Contra Costa County Distributed Energy Resources Plan

At the Board of Supervisors Ad Hoc Committee on Sustainability meeting of January 22, 2018, Public Works representatives were directed to provide additional information on the proposed Contra Costa County Distributed Energy Resources Plan. In response, this brief report provides a definition of DER and presents Public Works proposed goals and implementation strategy.

What is Distributed Energy Resources (DER)?

The U.S. Department of Energy (DOE) envisions a resilient, secure, resource efficient and environmentally sustainable "Smart" electric utility grid. As envisioned, the Smart Grid relies on the internet of things (IoT)[1] and supports the integration of Distributed Energy Resources. The California Energy Commission (CEC) defines DER as grid-connected distributed renewable energy systems, energy efficiency (EE), energy storage (ES), electric vehicles (EV), and demand response (DR) supported by a wide-ranging suite of policies adopted by the California Public Utilities Commission (CPUC).

Distributed Energy Resources (DER) consists of five elements as follows:

1. **PV** Parking Lot Canopy and Building Integrated Photovoltaics
2. **EE** Energy Efficiency HVAC, Controls, Lighting modernization
3. **ES** Energy Storage – Lithium ion and flow battery systems for load management
4. **EV** Electric Vehicle Charging Systems
5. **ADR** Automated Demand Response systems tied to PG&E rate reduction program

Prime examples of DER technologies include parking lot canopy solar PV systems, LED lighting and advanced building controls, lithium-ion battery storage systems, electric vehicle supply equipment (EVSE) to charge vehicles such as the Chevy Bolt and Nissan Leaf, and demand response systems that automatically respond to utility calls for load reduction by relaxing cooling system set points, dimming lights and turning off unessential equipment to relieve the burden on the grid during periods of capacity constraint.

Distributed Energy Resources in Contra Costa County Operations

Contra Costa County leaders realize that aggressively pursuing implementation of DER in County facilities is the best way to meet the statutory renewable energy goals and the carbon reduction requirements of SB350 (Clean Energy & Pollution Reduction Act) and the objectives of the County's Climate Action Plan.

[1] The IoT is the interconnection via the Internet of computing devices embedded in everyday objects, enabling them to send and receive data.

The DER Plan that follows has been prepared with input and direction from the Public Works Department staff, including Facility Maintenance Directors and Deputy Directors.

Photovoltaics (PV)

The Department of Public Works has issued an RFQ to identify and short-list solar developers capable of installing the PV systems listed in Figure 1 below under a power purchase agreement (PPA) or other financial arrangement that is positive cash flow for the County beginning in year 1 and remaining positive throughout the contract or lease period. The selected solar developer must also have expertise and practical experience with the installation of EV Chargers and Energy Storage in conjunction with PV.

Site	Energy Consumption (kWh/yr)	Annual Energy Cost ($)	Est. PV Capacity (kWac)	Est. Annual PV Production (kWh)	Est. 1st Year PV Savings ($)	Solar % of Load
1000 WARD ST	2,526,524	$ 417,536	1,313	1,900,000	$ 323,000	75%
30 DOUGLAS DR	2,034,165	$ 309,944	842	1,200,000	$ 192,000	59%
50 DOUGLAS DR	985,486	$ 216,344	370	540,000	$ 118,800	55%
30 MUIR RD	320,993	$ 65,815	149	218,000	$ 45,780	68%
1305 MACDONALD AVE	468,109	$ 50,244	241	350,000	$ 56,000	75%
4800 IMHOFF PL	315,606	$ 48,325	184	265,000	$ 42,400	84%
2935 PINOLE VALLEY RD	106,516	$ 30,404	66	96,000	$ 21,120	90%
597 Center	651,674	$ 143,631	196	285,000	$ 62,700	44%
2530 Arnold	1,067,935	$ 210,914	462	676,000	$ 135,200	63%
4545 Delta Fair	753,365	$ 129,798	396	579,000	$ 104,220	77%
4549 Delta Fair	429,169	$ 92,394	198	290,000	$ 62,350	68%
TOTALS	9,659,542	$ 1,715,349	4,417	6,399,000	1,163,570	66%

Figure 1: Facilities with grandfathered Interconnection Agreements (IAs)

FY18/19 Goal: The Department of Public Works anticipates that between 5 MW or more of solar capacity will be installed in FY18/19 generating over 6,000,000 kWh of clean renewable energy per year with an associated annual GHG reduction of 1,440 metric tons CO_2.

Additional PV Activities

- Develop a zero net energy (ZNE) pilot project, preferably at a County facility located in a disadvantaged community. The focus will be on public education and job development training for local electricians.
- Provide technical support and related assistance to DCD with the Renewable Resources Potential study being performed with support from Cadmus Consulting.
- Assist DCD in evaluating permit applications for megawatt class merchant solar power plants and large warehouse solar projects.
- Explore partnership possibilities with MCE, Solar Richmond, Richmond Build and Grid Alternatives to build new PV systems in the County with a focus on community solar projects that provide the greatest benefit to disadvantaged communities.

Energy Efficiency

The Department of Public Works has issued an RFQ to identify and place on a short-list Energy Service Companies (ESCos) capable of generating performance contracts for high value, short payback period energy efficiency measures at selected facilities using PG&E on-bill financing (OBF) as the fund source.

FY18/19 Goal: The Department of Public Works anticipates that approximately $4,000,000 (PG&E OBF max for municipalities) in energy efficiency improvements will be installed and operational in FY18/19.

Electric Vehicles

A recent survey (February, 2018) of County employees with 1221 respondents provided the following information:

1. 126 County employees currently own electric vehicles
2. 473 indicated that they are interested in purchasing a plug-in electric or hybrid vehicle
3. 880 (75 % of respondents) support the installation of EV chargers at the facility where they work
4. 763 (66 % of respondents) stated that they would be more likely to purchase an electric vehicle if there were EV chargers at the workplace

It appears that the most economical and timely method of installing EV chargers is PG&E's *EV Charge Network Program* whereby PG&E designs and installs EV Charging infrastructure (minimum of ten chargers) at no cost to the building owner. PG&E also provides a 25% rebate for the EV charger units and MCE has a proposed program in place to pay for half of the remaining cost of the chargers via a rebate. The PG&E program requires the County to enter into both a ten year easement and a contractual agreement. Public Works has prepared a Board Order requesting Board approval to allow Public Works to enter agreements with PG&E under the EV Charge Network Program.

Initial facilities where there is sufficient demand and that can gain the greatest benefit from PG&E's program include but are not limited to:

- 30 Muir
- 595/597 Center
- 4549 Delta Fair
- 50 Douglas

With the Board's approval, the County will join the California Air Resources Board's (CARB) Low Carbon Fuel Standard (LCFS) program. County participation in this program will create a source of ongoing revenue to offset the cost of EV charging infrastructure and/or to allow a lower price for electricity consumed by EV drivers that use County facilities.

FY18/19 Goal: The Department of Public Works anticipates that the County will install 75 to 100 Level 2[2] EV chargers in FY18/19. Many of these chargers will be public facing and therefore usable by both the public and County employees.

[2] Level 2 chargers are the most commonly used and accessible to all EV on the road today

Energy Storage

The solar developer selected through the RFQ process will evaluate the eleven facilities listed in Figure 1 to determine if and where energy storage is cost effective.

FY18/19 Goal: The Department of Public Works anticipates that one or more of the facilities listed in Figure 1 will be a candidate site for a cost-effective energy storage system that can be financed under a power purchase agreement in conjunction with PV. The County intends to install an energy storage system at the Zero Net Energy Retrofit Pilot Project site mentioned above.

Automated Demand Response

The County is working with PG&E's third-party contractor to identify facilities that will gain economic benefit by participating in PG&E's automated demand response program which provides rate relief to participants by allowing customers to curtail energy usage during periods of high electricity demand. PG&E's automated demand response program also provides rebates for hardware and no-cost technical support.

In a parallel activity the County is working with its building management systems contractor to upgrade the County's building management systems (BMS) software so that it can interface with PG&E automated demand response equipment, optimize operations, reduce energy consumption, and allow the County to better monitor and understand building energy consumption and electrical and mechanical systems' performance on a County-wide basis.

FY18/19 Goal: Utilize PG&E's incentive program to the extent possible. It is projected that the County will receive $270,000 in rebates for hardware that will allow sixty-four (64) County facilities to participate in PG&E ADR programs.

Direction from the Board

Public Works seeks input, direction and approval from the Board to modify or expand the DER plan as needed and to proceed with the implementation strategies.

Figure 2: Contra Costa County has established itself as a leader in DER, as illustrated by this Google image showing a high penetration of parking lot canopy PV systems and EV chargers at a County complex that provides vital services to the public.