that the foregoing recitals are true and correct, and together with information provided by the Successor

Agency staff and the public, form the basis for the approvals, findings, resolutions and determinations set forth below.

BE IT FURTHER RESOLVED that under Health and Safety Code Section 34180(g), the Oversight Board must approve establishment of a ROPS for the Successor Agency.

BE IT FURTHER RESOLVED in accordance with the Dissolution Act, the Successor Agency to the Contra Costa County Redevelopment Agency hereby approves ROPS 22-23, including the agreements and obligations described on the ROPS 22-23, and hereby determines that such agreements and obligations constitute "enforceable obligations" and "recognized obligations" for all purposes of the Dissolution Act. In connection with such approval, the Successor Agency to the Contra Costa County Redevelopment Agency makes the specific findings set forth below.

BE IT FURTHER RESOLVED in accordance with the Dissolution Act, the Successor Agency to the Contra Costa County Redevelopment Agency directs staff to forward ROPS 22-23, to the Countywide Oversight Board for consideration on January 24, 2022, with submittal to the Department of Finance by February 1, 2022.

Contact: Maureen Toms, 925-655-2895

I hereby certify that this is a true and correct copy of an action taken and entered on the minutes of the Board of Supervisors on the date shown.

ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By: June McHuen, Deputy

cc:

THE BOARD OF SUPERVISORS OF CONTRA COSTA COUNTY, CALIFORNIA

and for Special Districts, Agencies and Authorities Governed by the Board

Adopted this Resolution on 01/18/2022 by the following vote:

AYE:	5	**John Gioia** **Candace Andersen** **Diane Burgis** **Karen Mitchoff** **Federal D. Glover**
NO:		
ABSENT:		
ABSTAIN:		
RECUSE:		

Resolution No. 2022/24

THE SUCCESSOR AGENCY FOR THE FORMER CONTRA COSTA COUNTY REDEVELOPMENT AGENCY APPROVING THE RECOGNIZED OBLIGATION PAYMENT SCHEDULE FOR THE PERIOD JULY 2022 THROUGH JUNE 2023 FOR CONTRA COSTA COUNTY SUCCESSOR AGENCY.

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WHEREAS, on February 1, 2012, the RDA was dissolved pursuant to Health and Safety Code Section 34172; and

WHEREAS, the Dissolution Act provides for the appointment of an oversight board (the "Oversight Board") with specific duties to approve certain Successor Agency actions pursuant to Health and Safety Code Section 34180 and to direct the Successor Agency in certain other actions pursuant to Health and Safety Code Section 34181; and

WHEREAS, pursuant to Assembly Bill 1484 enacted June 27, 2012 to amend various provisions of the Dissolution Act, the Successor Agency is now declared to be a separate legal entity from the County of Contra Costa; and

WHEREAS, on July 18, 2013, the Department of Finance issued the Successor Agency a "finding of completion" pursuant to Health and Safety Code Section 34179.7 and as a result of the issuance of the finding of completion, pursuant to 34191.4 the Successor Agency is authorized to: (1) place loan agreements between the Dissolved RDA and the County on the Recognized Obligation Payment Schedule ("ROPS ") and (2) utilize proceeds derived from bonds issued prior to January 1, 2011, in a manner consistent with the original bond covenants; and

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WHEREAS, the Successor Agency is charged with paying for and completing the enforceable obligations of the Dissolved RDA (each as further defined in Health and Safety Code Section 34171(d)), disposing of the properties and other assets of the Dissolved RDA, and unwinding the affairs of the Dissolved RDA; and

WHEREAS, the accompanying staff report provides supporting information upon which the actions set forth in this Resolution are based.

NOW, THEREFORE, the Successor Agency to the Contra Costa County Redevelopment Agency does hereby finds, resolves, approves, and determines that the foregoing recitals are true and correct, and together with information provided by the Successor

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ATTESTED: January 18, 2022

Monica Nino, County Administrator and Clerk of the Board of Supervisors

By June McHuen, Deputy

Contact: Maureen Toms, 925-655-2895

cc:

Recognized Obligation Payment Schedule (ROPS 22-23) - Summary
Filed for the July 1, 2022 through June 30, 2023 Period

Successor Agency: Contra Costa County

County: Contra Costa

Current Period Requested Funding for Enforceable Obligations (ROPS Detail)	22-23A Total (July - December)	22-23B Total (January - June)	ROPS 22-23 Total
A Enforceable Obligations Funded as Follows (B+C+D)	**$ -**	**$ -**	**$ -**
B Bond Proceeds	-	-	-
C Reserve Balance	-	-	-
D Other Funds	-	-	-
E Redevelopment Property Tax Trust Fund (RPTTF) (F+G)	**$ 3,837,399**	**$ 4,449,975**	**$ 8,287,374**
F RPTTF	3,712,399	4,324,975	8,037,374
G Administrative RPTTF	125,000	125,000	250,000
H Current Period Enforceable Obligations (A+E)	**$ 3,837,399**	**$ 4,449,975**	**$ 8,287,374**

Certification of Oversight Board Chairman:

Pursuant to Section 34177 (o) of the Health and Safety code, I hereby certify that the above is a true and accurate Recognized Obligation Payment Schedule for the above named successor agency.

Name Title

/s/

Signature Date

Contra Costa County
Recognized Obligation Payment Schedule (ROPS 22-23) - ROPS Detail
July 1, 2022 through June 30, 2023

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
											ROPS 22-23A (Jul - Dec)						ROPS 22-23B (Jan - Jun)					
											Fund Sources						Fund Sources					
Item #	Project Name	Obligation Type	Agreement Execution Date	Agreement Termination Date	Payee	Description	Project Area	Total Outstanding Obligation	Retired	ROPS 22-23 Total	Bond Proceeds	Reserve Balance	Other Funds	RPTTF	Admin RPTTF	22-23A Total	Bond Proceeds	Reserve Balance	Other Funds	RPTTF	Admin RPTTF	22-23B Total
								$130,855,544		$8,287,374	$-	$-	$-	$3,712,399	$125,000	$3,837,399	$-	$-	$-	$4,324,975	$125,000	$4,449,975
46	Placemaking Transit Village	OPA/DDA/ Construction	12/19/ 2005	07/10/2026	Avalon Bay	Placemaking improvements (i.e. parks, etc.)	C	-	Y	$-	-	-	-	-	-	$-	-	-	-	-	-	$-
60	Bond-License agreement	Professional Services	03/31/ 2006	03/31/2038	DAC	Document repository for bond issues	ALL	45,500	N	$4,000	-	-	-	4,000	-	$4,000	-	-	-	-	-	$-
61	Bond-Treasurer fees	Fees	07/10/ 1984	08/01/2037	CCC Treasurer	Cash management for bond issues	ALL	-	Y	$-	-	-	-	-	-	$-	-	-	-	-	-	$-
63	Hookston Station Remediation	Remediation	11/05/ 1997	08/01/2037	Bank Of Amer, Trustee	Remediation of hazardous material	C	1,900,000	N	$250,000	-	-	-	250,000	-	$250,000	-	-	-	-	-	$-
77	Financial Assistance	OPA/DDA/ Construction	11/01/ 1998	11/01/2028	Bridge Housing	Agency assistance	C	600,000	N	$100,000	-	-	-	100,000	-	$100,000	-	-	-	-	-	$-
78	Financial Assistance	OPA/DDA/ Construction	12/19/ 2005	05/01/2036	Avalon Bay	Agency assistance.	C	17,261,556	N	$1,327,812	-	-	-	-	-	$-	-	-	-	1,327,812	-	$1,327,812
82	I H Trail/ Hookston Remediation (IH Hookston Station)	Professional Services	08/15/ 2012	12/31/2027	Contra Costa County - County Counsel	Remediation of I H corridor parcels (IH Hookston Station)	C	25,000	N	$20,000	-	-	-	10,000	-	$10,000	-	-	-	10,000	-	$10,000
91	Hookston Station Remediation (IH Hookston Station)	Professional Services	01/23/ 2012	06/15/2017	Ensafe	Administrator of haz-mat remediation fund. (IH Hookston Station)	C	42,158	N	$9,000	-	-	-	5,000	-	$5,000	-	-	-	4,000	-	$4,000
94	Administrative Allowance	Admin Costs	07/01/ 2016	05/01/2037	Contra Costa County	Administrative Allowance	ALL	4,000,000	N	$250,000	-	-	-	-	125,000	$125,000	-	-	-	-	125,000	$125,000
110	Disclosure Statements Reporting Compliance	Fees	04/20/ 1999	03/01/2038	Fraser & Associates/ Schiff Harden	Disclosure Statements Compliance Services	ALL	85,000	N	$5,000	-	-	-	1,500	-	$1,500	-	-	-	3,500	-	$3,500
125	Financial Assistance-Escrow	OPA/DDA/ Construction	12/19/ 2005	05/01/2036	Banking/ Escrow Fund TBD	Related to #78, but the escrow payee		23,078,677	N	$356,405	-	-	-	356,405	-	$356,405	-	-	-	-	-	$-

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
Item #	Project Name	Obligation Type	Agreement Execution Date	Agreement Termination Date	Payee	Description	Project Area	Total Outstanding Obligation	Retired	**ROPS 22-23 Total**	**ROPS 22-23A (Jul - Dec)**					**22-23A Total**	**ROPS 22-23B (Jan - Jun)**					**22-23B Total**
											Fund Sources						**Fund Sources**					
											Bond Proceeds	Reserve Balance	Other Funds	RPTTF	Admin RPTTF		Bond Proceeds	Reserve Balance	Other Funds	RPTTF	Admin RPTTF	
						portion																
126	2017 Series A&B Debt Service	Refunding Bonds Issued After 6/27/12	08/01/ 2018	08/01/2037	US BANK	Series 2017 A&B Tax Allocation Bonds		83,755,653	N	$5,960,157	-	-	-	2,980,494	-	$2,980,494	-	-	-	2,979,663	-	$2,979,663
127	Trustee fees for 2017 Series A&B	Fees	08/01/ 2018	08/01/2038	US BANK	Annual administration fees - 2017 Series A&B		62,000	N	$5,000	-	-	-	5,000	-	$5,000	-	-	-	-	-	$-

Contra Costa County
Recognized Obligation Payment Schedule (ROPS 22-23) - Notes
July 1, 2022 through June 30, 2023

Item #	Notes/Comments
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