



Contra Costa County
PV Portfolio Summary

SUNPOWER®

Kevin Johnston, Yuan Zhang, Ian Creelman
December 2018

Project Executive Summary –

Project

- **3.71 MW** solar project across 9 sites
- **Power Purchase Agreement** (PPA) financing
 - Fixed 25 Year PPA Rate Below Utility Market Rate
- **2.5 MW** potential energy storage system with pending Option S tariff
 - Provides increased financial savings and energy security

Benefits

- **~\$11 million** in net utility savings over 25 Yrs (Solar Only)
- **~\$6.6 million** in Net Present value over 25 Yrs (Solar Only)
- **55%** Average Facility Energy Load Offset
- **Over 360,000 metric tons of GHG offsets** over 25 Yrs

Timeline

- | | |
|---|------------------|
| • County Project Approval | Jan. 2019 |
| • SGIP Step 2 | Jan. 2019 |
| • Option S Tariff Availability | Dec. 2018 |
| • Engineering / Permitting | June 2019 |
| • NEM 3 Review (County retains NEM 1 and 2) | Oct. 2019 |
| • Investment Tax Credit Step Down | Jan. 2020 |

Financial Summary

PPA for Base (solar) and Alternate (solar+storage)

Scenario	System Size (kWp)	Energy Production (kWh)	PPA Rate (\$/kWh) 25 yr fixed rate	Year 1 Net Savings	First 5 Yrs Net Savings (\$)	25-Year Nominal Net Savings (\$)	25-Year NPV of Savings (\$)	NPV/Watt (\$/W)
PPA Base Case (Solar Only)	3,715 kW Solar	5,998,109	\$0.1315	\$219,492	\$731,319	\$11,041,612	\$6,834,728	\$1.84
PPA Alternate (Solar + Storage)	3,715 kW Solar 2,500 kW Storage	5,998,109	\$0.1620*	\$295,288	\$1,194,968	\$13,158,636	\$8,454,684	\$2.28

The pending Option S utility tariff will add significant savings for the County's energy project. SUNPOWER is actively lobbying to optimize and expedite the launch of Option S. Without the Option S tariff the County still has a fantastic solar PV opportunity.

* \$0.0306 PPA Rate Adder in Years 1 thru 15 to pay for energy storage system (ESS). PPA rate drops to \$0.1315/kWh for years 16 thru 25

Assumptions

- 25 Year Fixed Rate PPA Term
- 25 year 90% Performance Guarantee (PeGu)
- Commercial Operation Date - late 2019
- Discount rate 3%
- Utility rate escalator 3%

PPA Financial Summary – Base Case (solar only)

Site	Solar System Size (kWp)	Energy Production (kWh)	Energy Storage Size (kW)	Year 1 Net Savings (\$) Solar	25-Year Nominal Net Savings (\$M) Solar
1000 WARD ST	323	507,596	500	\$18,575	\$934,407
30 DOUGLAS DR	987	1,637,911	500	\$59,937	\$3,015,147
50 DOUGLAS DR	355	572,039	500	\$20,933	\$1,053,038
30 Muir	166	256,703	0	\$9,394	\$472,551
2530 ARNOLD DR	526	780,534	500	\$28,562	\$1,436,844
4549 DELTA FAIR BLVD	212	339,968	0	\$12,441	\$625,830
597 CENTER AVE	116	175,542	0	\$6,424	\$323,146
595 CENTER AVE	312	532,976	500	\$19,503	\$981,127
4545 DELTA FAIR BLVD	437	720,968	0	\$26,383	\$1,327,193
1305 MACDONALD AVE	282	473,873	0	\$17,341	\$872,328
Total	3,715	5,998,109	2,500	219,492	\$11,041,612

Assumptions

- 25 year Operations & Maintenance and 90% Performance Guarantee (PeGu)
- Commercial Operation Date - late 2019
- Discount rate 3%

PPA Financial Summary – Alternate Case Solar + Storage Upside

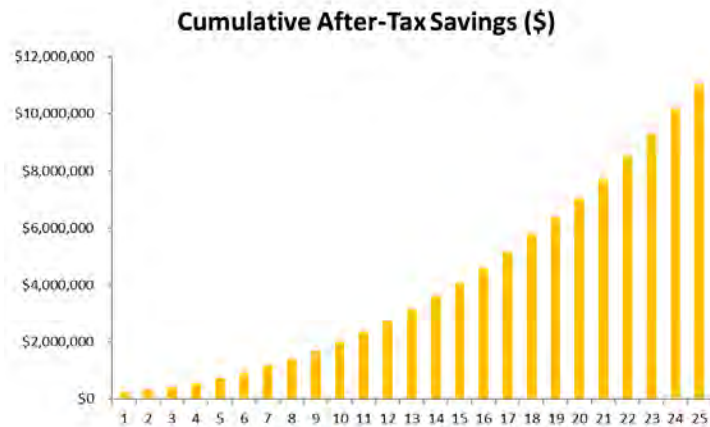
Site	Solar System Size (kWp)	Energy Production (kWh)	Energy Storage Size (kW)	Year 1 Net Savings (\$)	25-Year Nominal Net Savings (\$M)
1000 WARD ST	323	507,596	500	\$41,340	\$1,113,562
30 DOUGLAS DR	987	1,637,911	500	\$80,860	\$3,593,246
50 DOUGLAS DR	355	572,039	500	\$33,766	\$1,254,938
30 Muir	166	256,703	0	\$9,394	\$563,154
2530 ARNOLD DR	526	780,534	500	\$37,944	\$1,712,332
4549 DELTA FAIR BLVD	212	339,968	0	\$12,441	\$745,822
597 CENTER AVE	116	175,542	0	\$6,424	\$385,104
595 CENTER AVE	312	532,976	500	\$37,494	\$1,169,240
4545 DELTA FAIR BLVD	437	720,968	0	\$26,383	\$1,581,658
1305 MACDONALD AVE	282	473,873	0	\$17,341	\$1,039,581
Total	3,715	5,998,109	2,500	295,288	\$13,158,636

Assumptions

- \$0.0306/kWh Storage PPA Adder for Year 1-15
- 25 year Operations & Maintenance and 90% Performance Guarantee (PeGu)
- Commercial Operation Date - late 2019
- Discount rate 3%

PPA Portfolio Pro-forma – Solar Only Base Case

Project Economics	
System Size (kWp)	3,715
25-Year / 0% PPA Rate	\$0.1315
Cumulative Net Savings (25yr)	\$11,-41,612
25 Year Net Present Value (NPV)	\$6,834,728



Year	Savings			Costs				Net Savings (\$)	Cumulative Net Savings (\$)
	Utility Bill No Solar (\$)	Solar Energy Generated (kWh)	Avoided Cost (\$/kWh)	Residual Utility Bill (\$)	Annual PPA Rate (\$/kWh)	PPA Payment (\$)*	Hybrid Bill Utility + Solar (\$)		
1	\$1,797,092	5,998,109	\$0.1680	\$789,133	\$0.1315	\$788,467	\$1,577,600	\$219,492	\$219,492
2	\$1,851,005	5,983,114	\$0.1462	\$976,149	\$0.1315	\$786,496	\$1,762,644	\$88,360	\$307,852
3	\$1,906,535	5,968,156	\$0.1506	\$1,007,686	\$0.1315	\$784,530	\$1,792,215	\$114,320	\$422,172
4	\$1,963,731	5,953,236	\$0.1551	\$1,040,231	\$0.1315	\$782,568	\$1,822,799	\$140,932	\$563,104
5	\$2,022,643	5,938,353	\$0.1598	\$1,073,816	\$0.1315	\$780,612	\$1,854,428	\$168,215	\$731,319
6	\$2,083,322	5,923,507	\$0.1646	\$1,108,474	\$0.1315	\$778,660	\$1,887,134	\$196,188	\$927,507
7	\$2,145,822	5,908,698	\$0.1695	\$1,144,238	\$0.1315	\$776,714	\$1,920,952	\$224,870	\$1,152,378
8	\$2,210,197	5,893,927	\$0.1746	\$1,181,144	\$0.1315	\$774,772	\$1,955,916	\$254,280	\$1,406,658
9	\$2,276,502	5,879,192	\$0.1798	\$1,219,228	\$0.1315	\$772,835	\$1,992,063	\$284,439	\$1,691,097
10	\$2,344,797	5,864,494	\$0.1852	\$1,258,528	\$0.1315	\$770,903	\$2,029,430	\$315,367	\$2,006,464
11	\$2,415,141	5,849,833	\$0.1908	\$1,299,081	\$0.1315	\$768,976	\$2,068,056	\$347,085	\$2,353,550
12	\$2,487,596	5,835,208	\$0.1965	\$1,340,927	\$0.1315	\$767,053	\$2,107,980	\$379,616	\$2,733,165
13	\$2,562,224	5,820,620	\$0.2024	\$1,384,107	\$0.1315	\$765,136	\$2,149,243	\$412,981	\$3,146,146
14	\$2,639,090	5,806,068	\$0.2085	\$1,428,664	\$0.1315	\$763,223	\$2,191,887	\$447,203	\$3,593,349
15	\$2,718,263	5,791,553	\$0.2147	\$1,474,641	\$0.1315	\$761,315	\$2,235,956	\$482,307	\$4,075,656
16	\$2,799,811	5,777,074	\$0.2212	\$1,522,083	\$0.1315	\$759,411	\$2,281,494	\$518,317	\$4,593,973
17	\$2,883,805	5,762,632	\$0.2278	\$1,571,035	\$0.1315	\$757,513	\$2,328,548	\$555,257	\$5,149,230
18	\$2,970,319	5,748,225	\$0.2346	\$1,621,547	\$0.1315	\$755,619	\$2,377,166	\$593,154	\$5,742,384
19	\$3,059,429	5,733,854	\$0.2417	\$1,673,666	\$0.1315	\$753,730	\$2,427,396	\$632,033	\$6,374,417
20	\$3,151,212	5,719,520	\$0.2489	\$1,727,444	\$0.1315	\$751,846	\$2,479,290	\$671,922	\$7,046,338
21	\$3,245,748	5,705,221	\$0.2564	\$1,782,934	\$0.1315	\$749,966	\$2,532,900	\$712,848	\$7,759,186
22	\$3,343,121	5,690,958	\$0.2641	\$1,840,189	\$0.1315	\$748,091	\$2,588,280	\$754,841	\$8,514,027
23	\$3,443,414	5,676,731	\$0.2720	\$1,899,264	\$0.1315	\$746,221	\$2,645,485	\$797,929	\$9,311,956
24	\$3,546,717	5,662,539	\$0.2802	\$1,960,219	\$0.1315	\$744,355	\$2,704,574	\$842,143	\$10,154,099
25	\$3,653,118	5,648,382	\$0.2886	\$2,023,110	\$0.1315	\$742,494	\$2,765,605	\$887,513	\$11,041,612
Total	\$65,520,653	\$145,539,204		\$35,347,537		\$19,131,504	\$54,479,041	\$11,041,612	
NPV								\$6,834,728	

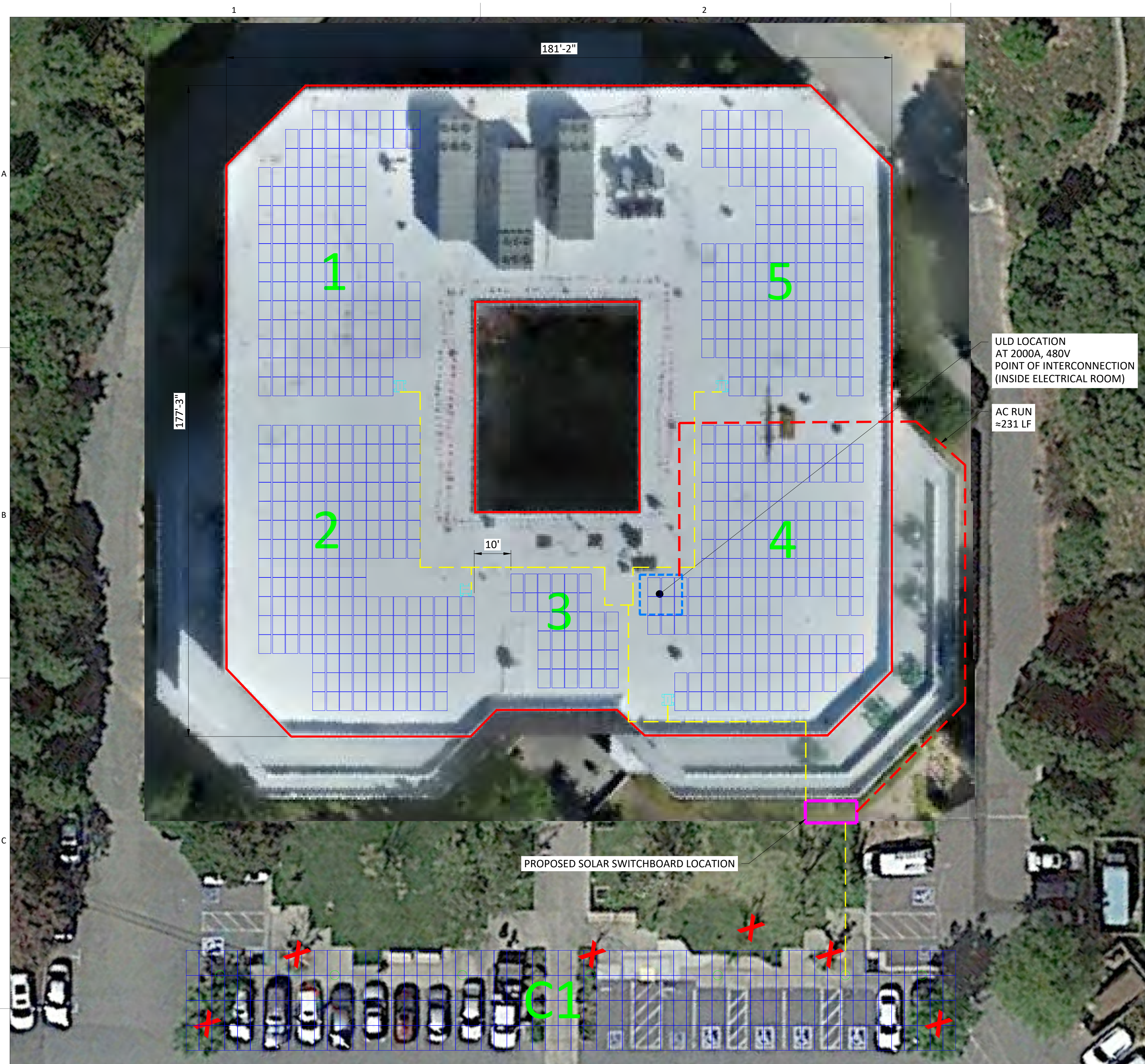
PPA Portfolio Pro-forma - Solar + Storage Upside

Solar + Storage Economics	
System Size (kWp)	3,715
Storage Size (kWp)	2,500
25-Year / 0% PPA Rate	\$0.1315
Storage PPA Adder	\$0.0306
Cumulative Net Savings (25yr)	\$13,158,636
25 Year Net Present Value (NPV)	\$8,454,684

Solar Only Economics	
System Size (kWp)	3,715
25-Year / 0% PPA Rate	\$0.1315
Cumulative Net Savings (25yr)	\$11,-41,612
25 Year Net Present Value (NPV)	\$6,834,728

Year	Savings				Costs					Solar + Storage		Solar Only	
	Utility Bill No Solar (\$)	Solar Energy Generated (kWh)	Avoided Cost (\$/kWh)	Savings from Energy Storage	Residual Utility Bill (\$)	Annual PPA Rate (\$/kWh)	PPA Payment (\$)*	Storage Payment (\$)	Hybrid Bill Utility + Solar (\$)	Net Savings (\$)	Cumulative Net Savings (\$)	Net Savings (\$)	Cumulative Net Savings (\$)
1	\$1,797,092	5,998,109	\$0.1680	\$259,101	\$530,032	\$0.1315	\$788,467	\$183,305	\$1,501,804	\$295,288	\$295,288	\$219,492	\$219,492
2	\$1,851,005	5,983,114	\$0.1462	\$266,874	\$709,275	\$0.1315	\$786,496	\$182,847	\$1,678,617	\$172,388	\$467,676	\$88,360	\$307,852
3	\$1,906,535	5,968,156	\$0.1506	\$274,880	\$732,806	\$0.1315	\$784,530	\$182,390	\$1,699,725	\$206,810	\$674,486	\$114,320	\$422,172
4	\$1,963,731	5,953,236	\$0.1551	\$283,127	\$757,104	\$0.1315	\$782,568	\$181,934	\$1,721,606	\$242,125	\$916,611	\$140,932	\$563,104
5	\$2,022,643	5,938,353	\$0.1598	\$291,620	\$782,195	\$0.1315	\$780,612	\$181,479	\$1,744,286	\$278,357	\$1,194,968	\$168,215	\$731,319
6	\$2,083,322	5,923,507	\$0.1646	\$300,369	\$808,104	\$0.1315	\$778,660	\$181,025	\$1,767,790	\$315,532	\$1,510,501	\$196,188	\$927,507
7	\$2,145,822	5,908,698	\$0.1695	\$309,380	\$834,858	\$0.1315	\$776,714	\$180,572	\$1,792,144	\$353,678	\$1,864,179	\$224,870	\$1,152,378
8	\$2,210,197	5,893,927	\$0.1746	\$318,662	\$862,483	\$0.1315	\$774,772	\$180,121	\$1,817,376	\$392,821	\$2,257,000	\$254,280	\$1,406,658
9	\$2,276,502	5,879,192	\$0.1798	\$328,221	\$891,007	\$0.1315	\$772,835	\$179,671	\$1,843,513	\$432,990	\$2,689,989	\$284,439	\$1,691,097
10	\$2,344,797	5,864,494	\$0.1852	\$338,068	\$920,460	\$0.1315	\$770,903	\$179,222	\$1,870,584	\$474,213	\$3,164,203	\$315,367	\$2,006,464
11	\$2,415,141	5,849,833	\$0.1908	\$348,210	\$950,871	\$0.1315	\$768,976	\$178,773	\$1,898,620	\$516,522	\$3,680,725	\$347,085	\$2,353,550
12	\$2,487,596	5,835,208	\$0.1965	\$358,656	\$982,271	\$0.1315	\$767,053	\$178,327	\$1,927,650	\$559,945	\$4,240,670	\$379,616	\$2,733,165
13	\$2,562,224	5,820,620	\$0.2024	\$369,416	\$1,014,691	\$0.1315	\$765,136	\$177,881	\$1,957,708	\$604,516	\$4,845,186	\$412,981	\$3,146,146
14	\$2,639,090	5,806,068	\$0.2085	\$380,499	\$1,048,166	\$0.1315	\$763,223	\$177,436	\$1,988,824	\$650,266	\$5,495,452	\$447,203	\$3,593,349
15	\$2,718,263	5,791,553	\$0.2147	\$391,914	\$1,082,728	\$0.1315	\$761,315	\$176,992	\$2,021,035	\$697,228	\$6,192,680	\$482,307	\$4,075,656
16	\$2,799,811	5,777,074	\$0.2212	\$0	\$1,522,083	\$0.1315	\$759,411	\$0	\$2,281,494	\$518,317	\$6,710,997	\$518,317	\$4,593,973
17	\$2,883,805	5,762,632	\$0.2278	\$0	\$1,571,035	\$0.1315	\$757,513	\$0	\$2,328,548	\$555,257	\$7,266,254	\$555,257	\$5,149,230
18	\$2,970,319	5,748,225	\$0.2346	\$0	\$1,621,547	\$0.1315	\$755,619	\$0	\$2,377,166	\$593,154	\$7,859,408	\$593,154	\$5,742,384
19	\$3,059,429	5,733,854	\$0.2417	\$0	\$1,673,666	\$0.1315	\$753,730	\$0	\$2,427,396	\$632,033	\$8,491,441	\$632,033	\$6,374,417
20	\$3,151,212	5,719,520	\$0.2489	\$0	\$1,727,444	\$0.1315	\$751,846	\$0	\$2,479,290	\$671,922	\$9,163,362	\$671,922	\$7,046,338
21	\$3,245,748	5,705,221	\$0.2564	\$0	\$1,782,934	\$0.1315	\$749,966	\$0	\$2,532,900	\$712,848	\$9,876,210	\$712,848	\$7,759,186
22	\$3,343,121	5,690,958	\$0.2641	\$0	\$1,840,189	\$0.1315	\$748,091	\$0	\$2,588,280	\$754,841	\$10,631,051	\$754,841	\$8,514,027
23	\$3,443,414	5,676,731	\$0.2720	\$0	\$1,899,264	\$0.1315	\$746,221	\$0	\$2,645,485	\$797,929	\$11,428,980	\$797,929	\$9,311,956
24	\$3,546,717	5,662,539	\$0.2802	\$0	\$1,960,219	\$0.1315	\$744,355	\$0	\$2,704,574	\$842,143	\$12,271,123	\$842,143	\$10,154,099
25	\$3,653,118	5,648,382	\$0.2886	\$0	\$2,023,110	\$0.1315	\$742,494	\$0	\$2,765,605	\$887,513	\$13,158,636	\$887,513	\$11,041,612
Total	\$65,520,653	145,539,204			\$30,528,540		\$19,131,504		\$52,362,017	\$13,158,636		\$11,041,612	
NPV										\$8,454,684		\$6,834,728	

Increased Savings w/ Storage
\$2.5M Greater Savings Thru Year 15



- LEGEND:**
- PROPOSED LIGHT POLE REMOVAL
 - PROPOSED TREE REMOVAL
 - PROPOSED EQUIPMENT PAD
 - PROPOSED POINT OF INTERCONNECTION
 - AC CONDUITS (SSB-POI)
 - AC CONDUITS (SPB-SSB)
 - AC CONDUITS (INV-SPB)

ULD LOCATION
AT 2000A, 480V
POINT OF INTERCONNECTION
(INSIDE ELECTRICAL ROOM)

AC RUN
≈231 LF

PROPOSED SOLAR SWITCHBOARD LOCATION

- NOTES:**
- 110 MPH WIND ZONE (ASCE 7-10) CATEGORY II, EXPOSURE C.
 - CORROSION RATE: [1.0µm/yr.], [C2: 11%, C3: 99%]
 - METER #10100543591
 - ARRAY SHOWN ON AERIAL IMAGE
 - ARRAY MOUNTING STRUCTURE HELIX CARPORT 1.5
 - STANDARD CANOPY LOW-END CLEARANCE: 13.5' PROVIDED FOR STANDARD VEHICLE
 - BUILDING CODE REQUIRES 20' MIN. CLEARANCE FROM EXISTING BUILDINGS
 - FIRE DEPARTMENT REQUIRES 20' MIN. CLEARANCE ALONG EMERGENCY ACCESS ROUTES
 - TOTAL OF TREES TO BE REMOVED: 6
 - TOTAL OF LIGHT POLE TO BE REMOVED: 0

1 ARRAY LAYOUT
SCALE: 1/16" = 1'-0"

ARRAY	M60U_121 (18 STR)	M60U_121 (14 STR)	M42U_121 (12 STR)	TOTAL STRINGS	TOTAL #OF MODULE	DC POWER (KW)	AC POWER (KW)	AC-RUN (INV-SSB)
1			1	12	144	51.84	46	220
2	1			15	180	64.8	66	160
3				3	36	12.96	66	65
4		1		14	168	60.48	66	195
5			1	12	144	51.84	46	195
	1	1	2	56	672	241.92	224	

CANOPY	LABEL	#MODULE	#STRING	KW (DC)	M42U_121 (12 STR)	KW (AC)	TILT	AZIMUTH CSI	AZIMUTH SPWR	AC RUN (INV-SSB)
C1	4x60	240	24	112.8	2	92	10°	140°	-40°	42

PROJECT SUMMARY

PROJECT SUMMARY	ROOF	CARPORT	TOTAL
TOTAL # OF MODULE	672	240	912
MODULE TYPE	SPR-X22-360-COM	SPR-X21-470-COM	
# OF INVERTER	4	2	6
DC SYSTEM SIZE (KW)	241.92	112.80	354.72
AC SYSTEM SIZE (KW)	224	92	316

STRUCTURAL DESIGN PARAMETERS

WIND SPEED ASCE 7-10 (MPH)	110
EXPOSURE CATEGORY	C
TRANSITIONAL DISTANCE (FT)	
GROUND SNOW LOAD (PSF)	
SPECTRAL RESPONSE (SDS)	1.013
Ss	1.52
S1	0.6
SEISMIC HAZARD LEVEL	2
SITE CLASS	
SEISMIC IMPT. FACTOR (IP)	1.5
OCCUPANCY CATEGORY	II

RACKING TYPE

RACKING TYPE	ROOF A
RACKING TECHNOLOGY	HELIX DUAL-TILT
ANCHOR TYPE	OMG PowerGrip Plus
BALLAST BLOCK WEIGHT (LBS)	14
ROOF MEMBRANE	
SEISMIC OFFSETS FOR UNANCHORED ARRAYS	
MAX ROOF SLOPE	1:12
MIN. OFFSET FROM ROOF EDGE (FT)	15

BUILDING CHARACTERIZATIONS

ROOF HEIGHT (FT)	44
ROOF LENGTH (FT)	181
ROOF WIDTH (FT)	177
PARAPET HEIGHT (FT)	3
SPWR AZIMUTH (DEGREES)	-40
MAX ALLOWABLE PRESSURE (PSF)	12
MAX ALLOWABLE WEIGHT (LBS)	

BALLAST AND ANCHOR SUMMARY

SYSTEM WEIGHT (LBS)	75196
AVERAGE PSF	5.8
MAX PSF	12.0
# BALLAST PER ROOF	2993
# OF ANCHOR PER ROOF	95
# MODULE PER ROOF	672
TOTAL # OF BALLASTS	2993
TOTAL # OF ANCHORS	95
TOTAL # OF MODULES	672



SUNPOWER® | HELIX™



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THE PROPOSED ARRAY LAYOUT SHOWN IS DESIGNED TO FIT EXISTING CONDITIONS AS THEY ARE DESCRIBED ON THIS DRAWING. LAYOUT AND QUANTITIES ARE SUBJECT TO CHANGE BASED ON SUNPOWER VERIFICATION OF ACTUAL SITE CONDITIONS.

TIER 1

SUNPOWER®

1414 HARBOUR WAY SOUTH
RICHMOND, CA 94804 USA
(510) 540-0550

ENGINEER'S STAMP

CONTRA COSTA COUNTY
50 DOUGLAS DRIVE
1000 WARD ST.
MARTINEZ, CA 94553

ARRAY LAYOUT

REV	DESIGN #	DATE	DB	CB	RA	DJ
A	D-0091301	08-17-18				

DESCRIPTION: PROPOSAL

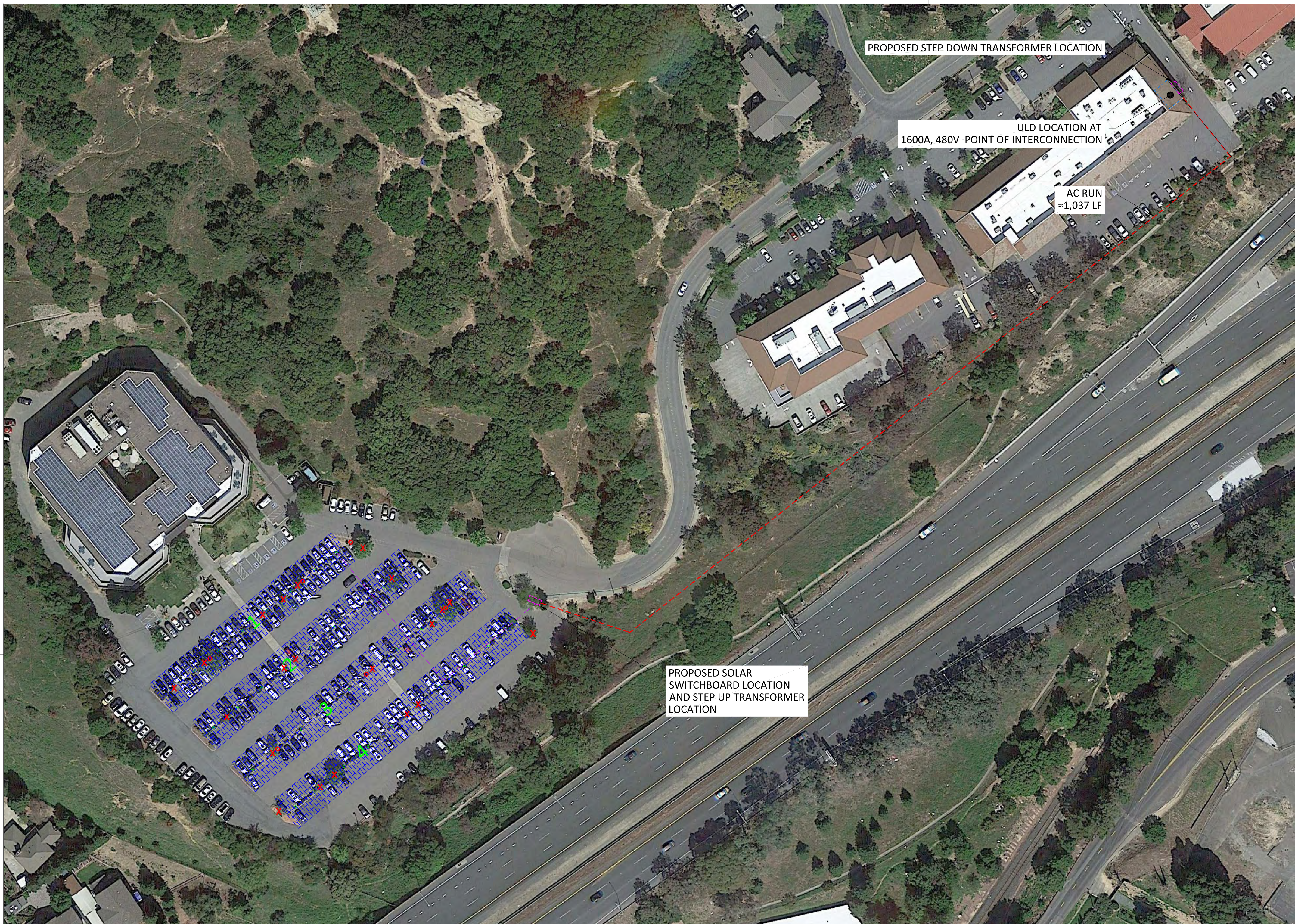
OPPORTUNITY: 0001557288

PROJECT: ---

SCALE: 0 1/2" 1"

IF BAR IS NOT ONE INCH, DRAWING IS NOT TO SCALE

SHEET: **AL1**



1 ARRAY LAYOUT
SCALE: 1/64" = 1'-0"

NOTES:

- 110 MPH WIND ZONE (ASCE 7-10) CATEGORY II, EXPOSURE C.
- CORROSION RATE: [1.0µm/yr.],[C2: 11%, C3: 99%]
- METER #PG&E 7555R0
- ARRAY SHOWN ON AERIAL IMAGE
- ARRAY MOUNTING STRUCTURE HELIX CARPORT 1.5
- STANDARD CANOPY LOW-END CLEARANCE: 13.5' PROVIDED FOR STANDARD VEHICLE
- BUILDING CODE REQUIRES 20' MIN. CLEARANCE FROM EXISTING BUILDINGS
- FIRE DEPARTMENT REQUIRES 20' MIN. CLEARANCE ALONG EMERGENCY ACCESS ROUTES
- TOTAL OF TREES TO BE REMOVED: 21
- TOTAL OF LIGHT POLE TO BE REMOVED: 6

PANELBOARD - CARPORT	CANOPY	LABEL	#MODULE	#STRING	KW (DC)	M80U_122 (18 STR)	M60U_122 (15 STR)	M42U_122 (12 STR)	M36U_122 (9 STR)	KW (AC)	TILT	AZIMUTH CSI	AZIMUTH SPWR	AC RUN (SPB-SSB)
SPB01	1	6x75	450	45	211.5	1	1	1		195	10°	140°	-40°	318
SPB02	2	6x85	510	51	239.7	2	1		232	256				
SPB03	3	6x95	570	57	267.9	2		1	251.6	192				
SPB04	4	6x95	570	57	267.9	2		1	251.6	42				
			2100	210	987.00	7	2	3	2	930.2				

- LEGEND:**
- PROPOSED LIGHT POLE REMOVAL
 - X PROPOSED TREE REMOVAL
 - PROPOSED EQUIPMENT PAD
 - PROPOSED POINT OF INTERCONNECTION
 - AC CONDUITS (SSB-POI)
 - AC CONDUITS (SPB-SSB)
 - AC CONDUITS (INV-SPB)

PROJECT SUMMARY

PROJECT SUMMARY	CARPORT
TOTAL # OF MODULE	2100
MODULE TYPE	SPR-X21-470-COM
# OF INVERTER	14
DC SYSTEM SIZE (kW)	987.00
AC SYSTEM SIZE (kW)	930.20



SUNPOWER® HELIX™
TIER 1

SUNPOWER®

1414 HARBOUR WAY SOUTH
RICHMOND, CA 94804 USA
(510) 540-0550

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ENGINEER'S STAMP

CONTRA COSTA COUNTY
30 DOUGLAS DRIVE
ARRAY LAYOUT

30 DOUGLAS DRIVE
 MARTINEZ, CA 94553

REV	DESIGN #	DATE	DB	CB	RA	DI
A	D-00913100	08-16-18				

OPPORTUNITY 0001557288

PROJECT ---

0 1/2" 1"

IF BAR IS NOT ONE INCH, DRAWING IS NOT TO SCALE

SHEET **AL1**



1 ARRAY LAYOUT
SCALE: 1/32" = 1'-0"

PROJECT SUMMARY	
PROJECT SUMMARY	ROOF
TOTAL # OF MODULE	460
MODULE TYPE	SPR-X22-360-COM
# OF INVERTER	3
DC SYSTEM SIZE (KW)	165.60
AC SYSTEM SIZE (KW)	171.60

STRUCTURAL DESIGN PARAMETERS	
WIND SPEED ASCE 7-10 (MPH)	110
EXPOSURE CATEGORY	C
TRANSITIONAL DISTANCE (FT)	
GROUND SNOW LOAD (PSF)	0
SPECTRAL RESPONSE (SDS)	0.8
S _s	1.5
S ₁	0.6
SEISMIC HAZARD LEVEL	1
SITE CLASS	D
SEISMIC IMPT. FACTOR (IP)	1.0
OCCUPANCY CATEGORY	II

RACKING TYPE		
RACKING TYPE	ROOF A	ROOF B
RACKING TECHNOLOGY	HELIX DUAL-TILT	HELIX DUAL-TILT
ANCHOR TYPE	OMG PowerGrip Plus	OMG PowerGrip Plus
BALLAST BLOCK WEIGHT (LBS)	14	14
ROOF MEMBRANE		
SEISMIC OFFSETS FOR UNANCHORED ARRAYS		
MAX ROOF SLOPE	1:12	1:12
MIN. OFFSET FROM ROOF EDGE (FT)	6	6

BUILDING CHARACTERIZATIONS		
ROOF HEIGHT (FT)	27	29
ROOF LENGTH (FT)	188	115
ROOF WIDTH (FT)	143	98
PARAPET HEIGHT (FT)	3	3
SPWR AZIMUTH (DEGREES)	28	28
MAX ALLOWABLE PRESSURE (PSF)	12	12
MAX ALLOWABLE WEIGHT (LBS)		

BALLAST AND ANCHOR SUMMARY		
SYSTEM WEIGHT (LBS)	27769	17035
AVERAGE PSF	5.1	4.9
MAX PSF	11.3	9.4
# BALLAST PER ROOF	1059	595
# OF ANCHOR PER ROOF	27	16
# MODULE PER ROOF	280	180
TOTAL # OF BALLASTS	1059	595
TOTAL # OF ANCHORS	27	16
TOTAL # OF MODULES	280	180

- LEGEND:
- PROPOSED LIGHT POLE REMOVAL
 - X PROPOSED TREE REMOVAL
 - PROPOSED EQUIPMENT PAD
 - PROPOSED POINT OF INTERCONNECTION
 - AC CONDUITS (SSB-POI)
 - AC CONDUITS (SPB-SSB)
 - AC CONDUITS (INV-SPB)



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THE PROPOSED ARRAY LAYOUT SHOWN IS DESIGNED TO FIT EXISTING CONDITIONS AS THEY ARE DESCRIBED ON THIS DRAWING. LAYOUT AND QUANTITIES ARE SUBJECT TO CHANGE BASED ON SUNPOWER VERIFICATION OF ACTUAL SITE CONDITIONS.

TIER 1

ARRAY SUMMARY TABLE - ROOF							
ARRAY	M60U_121 (18 STR)	M36U_121 (10 STR)	TOTAL STRINGS	TOTAL #OF MODULE	DC POWER (KW)	AC POWER (KW)	AC RUN (INV-SSB)
1	1		18	180	64.8	66	285
2			1	10	3.6	39.6	430
3		1	9	90	32.4		
4	1		18	180	64.8	66	40
TOTAL	2	1	46	460	165.6	171.6	

1414 HARBOUR WAY SOUTH
RICHMOND, CA 94804 USA
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CONTRA COSTA COUNTY
30 MUIR RD

ARRAY LAYOUT

ENGINEER'S STAMP

30 MUIR RD
MARTINEZ, CA 94553

REV	DESIGN #	DATE	DB	CB	IF	DI
A	D-0091302	08-16-18				

REVISIONS

PROPOSAL

OPPORTUNITY

0001557288

PROJECT

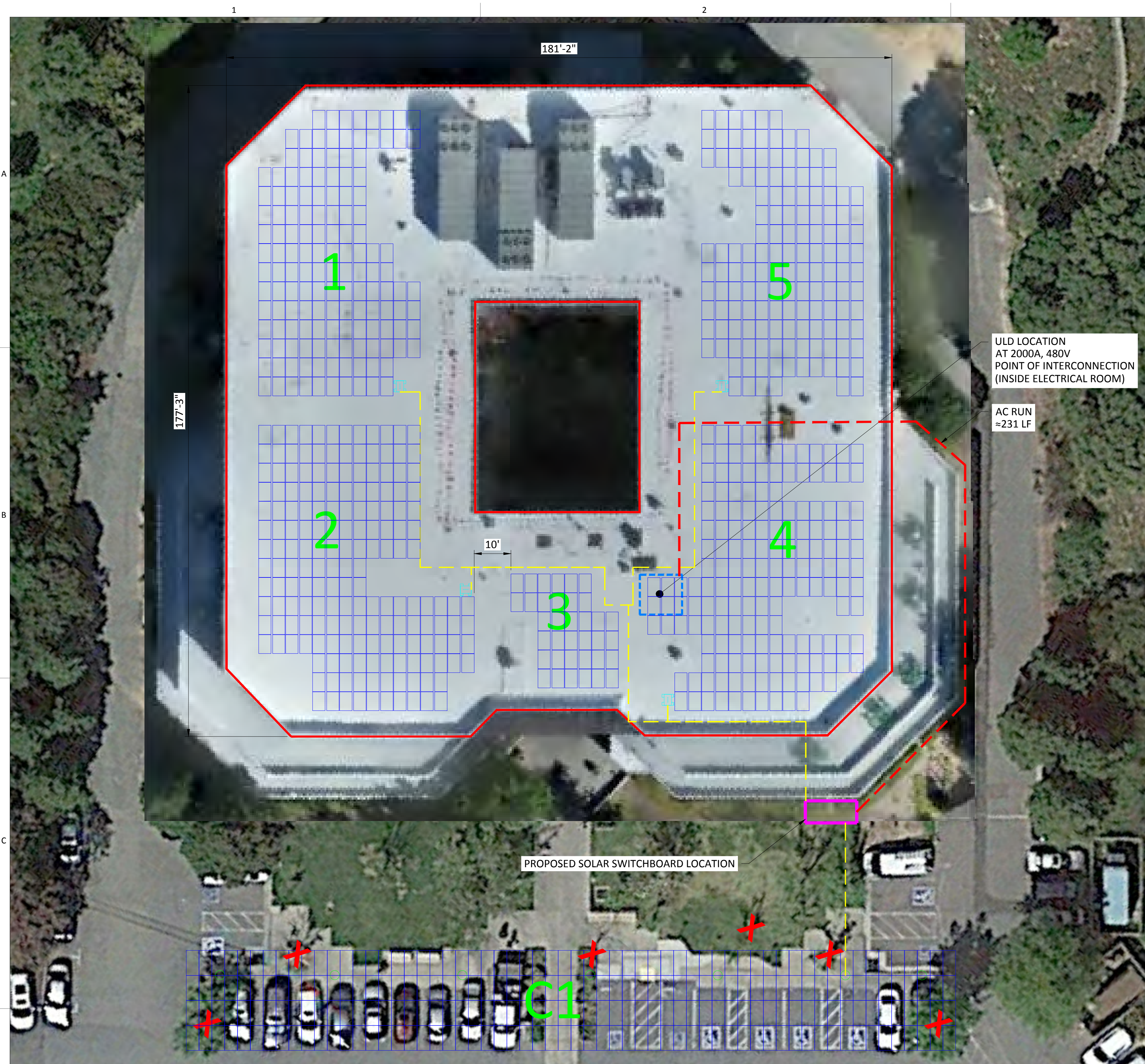
SHEET

AL1

SCALE

0 1/2" 1"

IF BAR IS NOT ONE INCH, DRAWING IS NOT TO SCALE



- LEGEND:**
- PROPOSED LIGHT POLE REMOVAL
 - X PROPOSED TREE REMOVAL
 - PROPOSED EQUIPMENT PAD
 - PROPOSED POINT OF INTERCONNECTION
 - AC CONDUITS (SSB-POI)
 - AC CONDUITS (SPB-SSB)
 - AC CONDUITS (INV-SPB)

PROJECT SUMMARY

PROJECT SUMMARY	ROOF	CARPORT	TOTAL
TOTAL # OF MODULE	672	240	912
MODULE TYPE	SPR-X22-360-COM	SPR-X21-470-COM	
# OF INVERTER	4	2	6
DC SYSTEM SIZE (KW)	241.92	112.80	354.72
AC SYSTEM SIZE (KW)	224	92	316

STRUCTURAL DESIGN PARAMETERS

WIND SPEED ASCE 7-10 (MPH)	110
EXPOSURE CATEGORY	C
TRANSITIONAL DISTANCE (FT)	
GROUND SNOW LOAD (PSF)	
SPECTRAL RESPONSE (SDS)	1.013
Ss	1.52
S1	0.6
SEISMIC HAZARD LEVEL	2
SITE CLASS	
SEISMIC IMPT. FACTOR (IP)	1.5
OCCUPANCY CATEGORY	II

RACKING TYPE

RACKING TYPE	ROOF A
RACKING TECHNOLOGY	HELIX DUAL-TILT
ANCHOR TYPE	OMG PowerGrip Plus
BALLAST BLOCK WEIGHT (LBS)	14
ROOF MEMBRANE	
SEISMIC OFFSETS FOR UNANCHORED ARRAYS	
MAX ROOF SLOPE	1:12
MIN. OFFSET FROM ROOF EDGE (FT)	15

BUILDING CHARACTERIZATIONS

ROOF HEIGHT (FT)	44
ROOF LENGTH (FT)	181
ROOF WIDTH (FT)	177
PARAPET HEIGHT (FT)	3
SPWR AZIMUTH (DEGREES)	-40
MAX ALLOWABLE PRESSURE (PSF)	12
MAX ALLOWABLE WEIGHT (LBS)	

BALLAST AND ANCHOR SUMMARY

SYSTEM WEIGHT (LBS)	75196
AVERAGE PSF	5.8
MAX PSF	12.0
# BALLAST PER ROOF	2993
# OF ANCHOR PER ROOF	95
# MODULE PER ROOF	672
TOTAL # OF BALLASTS	2993
TOTAL # OF ANCHORS	95
TOTAL # OF MODULES	672



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TIER 1

- NOTES:**
- 110 MPH WIND ZONE (ASCE 7-10) CATEGORY II, EXPOSURE C.
 - CORROSION RATE: [1.0µm/yr.], [C2: 11%, C3: 99%]
 - METER #10100543591
 - ARRAY SHOWN ON AERIAL IMAGE
 - ARRAY MOUNTING STRUCTURE HELIX CARPORT 1.5
 - STANDARD CANOPY LOW-END CLEARANCE: 13.5' PROVIDED FOR STANDARD VEHICLE
 - BUILDING CODE REQUIRES 20' MIN. CLEARANCE FROM EXISTING BUILDINGS
 - FIRE DEPARTMENT REQUIRES 20' MIN. CLEARANCE ALONG EMERGENCY ACCESS ROUTES
 - TOTAL OF TREES TO BE REMOVED: 6
 - TOTAL OF LIGHT POLE TO BE REMOVED: 0

1 ARRAY LAYOUT
SCALE: 1/16" = 1'-0"

ARRAY SUMMARY TABLE - ROOF

ARRAY	M60U_121 (18 STR)	M60U_121 (14 STR)	M42U_121 (12 STR)	TOTAL STRINGS	TOTAL #OF MODULE	DC POWER (KW)	AC POWER (KW)	AC-RUN (INV-SSB)
1			1	12	144	51.84	46	220
2	1			15	180	64.8	66	160
3				3	36	12.96		
4		1		14	168	60.48	66	65
5			1	12	144	51.84	46	195
	1	1	2	56	672	241.92	224	

ARRAY SUMMARY TABLE - PFT

CANOPY	LABEL	#MODULE	#STRING	KW (DC)	M42U_121 (12 STR)	KW (AC)	TILT	AZIMUTH CSI	AZIMUTH SPWR	AC RUN (INV-SSB)
C1	4x60	240	24	112.8	2	92	10°	140°	-40°	42

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CONTRA COSTA COUNTY
50 DOUGLAS DRIVE
1000 WARD ST.
MARTINEZ, CA 94553

ARRAY LAYOUT

ENGINEER'S STAMP

REV	DESIGN #	DATE	DB	CB	DI
A	D-0091301	08-17-18	RA		

OPPORTUNITY 0001557288

PROJECT ---

0 1/2" 1"

IF BAR IS NOT ONE INCH, DRAWING IS NOT TO SCALE

SHEET **AL1**

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- LEGEND:**
- PIER LOCATION
 - PROPOSED LIGHT POLE REMOVAL
 - PROPOSED TREE REMOVAL
 - PROPOSED EQUIPMENT PAD
 - PROPOSED POINT OF INTERCONNECTION
 - AC CONDUITS (SSB-POI)
 - AC CONDUITS (SPB-SSB)
 - AC CONDUITS (INV)

- PFT NOTES:**
- EXPOSURE C.
 - CORROSION RATE: [1.0µm/yr],[C2: 11%, C3: 99%]
 - METER #TBD
 - ARRAY SHOWN ON AERIAL IMAGE
 - ARRAY MOUNTING STRUCTURE HELIX CARPORT 1.5
 - STANDARD CANOPY LOW-END CLEARANCE: 11' PROVIDED FOR STANDARD VEHICLE
 - BUILDING CODE REQUIRES 20' MIN. CLEARANCE FROM EXISTING BUILDINGS
 - FIRE DEPARTMENT REQUIRES 20' MIN. CLEARANCE ALONG EMERGENCY ACCESS ROUTES
 - TOTAL OF TREES TO BE REMOVED: 8
 - TOTAL OF LIGHT POLE TO BE REMOVED: 4

PROJECT SUMMARY

PROJECT SUMMARY	ROOF	CARPORT	TOTAL
TOTAL # OF MODULE	168	800	968
MODULE TYPE	SPR-X21-345-COM	SPR-X21-470-COM	
# OF INVERTER	1	5	6
DC SYSTEM SIZE (KW)	57.96	376.00	433.96
AC SYSTEM SIZE (KW)	66	361	427.00

STRUCTURAL DESIGN PARAMETERS

WIND SPEED (ASCE 7-10 (MPH))	110
EXPOSURE CATEGORY	B
TRANSITIONAL DISTANCE (FT)	
GROUND SNOW LOAD (PSF)	
SPECTRAL RESPONSE (SDS)	1.045
S5	1.568
S1	0.6
SEISMIC HAZARD LEVEL	2
HAZARD	D
SITE CLASS	
SEISMIC IMPT. FACTOR (IP)	1.5
OCCUPANCY CATEGORY	II

RACKING TYPE

RACKING TYPE	ROOF A
RACKING TECHNOLOGY	HELIX DUAL-TILT
ANCHOR TYPE	OMG PowerGrip Plus
BALLAST BLOCK WEIGHT (LBS)	14
ROOF MEMBRANE	
SEISMIC OFFSETS FOR UNANCHORED ARRAYS	
MAX ROOF SLOPE	1:12
MIN. OFFSET FROM ROOF EDGE (FT)	4

BUILDING CHARACTERIZATIONS

ROOF HEIGHT (FT)	42
ROOF LENGTH (FT)	106
ROOF WIDTH (FT)	175
PARAPET HEIGHT (FT)	3
SPWR AZMUTH (DEGREES)	-26
MAX ALLOWABLE PRESSURE (PSF)	12
MAX ALLOWABLE WEIGHT (LBS)	

BALLAST AND ANCHOR SUMMARY

SYSTEM WEIGHT (LBS)	17548
AVERAGE PSF	5.4
MAX PSF	8.7
# BALLAST PER ROOF	
# OF ANCHOR PER ROOF	
# MODULE PER ROOF	
TOTAL # OF BALLASTS	703
TOTAL # OF ANCHORS	0
TOTAL # OF MODULES	168



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TIER 1

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**CONTRA COSTA COUNTY
595 CENTER**

595 CENTER AVE.
MARTINEZ, CA 94553

ARRAY LAYOUT

ENGINEER'S STAMP

REV	DATE	DESCRIPTION	DESIGNER	DATE	DESCRIPTION	DESIGNER
A	08-24-18	PROPOSAL	D-1007458			

OPPORTUNITY 0001557288

PROJECT ---

0 3/8" 1"

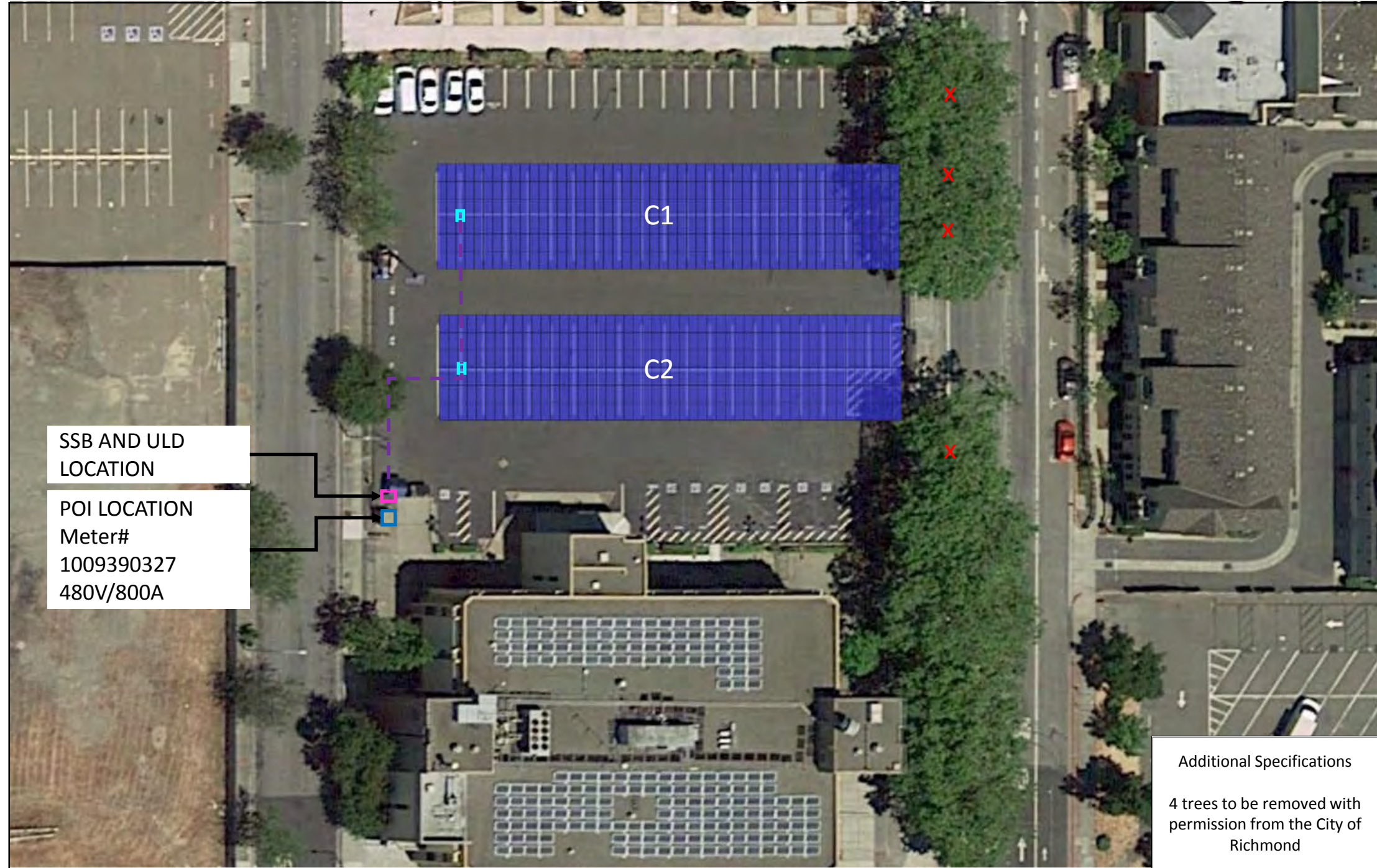
SHEET **AL1**

ARRAY SUMMARY TABLE - ROOF

ARRAY	M60U_121 (14 STR)	TOTAL STRINGS	TOTAL #OF MODULE	DC POWER (KW)	AC POWER (KW)	AC RUN (INV-SSB)
R1	1	14	168	57.960	66	46

ARRAY SUMMARY TABLE - PFT

PANELBOARD - CARPORT	CANOPY	LABEL	#MODULE	#STRING	KW (DC)	M80U_121 (18 STR)	M60U_121 (14 STR)	M42U_121 (12 STR)	KW (AC)	TILT	AZIMUTH CSI	AZIMUTH SPWR	AC RUN (INV-SPB)	AC RUN (SPB-SSB)
SPB01	1	4x35	140	14	65.8		1		66	10°	244°	64°	116	316
	2	6x20	120	12	56.4			1	46					
	3	4x45	180	18	84.6	1			83					
SPB02	4	6x60	360	36	169.2	2			166				148	
	TOTAL		800	80	376.00	3	1	1	361					



SSB AND ULD
LOCATION

POI LOCATION
Meter#
1009390327
480V/800A

Additional Specifications

4 trees to be removed with
permission from the City of
Richmond

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(510) 540 - 0550

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CONTRA COSTA COUNTY

**1305 MACDONALD AVE,
RICHMOND, CA 94801**

System Specifications

SPR-X21-470W Modules
282.0 kWp / 240.6 kWAC
180° Az, 10° Tilt



1 ARRAY LAYOUT
SCALE: 1/32" = 1'-0"

NOTES:

- 110 MPH WIND ZONE (ASCE 7-10) CATEGORY II, EXPOSURE C
- CORROSION RATE: [1.7um./yr],[C3: 83%, C4: 99%]
- METER #1004577984
- ARRAY SHOWN ON AERIAL IMAGE
- ARRAY MOUNTING STRUCTURE HELIX CARPORT 1.5
- STANDARD CANOPY LOW-END CLEARANCE: 11' PROVIDED FOR STANDARD VEHICLE
- BUILDING CODE REQUIRES 20' MIN. CLEARANCE FROM EXISTING BUILDINGS
- FIRE DEPARTMENT REQUIRES 20' MIN. CLEARANCE ALONG EMERGENCY ACCESS ROUTES
- TOTAL OF TREES TO BE REMOVED: 19
- TOTAL OF LIGHT POLE TO BE REMOVED: 9

ARRAY SUMMARY TABLE - CARPORT														
PANELBOARD - CARPORT	CANOPY	LABEL	#MODULE	#STRING	KW (DC)	M80U_121 (18 STR)	M60U_121 (16 STR)	M42U_121 (12 STR)	KW (AC)	TILT	AZIMUTH CSI	AZIMUTH SPWR	AC RUN (INV-SPB)	AC RUN (SPB-SSB)
SPB01	1	4x60	240	24	112.8			2	92	10°	157°	-23°	30,140	30
	2	6x60	360	36	169.2	2			166	10°	157°	-23°	65,205	
SPB02	3	6x60	360	36	169.2	2			166	10°	157°	-23°	30,140	150
	4	4x40	160	16	75.2		1		66	10°	157°	-23°	70	
TOTAL			1120	112	526.4	4	1	2	490					

- LEGEND:**
- PIER LOCATION
 - PROPOSED LIGHT POLE REMOVAL
 - X PROPOSED TREE REMOVAL
 - PROPOSED EQUIPMENT PAD
 - PROPOSED POINT OF INTERCONNECTION
 - AC CONDUITS (SSB-POI)
 - AC CONDUITS (SPB-SSB)
 - AC CONDUITS (INV-SPB)

PROJECT SUMMARY

PROJECT SUMMARY	CARPORT
TOTAL # OF MODULE	1120
MODULE TYPE	SPR-X21-470-COM
# OF INVERTER	7
DC SYSTEM SIZE (KW)	526.40
AC SYSTEM SIZE (KW)	490.00



SUNPOWER® HELIX™ TIER 1

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ENGINEER'S STAMP

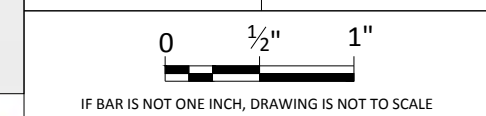
CONTRA COSTA COUNTY
2530 ARNOLD DR
MARTINEZ, CALIFORNIA 94553

REV	DESCRIPTION	DATE	DB	CB	BS	DI
A	PROPOSAL	08-27-18				

REVISIONS

OPPORTUNITY 0001557288

PROJECT ---



IF BAR IS NOT ONE INCH, DRAWING IS NOT TO SCALE

SHEET

AL1



PROPOSED SOLAR SWITCHBOARD LOCATION

AC RUN (SSB-POI) ≈50 LF

POINT OF INTERCONNECTION, METER #9281R7

SPB01

SPB02

1 ARRAY LAYOUT
SCALE: 1/32" = 1'-0"

LEGEND:

- X PROPOSED TREE REMOVAL
- PROPOSED LIGHT POLE REMOVAL
- PIER LOCATION
- PROPOSED EQUIPMENT PAD
- PROPOSED POINT OF INTERCONNECTION
- AC CONDUITS (SSB-POI)
- AC CONDUITS (SPB-SSB)
- AC CONDUITS (INV-SPB)

PROJECT SUMMARY

PROJECT SUMMARY	CARPORT
TOTAL # OF MODULE	930
MODULE TYPE	SPR-X21-470-COM
# OF INVERTER	6
DC SYSTEM SIZE (kW)	437.1
AC SYSTEM SIZE (kW)	407



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TIER 1

PANEL BOARD - CARPORT	CANOPY	LABEL	#MODULE	#STRING	KW (DC)	M80U_121 (18 STR)	M60U_121 (15 STR)	M42U_121 (12 STR)	KW (AC)	TILT	AZIMUTH CSI	AZIMUTH SPWR	AC RUN (INV-SPB)	AC RUN (INV-SSB)
SPB01	1	6x50	300	30	141	1		1	129	10°	144°	-36°		30
	2	6x45	270	27	126.9		1	1	112	10°	144°	-36°	95	
SPB02	3	6x60	360	36	169.2	2			166	10°	144°	-36°		160
TOTAL			930	93	437.1	3	1	2	407					

- NOTES:
- 110 MPH WIND ZONE (ASCE 7-10) CATEGORY II, EXPOSURE C
 - CORROSION RATE: [1.2µm/yr],[C2: 4%, C3: 99%]
 - ARRAY SHOWN ON AERIAL IMAGE
 - ARRAY MOUNTING STRUCTURE HELIX CARPORT 1.5
 - STANDARD CANOPY LOW-END CLEARANCE: 11' PROVIDED FOR STANDARD VEHICLE
 - BUILDING CODE REQUIRES 20' MIN. CLEARANCE FROM EXISTING BUILDINGS
 - FIRE DEPARTMENT REQUIRES 20' MIN. CLEARANCE ALONG EMERGENCY ACCESS ROUTES
 - TOTAL OF TREES TO BE REMOVED: 9
 - TOTAL OF LIGHT POLE TO BE REMOVED: 5

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ENGINEER'S STAMP

CONTRA COSTA COUNTY
4545 DELTA FAIR BLVD
ANTIOCH, CA 94509

ARRAY LAYOUT

REV	DESIGN #	DATE	DB	CB	AA	DJ
A	D-0091445	08-27-18				

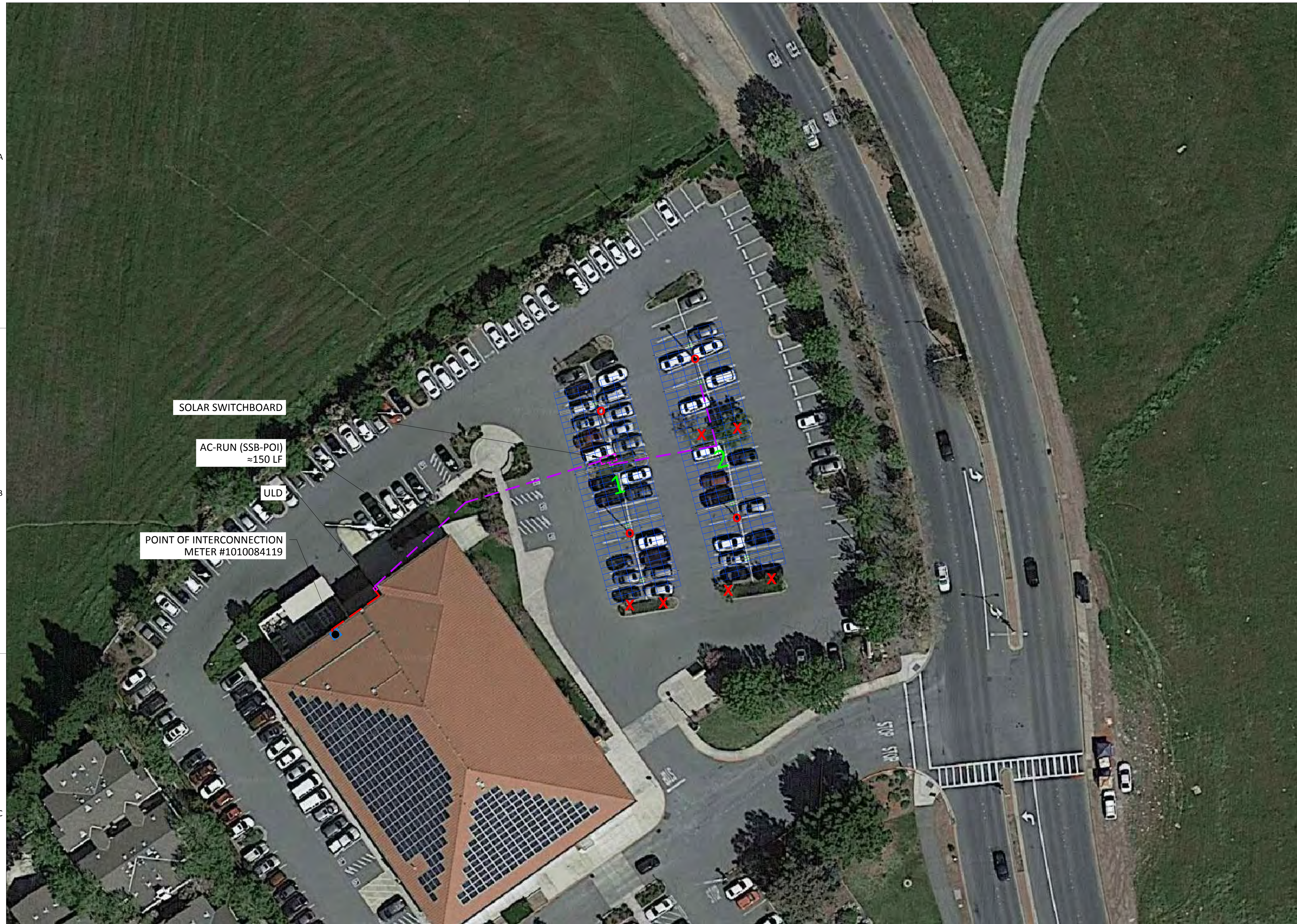
OPPORTUNITY: 0001557288

PROJECT: ---

0 1/2" 1"

IF BAR IS NOT ONE INCH, DRAWING IS NOT TO SCALE

SHEET **AL1**



1
ARRAY LAYOUT
 SCALE: 1/32" = 1'-0"

NOTES:

1. 110 MPH WIND ZONE (ASCE 7-10) CATEGORY II, EXPOSURE C
2. CORROSION RATE: [1.8µm/yr],[C3: 75%, C4: 99%]
3. ARRAY SHOWN ON AERIAL IMAGE
4. ARRAY MOUNTING STRUCTURE: HELIX CARPORT 1.5
5. STANDARD CANOPY LOW-END CLEARANCE: 11' PROVIDED FOR STANDARD VEHICLE
6. BUILDING CODE REQUIRES 20' MIN. CLEARANCE FROM EXISTING BUILDINGS
7. FIRE DEPARTMENT REQUIRES 20' MIN. CLEARANCE ALONG EMERGENCY ACCESS ROUTES
8. TOTAL OF TREES TO BE REMOVED: 4
9. TOTAL OF LIGHT POLE TO BE REMOVED: 4

CANNOPY	LABEL	# MODULE	# STRING	KW (DC)	M42U_121 (12STR)	M36U_121 (9 STR)	KW (AC)	TILT	AZIMUTH CSI	AZIMUTH SPWR	AC RUN (INV-SSB)
1	6x35	210	21	98.70	1	1	85.6	10°	255°	75°	95, 95
2	6x40	240	24	112.80	2		92.0	10°	255°	75°	30
TOTAL		450	45	211.50	3	1	177.6				

- LEGEND:**
- PROPOSED LIGHT POLE REMOVAL
 - ✕ PROPOSED TREE REMOVAL
 - PIER LOCATION
 - PROPOSED EQUIPMENT PAD
 - PROPOSED POINT OF INTERCONNECTION
 - AC CONDUITS (SSB-POI)
 - AC CONDUITS (SPB-SSB)
 - AC CONDUITS (INV-SPB)

PROJECT SUMMARY

PROJECT SUMMARY	CARPORT
TOTAL # OF MODULE	450
MODULE TYPE	SPR-X21-470-COM
# OF INVERTER	4
DC SYSTEM SIZE (kW)	211.50
AC SYSTEM SIZE (kW)	177.60



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 TIER 1

SUNPOWER®

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ENGINEER'S STAMP

CONTRA COSTA COUNTY
 4549 DELTA FAIR BLVD
 ANTIOCH, CA 94509

ARRAY LAYOUT

REV	DESIGN #	DATE	DB	CB	HG	ID
A	D-0091446	08-28-18				

REVISIONS

DESCRIPTION	PROPOSAL

OPPORTUNITY	0001557288
PROJECT	---

0 1/2" 1"
 IF BAR IS NOT ONE INCH, DRAWING IS NOT TO SCALE

SHEET AL1

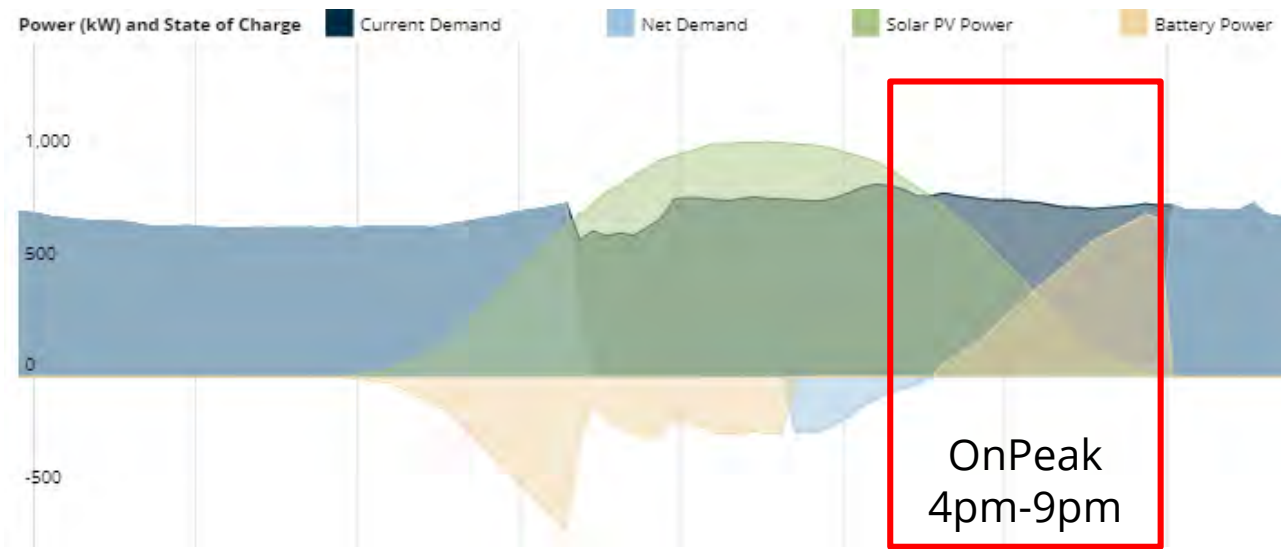
Option S Decision Overview – Critical for Storage Option

The August 9th CPUC decision mandates PG&E to create an Option S Rate

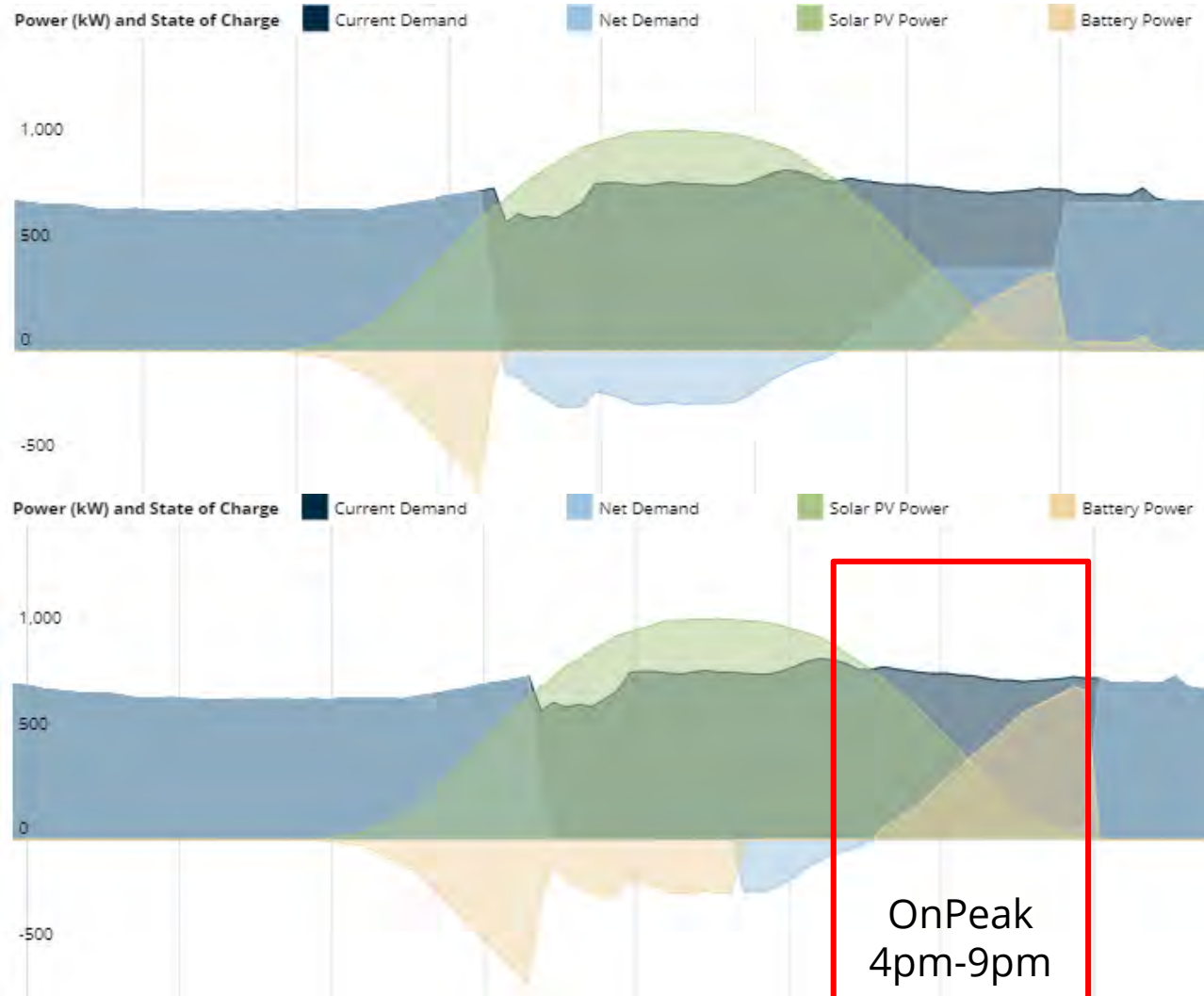
- **Option S will be available** at the earlier of 1) the same time proposed rate tariffs are available for opt-in enrollment (**Oct 2019**), or 2) **January 1, 2020**
- “The energy storage system must have a **rated capacity** in watts which is **at least 10% of the customer’s peak demand** over the previous 12 months.”
- “Option S shall collect **all distribution demand charge revenue through daily demand charges** for participating E-19V, E-19, and E-20 customers, for Option S customers.”
- “After **duplicating the Option R rate design**, **80%** of the revenue that would otherwise be collected from customers by non-coincident distribution demand charges (referred to by PG&E as “maximum” demand charges) shall be collected instead through daily demand charges **assessed during the peak period only (4 p.m. to 9 p.m.** for MLLP customers) for customers on Option S.”
- “**20%** of the revenue that would otherwise be collected from customers by non-coincident distribution demand charges **shall be collected through a non-coincident distribution demand charge** for customers on Option S, except that no distribution demand charges may be assessed between 9 a.m. and 2 p.m. each day.”
- **Cap of 150MW** (50MW per rate class for E-19V, E-19 and E-20)

How Option S Impacts Customer Savings

- Duplication of Option R rate design and associated energy rates, preserves solar economics under Option S
- Having the majority (80%) of demand charges assessed from 4pm-9pm creates a demand period that Solar + Storage are very effective at managing
- Charging from Off Peak Solar and Discharging during On Peak to manage demand charges creates stacking energy arbitrage value



2500 Alhambra, July 21st



Option R Grandfathered

- 704 kW Average Max Monthly Demand
- \$36,080 ESS Demand Savings
- \$20,592 ESS Energy Savings

Option S

Annual:

- 289 kW Average Daily Max Demand
- \$70,280 ESS Demand Savings
- \$49,775 ESS Energy Savings

Contra Costa County Portfolio

Site Name	Solar Rate	ESS System Size (kW)	ESS System Size (kWh)	ESS Cost (\$/year)	Option R				Option S			
					ESS Energy Savings (\$/year)	ESS Demand Savings (\$/year)	Total ESS Savings (\$/year)	Net Savings (\$/year)	ESS Energy Savings (\$/year)	ESS Demand Savings (\$/year)	Total ESS Savings (\$/year)	Net Savings (\$/year)
1000 Ward	E19S Option R	500	950	\$34,035	-\$293	-\$425	\$22,280	-\$11,755	\$23,463	\$34,344	\$57,807	\$23,772
30 Douglas	E19 S Option R (Grandfathered)	500	950	\$34,035	-\$2,807	\$20,714	\$20,003	-\$14,032	\$7,974	\$46,902	\$55,965	\$21,930
50 Douglas	E19S Option R	500	950	\$34,035	\$207	-\$3,009	\$23,730	-\$10,305	\$2,992	\$44,882	\$47,875	\$13,840
2350 Arnold	E19S Option R	500	950	\$34,035	\$1,227	\$407	\$23,707	-\$10,328	\$5,909	\$38,514	\$44,423	\$10,388
595 Center	E19S Option R	500	950	\$34,035	\$468	-\$3,602	\$18,029	-\$16,006	\$16,931	\$36,101	\$53,032	\$18,997
		2500	4750	\$170,175	-\$1,197	\$14,084	\$107,748	-\$62,427	\$57,268	\$200,743	\$259,101	\$88,926
2500 Alhambra	E20P Option R	1000	1900	\$57,641	\$20,592	\$36,080	\$55,914	-\$1,728	\$49,775	\$70,281	\$120,056	\$62,415

Option S Unknowns

- **Daily Demand Rates**
 - CALSSA has requested illustrative Daily Demand Rates from PG&E that are expected to be released by end of Nov 2018
 - Estimate of Daily Demand rate calculated by scaling the Daily Demand Rate estimated by SEIA that was given in a Rate Design Q&A Session
- **Securing Option S allocation under 150MW cap**
 - More information about how to apply for Option S will be in PG&E advise letter
 - Will there be a queue?
 - Will existing storage customers be able to switch to Option S?

Your Best Partner for Sustainable Energy Savings



Execution
Certainty



Best Products
and Solutions



Committed
Partner



Execution
Certainty



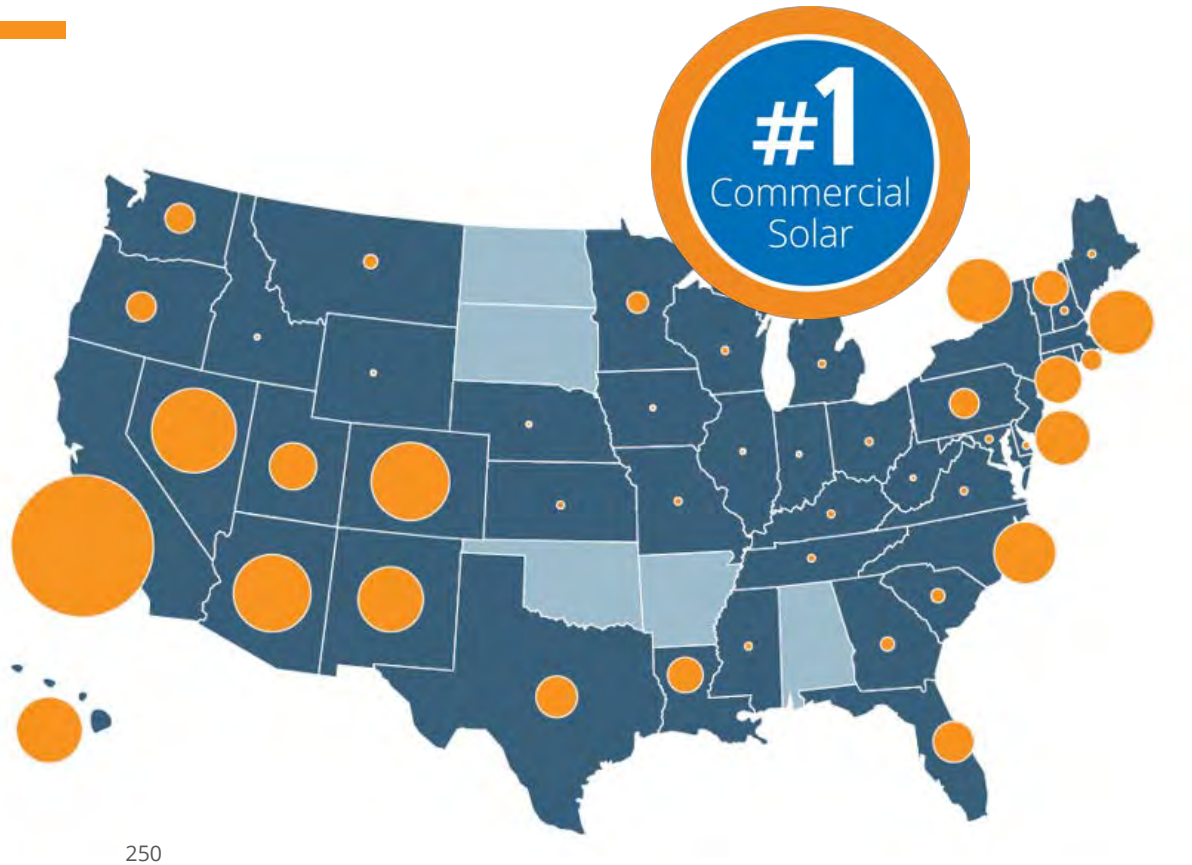
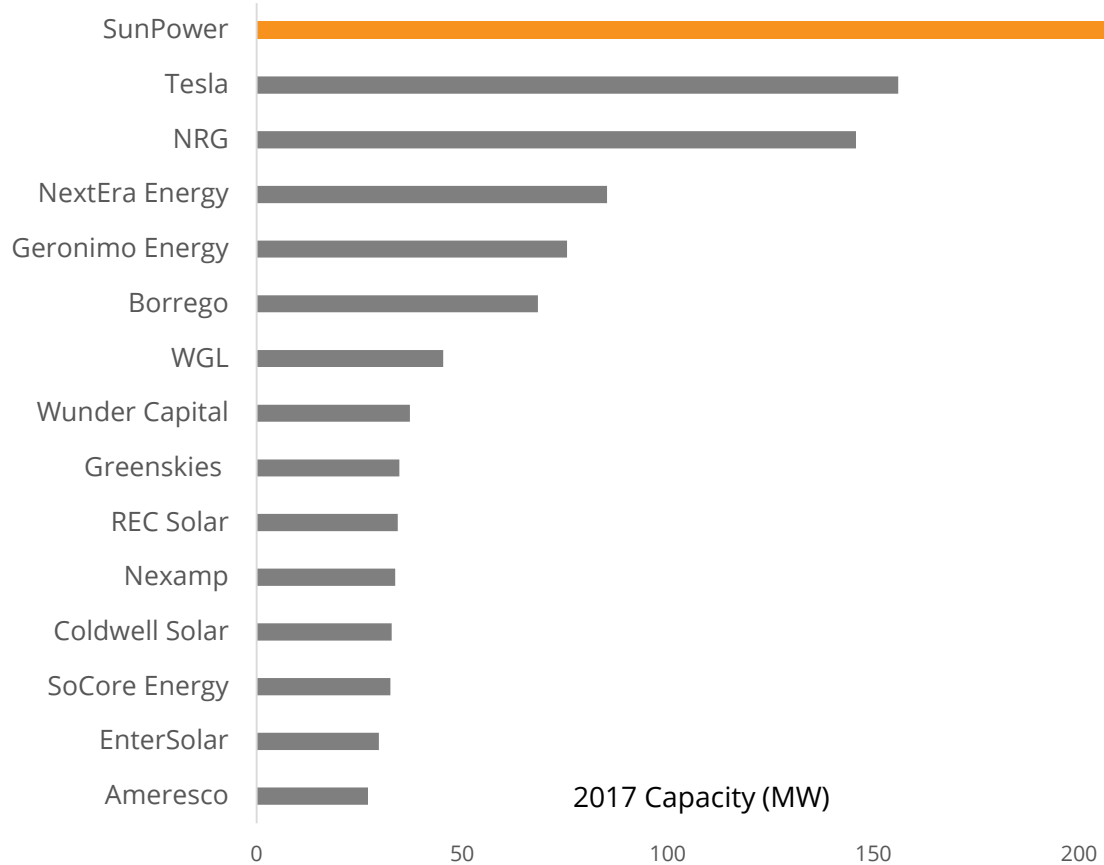
We make solar seamless and easy for you.

Expertise in in product selection, project design,
financing, construction, grid connection and operations.

Full service, coast to coast

SunPower is the trusted #1 commercial solar provider for large corporate customers, with more than 33 years' experience, 9.2 gigawatts installed and \$10 billion financed worldwide. We've simplified the process, providing you with the best possible solar experience.

A recent GTM Research report confirms SunPower is the No. 1 U.S. commercial solar provider based on 2017 delivered projects - and information collected from installers, developers, asset owners and financiers.

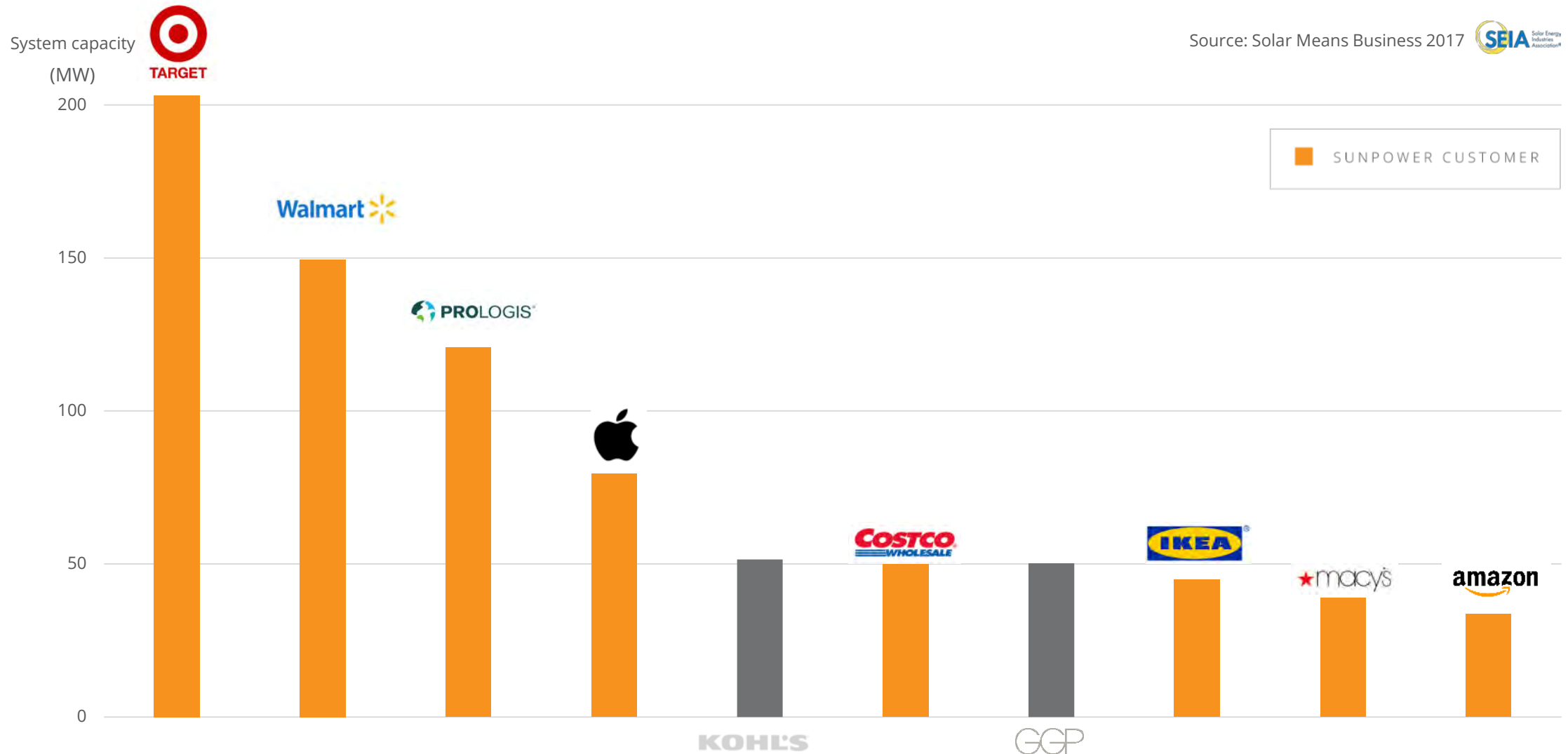


#1
Commercial Solar

● SunPower Installed and deployed solar systems

Source: Greentech Media Research, 2018

8 of Top 10 corporate solar buyers chose SunPower



Over \$10B in solar project financing

Financing that fits your needs, with maximum returns.

The SunPower solar financing team are helpful facilitators for our customers. Our primary goal is finding and executing the best financial solution to achieve your organization's energy objectives and the very best long-term ROI.



Best Products and Solutions

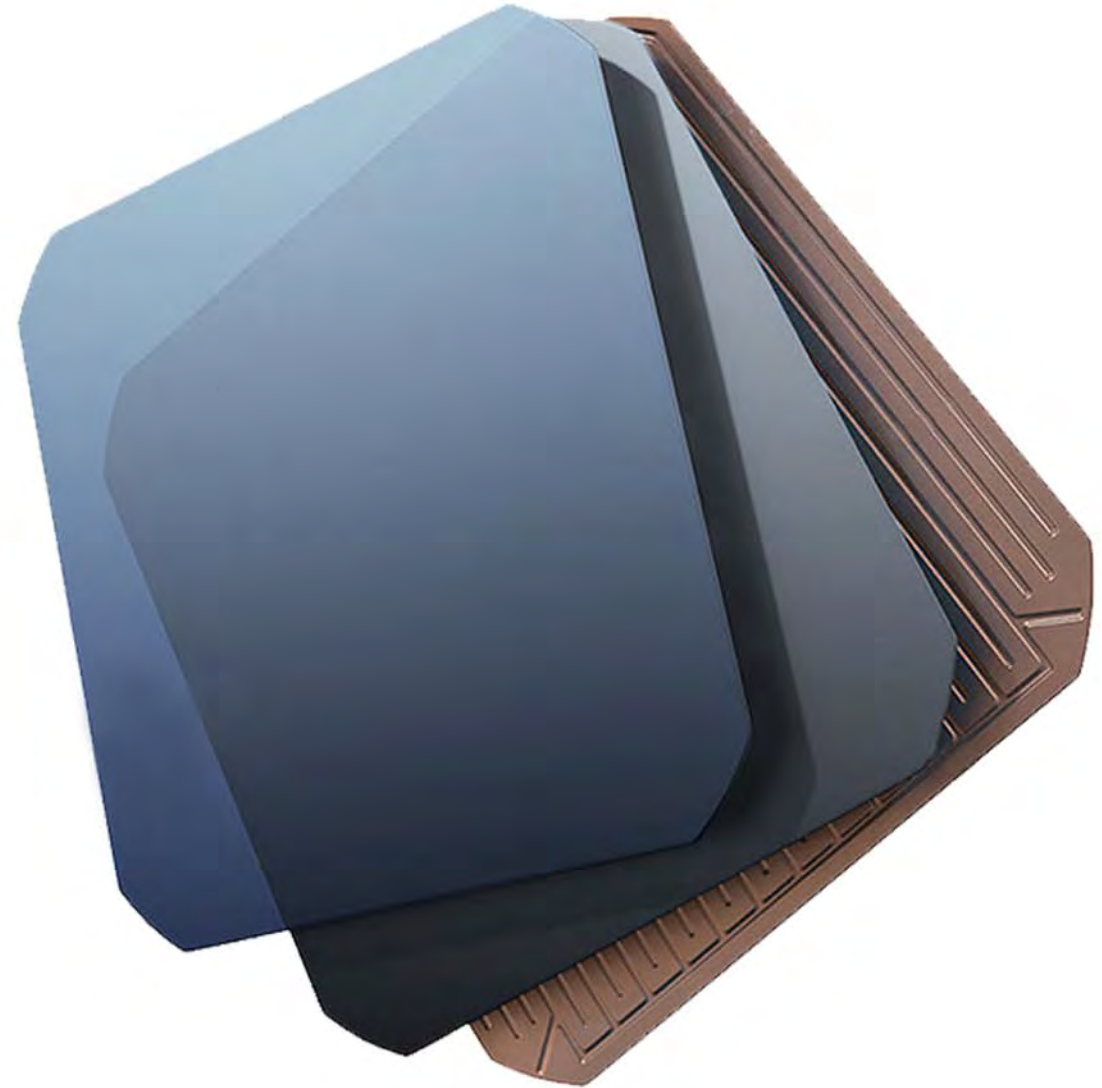








SunPower technology is different, and better.

For uncompromised performance and dependable results.

Higher savings start with different, better cells

- 25.2% efficient solar cell maximizes system power production
- Fundamentally different design enhances reliability, eliminating 86% of the reasons cells fail¹
- This adds up to better reliability and more power over time, giving you improved economics and more savings



	SUNPOWER®	vs.	Conventional Solar	
MORE ENERGY	No grid lines on cell front			Lines of metal paste
HIGHER RELIABILITY	Solid metal backing			Metal paste on back of cell
HIGHER RELIABILITY	Thick connections			Thin connections

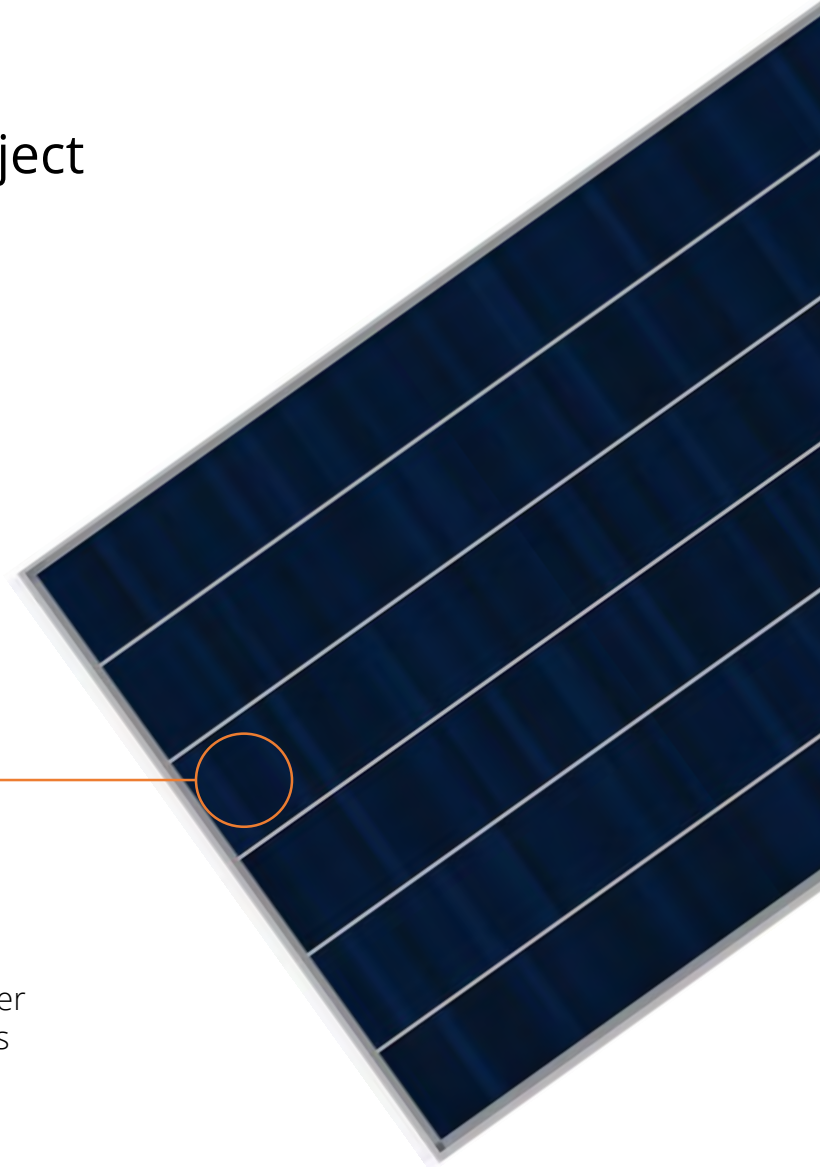
Module choice so you can select the right technology for your project



A close-up view of a solar panel with a grid of small, square cells. An orange circle highlights one of the cells, with a line pointing to the text below.

SunPower® Maxison® Cell-based Modules

- Highest efficiency module you can buy¹
- Unmatched reliability²
- Up to 60% more energy in the same space over the first 25 years³
- Best choice for constrained areas to maximize lifetime energy production



A close-up view of a solar panel with a grid of larger, rectangular cells. An orange circle highlights one of the cells, with a line pointing to the text below.

SunPower® Performance Series Modules

- Superior in every way to Conventional Modules—efficiency, quality, and reliability
- Backed by the same 25-year Product and Power Warranty covering Maxison cell-based modules
- Best choice for minimizing up-front project costs

Our Warranty

The industry's best modules, best warranty

- The proven reliability of SunPower® modules enables the industry's best warranty
- We eliminate the loopholes and gaps found in other solar warranties to offer the highest level of protection on your investment
- We stand behind every module we ship to homes, businesses and power plants around the world to provide you with the confidence to secure your energy future

CONVENTIONAL MODULES		
POWER	PRODUCT	SERVICE
25 YEARS	5-15 YEARS	0-10 YEARS

vs.

SUNPOWER®		
POWER	PRODUCT	SERVICE
25 YEARS		

POWER

SunPower's power warranty is the highest in solar—for 25 years

PRODUCT

SunPower covers all product defects for the full 25 years

SERVICE

SunPower will repair or replace defective modules within 25 years of purchase



Commercial Carport and Rooftop Solutions

Make a visible statement on your sustainability goals

SunPower® Helix™ Carport System

- Designed by architects and engineers to deliver the best in value, performance and elegance
- Each component is engineered for greater reliability and longer system life
- System features surpass industry standards for safety and durability



SunPower® Helix™ Roof Single Tilt System

- Optimizes energy output per kW
- Ideal for unconstrained roofs
- Ideal for customers prioritizing IRR



Maximizing the value of solar + storage

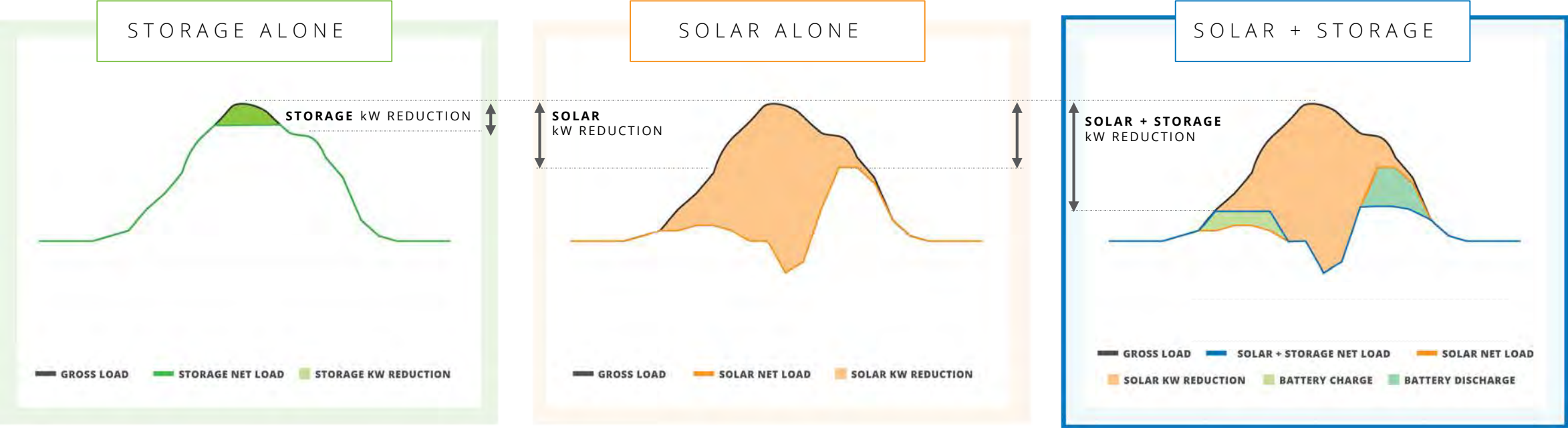
- **Lower your electricity costs**
Realize significant reductions in your monthly utility demand charges with Helix™ Storage.
- **Realize savings quicker**
Design, installation, and O&M services are seamlessly integrated to provide a turnkey solution that speeds your time to savings.
- **Minimize disruptions**
Your system is delivered on a timeline and budget that's right for you—certainty that's backed by SunPower's 30+ years of experience.



Storage Image courtesy of Lockheed Martin

Solar and storage are better together

While solar does provide demand charge savings; when paired with energy storage that is charged and discharged at the most opportune times, demand charge reductions become more reliable.



Smaller peak reduction from “flatter” usage pattern

Limited value for morning and evening peaks

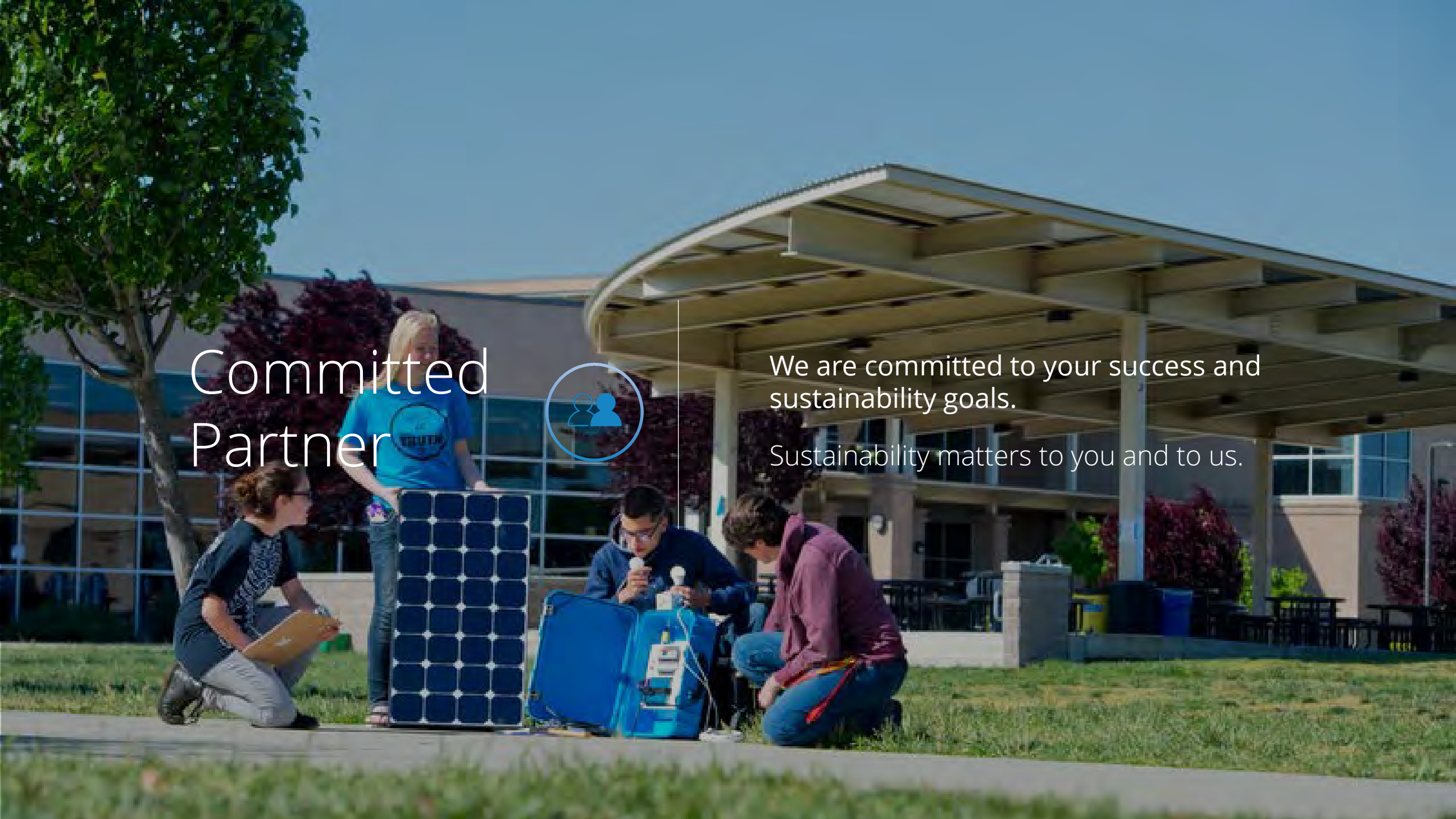
Maximum savings

Committed Partner



We are committed to your success and sustainability goals.

Sustainability matters to you and to us.



Rigorous safety protocol helps ensure your project is on time and on budget

Our safety standards are based on decades of experience and ensure the well-being of our contractors and workers.

Safety lapses cause delays, higher costs and accidents, which is why we plan ahead to protect your investment at every milestone.



ON-SITE SAFETY

- Design review and approval
- Project kickoff with hazard analysis and site safety plan
- Weekly safety and quality control audits
- Daily team reports, review of on-site hazards and construction calls
- Thorough investigation of near misses, accidents and corrective actions
- Customer solar safety training



CORPORATE CULTURE

- Dedicated to safe, injury-free workplaces
- Training required for staff, managers and executives
- Extensive programs: fall protection, excavation, crane, rigging, OSHA compliance, etc.
- Quarterly reviews and awards
- Total RIR reporting

Sustainable manufacturing

At every step of the product lifecycle, from manufacturing to end of life, we work to minimize resource usage and maximize environmental benefits.



SunPower facilities in De Vernejoul and Toulouse, France, and Mexicali, Mexico have landfill-free verification from NSF Sustainability, meaning these facilities divert more than 99% of their waste, with 1% or less going to landfills.



SunPower has LEED certifications at facilities globally, including our San Jose headquarters and Mexicali manufacturing sites. The SunPower Malaysia administration building is certified LEED Platinum and the manufacturing facility is certified LEED Gold. The regional operating headquarters in the Philippines is certified LEED Platinum.



SunPower is the world's first and only solar panel company to earn the prestigious Cradle to Cradle Certified™ Silver designation for our direct current E-Series and X-Series panels.¹



In 2016, SunPower published its first Declare label for E- and X-Series panels, providing details on where the products are assembled, their life expectancy and end-of-life options.

Strengthen your sustainability goals and increase your facility value




SunPower systems contribute more for your LEED certification

- 40 points are required for Basic LEED Certification, and a SunPower solar system with Cradle to Cradle Certified™ solar panels can contribute across several credit categories.
- On a typical project², a solar system contributes 5 points, and Using Cradle to Cradle™ certified SunPower products and reducing construction waste can yield an additional 10 points.



SunPower is a member of the US Green Building Council, the organization which denotes expertise in the field of green building.

LEED POINTS

		Conventional Panels	SunPower Maxeon Panels
	- Renewable energy production	3	3
	- Heat Island Reduction	2	2
	- Environmental product declarations - Material ingredients - Sourcing of raw materials - Construction + waste management - Avoidance of chemicals of concern		10

Get your projects done right

Deliver great savings



Execution Certainty

- 33 years of global experience installing 9.2GW with over \$10B in financing.
- No. 1 U.S. commercial solar provider based on 2017 delivered projects³
- The most expertise in product selection, project design, financing, construction, grid connection and operations.



Best Products and Solutions

- World and industry record breaking technology in cells, modules and systems with the highest performance and the lowest degradation rate.
- A broad portfolio for more choice and a better fit for your needs.
- Solutions that deliver the most energy for predictable savings and dependable results.
- Industry's largest investment in solar R&D and the best warranty.



Committed Partner

- No other solar company offers such a complete best technology and delivery, custom financing options, customer service, community programs and sustainability practices.
- Highest safety standards in the industry.
- Commitment to our communities, with programs like Horizons and Solar Academies for learning, mentorship and workforce training opportunities.



Cupertino Apple Campus
15MW Roof system

DEMAND BETTER SOLAR®

SUNPOWER®

Important Information

1. Based on search of datasheet values from websites of top 10 manufacturers per IHS, as of January 2017.
2. A typical project assumes core and shell or major renovation with at least 48% of the energy offset by solar, sufficient products to qualify for Material and Resource categories, and at least 33% of the hardscape covered with solar. LEED, USGBC and the related logo are trademarks owned by the U.S. Green Building Council and are used with permission
3. Greentech Media Research, 2018

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