Clean Coalition

Feed-In Tariffs (FITs)

Unleashing commercial-scale renewables

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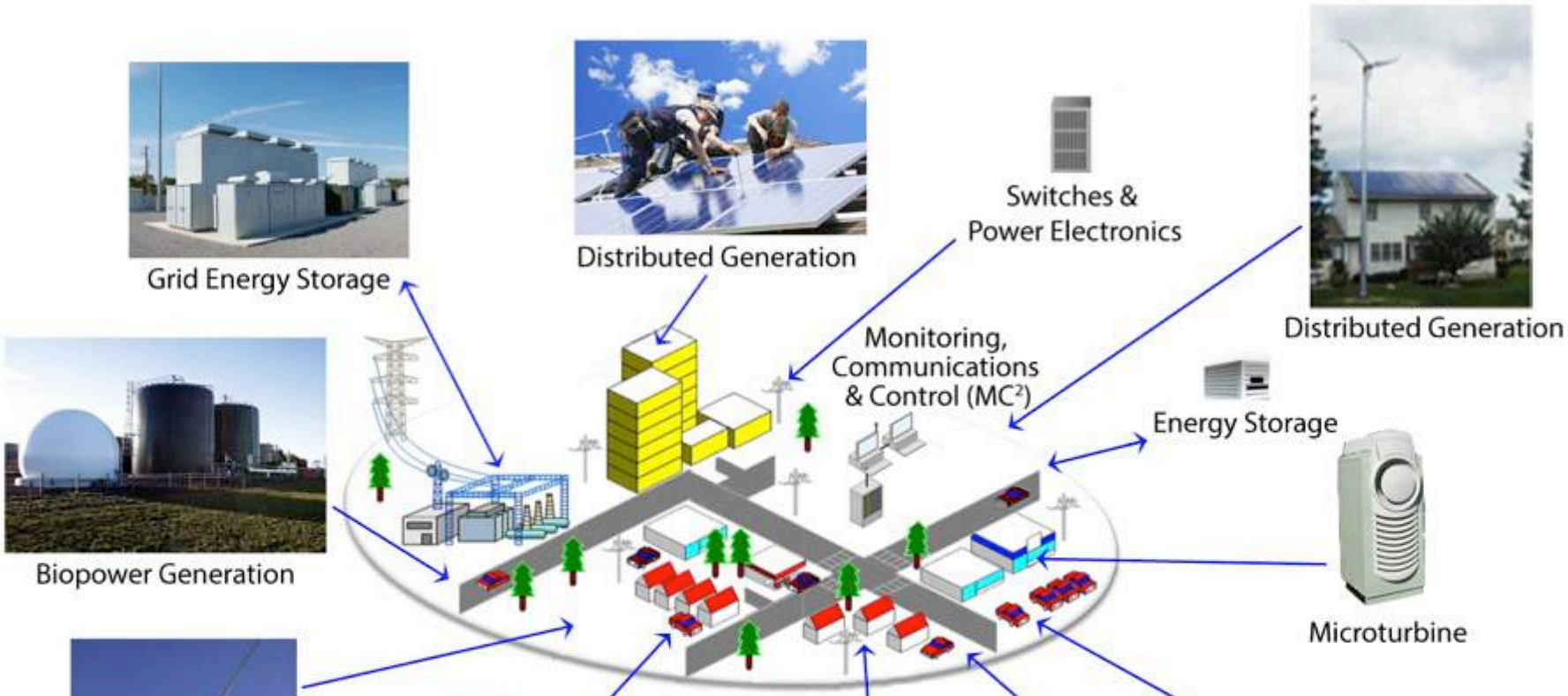
Clean Coalition mission

To accelerate the transition to renewable energy and a modern grid through technical, policy, and project development expertise

Clean Coalition vision



Clean Coalition over-arching goal & action plan

By 2025, set the stage for achieving 25% of the energy consumption in the United States from local renewables and deliver the associated trifecta of economic, environmental, and resilience benefits.

Relentlessly design and implement policies that facilitate local renewables and other distributed energy resources (DER) and program successes that show the way. FITs are key and are being driven by both policy and program actions.

WDG provides the gradient path to success

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Wholesale Distributed Generation (WDG) is the market segment that will realize the Clean Coalition's mission, vision, and over-arching goal.

FITs address the WDG market segment

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Project Size

50+ MW

500 kW

5 kW

Wholesale DG

Serves Local Loads

Central Generation

Serves Remote Loads

Retail DG

Serves Onsite Loads

Behind the Meter

Distribution Grid

Transmission Grid

FITs proliferated WDG solar in Germany

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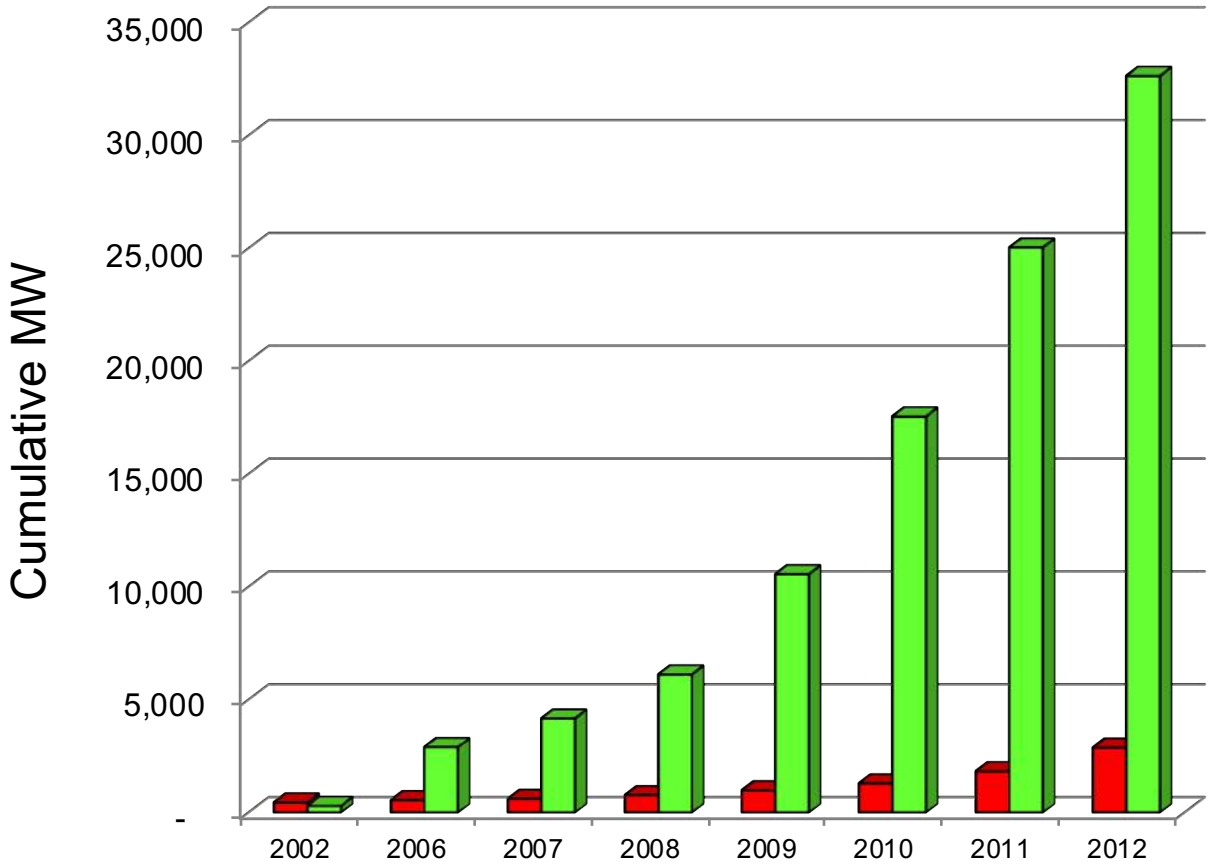
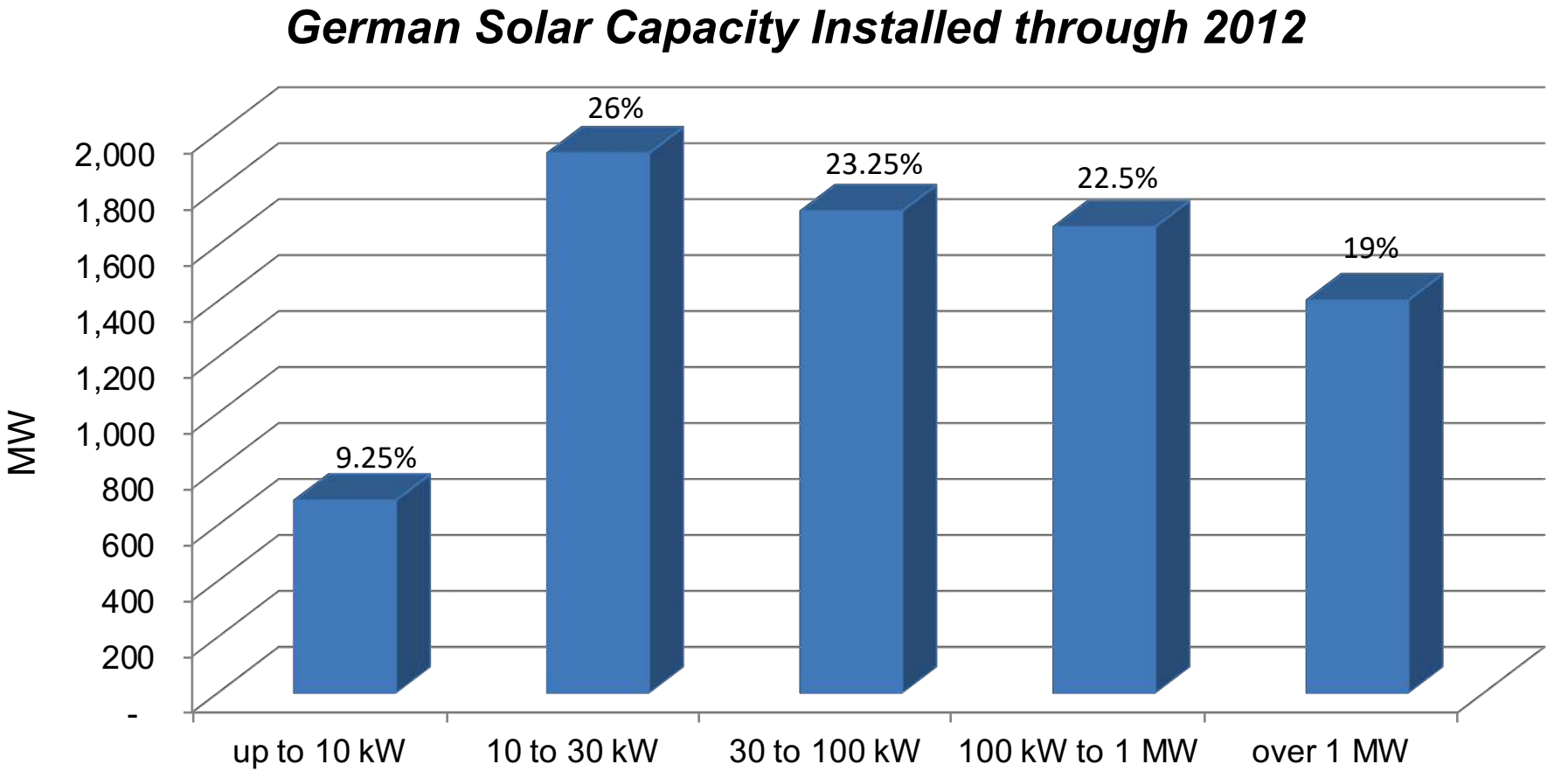
Solar Markets: Germany vs California (2002-2012)



Sources: CPUC, CEC, SEIA and German equivalents.

Germany deployed over 10 times more solar than California in the decade from 2002 — despite California having 70% better solar resource.

The majority of German solar is local solar



Source: Paul Gipe, March 2012

Germany's solar deployments are almost entirely sub-2 MW projects on built-environments and interconnected to the distribution grid (not behind-the-meter).

German rooftop solar is 4 to 6 cents/kWh today

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Project Size	Euros/kWh	USD/kWh	California Effective Rate $/kWh
Under 10 kW	0.1270	0.1359	0.0628
10 kW to 40 kW	0.1236	0.1323	0.0611
40.1 kW to 750 kW	0.1109	0.1187	0.0548
Other projects up to 750 kW*	0.0891	0.0953	0.0440

- Conversion rate for Euros to Dollars is €1:$1.07.
- California's effective rate is reduced 40% due to tax incentives and then an additional 33% due to the superior solar resource.

Replicating German scale and efficiencies would yield rooftop solar today at only between 4 and 6 cents/kWh to California ratepayers.

* For projects that are not sited on residential structures or sound barriers.

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Case for FITs

FITs keep things simple

- Standardized and guaranteed contract with a long-term, predefined rate paid for energy produced

FIT project

Utility customer

100% of the renewable energy generation is purchased by SDGE at FIT rate

100% of customer energy usage is purchased based on a normal retail rate

SDGE

Benefits of a FIT

- **Maintains relationship with customers:** A buy-all, sell-all structure; Load Serving Entity (LSE) customers continue to pay for all energy they consume, so load is not reduced from FIT projects.

- **Creates visible, manageable assets:** A FIT uses wholesale interconnection, so the LSE and Independent System Operator (ISO) have visibility and control of power produced by DG systems.

- **Guides the market to build desired projects**: Through adders, a FIT can be tailored to drive deployment of projects that have certain characteristics, such as location, size, and ability to dispatch power on-call using energy storage.

Net metering does not work for many properties

- **Maximizes applicable properties**: A FIT simplifies the process for all commercial properties to participate in energy generation, including non-owner occupied and split-metered properties. Also, a FIT removes on-site load limitations to allow for optimal project sizing.

Source: City of Palo Alto

FITs efficiently open the WDG market segment

- FITs offer clear guidance to the market through predefined terms and prices, thereby allowing project developers to qualify their planned projects before undertaking significant investment in siting, interconnection, etc.

- A clear, predictable purchase offer — and a simple, standardized contract for use between a LSE and energy generators — streamline the development of clean local energy. Not only does this approach nearly eliminate speculative projects, but it also drives down renewable energy development costs.

- FITs secure projects that will be built immediately and proven to deliver power within 12 to 18 months.

Auctions create inefficient markets, FITs do not

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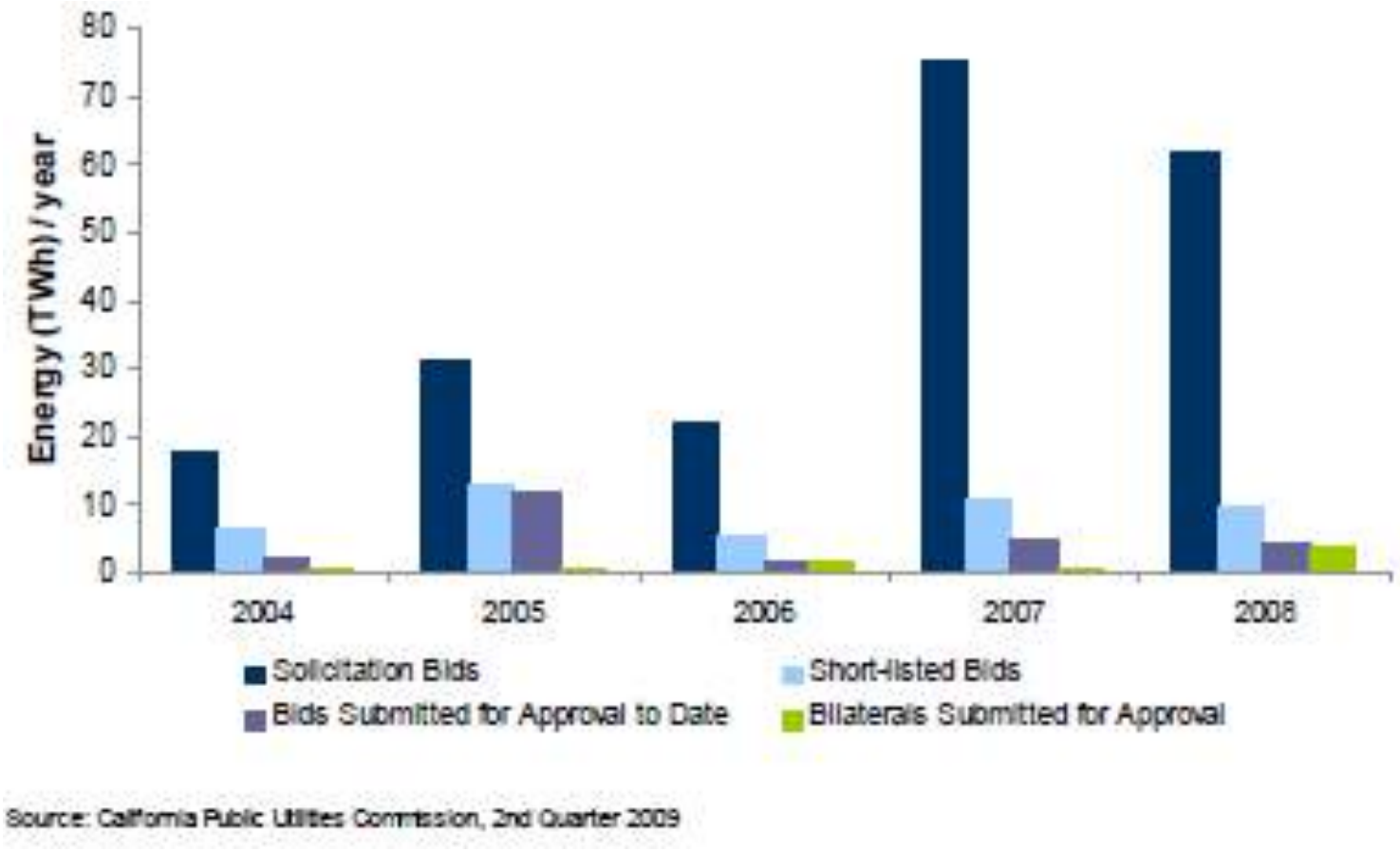
- Auctions and similar competitive solicitations result in a highly inefficient market due to exorbitant bidding costs and extreme failure rates.
  - Average minimum cost of producing an acution bid is over $150k, which overwhelms commercial-scale projects that generally have total turnkey installed costs of less than $500k.
  - 97% failure rates, combined with exorbitant bidding costs, are a recipe for bankruptcy.
  - Yes, it is insane to think that auctions could possibly attract commercial-scale renewables and other DER, and yet, California utilities and policymakers chronically prove Einstien's definition of insanity by continuing to pursue local renewables and other DER via auctions!
- Competitive solicitations for project developers raise the costs of doing business for all developers — and result in higher prices for consumers.
- Losing bids tie up prime siting options and flood interconnection queues. Winning bids include unrealistically low offers based on speculative future pricing rather than firm current pricing, resulting in projects that may never be built.

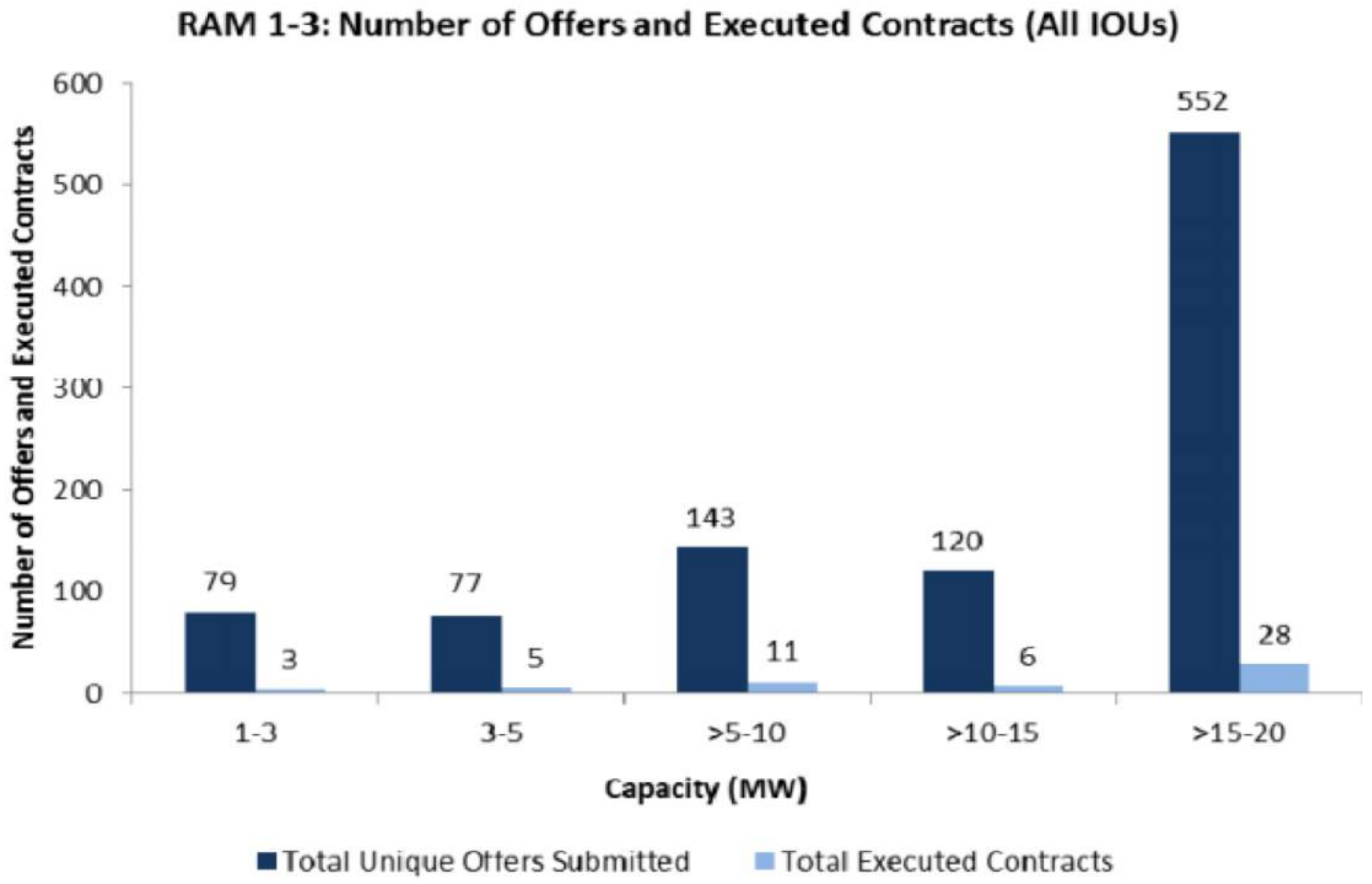
Auctions/solicitations have high failure rates

- Across California RPS solicitations, fewer than 1 in 10 project bids were actually developed, which resulted in high administrative costs for the program and exorbitant risk/cost for renewable energy project development.



Auctions/solicitations have high failure rates

- In California's Renewable Auction Mechanism (RAM) program, only a small percentage of proposed projects are actually contracted.



Feed-In Tariff

for

East Bay Community Energy (EBCE)

EBCE FIT project eligibility

- Open to all renewable energy technologies that meet California's Renewables Portfolio Standard (RPS) eligibility requirements
- Projects must be sited in the EBCE service territory
- Projects can sized up to 3 MW *

*All project size capacity references in this presentation are Alternating Current (AC) rated, unless noted otherwise.

EBCE FIT program size

- A 50 MW FIT will provide roughly 1.29% of EBCE annual electric load

FIT capacity	Annual energy production from each kW of FIT capacity	Annual energy deliveries through FIT	Annual CCA energy sales	Percent of total CCA retail sales
50 MW	1,600 kWh	80,000 MWh	6,200,000 MWh	1.29%

- Annual production of 1,600 kWh/kW of FIT capacity is based on solar resource analysis for Alameda County, as we expect PV to be the dominant FIT technology

Location	Solar resource quality ($kWh/m^2/day$)	System type	Capacity factor	Annual energy production ($kWh/kW_{AC}/year$)
Oakland Airport	4.63	Fixed rooftop installation	19.1%	1521
Livermore	5.00	Fixed rooftop installation	20.1%	1605
Livermore	5.00	Single-axis tracking installation	25.4%	2024

EBCE FIT initial pricing

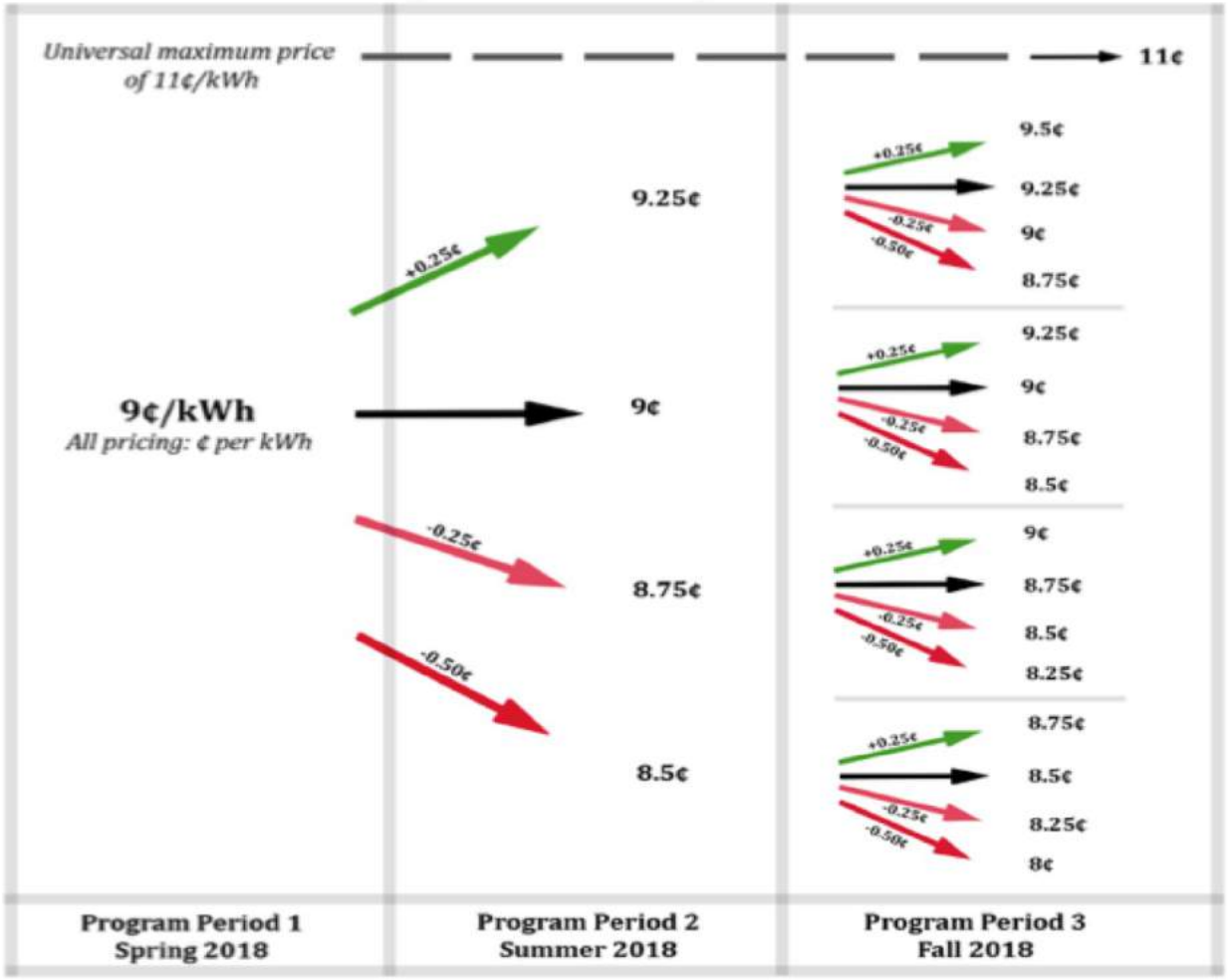
- Initial baseline FIT pricing of 9¢/kWh fixed for 20 years.
  - This price is expected to support larger, ground-mounted solar PV projects in eastern Alameda County.
  - Modeling was done using NREL's System Advisor Model.

Type of system	Size of solar PV system (W_{AC})	Installed cost ($/$W_{DC}$)	20-year fixed PPA price (¢/kWh) Oakland	20-year fixed PPA price (¢/kWh) Livermore
Built environment	100 kW roof	$2.30	15.6¢	14.8¢
Built environment	350 kW roof	$2.12	14.5¢	13.8¢
Built environment	500 kW roof	$2.06	14.2¢	13.5¢
Built environment	1 MW roof	$1.90	13.5¢	12.8¢
Ground-mount	1 MW tracking	$1.86	n/a[11]	10.0¢
Ground-mount	3 MW tracking	$1.78	n/a	9.74¢

EBCE FIT Market Responsive Pricing (MRP)

Once baseline pricing is set for the initial FIT tranche, MRP governs baseline pricing, which can never exceed a universal maximum of 11¢/kWh.

Market Responsive Pricing for EBCE FIT



EBCE FIT pricing adders

- The concept of pricing adders is simple
  - An LSE identifies the characteristics it would like to see in its FIT projects and then creates adders to its baseline FIT price to incentivize projects with these characteristics.
- The Clean Coalition recommends EBCE implement four pricing adders:
  - Built-environment adder at 20%
    - Rooftops, parking lots, parking structures, etc.
  - Small project adder at either 10% or 20%
    - 10% for projects larger than 100 kW and less than or equal to 350 kW.
    - 20% for projects less than or equal to 100 kW.
  - Community benefit adder at 5%
    - Tax-exempt and/or disadvantaged zone.
  - Dispatchability adder at 15 cents/kWh
    - Eligible for guaranteed daily dispatchable renewable energy at 2-4 hours of nameplate renewable energy FIT project.

Highlights from public comments on the FIT

- Numerous parties expressed strong support for the FIT because it will drive local renewable energy development and local job creation (CalSEIA, Borrego Solar, East Bay Clean Energy Alliance, others)
- Some parties (Borrego, EBCEA) would like to see a larger program and more adders; however, there are rate impacts to consider when it comes to expanding FIT program capacity and increasing the pricing.
- Borrego Solar recommended rolling unselected applications from one tranche into the next tranche. We agree with this suggestion and will clarify this in the final FIT design recommendations.
- More than Smart expressed concern about the benefits of the FIT to EBCE customers, as well as the untested nature of the proposed Market Responsive Pricing (MRP) mechanism.
  - In alignment with the goal of the LDBP, the FIT is designed to drive local economic and environmental benefits through local renewables. It also unleashes commercial-scale projects that are ill-suited to NEM (non-owner occupied, split-metered/multi-tenant, low on-site load) and avoids the tremendous inefficiency of auctions that kill any participation from the commercial-sale market segment.
  - The MRP is similar to California's ReMAT program, which has effectively driven down pricing for sub-3 MW renewable energy projects using a market adjusting tariff. An MRP has also driven German rooftop solar pricing to less than 5 cents/kWh equivalent.

EBCE FIT program timing

- 5 MW quarterly allocations — from Spring 2018 thru Summer 2020
- The FIT will bring all 50 MW of capacity online by year-end 2021 before ITC steps down from 22% to 10%

East Bay Community Energy FIT program expansion and timing

Allocation date	Capacity allocation	Total FIT program size	Estimated commercial online date (COD)[7]	Approximate annual energy deliveries through FIT[8]	FIT as a percent of total CCA estimated retail sales[9]
Spring 2018	5 MW	5 MW	Fall 2019	8,000,000 kWh	0.129%
Summer 2018	5 MW	10 MW	Winter 2019	16,000,000 kWh	0.26%
Fall 2018	5 MW	15 MW	Spring 2020	24,000,000 kWh	0.39%
Winter 2018	5 MW	20 MW	Summer 2020	32,000,000 kWh	0.52%
Spring 2019	5 MW	25 MW	Fall 2020	40,000,000 kWh	0.64%
Summer 2019	5 MW	30 MW	Winter 2020	48,000,000 kWh	0.77%
Fall 2019	5 MW	35 MW	Spring 2021	56,000,000 kWh	0.90%
Winter 2019	5 MW	40 MW	Summer 2021	64,000,000 kWh	1.03%
Spring 2020	5 MW	45 MW	Fall 2021	72,000,000 kWh	1.12%
Summer 2020	5 MW	50 MW	Winter 2021	80,000,000 kWh	1.29%

EBCE FIT program capacity management

- If any capacity remains unclaimed within 30 days of the next upcoming allocation, then that excess capacity should be rolled into the next allocation.
  - For example, if a 5 MW allocation in Spring 2018 receives only 3 MW worth of applications, then the Summer 2018 capacity allocation should total 7 MW — the originally planned 5 MW plus the 2 MW of unclaimed capacity from Spring 2018.

- This will ensure that the program remains on track to deliver the desired capacity in line with the program timeline.

Solar Siting Survey

for

City of San Diego

SSS methodology

SSS is performed manually through a multi-step process:

- **Set** a minimum project size for the SSS
- **Scan** the target region via Google Earth Pro for prospective solar sites that meet the minimum project size
- **Measure** the usable surface area (roof, parking lot, parking structure) and eliminate obvious portions that are not viable (trees were ignored since some property owners may elect to top or remove trees in order to install solar)
- **Assess** the probable solar generation density against the minimum project size threshold (1 MWac for this SSS)
- Where sensible, **aggregate** campus-type structures that are likely to have common ownership into a single site (examples being parking lots and rooftops in a shopping center, industrial park, or school campus)

SSS deliverables

- Searchable spreadsheet including detailed results and linking to the interactive maps
- Interactive maps in the form of Google Earth .kml files with icons marking structures and aggregations with details available in pop-up windows
  - Google Map versions are also made available
- Summary report of key findings and methodology

Summary of southern portion of City of San Diego SSS findings (all figures in AC)

Clean Coalition

- Over 300 MW of technical solar siting potential was found on built environments that can support projects sized at least 1 MW.
  - Note that the technical solar siting potential will be reduced by constraints that were not considered like structures that cannot support extra weight without significant upgrade and grid bottlenecks that would result in excessive solar curtailment (or require time-shifting dispatchability via energy storage)
- 75% of the potential is in parking lots and parking structures.
- Extrapolations to lower minimum project sizes:
  - 600 MW minimum total potential for projects sized at least 500 kW
  - 1.2 GW minimum total potential for projects sized at least 100 kW

SSS northern and southern sections and relevant substations

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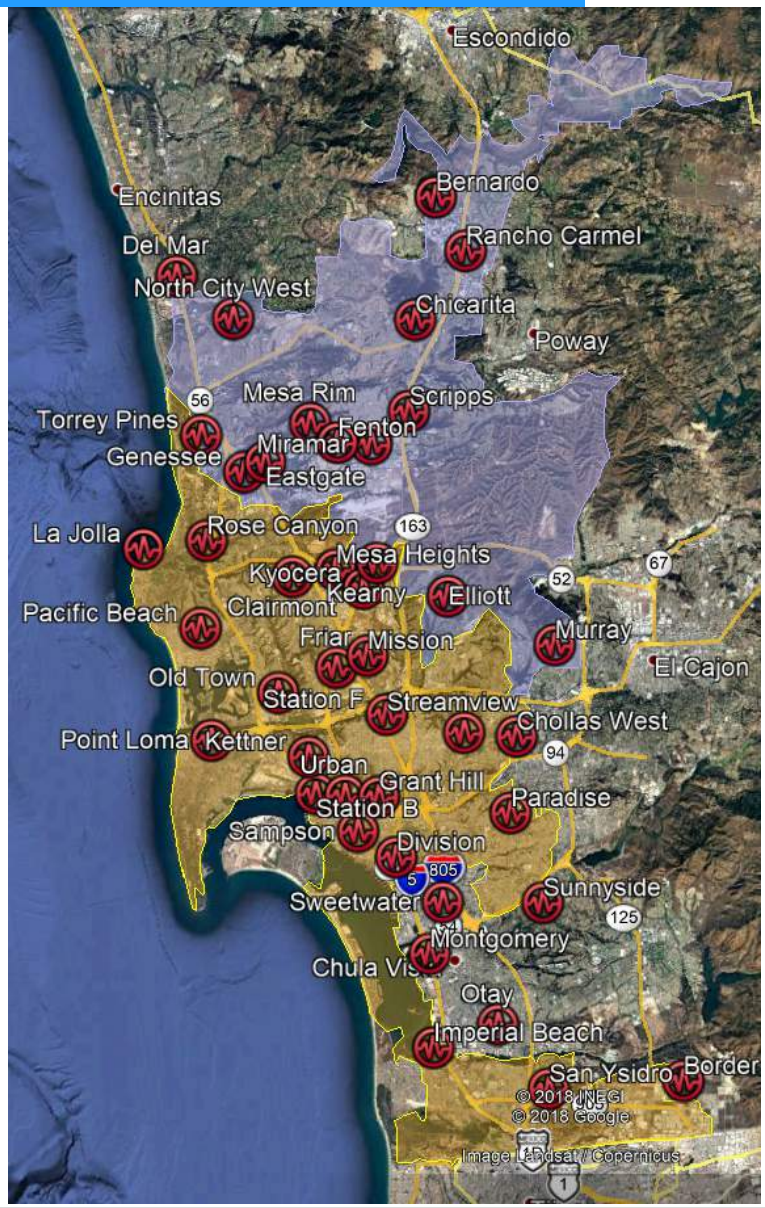

Overview of SSS sites, southern section

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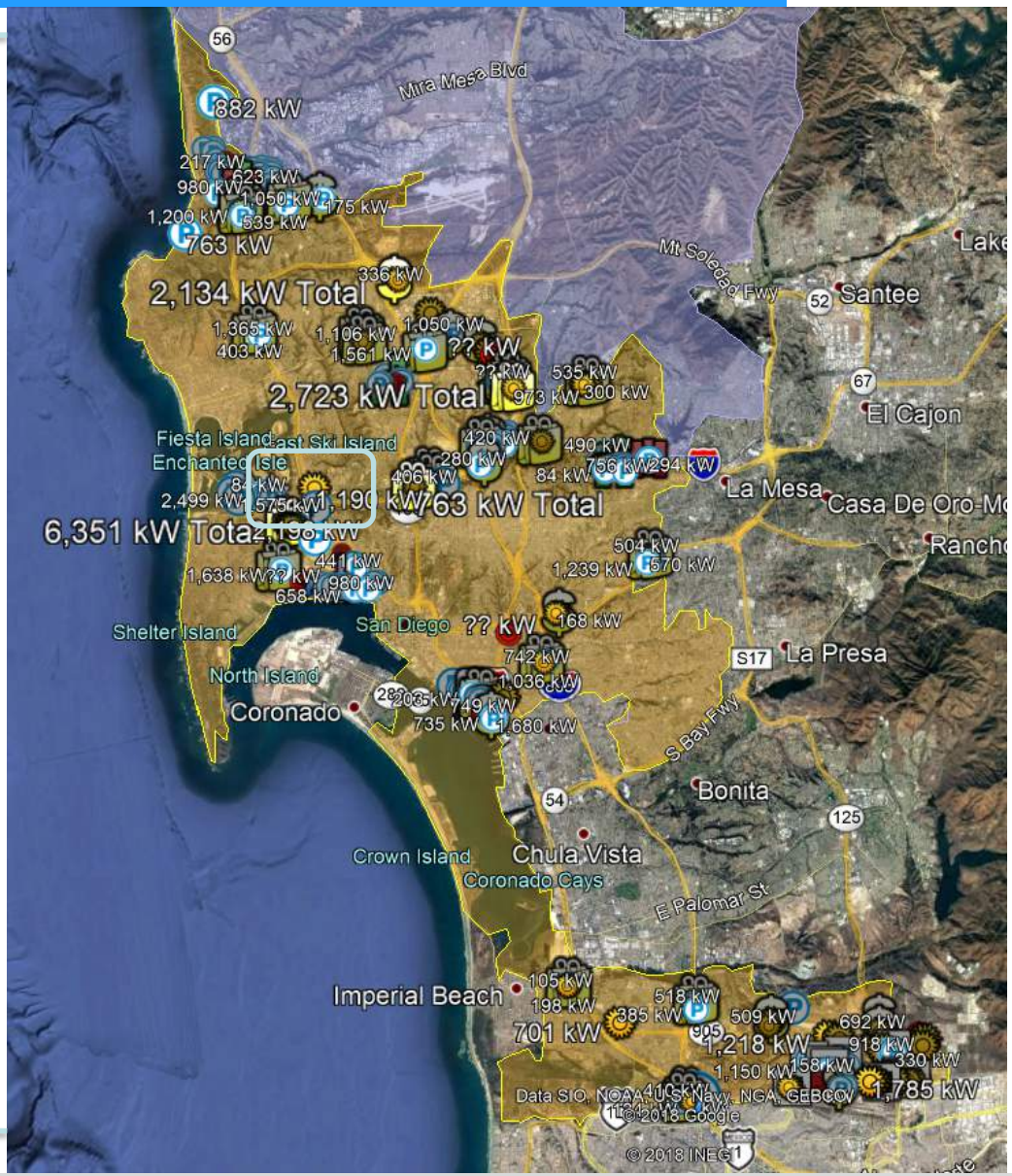
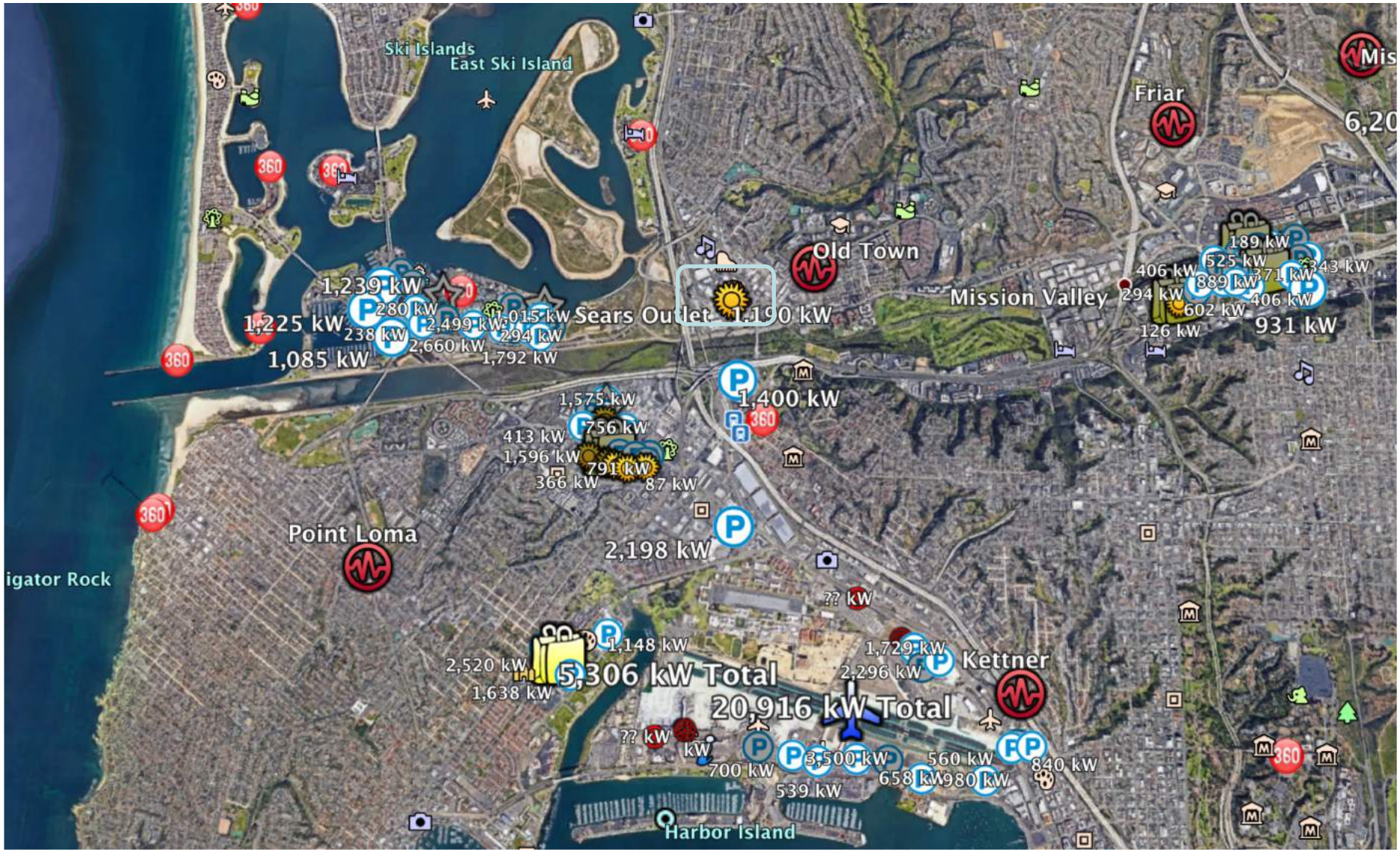
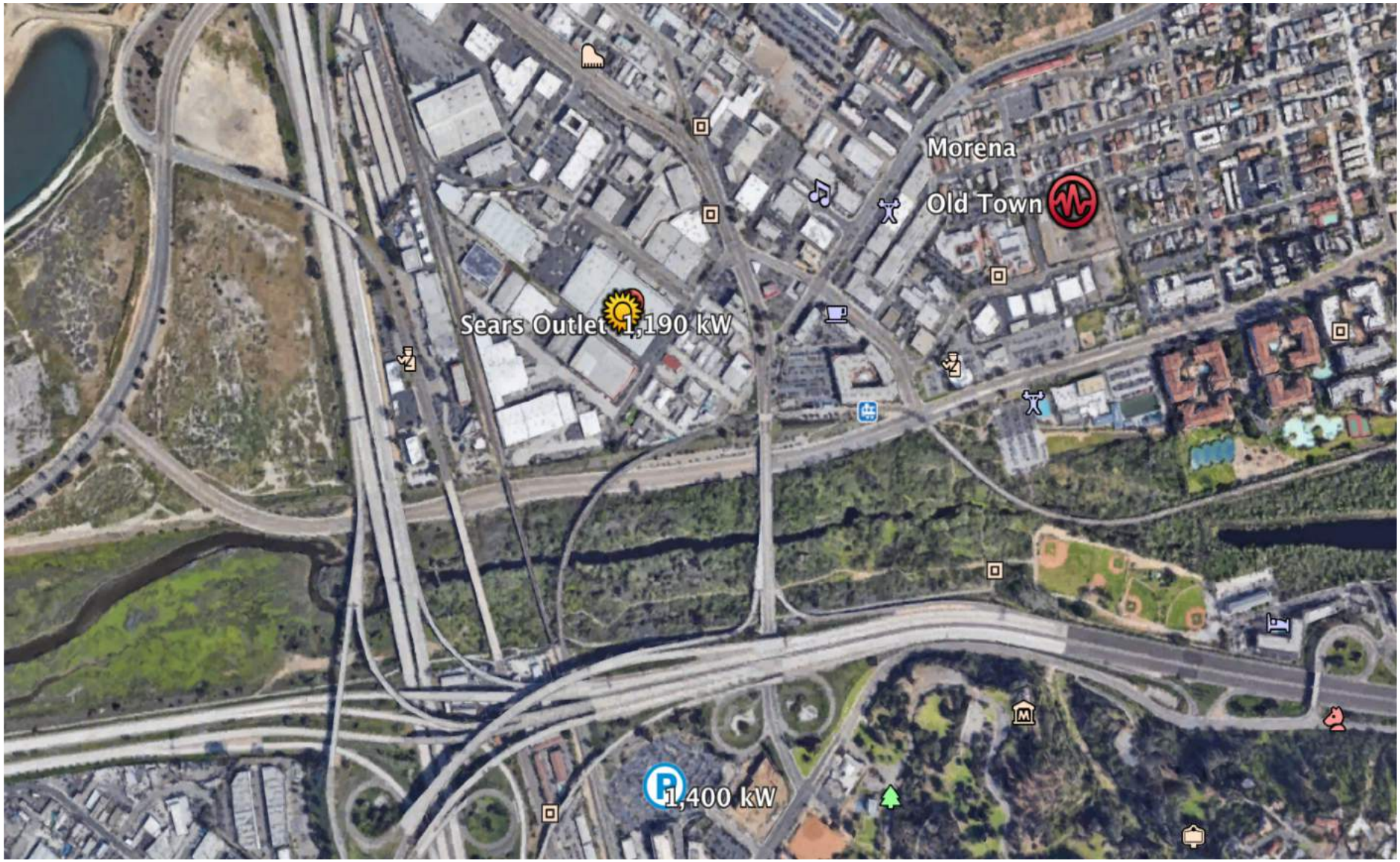
Over 300 MW of
Solar Siting Potential identified

- Sites > 1 MW
- On built environments

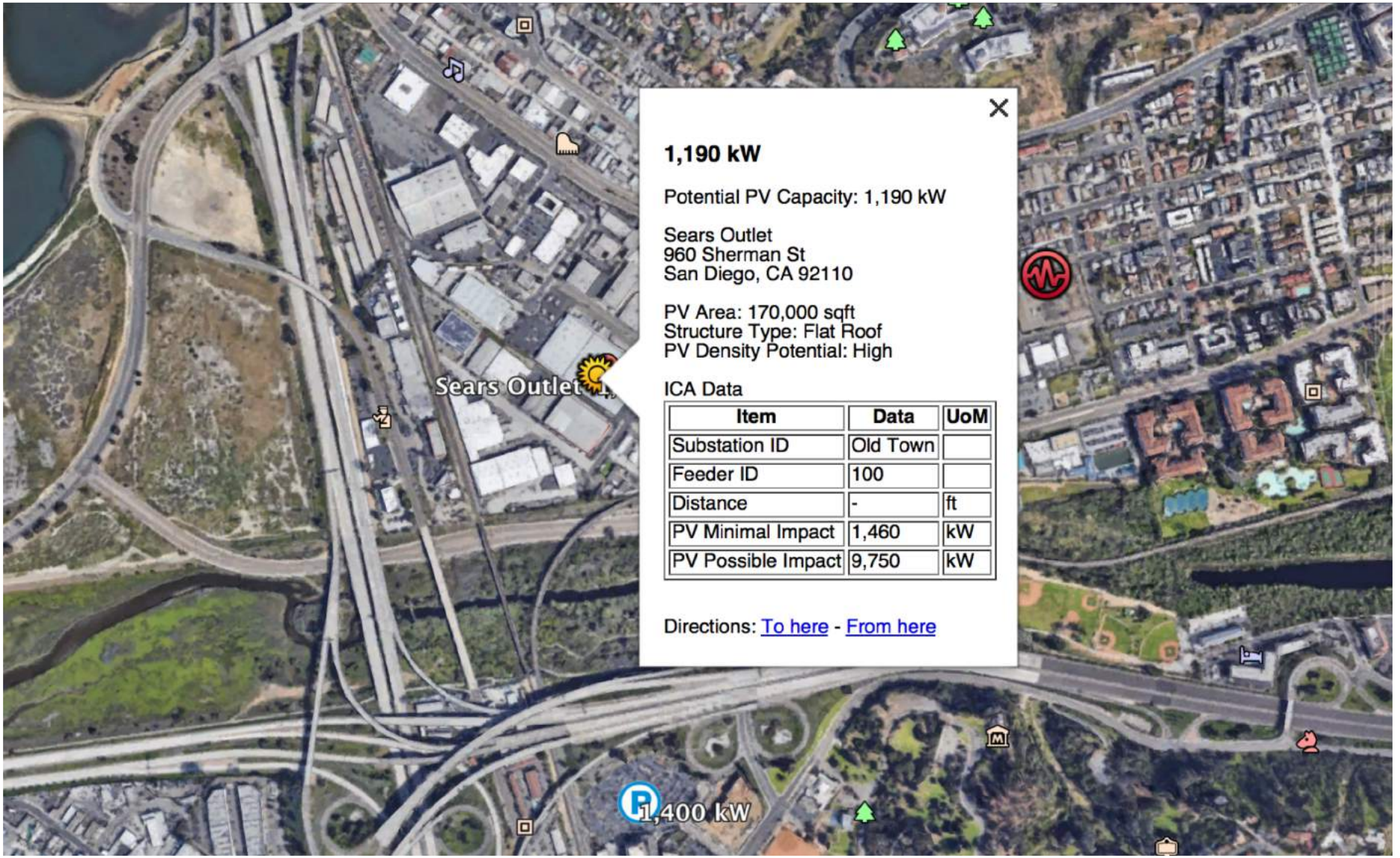


Sears Outlet




Morena
Old Town
Sears Outlet 1,190 kW
1,400 kW

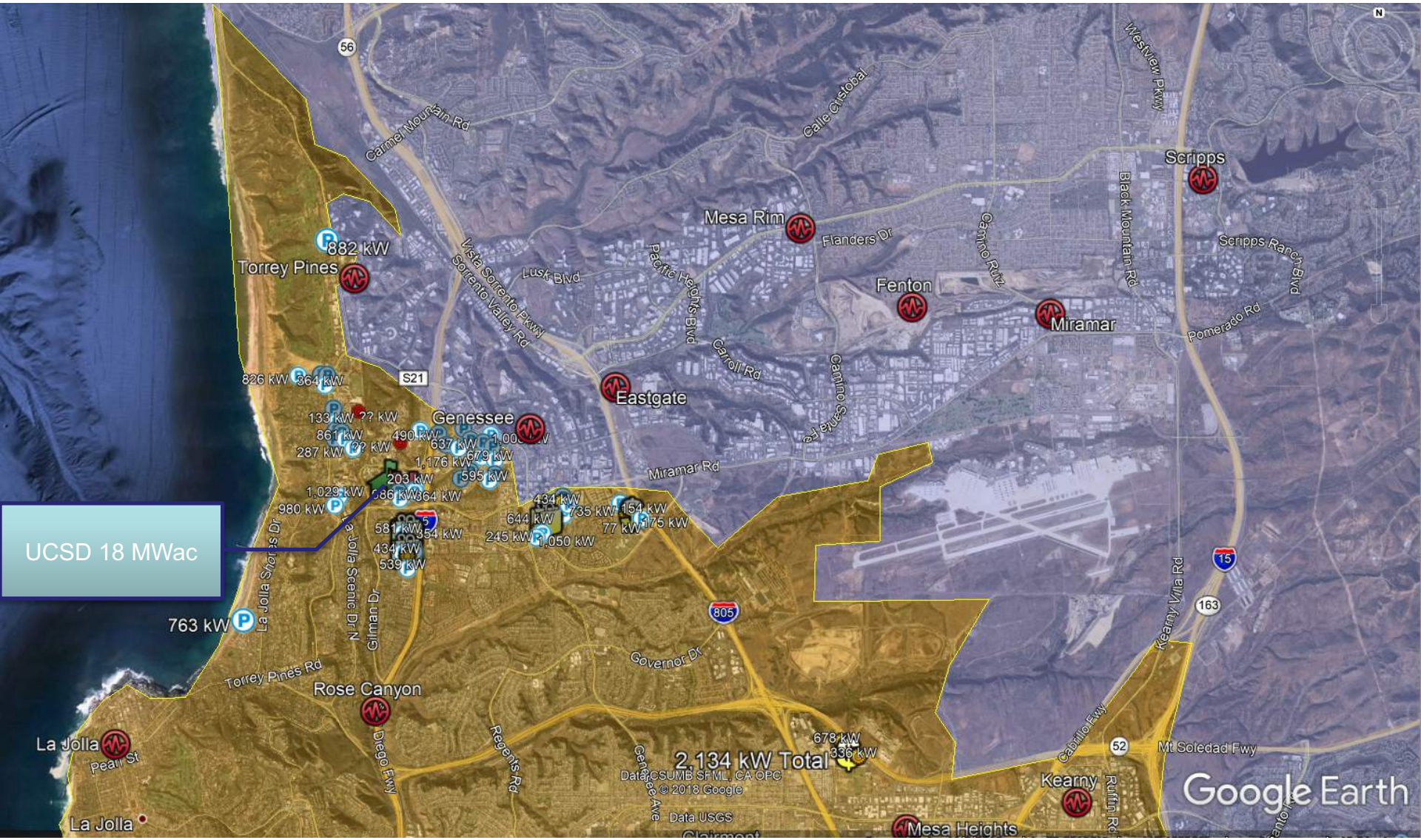
Sears Outlet



ICA sample

PV Sites		ICA	
Substation Name	Substation Survey Siting Potential [MW]	Substation Minimal Impact [MW]	Substation Possible Impact [MW]
Feeder ID	Feeder Survey Siting Potential [MW]	PV Feeder Minimal Impact [MW]	PV Feeder Possible Impact [MW]
Border	**52.59**	**6.48**	**43.17**
533	30.61	1.35	8.99
534	5.63	1.03	6.87
535	5.01	1.41	9.40
1,160	11.34	1.46	9.76
Division	**3.67**	**0.54**	**3.60**
48	3.67	1.50	10.00
Genesee	**24.02**	**1.50**	**10.00**
268	4.22	1.49	9.95
271	3.47	1.49	9.90
272	2.32	1.34	8.95
273	9.56	1.48	9.89
270	4.45	1.50	10.00
Imperial Beach	**3.59**	**7.95**	**52.99**
723	3.59	1.40	9.33
Kearney	**4.20**	**1.50**	**9.97**
711	1.40	1.50	9.97
251	2.80	0.98	6.56
Kettner	**20.92**	**8.39**	**55.92**
134	13.40	1.50	10.00
135	5.35	1.41	9.40
458	2.17	1.40	9.33
Mesa Heights	**7.23**	**11.65**	**77.70**
776	2.13	1.73	11.50
775	2.55	1.77	11.82
1,286	2.56	1.76	11.55
Old Town	**24.01**	**11.96**	**79.70**
100	17.37	1.46	9.75
136	3.05	1.49	9.96
491	3.60	1.50	9.98
Pacific Beach	**1.24**	**8.46**	**56.39**
546	1.24	1.45	9.70

North of state hwy 52 (mostly UCSD)



Between state hwy 52 and Interstate 8

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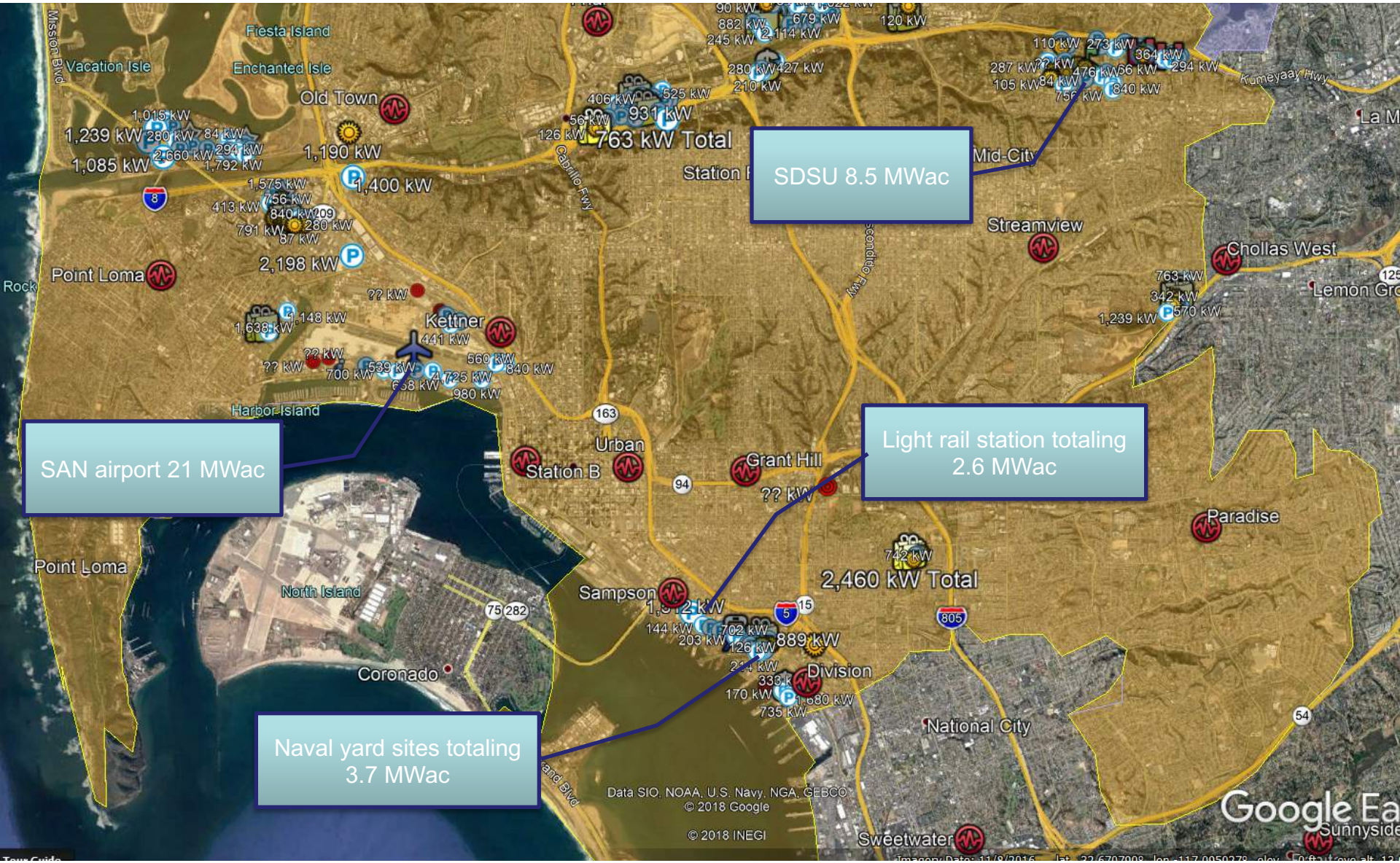
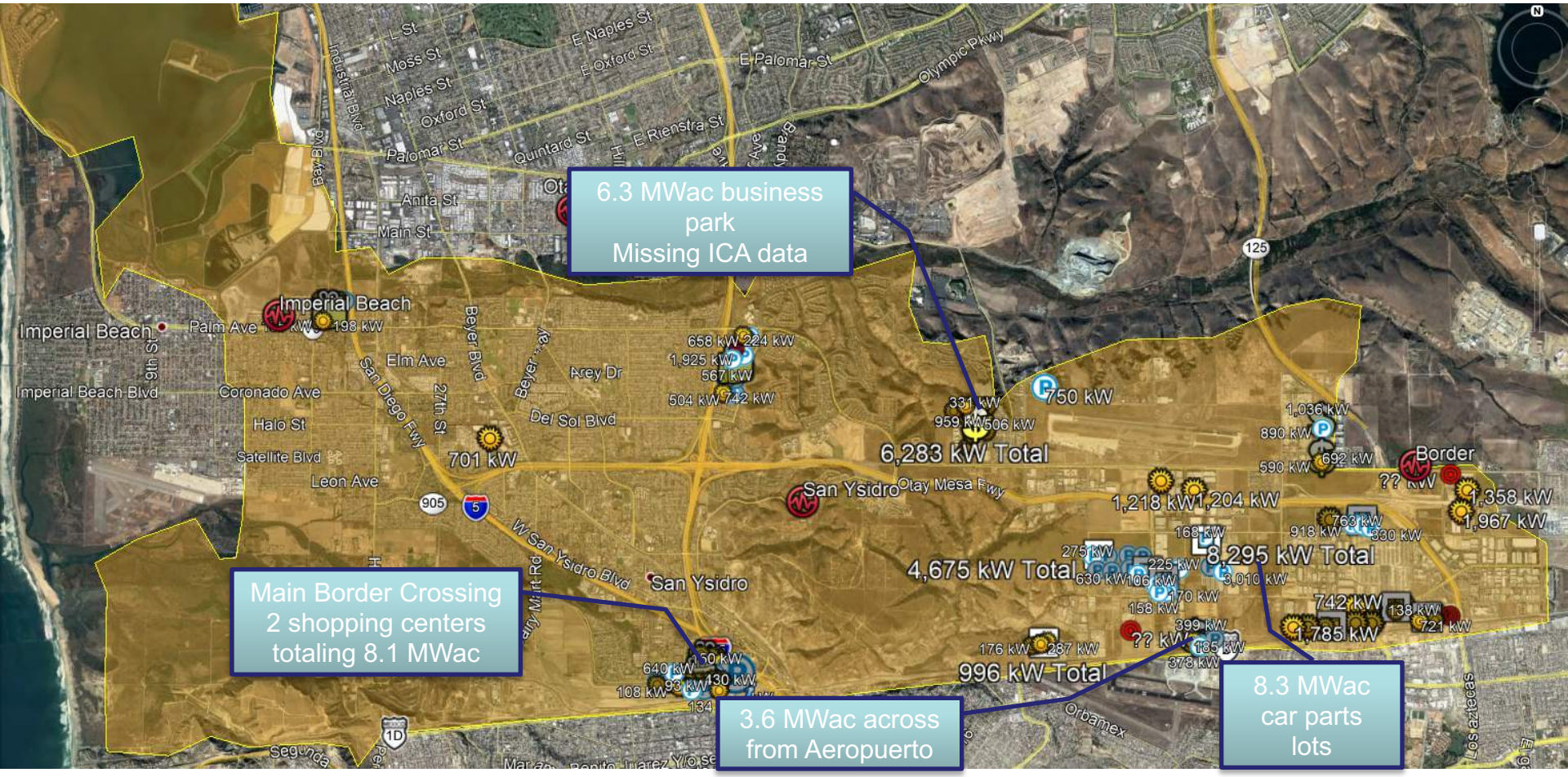
South of Interstate 8



Otay Mesa to Mexican border



SSS findings for southern sections

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Summary by Structures

Count	Count	kW_Total	PV W_AC >= 1,000 kW		> and >= 500 kW		Less than 500 kW	
	Sites	Structures	Structures		Structures		Structures	
Totals:								
North:								
South:	85	417	302,869 kW	94	168,868 kW	117	81,985 kW	206	52,016 kW

Summary by Structure Types

Roof_Flat	kW_Total	Pkg_Lot	kW_Total	Pkg_Garage	kW_Total	Roof_Angled	kW_Total	Water	kW_Total
Totals:									
North:									
South:	145	76,219 kW	253	215,586 kW	19	10,493 kW	2	571 kW	-	- kW

Solar siting capacity by site count

Clean Coalition

Solar Siting Survey

Summary by Structures

		Count	Count	kW_Total	PV W_AC >=	1,000 kW	> and >=	500 kW	Less than	500 kW
		Sites	Structures		Structures		Structures		Structures	
Totals:										
	N									
	S	85	417	302,869 kW	94	168,868 kW	117	81,985 kW	206	52,016 kW
ZIP	N_S	Rank								
92037	S	19	4	12	7,871	2	2,740	6	4,060	4	1,071
92093	S	7	1	28	17,815	6	6,818	9	6,489	13	4,508
92101	S	5	1	13	20,916	5	15,526	7	4,949	1	441
92102	S	28	1	3	1,512	-	-	1	917	2	595
92103		29	-	-	-	-	-	-	-	-	-
92104	S	29	-	-	-	-	-	-	-	-	-
92105	S	29	-	-	-	-	-	-	-	-	-
92106	S	23	1	3	5,306	3	5,306	-	-	-	-
92107	S	29	-	-	-	-	-	-	-	-	-
92108	S	2	8	48	51,286	12	35,007	14	10,122	22	6,157
92109	S	6	5	17	19,621	11	17,325	2	1,400	4	896
92110	S	9	5	19	16,424	7	11,011	5	3,587	7	1,826
92111	S	8	6	25	16,630	7	9,128	7	4,786	11	2,716
92112		29	-	-	-	-	-	-	-	-	-
92113	S	14	5	28	11,443	3	3,584	4	2,900	21	4,959
92114	S	29	-	-	-	-	-	-	-	-	-
92115	S	20	1	8	6,136	2	2,618	5	3,176	1	342
92116	S	29	-	-	-	-	-	-	-	-	-
92117	S	26	1	4	2,650	1	1,365	1	714	2	571
92118		29	-	-	-	-	-	-	-	-	-