Clean Coalition

Making Clean Local Energy Accessible Now

Goleta Load Pocket Community Microgrid

Renewables-driven Resilience for the Santa Barbara region

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Mission

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

Renewable Energy End-Game

100% renewable energy; 25% local, interconnected within the distribution grid and ensuring resilience without dependence on the transmission grid; and 75% remote, fully dependent on the transmission grid for serving loads.

Community Microgrids are the grid of the future

Clean Coalition

A Community Microgrid is a new approach for designing and operating the electric grid, stacked with local renewables and staged for resilience.

Key features:

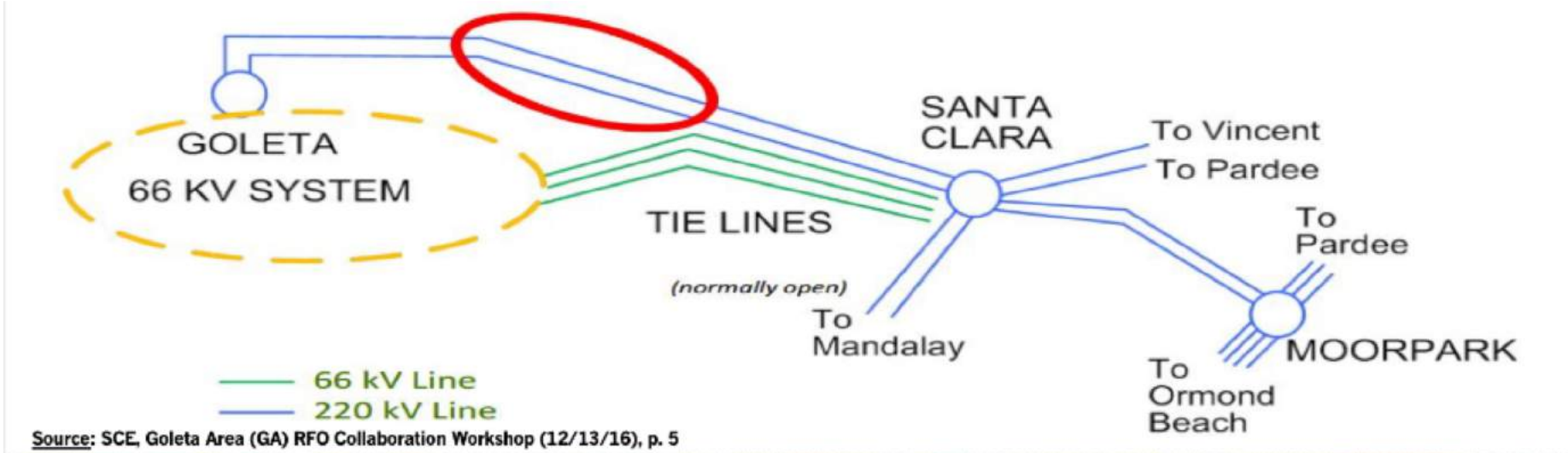
- A targeted and coordinated distribution grid area served by one or more substations – ultimately including a transmission-distribution substation that sets the stage for Distribution System Operator (DSO) performance.
- High penetrations of local renewables and other distributed energy resources (DER) such as energy storage and demand response.
- Staged capability for indefinite renewables-driven backup power for critical community facilities across the grid area – achieved by 25% local renewables mix.
- A solution that can be readily extended throughout a utility service territory – and replicated into any utility service territory around the world.

Goleta Load Pocket (GLP)

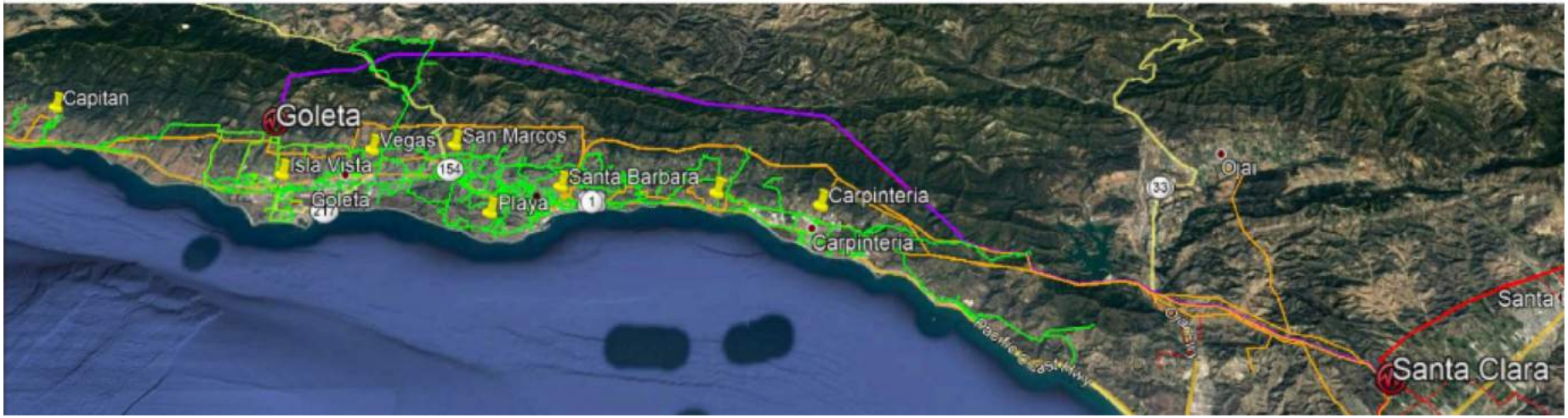
The GLP is the perfect opportunity for a comprehensive Community Microgrid

- GLP spans 70 miles of California coastline, from Point Conception to Lake Casitas, encompassing the cities of Goleta, Santa Barbara (including Montecito), and Carpinteria.
- GLP is highly transmission-vulnerable and disaster-prone (fire, landslide, earthquake).
- **200 megawatts (MW) of solar and 400 megawatt-hours (MWh) of energy storage** will provide 100% protection to GLP against a complete transmission outage ("N-2 event").
  - 200 MW of solar is equivalent to about 5 times the amount of solar currently deployed in the GLP and represents about 25% of the energy mix.
  - Multi-GWs of solar siting opportunity exists on commercial-scale built-environments like parking lots, parking structures, and rooftops; and 200 MW represents about 7% of the technical siting potential.
  - Other resources like energy efficiency, demand response, and offshore wind can significantly reduce solar+storage requirements.

GLP is critically transmission-vulnerable



Source: SCE, Goleta Area (GA) RFO Collaboration Workshop (12/13/16), p. 5



Need for resilience in GLP: May 2016 Edison Fire (NW of Santa Clara station, multiple lines threatened)

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Need for resilience in GLP: December 2017, Thomas Fire (multiple outages)

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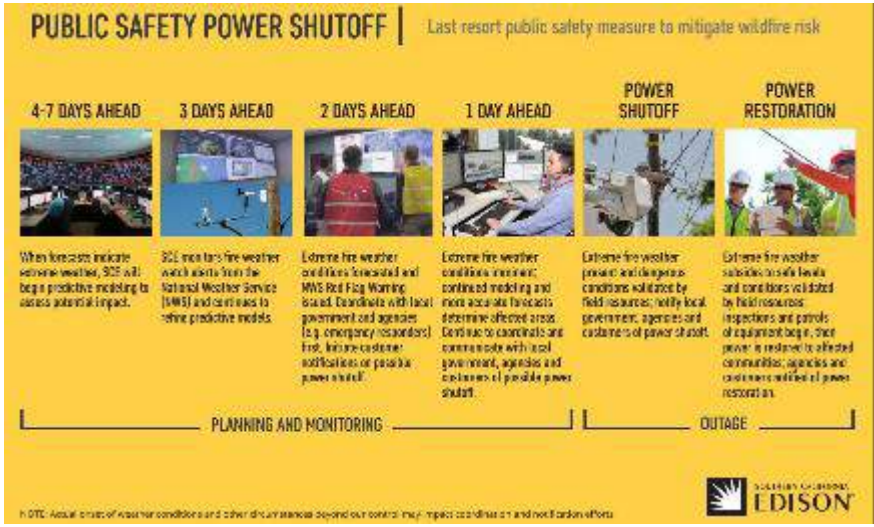
Need for resilience in GLP: Transmission lines subject to preemptive shutoff

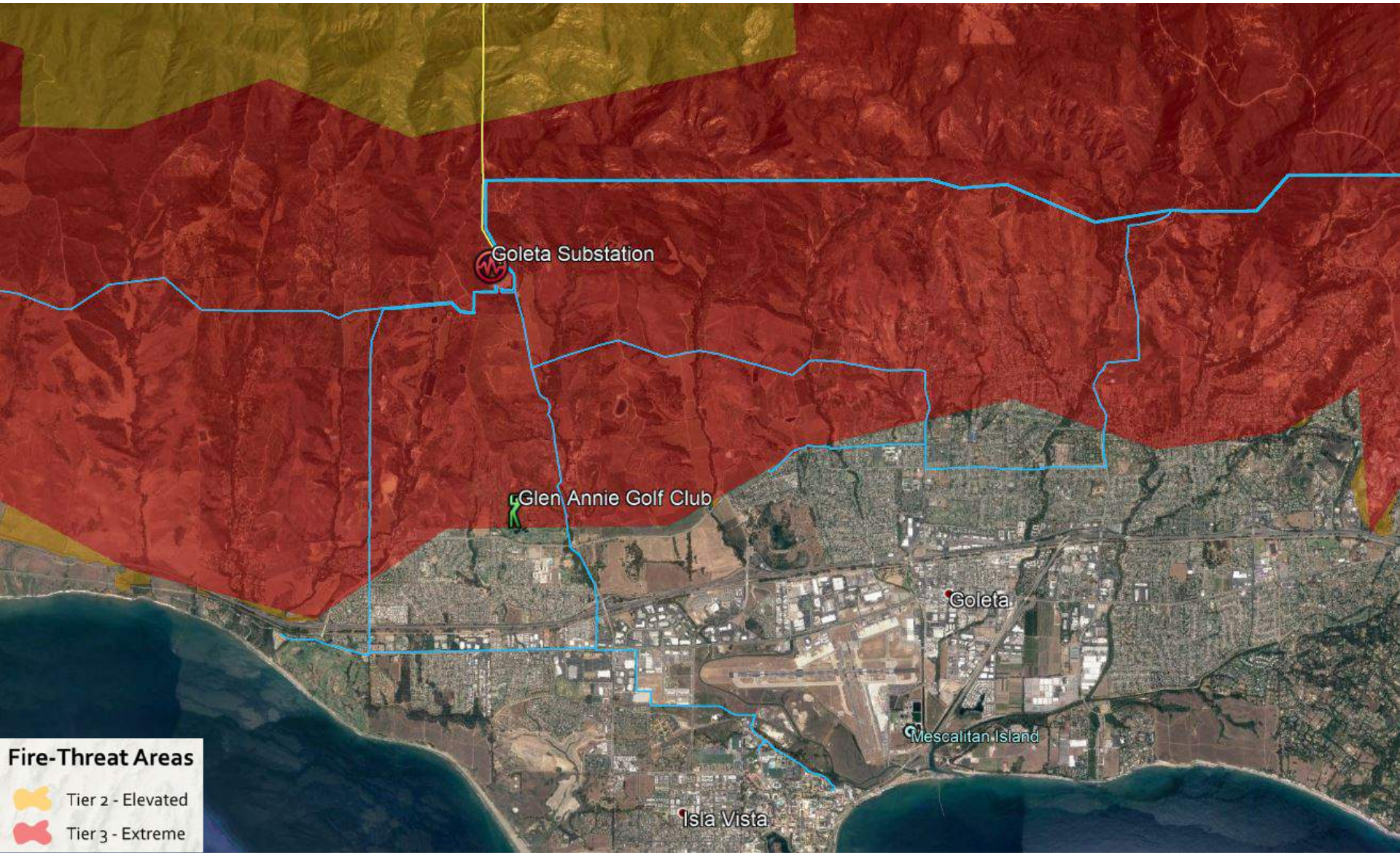
Source: CPUC FireMap, ESRI, SCE DRPEP

Given the recent passage of wildfire legislation and potential liability for wildfires started from utility wires and equipment, SCE has instituted preemptive measures, outlined on the right, that may result in more frequent de-energizing of transmission lines on high fire risk days.

The CPUC Fire Map above shows that the Goleta Load Pocket is surrounded by extreme fire threats.



Glen Annie Golf Club and Goleta Substation



Glen Annie Golf Club in Tier 3 Fire Threat danger

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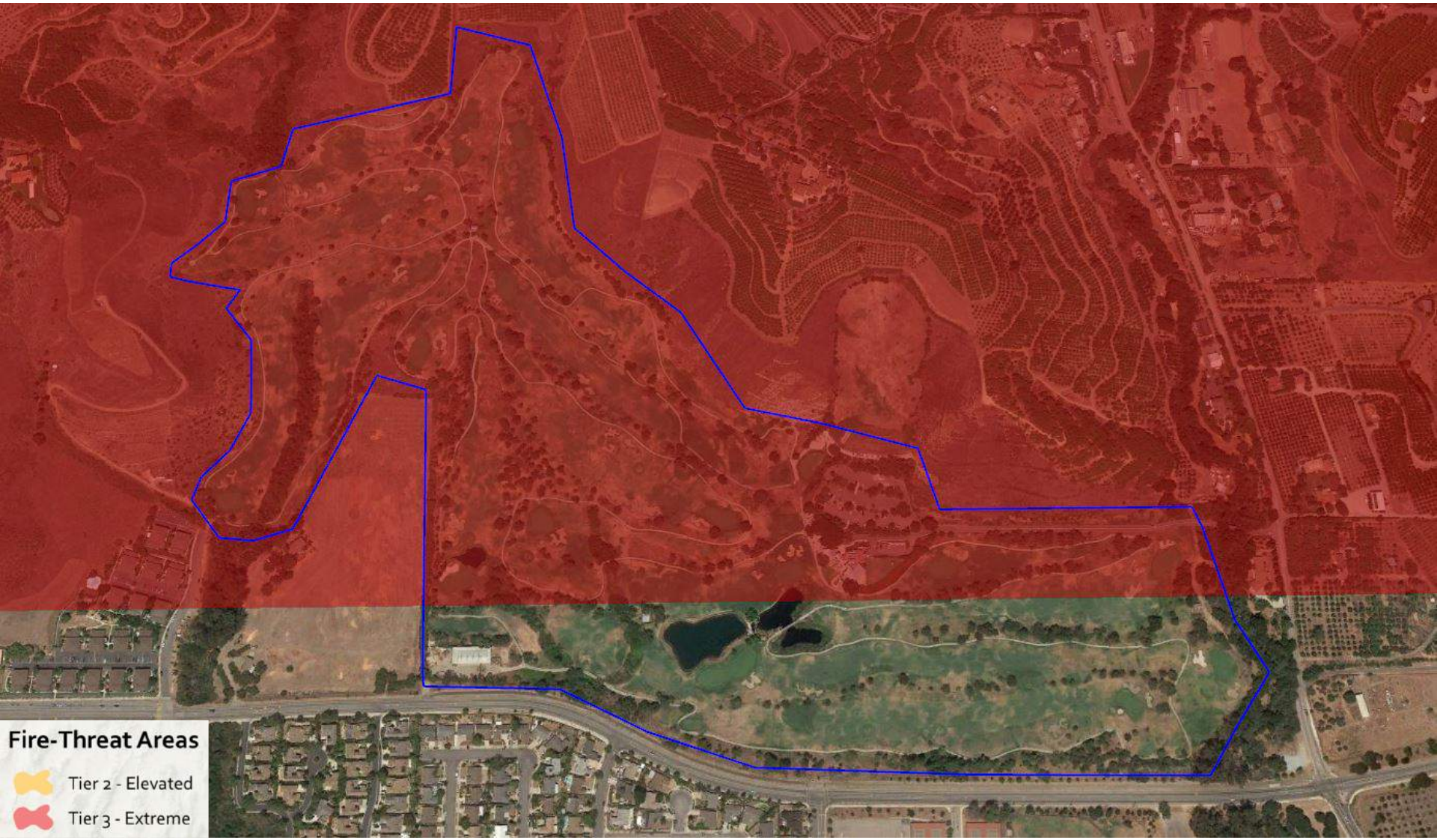


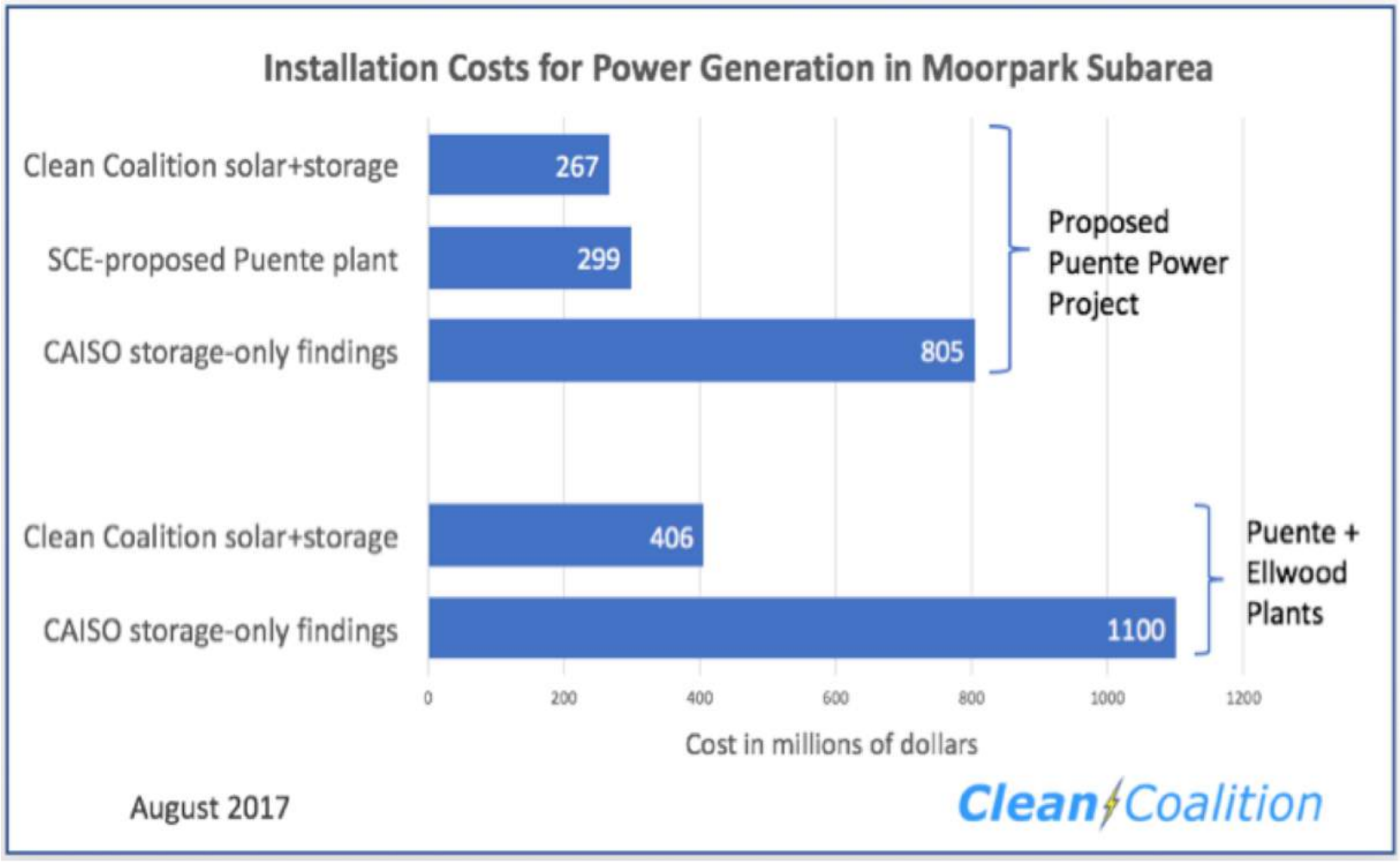
Glen Annie Golf Club Solar Siting Survey – 707 kW Total

Community Microgrids obviate gas peakers

- Thanks in part to Clean Coalition analyses, California regulators blocked repowering of the Ellwood gas peaker in Goleta and constructing the massive Puente gas peaker in Oxnard.
- “Let’s take this opportunity to move the Oxnard community into the clean energy future — which is here already.” *Carmen Ramirez, Mayor of Oxnard*
- Significant opportunity to leverage this work to prevent future new gas plant proposals across the country

Community Microgrids cheaper than gas peakers

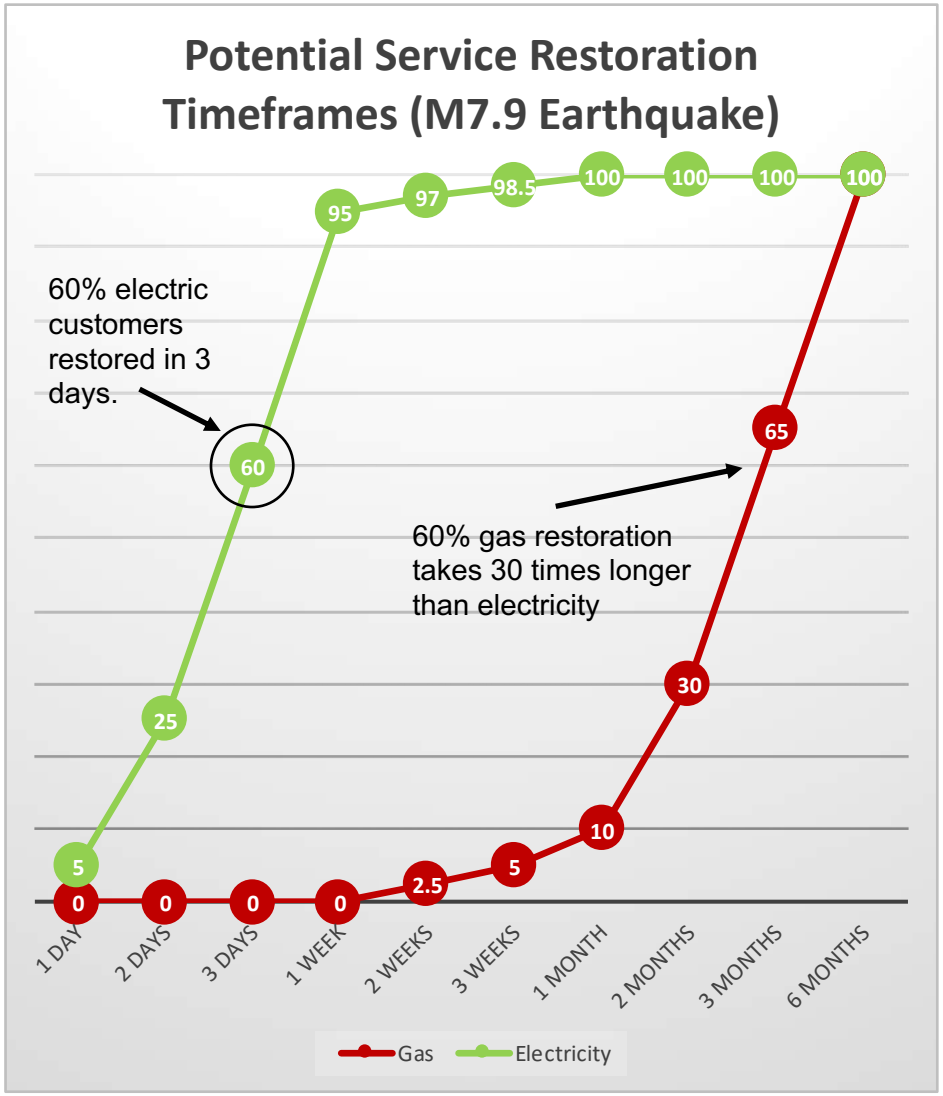
- Leveraging our technical and economic expertise, the Clean Coalition conducted an analysis to determine the viability of solar+storage as a better alternative



Natural gas infrastructure is not resilient

- **Assertion:** Gas-driven generation is often claimed to be resilient.
- **Reality:** Gas infrastructure is not resilient and takes much longer to restore than electricity infrastructure.
- **Threats:** Gas infrastructure can be flat-out dangerous and highly vulnerable to earthquakes, fires, landslides, and terrorism.

2010 San Bruno Pipeline Explosion



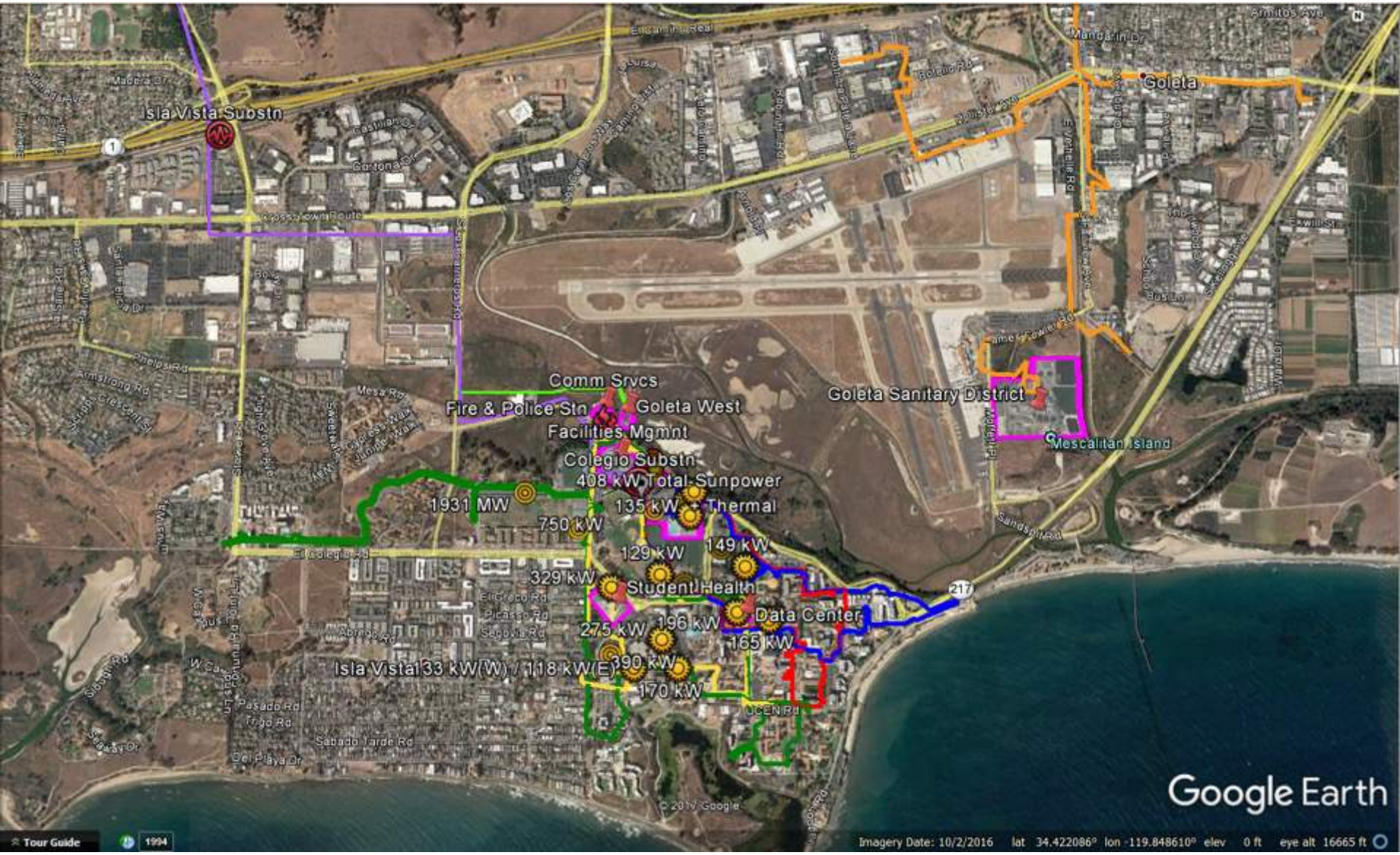
Source: The City and County of San Francisco Lifelines Study

Recent gas pipeline explosions

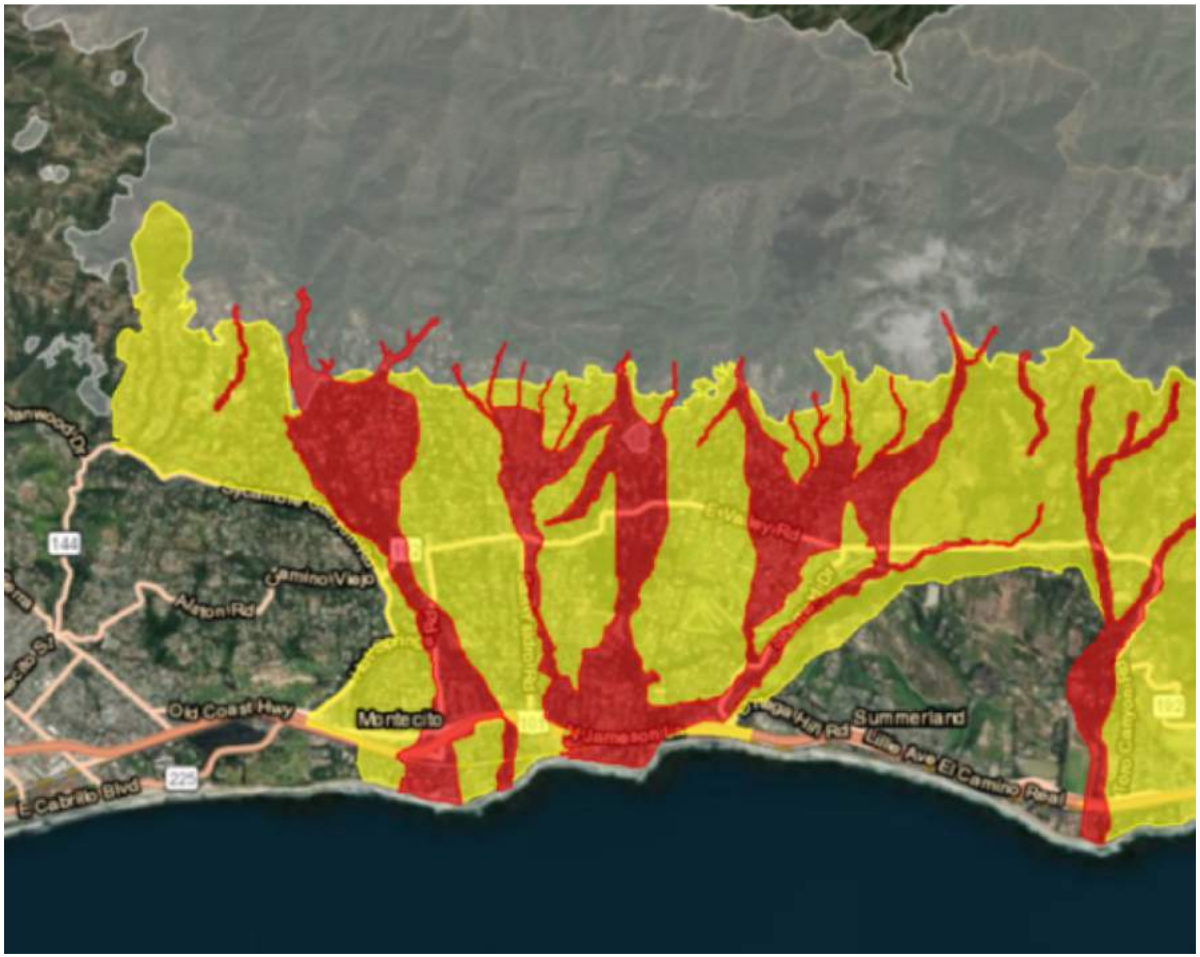
Clean Coalition

- October 9, 2018: British Columbia.
- September 13, 2018: Merrimack Valley, Massachusetts. Over 80 individual fires, one person killed and 30,000 forced to evacuate.
- February 17, 2017: A natural gas pipeline operated by Kinder Morgan in Refugio Texas exploded creating a massive fire. The explosion shook homes 60 miles away.
- February 10, 2017: A natural gas pipeline operated by Phillips 66 Pipeline in St. Charles Parish, LA exploded, injuring 3 workers.
- February 1, 2017: A DCP pipeline in Panola County TX exploded and created a crater in an airport runway, shutting down the airport for a month.
- January 17, 2017: A natural gas pipeline operated by DCP Midstream exploded in Spearman, TX, which led to multiple fire crews being called to the scene.
- From 2010 to 2016: Gas companies reported 35 explosions and 32 ignitions at their transmission pipelines, according to federal records. The explosion killed 17 people and injured 86.
- September 9, 2010: A pipeline explosion in San Bruno, California, killed eight people and injured 51.

UCSB Community Microgrid – Area Map



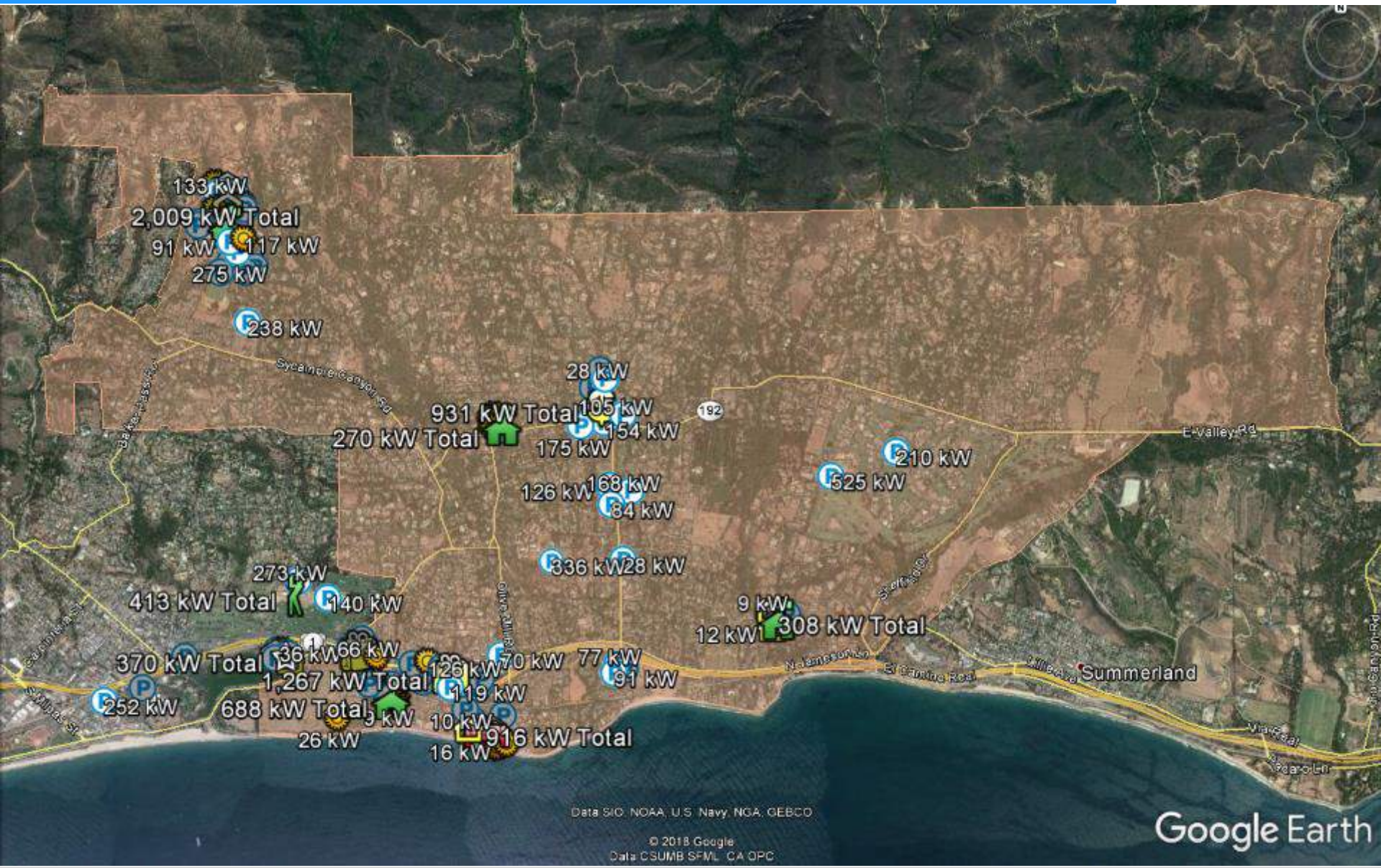
Montecito offers opportunity for initial demonstration: First building block for GLPCM



Areas at extreme & high risk for debris flows in the event of major storms.

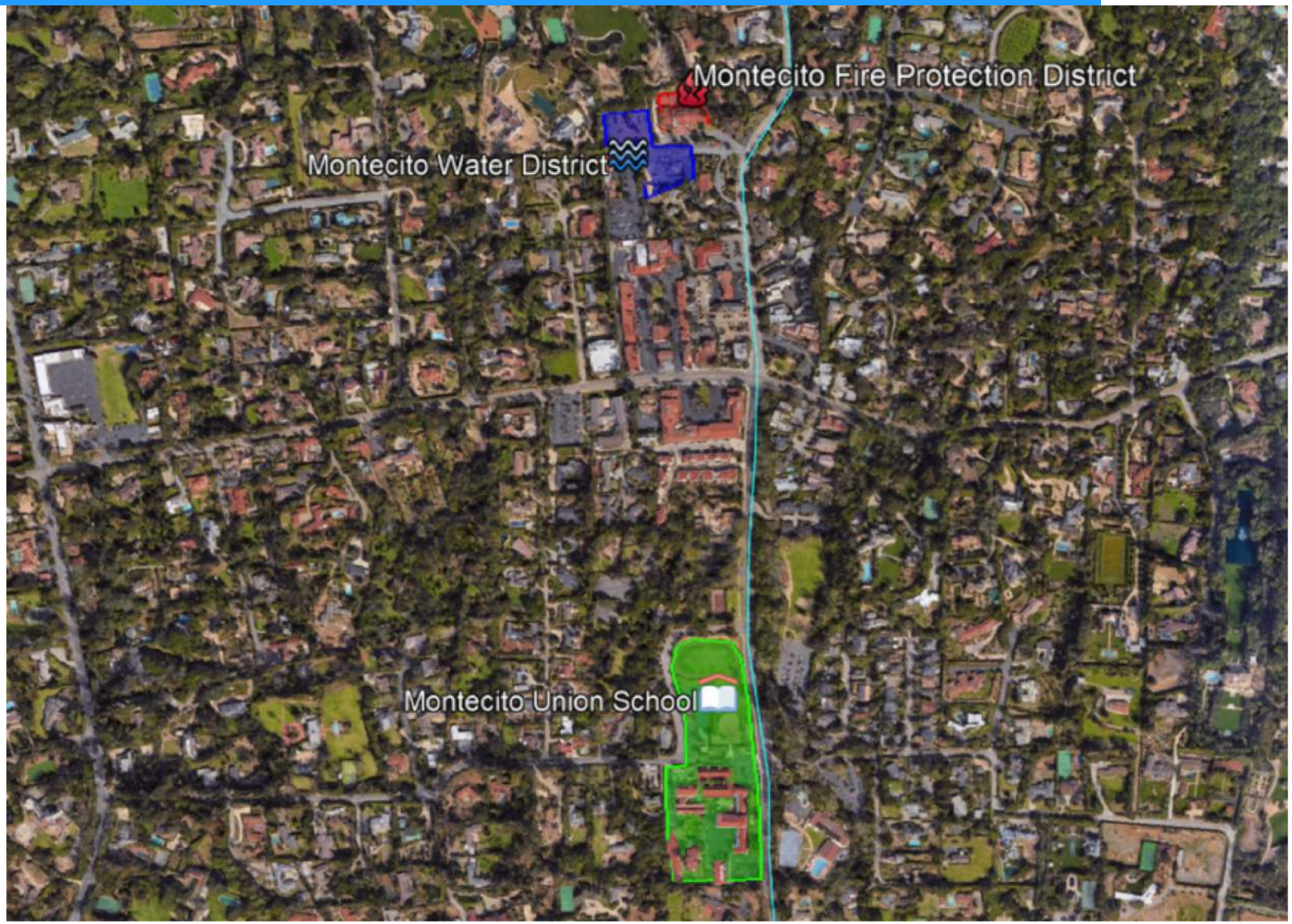
Source: Santa Barbara County OEM

Solar Siting Survey (SSS) for Montecito



Montecito Upper Village has a concentration of critical community facilities (Fire, Water, Shelter)

Clean Coalition



Montecito Community Microgrid block diagram

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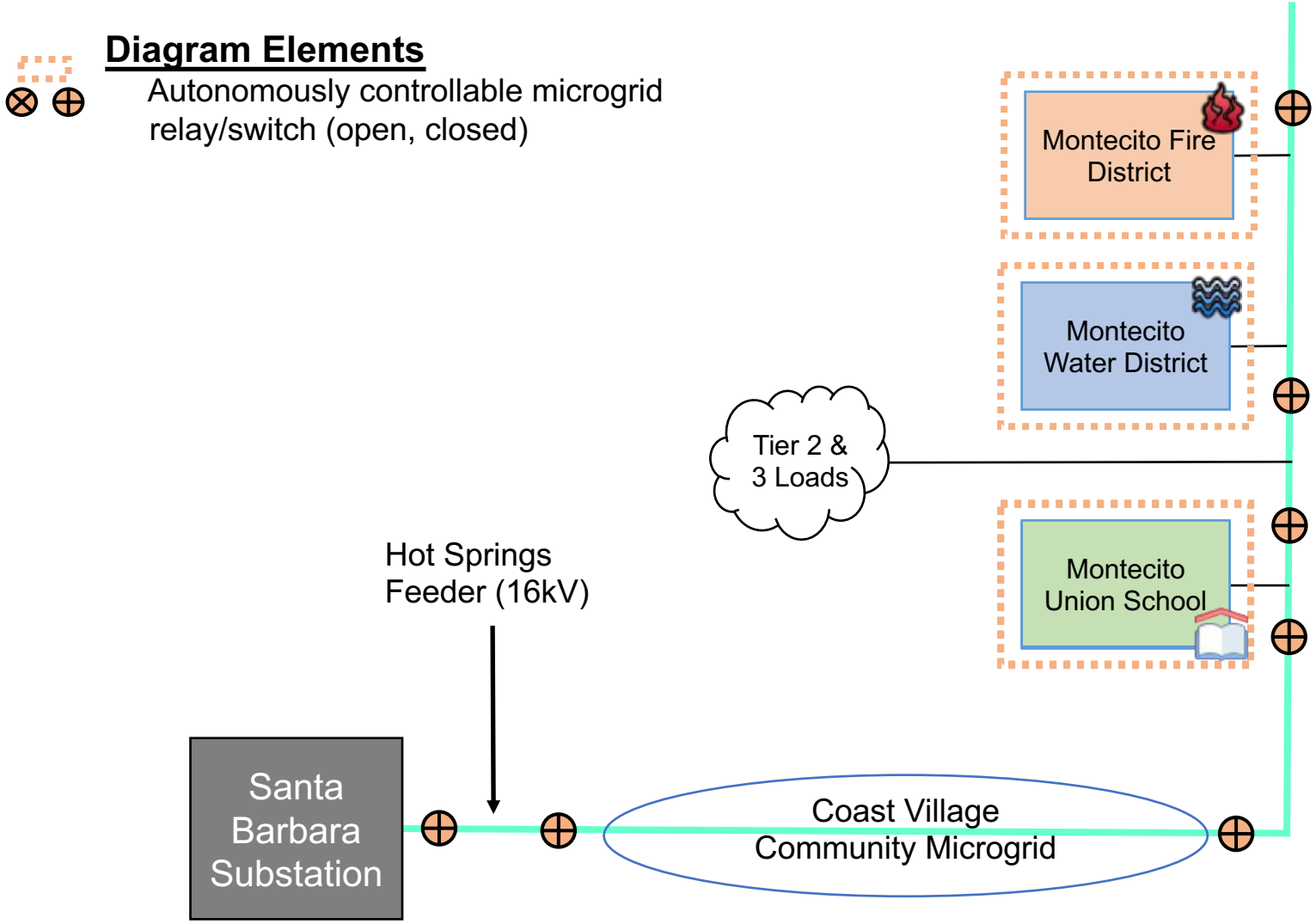


Montecito Community Microgrid – overview

Clean Coalition

Overall Goal is to provide renewables-driven energy resilience to critical community facilities in Montecito and to showcase the benefits of Community Microgrids for communities around the world.

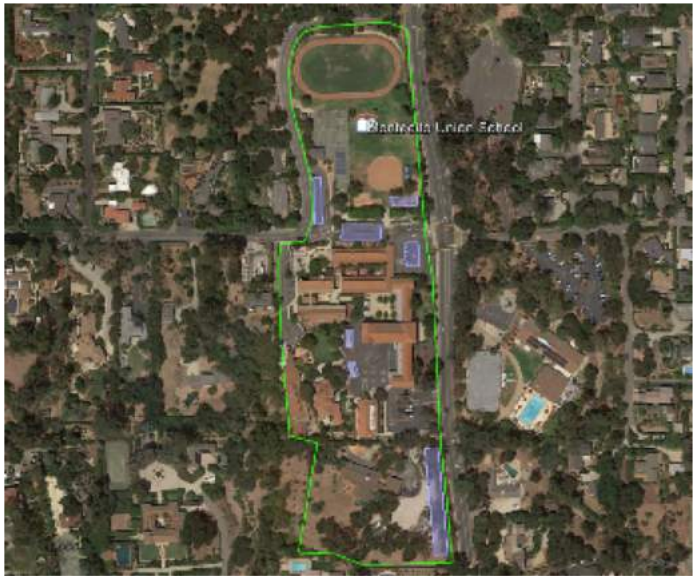
Initial Facilities:

- Montecito Fire Protection District headquarters & primary fire station
- Montecito Water District headquarters & critical pumps
- Montecito Union School

Each site is anticipated to have an independent microgrid with enough solar+storage to be net zero and deliver indefinite renewables-driven backup power to the most critical loads:

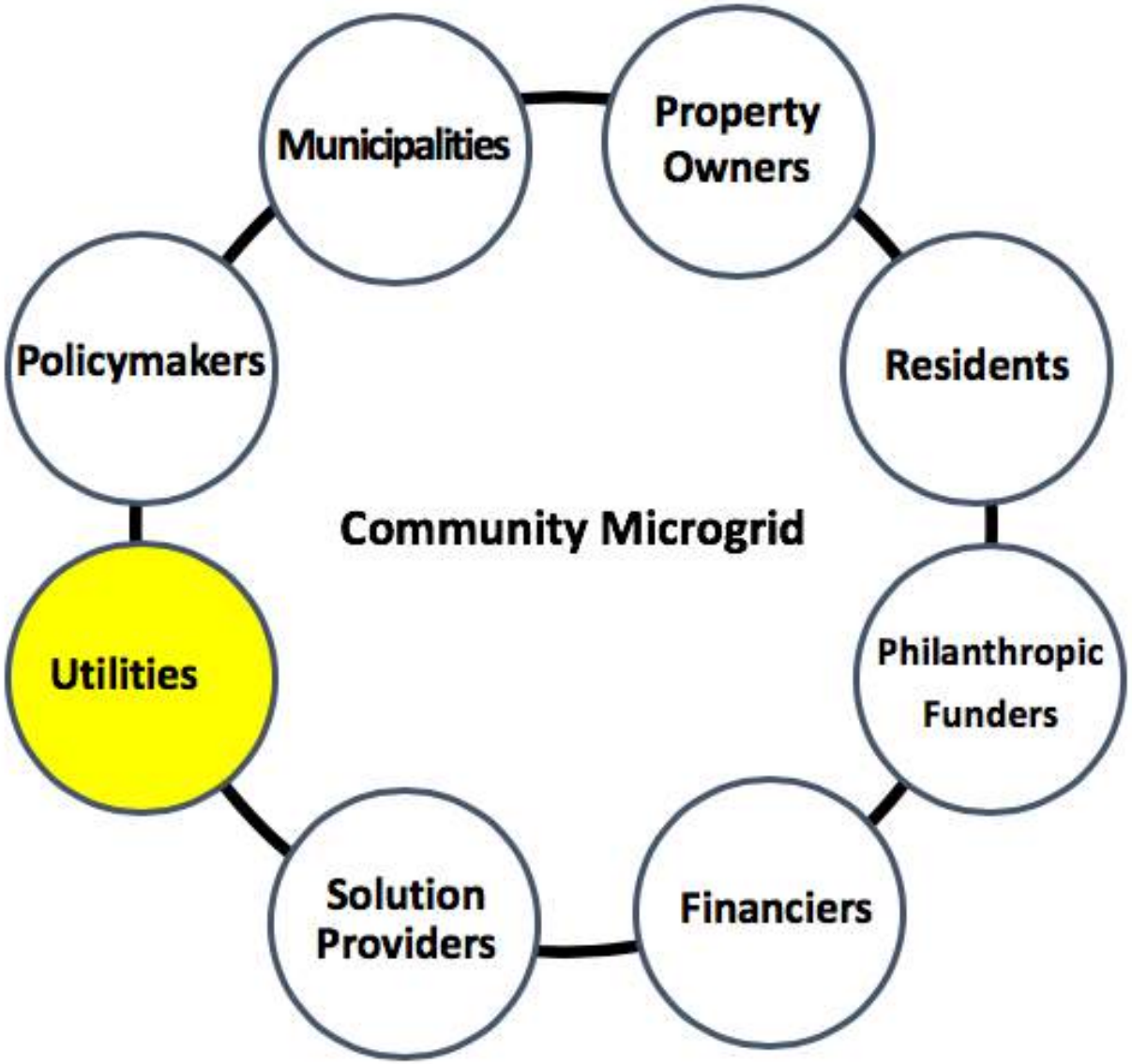
- 10% of the load 100% of the time.
- 100% of the load at least 25% of the time.

Montecito Fire and Water Districts

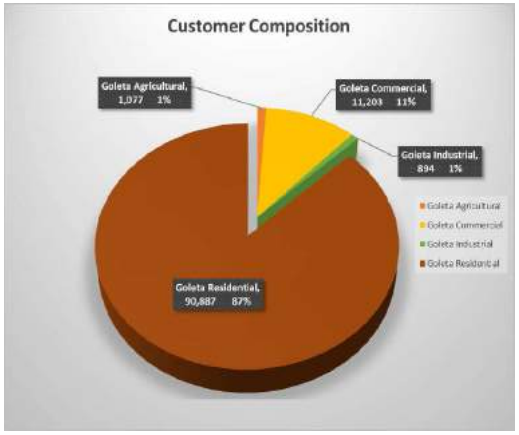


Montecito Union School

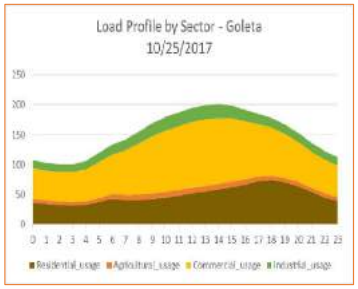
Community Microgrid key stakeholders

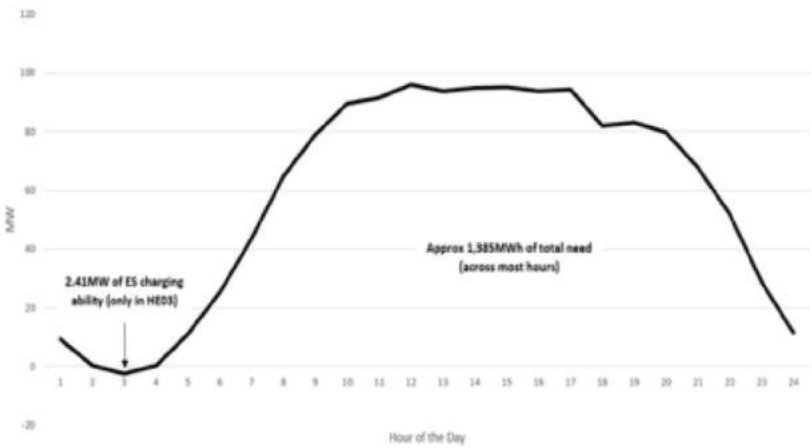


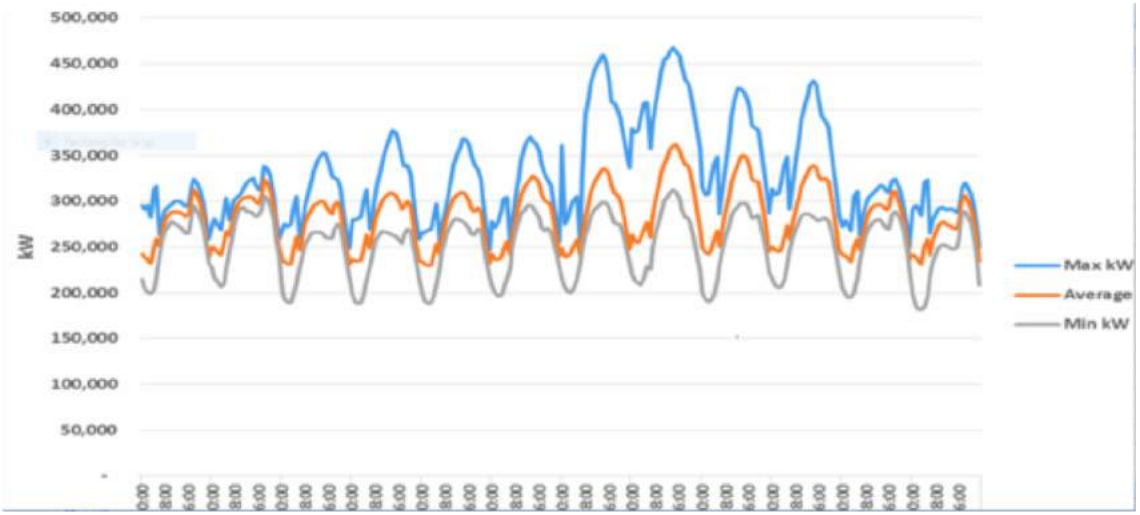
GLP load profile



Goleta		
Peak day	Hour	Peak Load (MW)
25-Oct-17	14:00:00	201







- 201 MW total peak, modeled using 200 MW
- Resilience need is for 95 MW peak and 1,385 MWh max day energy
- Seasonal load profile from Willdan showing max, min, avg load for single day in each month for Santa Barbara County

Southern California Edison's planned energy storage

Clean Coalition

Table VI-10
Final Selection Set to Solve LCR Need

Bidder	Project	Resource Type	Location	Capacity (MW)	Average Capacity Price ($/kW-mo)	Commercial Online Date	Regulatory Approval Mechanism
Swell	SC/G	BTM-DR	S & G	14	[redacted]	January 2021	ACES AL
E.ON	Painter	ES-RA Only	G	10		March 2021	ACES AL
Strata	Saticoy	ES-RA Only	S	100		December 2020	LCR Application
Able Grid	Silverstran	ES-RA Only	S	11		March 2021	ACES AL
Ormat	Vallecito	ES-RA Only	G	10		December 2020	ACES AL
AltaGas*	Goleta	ES-RA Only	G	40		December 2020	ACES AL
Enel	Hollister	ES-RA Only	G	10		March 2021	ACES AL

Source: SCE LCR RFP April 22, 2019

280 MWh (70 MW x 4-hour) of energy storage has been formally proposed by SCE to the CPUC for siting within the GLP, with online dates by March 2021

How to realize the GLP Community Microgrid

Clean Coalition

1. Immediately and ongoing, expand behind-the-meter solar & storage via existing rules and market mechanisms
   - Net Energy Metering (NEM).
   - Self Generation Incentive Program

2. Short-term, fix a misguided prohibition to Wholesale Distributed Generation (WDG) in Santa Barbara County, that currently blocks WDG, even when sited on built-environments like rooftops, parking lots, and parking structures (only a problem in unincorporated areas).

3. Longer-term, unleash WDG and utilize the existing distribution grid during transmission system outages
   - Procurement – implement a comprehensive Feed-In Tariff (FIT).
   - Interconnection – streamline WDG interconnection.
   - Valuation – ensure full and fair valuation for WDG
     - Eliminate Transmission Access Charges (TAC) market distortion.
     - Establish standardized Value of Resilience for Tier 1, 2, and 3 loads (VOR123).
     - Implement a market mechanism for Dispatchable Energy Capacity Services (DECS) to attract wide deployment of energy storage that is owned by any party and is fully functional at the operational discretion of Load Serving Entities, whose economically optimal needs will change with time.

Wholesale Distributed Generation (WDG) defined

Clean Coalition

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

Need to redefine Utility-Scale Solar in SB County

Clean Coalition

Existing definition of Utility-Scale Solar Photovoltaic Facilities prohibits WDG even on built-environments like rooftops, parking lots, and parking structures:

> Utility-Scale Solar Photovoltaic Facilities. Facilities that are connected to the electrical grid on the utility side of the electric meter and are built for the primary purpose of generating and selling wholesale power.

Proposed new definition of Utility-Scale Solar Photovoltaic Facilities:

> Solar facilities of greater than 5 MWac capacity on open land that are connected to the electrical grid on the utility side of any pre-existing electric customer meter for the primary purpose of generating and selling wholesale power. Solar facilities of any size that are constructed on built-environments, including rooftops, parking lots, and parking structures, are not considered to be utility-scale solar facilities.

The amended definition needs to be applied in the following two places:

1. Santa Barbara County Comprehensive Plan, Land Use Element
2. Santa Barbara County Land Use and Development Code, Definitions

WDG and FIT drove huge solar use in Germany

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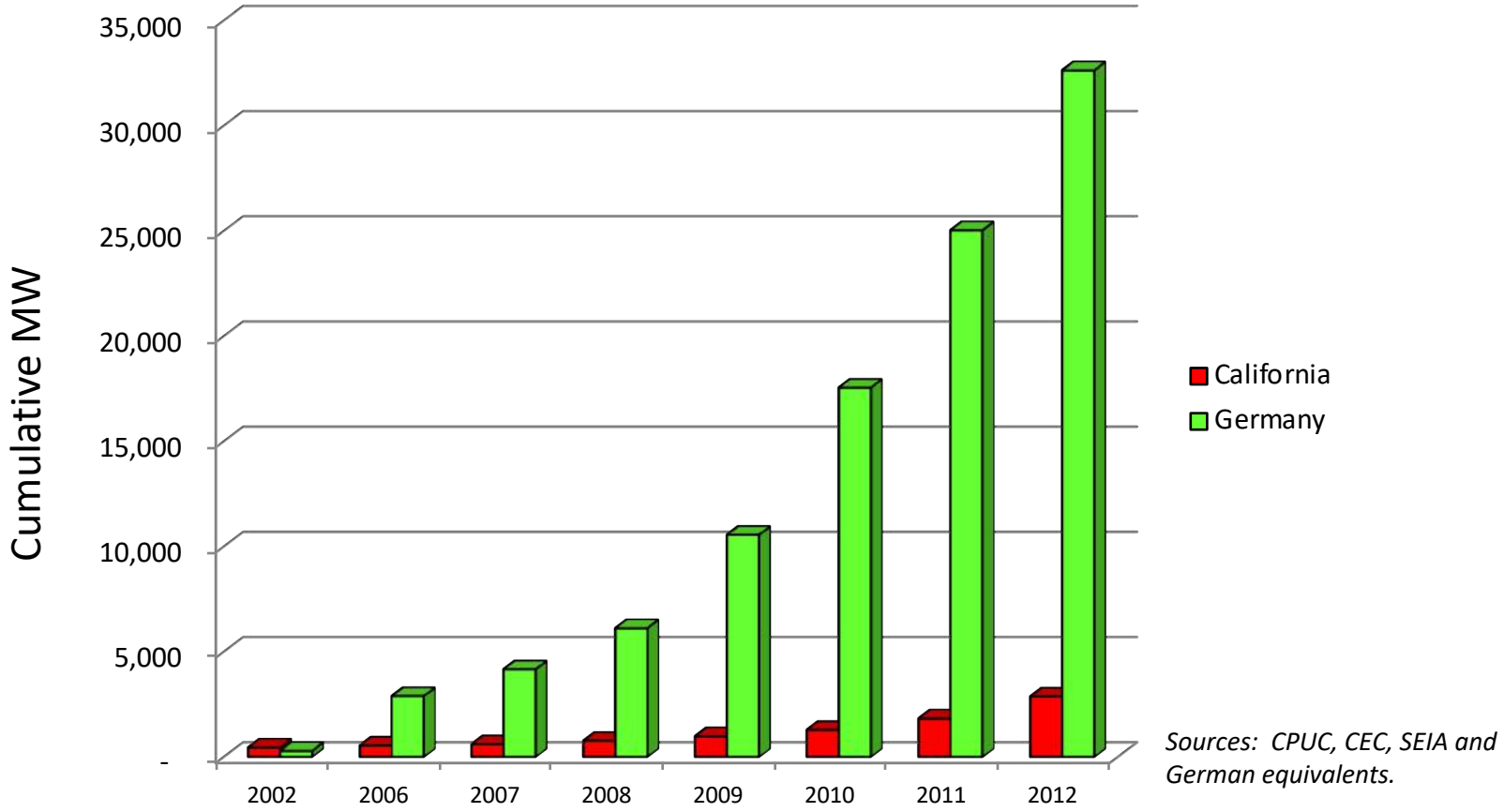
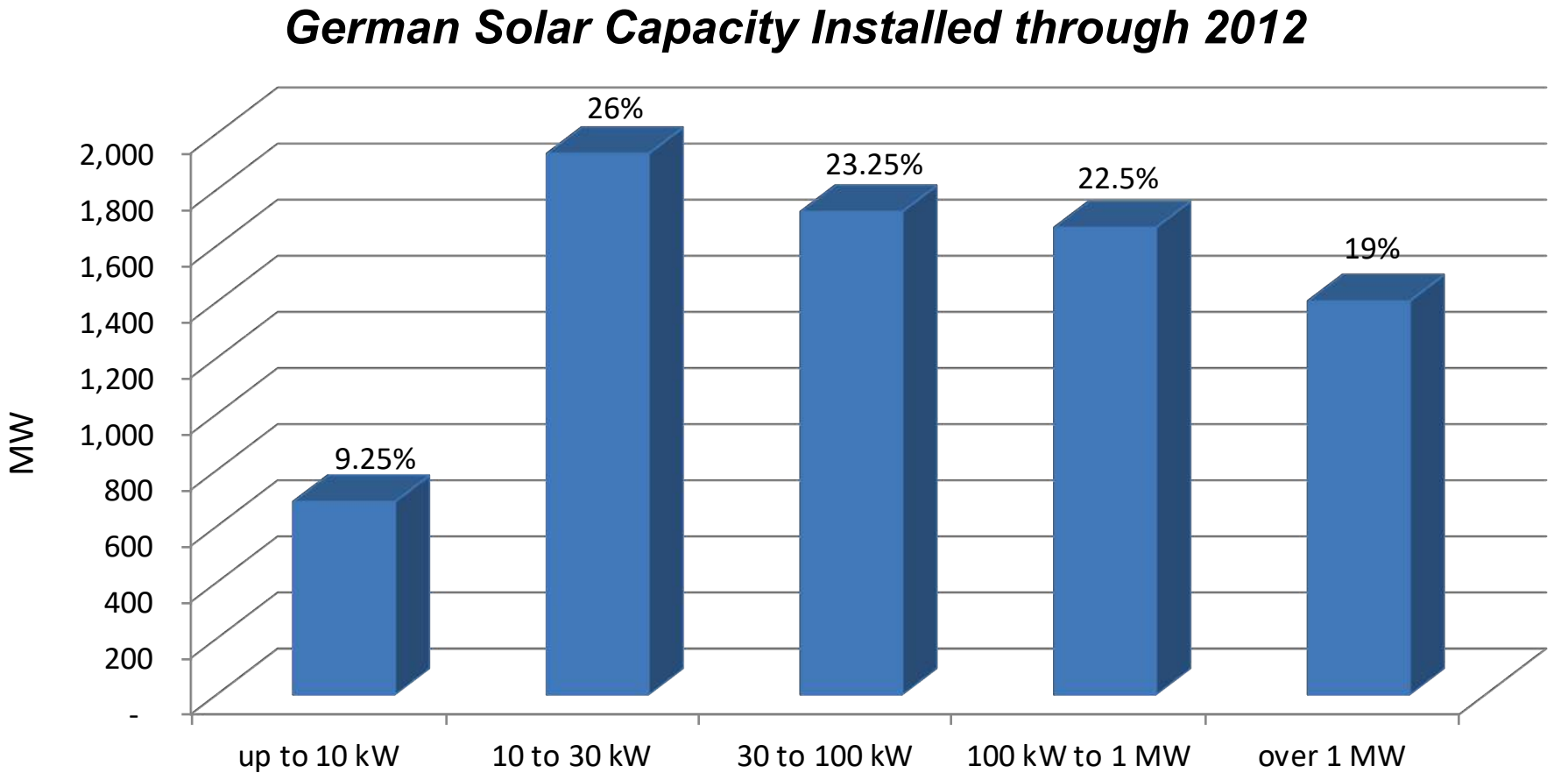
Solar Markets: Germany vs. California (2002-2012)



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.

Majority of German solar is small WDG



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 converts to 3 cents/kWh

Clean Coalition

Project Size	Euros/kWh	US$/kWh	California Effective Rate US$/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

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

- All data in table is from 2016. Foreign exchange conversion applied is 1 Euro to 1.07 US$.
- California's effective rate is reduced 40% due to tax incentives and then an additional 33% due to the superior solar resource.

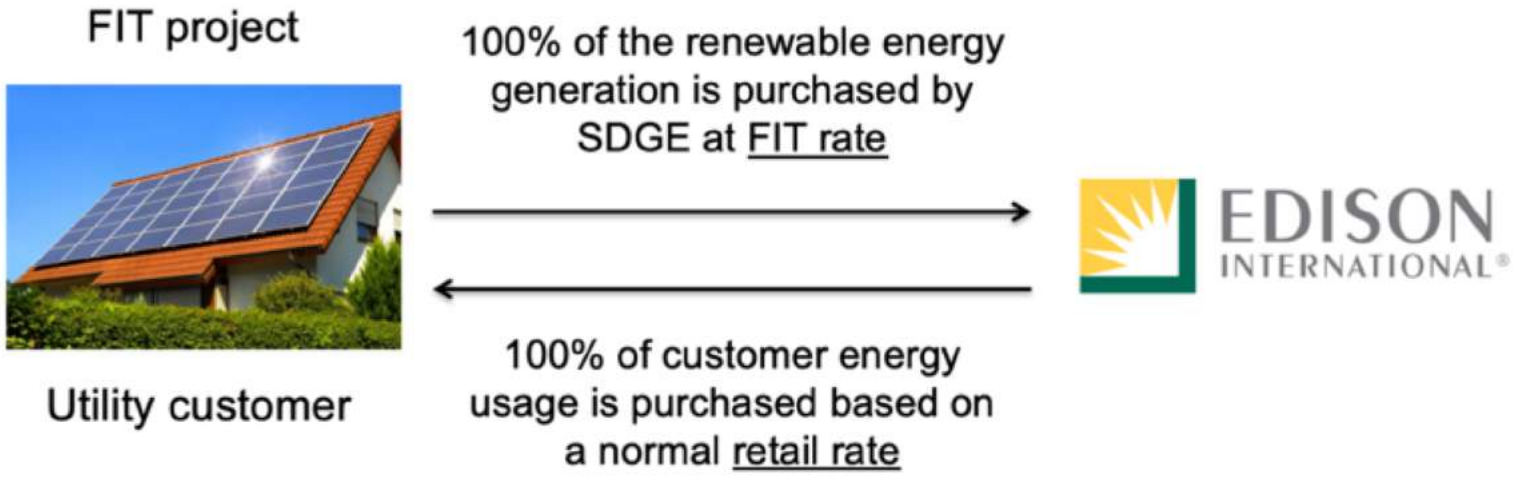
Replicating German scale and efficiencies yields commercial-scale rooftop solar in California at the lowest energy price possible: 3 cents/kWh for delivered energy.

Why FITs are the world-class solution

FITs are unparalleled in unleashing cost-effective, commercial-scale renewables

Feed-In Tariffs (FITs) and Dispatchability Adders

- The Clean Coalition designs market-based, cost-effective FITs with streamlined interconnection
  - A FIT is a standardized, long-term, guaranteed contract that allows smaller local renewable energy projects to sell power to the local utility or other load-serving entity
- FITs work far better than NEM or auctions to unleash commercial-scale renewables.
- Our FITs use Market Responsive Pricing, which allows subsequent contract prices to adjust based on market response to pricing of current contracts— ensuring that energy contracts are always set at the best market price to ensure deployments while protecting ratepayers.
- A Dispatchability Adder, a fixed ¢/kilowatt-hour (kWh) capacity bonus on top of the FIT rate, to attract energy storage that make renewable energy fully dispatchable.

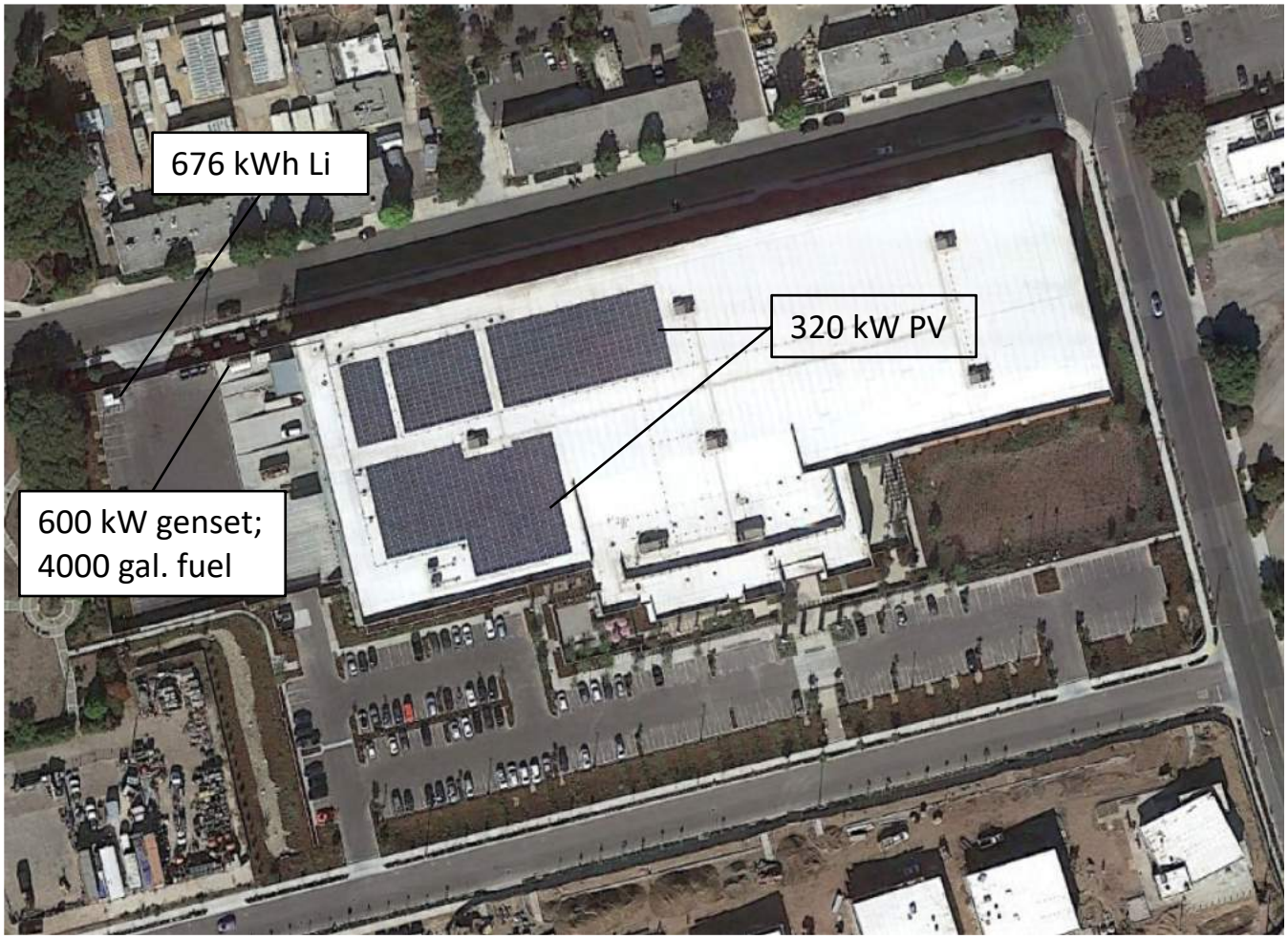


Direct Relief Microgrid should expand greatly

- Location: Santa Barbara, CA.
- Owner: Direct Relief (one of the largest disaster recover/supply non-profits in the world).
- Brand new 155,000-square-foot pharmaceutical warehouse.
- Ships direct to disasters zones, internationally. Cold storage cannot be without power.
- Needed a microgrid for indefinite renewables-driven backup power.

Direct Relief Microgrid – onsite Resilience only

- Resiliency is #1 concern:
  - 320 kW PV
  - 676 kWh Storage
  - 600 kW generator
  - 4000 gal. of fuel
- PV annual generation designed to cover annual consumption.
- Storage designed to time-shift the generation to more valuable times, and provide Resiliency.
- Genset provides “back-up to the back-up”.
- Direct Relief’s mission is to stay operational in the event of a local disaster that causes interruption of electricity.



Direct Relief Microgrid ready to do way more!

Clean Coalition

Microgrid only serves Direct Relief needs:

- 70% of roof and 100% of massive parking area solar potential is unused.
- Additional storage not able to be considered due to policy prohibitions around exporting energy from a battery to the grid – even though the energy is 100% stored solar.

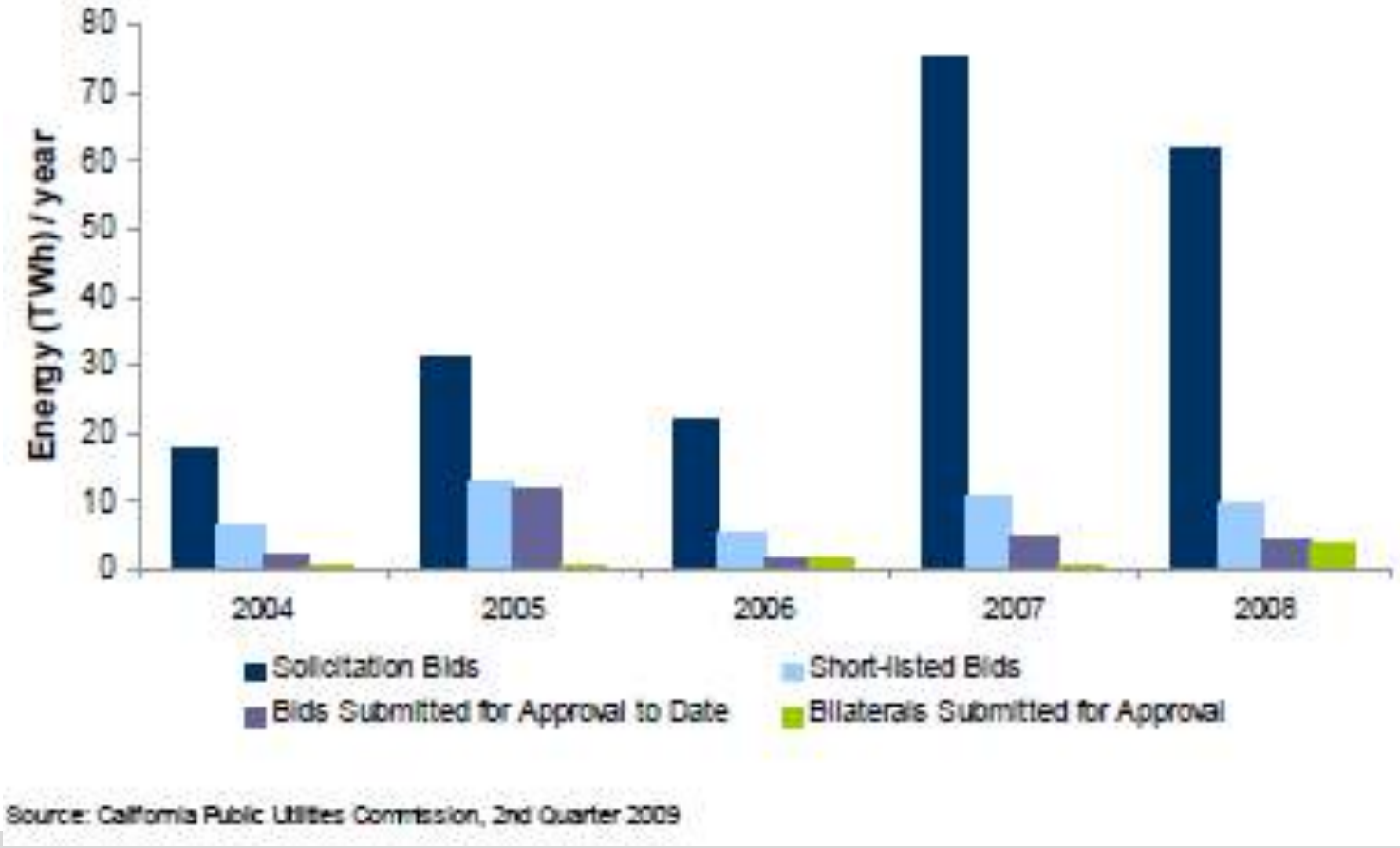
Ready to do way more::

- 1,133 kW in total solar siting potential, 427 kW more rooftop and 386 kW in parking lots.
- Existing switch gear is already sized for the expansion and is just awaiting the policy innovation!

Auctions/solicitations have massive failure rates and are NOT appropriate for commercial-scale

Clean Coalition

- 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.
- It is insane to think that auctions could possibly attract commercial-scale renewables and other DER, and yet, California utilities and policymakers chronically prove Einstein's definition of insanity by continuing to pursue local renewables and other DER via auctions!



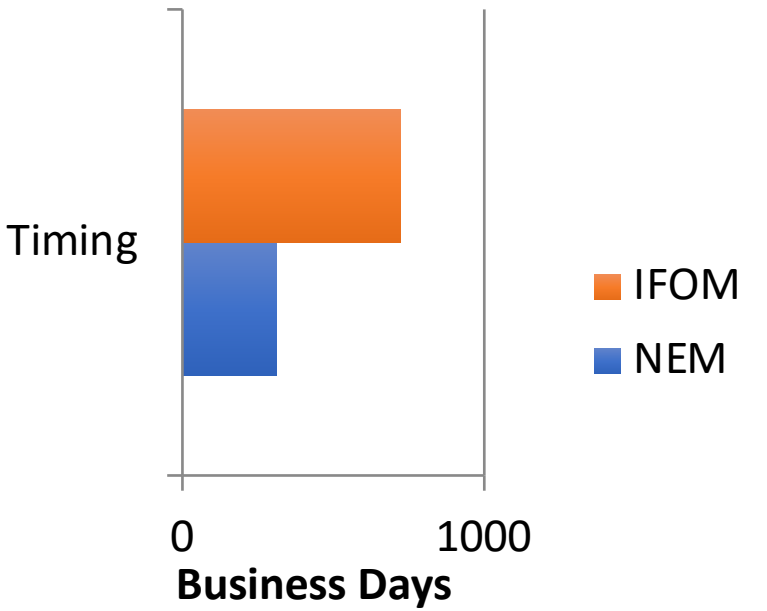
Source: California Public Utilities Commission, 2nd Quarter 2009

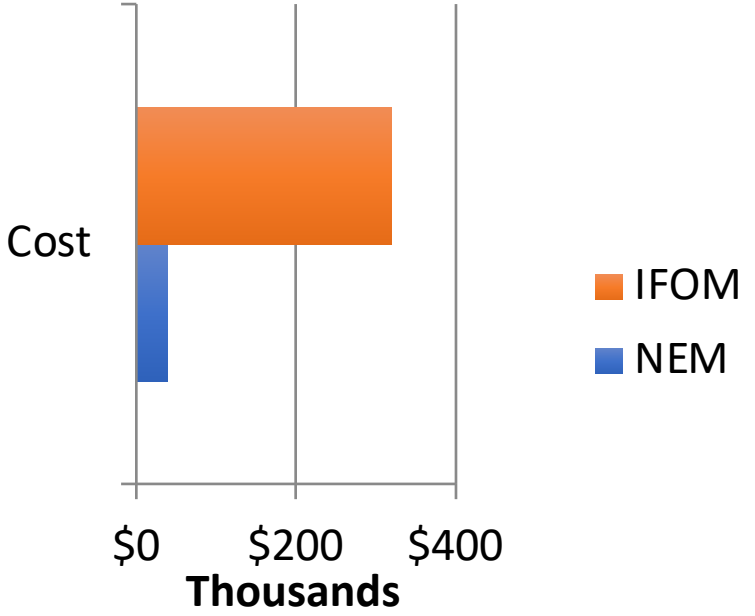
WDG & NEM interconnection need to be aligned

Clean Coalition

Our goal is to address the circumstances that lead to differences in timeframe and costs between what are otherwise identical PV systems, based on whether they are installed “behind the meter” (NEM) or “in front of meter” (IFOM or WDG).

Currently, there are <u>significant</u> differences in both project development timing and costs between NEM and IFOM/WDG systems:





Comparing Investor-Owned Utilities (IOUs) and SMUD project development timelines

Clean Coalition

CA IOUs	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12
Cluster process	Potential cluster process waiting period											2nd cluster window	IR review	Scoping Meetings	Phase I study					Results meeting	
Fast Track	IR validation and initial review	Options mtg and supp. Review agreement	Supp. Review	IA	EPC (construction)																
Ind. Study Procedure	IR validation and initial review	System Impact Study Agreement (SISA)	SIS			Security Posting	Facilities Study (FS)			IA	EPC										
SMUD FIT Program	IR review and scoping meetings				IA		Contract execution	EPC (estimated)													

Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14
Security posting	Phase II study							Interconnection agreement negotiation (IA)			EPC (construction)											

- SMUD: about 1 year total (6 months for interconnection)
- IOU default cluster process: up to 3.5 years (average of 2 years for interconnection)

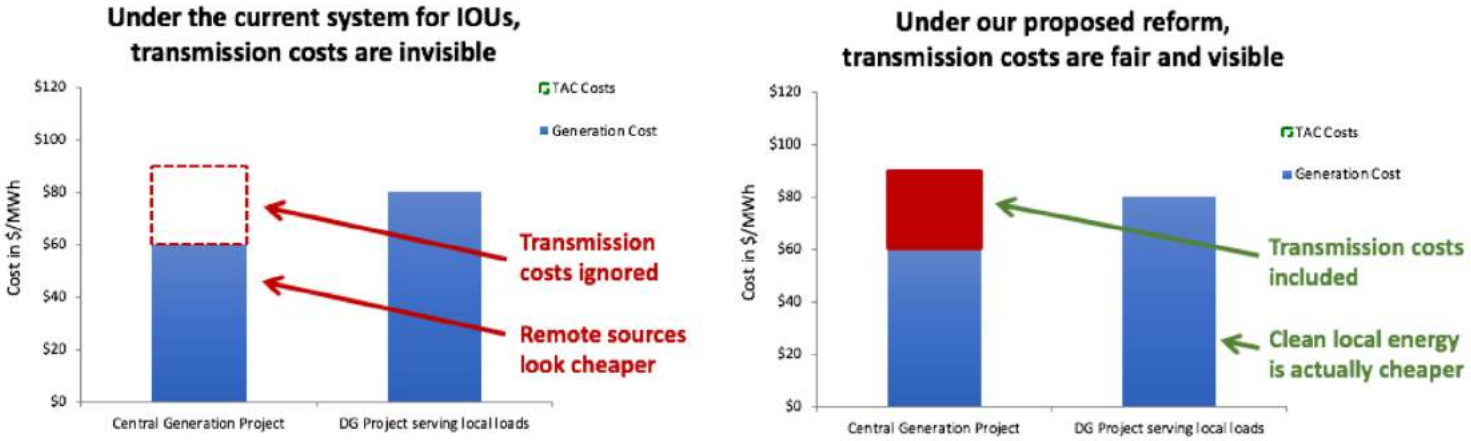
Interconnection with California IOUs takes 4 times longer than with SMUD

WDG interconnection

- Wholesale distributed generation (WDG): projects on the utility side of the meter rather than behind the customer's meter — often commercial-scale solar
- The interconnection process for WDG is broken in California
  - It can take years to interconnect these projects to the grid
  - The process can be arduous and expensive
- The Clean Coalition has designed a WDG Interconnection Pilot with these aims:
  - Make the WDG interconnection processes efficient and cost-effective while maintaining a safe and reliable electric grid
  - **Give WDG the same advantageous streamlined treatment as net energy metered (NEM) projects, making it equally fast and predictable**. Currently, WDG interconnections are significantly more risky, costly, time-consuming, and expensive.

TAC Campaign

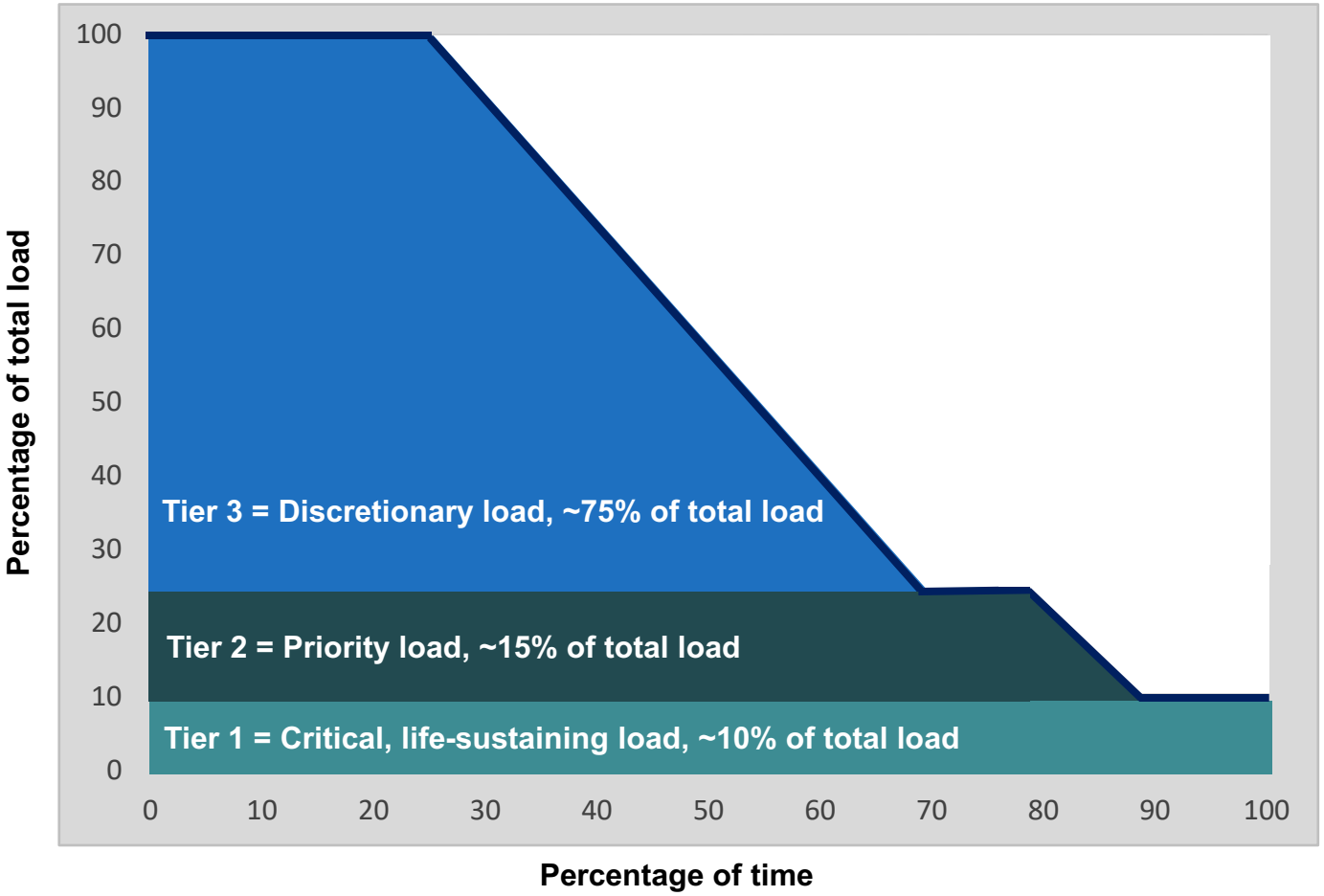
- Transmission Access Charges (TAC) in California are assessed inconsistently and unfairly, creating a massive market distortion
  - In PTO utility service territories, California ratepayers pay the same charge for "using" the transmission system whether or not the energy they use travels across that system
- The TAC market distortion has hidden costs:
  - Californians could pay up to $60 billion extra over the next 20 years
  - 3 cents per kWh is being stolen from clean local energy projects — 50% of their total cost — making them look more expensive than they really are
  - Fewer $$ are available for the resilience that Community Microgrids bring our communities
- The Clean Coalition is proposing this reform: Charge for electricity transmission based on actual use of the transmission grid
  - This method is already being used successfully by California's municipal utilities



Value of Resilience (VOR)

- Everyone understands there is significant value to resilience provided by indefinite renewables-driven backup power
  - But, nobody has yet to quantify this value of unparalleled resilience.
  - Hence, there is an economic gap for innovative Community Microgrid projects while learning is still is the early stages.
- The Clean Coalition aims to establish standardized Value of Resilience (VOR) for critical, priority, and discretionary loads that will help everyone understand that premiums are appropriate for indefinite renewables-driven backup power of critical loads and almost constant backup power to priority loads, which yields a configuration that delivers backup power to all loads a lot of the time
- The Clean Coalition's VOR approach will establish standardized values for resilience of three tiers of loads:
  - Tier 1 are mission-critical and life-sustaining loads, crucial to keep operational at all times, including during grid outages. Tier 1 loads usually represent about 10% of the total load.
  - Tier 2 are priority loads that should be maintained as long as long as doing so does not threaten the ability to maintain Tier 1 loads. Tier 2 loads are usually about 15% of the total load.
  - Tier 3 are discretionary loads make up the remaining loads, usually about 75% of the total load, and are maintained when doing so does not threaten the ability to maintain Tier 1 & 2 loads.

Percentage of time online for Tier 1, 2, and 3 loads for net zero solar+storage microgrids in California



Dispatchable Energy Capacity Services (DECS)

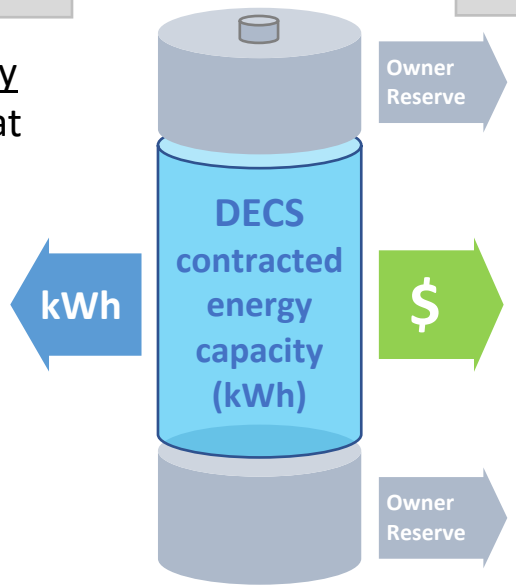
Clean Coalition

Load Serving Entity (LSE)

- LSE contracts for dispatchable daily cycling of energy capacity (kWh), at a fixed $/kWh fee, used or not.
- LSE optimizes fully flexible energy capacity, dispatching for any purpose, which could be based on time of day, day of week, season, event, and/or other optimizations over the DECS contract period.
- Initial DECS contracts are priced at Cost of Service (COS) while subsequent DECS contract pricing is adjusted for market response.

Three COS components:

1. Net Cost of Energy (NCOE).
2. Capital expenditure ("capex").
3. Operating expenditure ("opex").



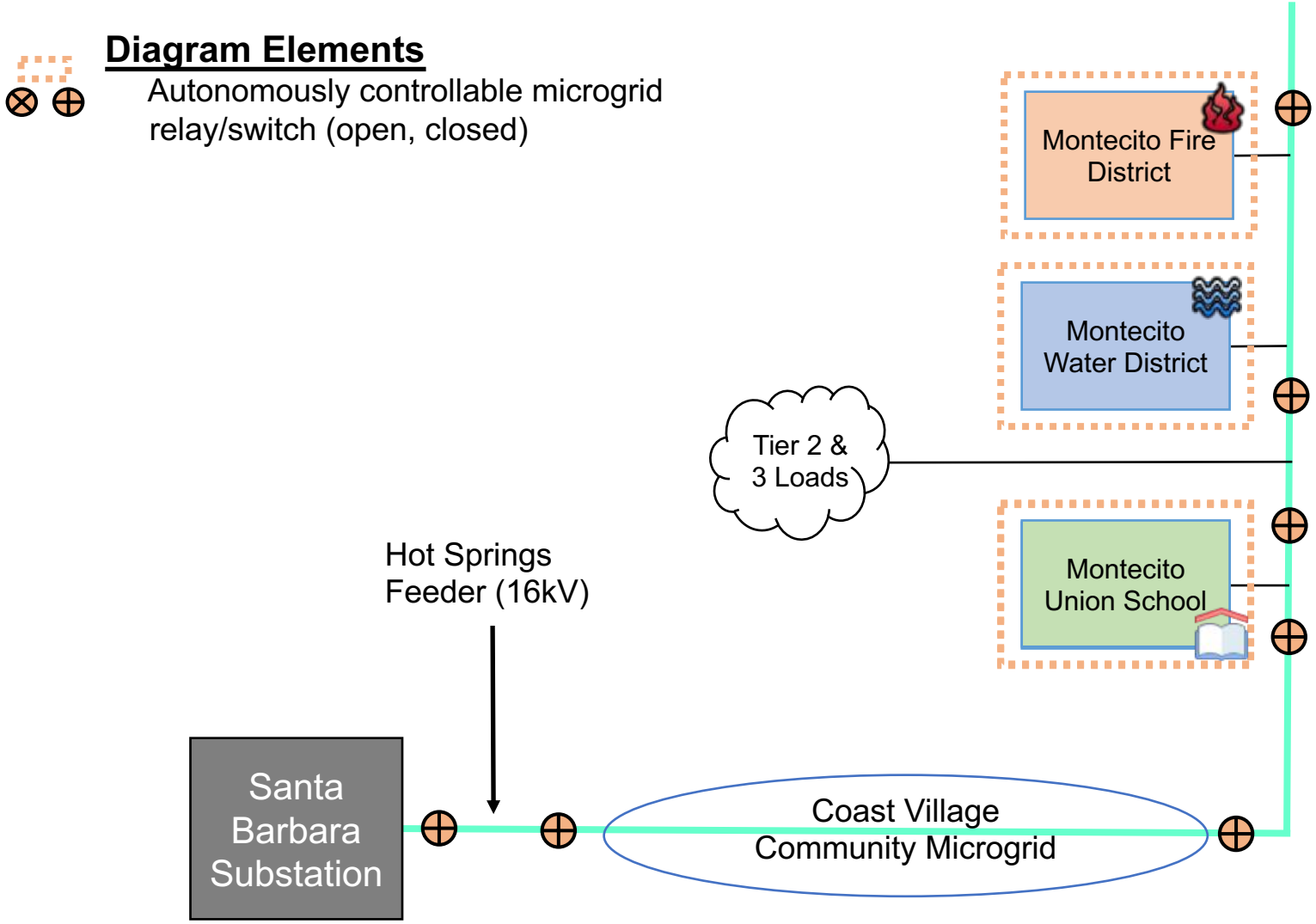
Storage Asset Owner

- Owner retains discretion over any capacity not under DECS contract.
- Owner earns guaranteed $/kWh payments for the DECS-contracted energy capacity.
- Owner retains discretion over any capacity not under DECS contract.

DECS offers a single bankable revenue stream for energy storage owners and a fully flexible & dispatchable energy source for LSEs available daily.

Montecito Community Microgrid block diagram

Clean Coalition



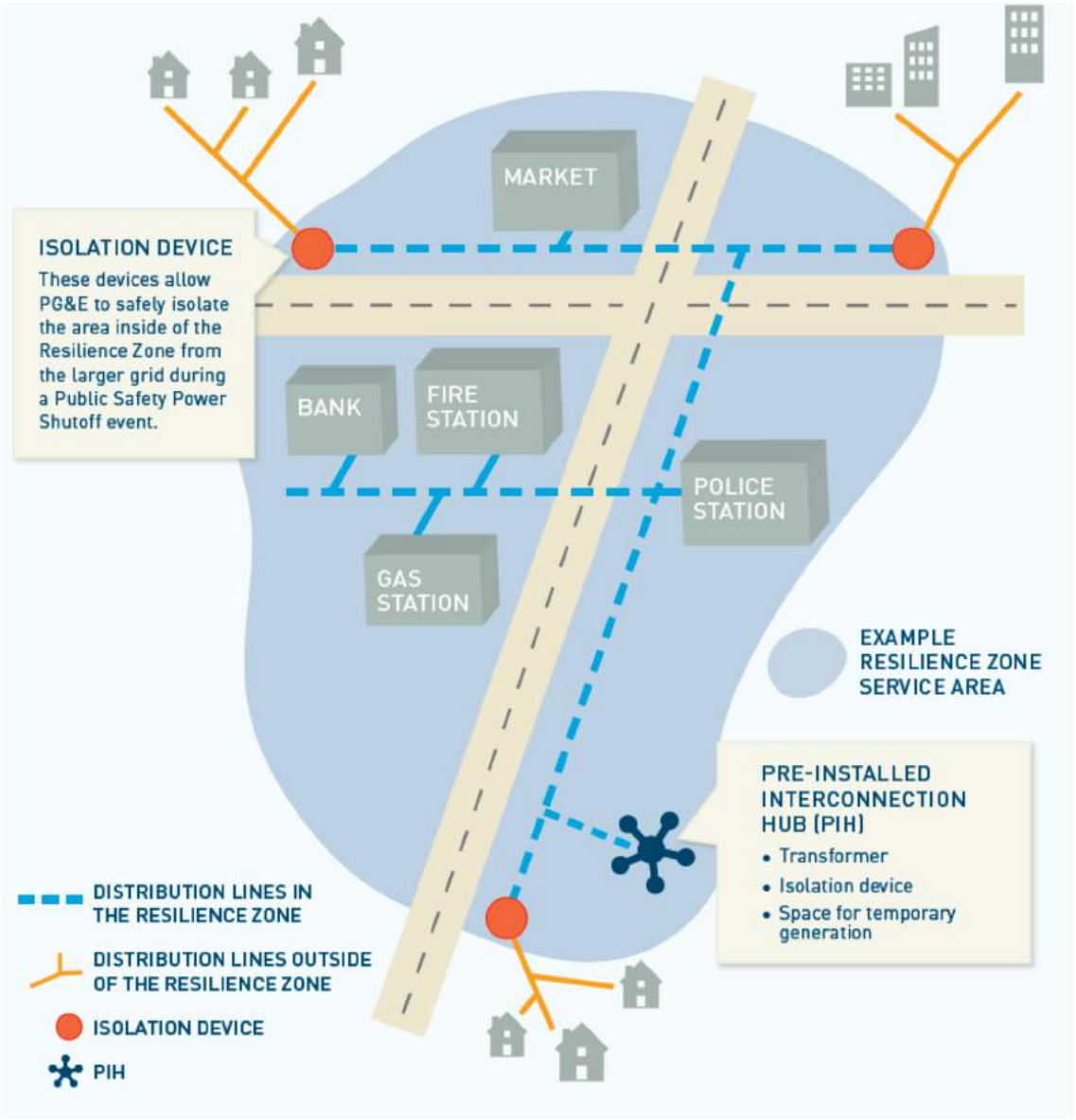
Valencia Gardens Energy Storage (VGES) project

Clean Coalition

Ecoplexus WDG solar project at the Valencia Gardens Apartments in San Francisco, ~800 kW equivalent to ~80% of annual load.

PG&E Resilience Zones = Community Microgrids

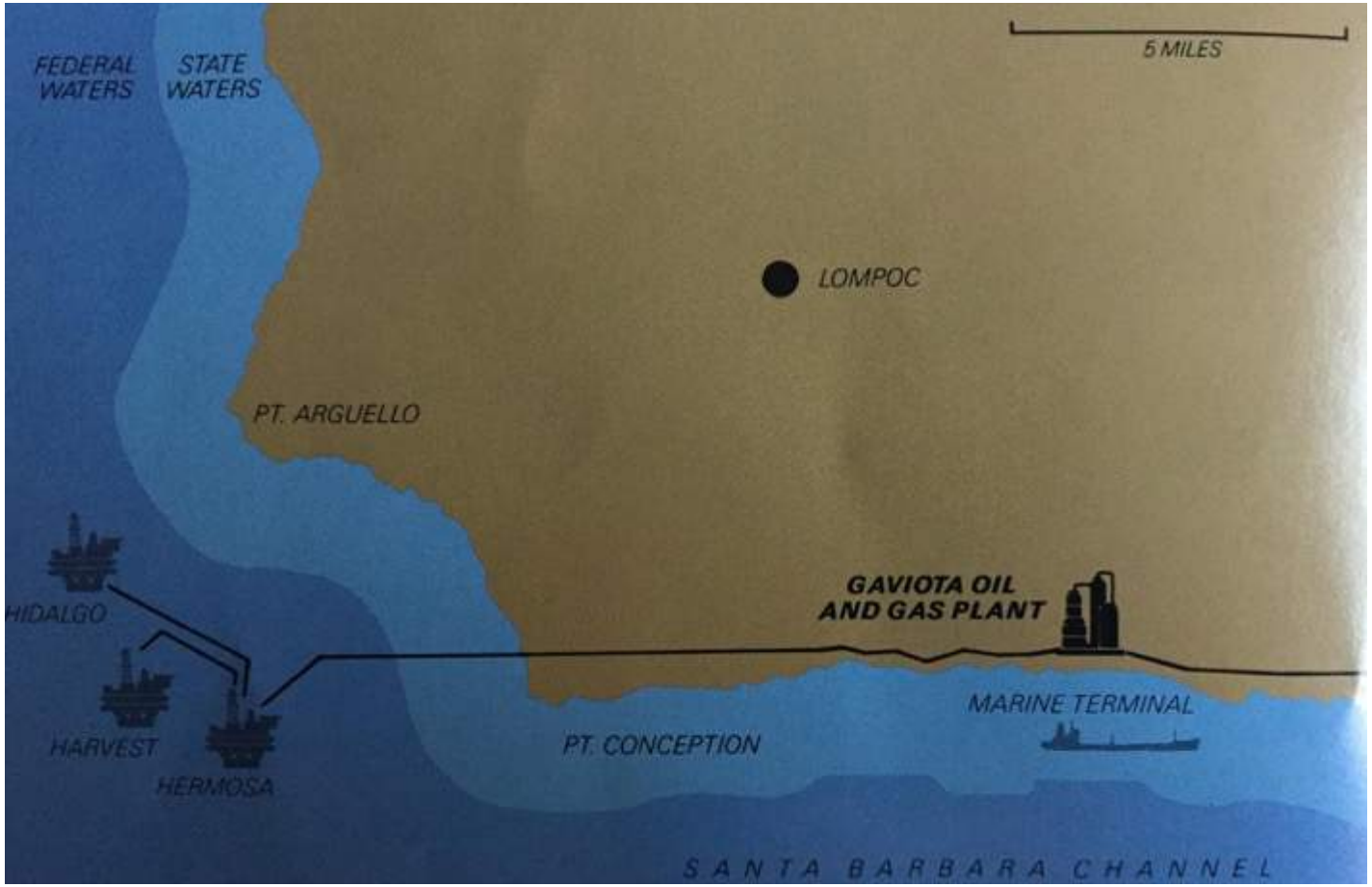
Clean Coalition



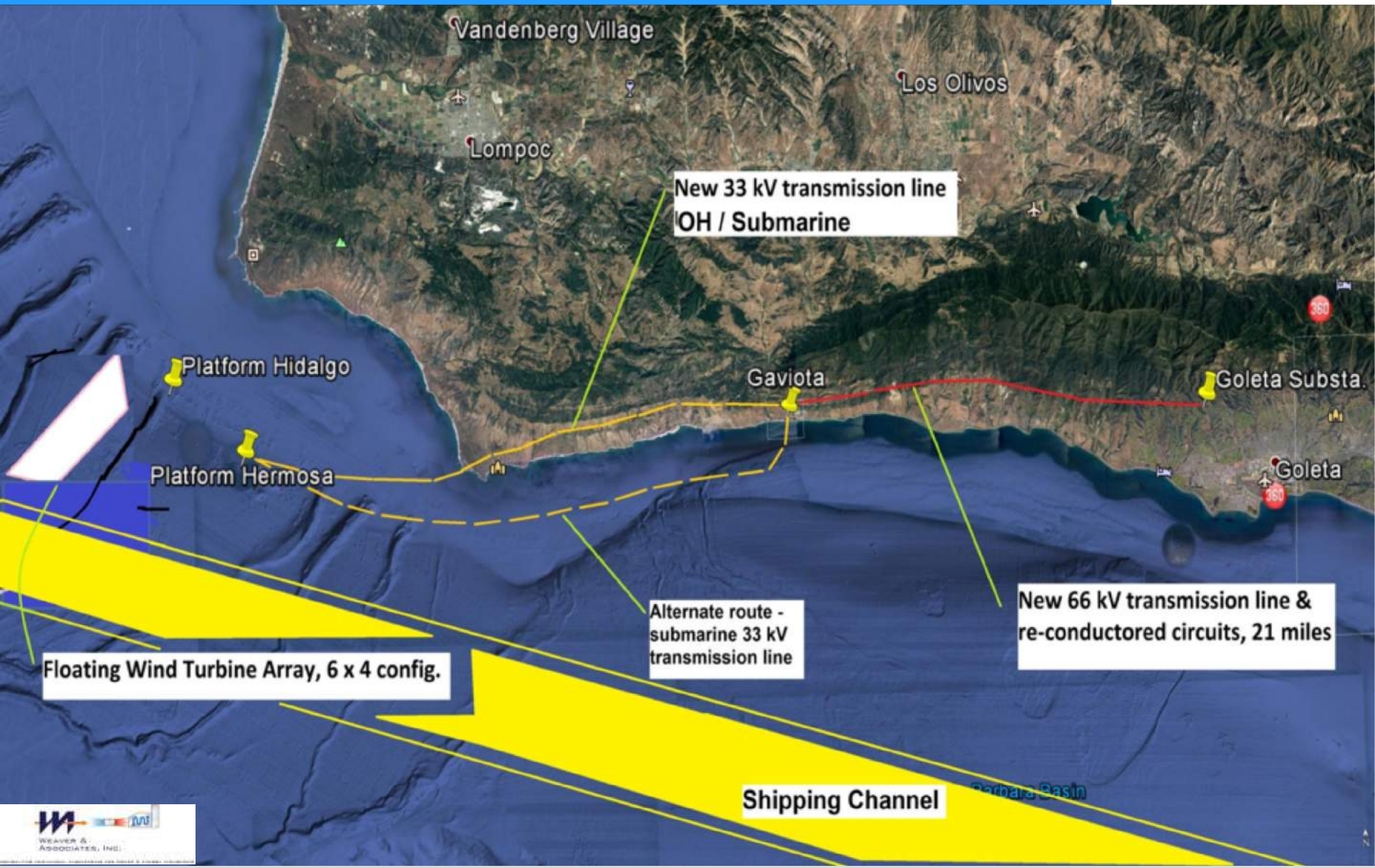
Source: PG&E, Jul2019

Point Conception and Gaviota offshore wind potential

Existing Gaviota oil and gas site infrastructure



Proposed infrastructure

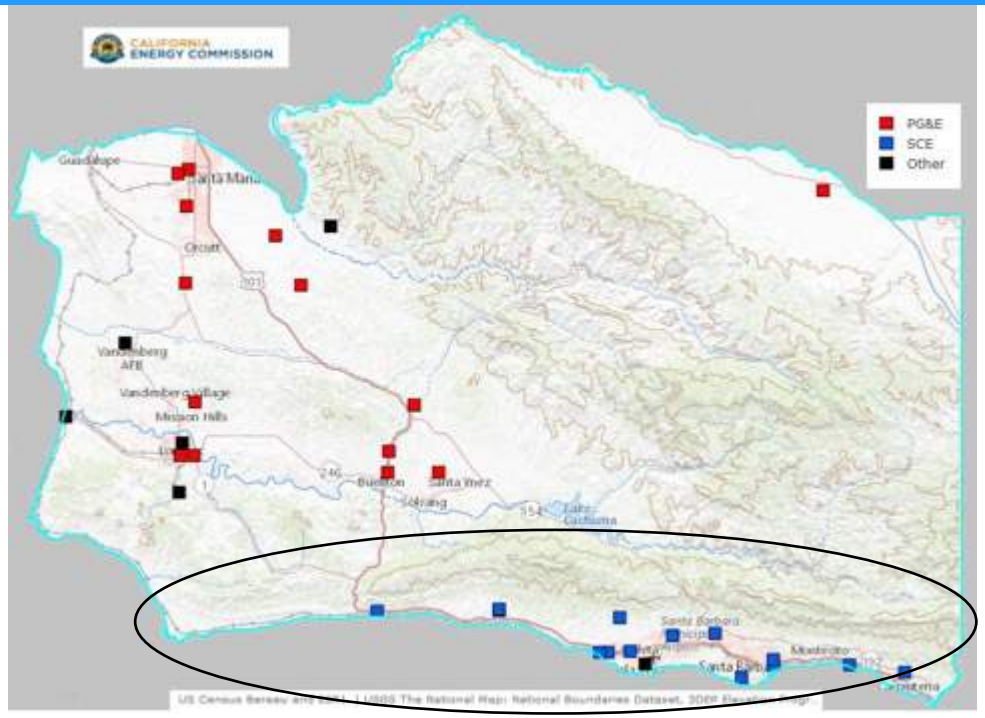


Get involved in the GLP Community Microgrid

- Contribute to the funding requirements of the GLP Community Microgrid Initiative, which should be staffed with several full-time equivalent experts to fulfill the vision.
- Bring properties into play for near-term NEM installations and to stage for WDG projects as policies and market mechanisms are innovated.
- Engage in the policymaking, including in upcoming County & City meetings.
- Bring solutions to the GLP, including Demand Response (DR), Electric Vehicle Charging Infrastructure (EVCI), and Energy Efficiency (EE).
- Share the GLP Community Microgrid as a game-changing showcase for delivering renewables-driven resilience to communities.
- Subscribe to the Clean Coalition newsletter to stay informed.

Backup slides

Strategic Energy Plan (SEP) objectives



The Cities of Goleta and Carpinteria chose to partner with the County on the development of the SEP, and the City of Santa Barbara is pursuing a similar energy planning process.

The objective of the SEP is to address resiliency concerns and stimulate local renewable energy development in three ways:

1. Identifying total resource potential for various types of renewable energy, including solar, wind, hydro, biomass/biogas, and geothermal power, as well as specific hotspots for development.
2. Creating a list of priority sites for renewable energy development throughout the County
3. Developing a set of strategies tackling barriers to renewable energy in diverse program areas ranging from drafting regulatory frameworks to creating new financing mechanisms.

Renewable energy potential countywide

Clean Coalition

Table 2.1: Total Countywide Renewable Energy Potential

Type		Generation Capacity (MW)	Annual Generation (GWh)
Solar	Rooftops	855 – 1,103	1,155 – 1,600
	Agricultural Land (Williamson Act)[22]	159 – 409	222 – 777
	Parking Lots	203 – 241	1,059 – 1,344
	Agricultural Land (Non-Williamson Act)	34 – 104	48 – 198
	Total Solar	1,251 – 1,857	2,484 – 3,919
Biomass	Forestry Waste	19 – 31	107 – 150
	Landfill Biosolids	19 – 31	106 – 149
	Agricultural Waste	6 – 16	36 – 76
	Total Biomass	44 – 78	249 – 375
Wind	Non-Williamson Act	14 – 28	30 – 86
	Williamson-Act	7 – 14	15 – 43
	Total Wind	21 – 42	45 – 129
Biogas	Landfills	2 – 5	8 – 13
	Wastewater Treatment	1 – 2	5 – 7
	Total Biogas	3 – 7	13 – 20
Hydro	Total Hydro	3 – 6	6 – 16
Geothermal	Total Geothermal	1 – 2	7 – 13
Grand Total		1,323 – 1,992	2,804 – 4,372

Potential urban solar capacity

Clean Coalition

Table 2.4: Summary of Potential Urban Solar Capacity (Power, in MW)

Area	City or Jurisdiction	Rooftop Generation Capacity (MW)	Parking Lot Generation Capacity (MW)	Total Urban Generation Capacity (MW)
Unincorporated County	Orcutt	88 – 113	1 – 3	89 – 116
	Isla Vista (non-UCSB)	9 – 11	1 – 3	10 – 14
	Other Unincorporated (Montecito, Santa Ynez, etc.)	120 – 154	11 – 15	131 – 169
Participating Cities	Goleta	79 – 107	22 – 26	101 – 133
	Carpinteria	31 – 39	7 – 8	38 – 47
Non-Participating Cities (Santa Barbara, Santa Maria, etc.)		528 – 679	161 – 186	689 – 835
Grand Total		**855 – 1,103**	**203 – 241**	**1,059 – 1,344**

Santa Barbara County solar priority site summery

Clean Coalition

Table 4.1: Site Summary

ID	Name	Priority Score	Site Type	Interconnect	System Size (kW-DC)	Energy Output (kWh/year)
Unincorporated County of Santa Barbara Public Sites						
1	Santa Maria Mental Health Building / SM Cares	A	Municipal Roof / Carport	Behind meter	161	258,000
2	Northern Branch Jail	A	Municipal Roof / Carport	Behind meter	1,120	1,813,400
3	Northern Branch Jail	B	Municipal Ground Mount	Front of meter	4,450	7,894,780
4	Fire Station 11	B	Municipal Roof	Behind meter	30	39,950
5	Goleta Pier / Beach Park	C	Municipal Carport	Front of meter	636	945,000
Total Maximum – County Sites					**6,397**	**10,951,130**
Total Recommended (A+B) – County Sites					**5,761**	**10,006,130**
Unincorporated County of Santa Barbara Private Sites						
6	Public -Commercial Site CoSB.1	A	Public Roof / Carport	Behind meter	125	207,600
7	Public – Industrial Site CoSB.1	A	Public Roof / Carport	Behind meter	92	151,000
8	Public -Commercial Site CoSB.2	A	Public Roof / Carport	Behind meter	449	779,000
9	Public -Commercial Site CoSB.4	A	Public Roof / Carport	Behind meter	603	1,040,000
10	Private – Agricultural Site CoSB.1	A	Private Ground	Behind meter	973	1,700,000
11	Ted Chamberlin Ranch – Parcel 1(a)	A	Private Ground	Front of meter	10600	19,340,000
12	Ted Chamberlin Ranch – Parcel 1(b)	A	Private Ground	Front of meter	14000	25,577,000
13	Ted Chamberlin Ranch – Parcel 2	A	Private Ground	Front of meter	14500	26,510,000
14	Ted Chamberlin Ranch – Parcel 3	A	Private Ground	Front of meter	9430	17,260,000
15	Ted Chamberlin Ranch – Parcel 4	A	Private Ground	Front of meter	14900	27,320,000
16	Public -Commercial Site CoSB.3	B	Public Roof	Behind meter	369	644,000
17	Public -Commercial Site CoSB.5	B	Public Roof / Ground	Behind meter	32	52,000
18	Private – MF Residential Site CoSB.1	B	Private Roof / Carport	Behind meter	180	260,000
19	Kim Jones Ranch – Parcel 2	B	Private Ground	Front of meter	1170	2,079,000
20	Kim Jones Ranch – Parcel 1	C	Private Ground	Front of meter	642	1,139,000
Total Maximum – Private Sites					**68,065**	**124,058,600**
Total Recommended (A+B) – Private Sites					**67,423**	**122,919,600**
TOTAL MAXIMUM – ALL SITES					**74,462**	**135,009,730**
TOTAL RECOMMENDED (A+B) – ALL SITES					**73,184**	**132,925,730**

74,462 kW DC of maximum solar potential at 20 public and private sites in SB County

Goleta Pier / Beach Park site example

Site Overview

Address:	5986 Sandspit Rd, Goleta, CA 93117		
Utility Provider:	SCE	Electricity Tariff:	TOU GS-1 E
Annual Energy Usage:	38,033 kWh (4 meters)	Monthly Demand Peak:	N/A

PV System Overview

System Size:	636 kW	Electricity Offset:	N/A
Expected Year 1 Output:	945,000 kWh	Expected GHG Reduction:	148 mTCO2/yr

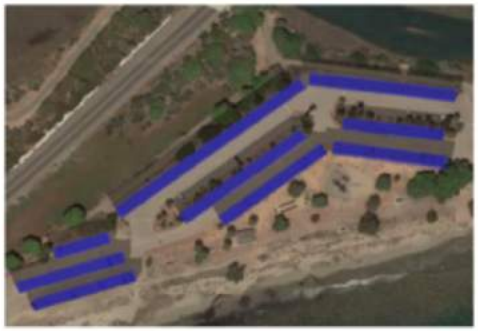
PV System Summary

There are large amounts of unshaded parking available for a solar installation at Goleta Beach Park. However, a low load would constrain a behind-the-meter project to less than 5% of its maximum output. As such, this project would be best suited for use in a Community Solar project or as the Generating Account under the RES-BCT program, which allows local governments to credit generation from a site with high solar potential to a site with low solar potential.

The other main difficulties at this site are related to its location very close to the ocean shoreline. Coastal permitting in this location would be difficult or unlikely, even with the loosened restrictions proposed in the Section 5.1.4 of the SEP. Additionally, underground construction of carport columns would likely encounter water table and soil stability issues so close to the beach, leading to higher costs to construct a stable carport. This location would almost certainly require the use of spread footings, which may also reduce parking availability, or, alternatively, would require much deeper foundations than are generally utilized.

Due to the unique nature of this site, financing options are not shown. However, if the constraints were able to be overcome, to take advantage of tax credits the project should be financed through a PPA, including for a Community Solar project. Again, due to the overwhelming constraints, a battery storage system was not analyzed for inclusion in this project.

Proposed Solar PV Design Layout



The layout above can accommodate approximately 636 kW on new solar carports. The energy yield for proposed solar arrays would be approximately 1,485 kWh/kW per year.

Priority Score: C

Scored low due to:

- Site is located close to the ocean shoreline. Coastal permitting in this location would be difficult or unlikely, even with the loosened restrictions proposed.
- Soil stability leading to higher costs.
- Require spread footings, reducing parking availability.

Clean Coalition identified additional barriers:

- Utility-scale solar definition.
- Lack of standard procurement mechanism (FIT, etc).

Goleta solar priority site summary

ID	Name	Priority Score	Site Type	Interconnection	System Size (kW-DC)	Energy Output (kWh/year)
	Goleta Municipal Solar Site Potential					
1	Goleta Library	A	Roof / Carport	Behind meter	118	190,911
2	Goleta City Hall	A	Roof / Carport	Behind meter	145	226,867
3	Goleta Valley Community Center	B	Carport	Behind meter	61	116,011
	Total Maximum at Municipal Site(s)				**324**	**533,789**
	Total Recommended for Municipal Site(s) (A+B)				**324**	**533,789**
	Goleta Solar Site Potential					
4	Public – Commercial Site 1	B	Roof / Carport	Behind meter	300	492,000
5	Public – Commercial Site 2	A	Roof / Carport	Behind meter	630	1,050,000
6	Public – Commercial Site 3	A	Roof / Carport	Behind Meter	548	961,900
7	Public – Commercial Site 4	A	Roof / Carport	Behind Meter	402	657,700
8	Private – Commercial Site 1	A	Roof / Carport	Behind Meter	334	517,000
9	Private – Commercial Site 2	A	Roof	Behind Meter	1,040	1,560,000
10	Private – Commercial Site 3	A	Roof / Carport	Behind Meter	1,180	1,940,000
11	Private – Commercial Site 4	A	Roof / Carport	Behind Meter	400	621,000
12	Private – Commercial Site 5	C	Roof / Carport	Behind Meter	45	68,000
13	Private – Commercial Site 6	B	Roof	Behind Meter	185	286,000
14	Private – Commercial Site 7	B	Roof / Carport	Behind Meter	945	1,510,000
15	Private – Commercial Site 8	B	Roof / Carport	Behind Meter	562	930,000
16	Private – Commercial Site 9	B	Roof / Carport	Behind Meter	949	1,500,000
17	Private – Commercial Site 10	A	Roof / Carport	Behind Meter	1,270	2,072,000
18	Private – MF Residential Site 1	C	Roof	Behind Meter	330.8	496,000
19	Private – MF Residential Site 2	A	Roof	Behind Meter	110.6	168,800
20	Private – MF Residential Site 3	B	Roof	Behind Meter	471.5	700,900
21	Private – MF Residential Site 4	C	Roof	Behind Meter	81.6	119,500
	Total Maximum at Private Site(s)				**9,653.5**	**15,516,100**
	Total Recommended for Private Site(s) (A+B)				**9,195.9**	**14,832,600**

9,977 kW DC of maximum solar potential at 21 municipal and private sites in the City of Goleta

Carpinteria site summary

ID	Name	Priority Score	Site Type	Interconnection	System Size (kW-DC)	Energy Output (kWh/year)
Carpinteria Municipal Potential Solar Site(s)						
1	Carpinteria City Hall	A	Municipal Roof / Carport	Behind meter	137.2	221,664
Total Maximum PV Production at Municipal Site(s)					**137.2**	**221,664**
Total Recommended PV Production for Municipal Site(s) (A+B)					**137.2**	**221,664**
Carpinteria Community Potential Solar Sites						
2	Public – Commercial 1	A	Rooftop	Behind Meter	105.7	163,000
3	Public – Commercial 2	A	Rooftop	Behind Meter	165.2	252,000
4	Public – Commercial 3	A	Rooftop / Carport	Behind Meter	1,090.0	1,720,000
5	Public – Commercial 4	A	Rooftop	Behind Meter	403.9	651,000
6	Public – Commercial 5	B	Rooftop / Carport	Behind Meter	173.6	270,000
7	Public – Commercial 6	C	Rooftop / Ground-Mount	Behind Meter	32.2	52,000
8	Private – Commercial 1	A	Rooftop	Behind Meter	632.5	948,000
9	Private – Commercial 2	B	Rooftop	Front of Meter	776.7	1,160,000
10	Private – Commercial 3	A	Rooftop / Carport	Behind Meter	426.0	653,200
11	Private – MF Residential 1	A	Rooftop / Carport	Behind Meter	175.0	294,000
Total Maximum PV Production at Community Sites					**3,980.8**	**6,163,200**
Total Recommended PV Production for ALL Sites (A+B)					**4,085.8**	**6,332,864**

4,118 kW DC of maximum solar potential at 11 municipal and community sites in the City of Carpinteria

Clean Coalition recommendations (modified SEP)

- Utility-scale solar definition and solar & solar+storage permitting
  - Change to remove solar on built environments in the Utility-scale solar definition in the Land-use development code and Santa Barbara County Comprehensive Plan, Land Use Element.
  - Implement expedited permitting procedures for systems on any built environments.
- Coastal Zoning Ordinance:
  - Allow the construction of solar on built environments to proceed without a CDP, provided compliance with all other provisions of the county code.
    - Do not constrain it to on-site consumption, NEM, VNEM, community solar etc.
- Institutional county barriers:
  - Get all municipal facilities identified for solar+storage opportunities.
    - For example, in the South County only, the County is in the process of completing an energy efficiency audit of over 50 buildings covering 823,000 square feet – why aren't solar and storage being considered for these buildings at the same time?
- Energy Assurance Plan (EAP):
  - The County recognizing the GLP Community Microgrid as a fundamental component of its EAP.

Clean Coalition recommendations (beyond SEP)

- Put pressure on Southern California Edison to proactively supports the Goleta Load Pocket Community Microgrid.
  - With the threat of PSPS and overall vulnerability of the GLP's connection to the transmission grid, the GLP Community Microgrid is a vital resilience solution and SCE has a big role.
  - SCE needs to implement grid isolation switches that enable the GLP Community Microgrid with tiered levels of resilience, beginning with critical community facilities like fire stations, hospitals, emergency shelters, etc (Currently even the existing Ellwood peaker plant has to shutdown during grid outages due to lack of grid isolation switches.)
- Approve 100 MW Strauss Wind Project and begin to consider the Point Conception Offshore Wind Project.
- Complete an accurate Solar Siting Survey to determine which built environments have a capacity for solar.
  - Built environments have the capacity needed to meet the entire 200 MW of solar and 400 MWh of storage required for the GLPCM.
  - That would only be 7% of the total siting potential on built environments.
- Ensure that resilience is a focus for all energy planning and pressuring SCE to do the right thing, for the CCA programs for local renewables and other DER, and resilience is properly valued and compensated.
- Push CCA to establish a FIT with Market Responsive Pricing and a Dispatchability Adder.

Need to redefine Utility-Scale Solar in SB County

Clean Coalition

Existing definition of Utility-Scale Solar Photovoltaic Facilities prohibits WDG even on built-environments like rooftops, parking lots, and parking structures:

> Utility-Scale Solar Photovoltaic Facilities. Facilities that are connected to the electrical grid on the utility side of the electric meter and are built for the primary purpose of generating and selling wholesale power.

Proposed new definition of Utility-Scale Solar Photovoltaic Facilities:

> Solar facilities of greater than 5 MWac capacity on open land that are connected to the electrical grid on the utility side of any pre-existing electric customer meter for the primary purpose of generating and selling wholesale power. Solar facilities of any size that are constructed on built-environments, including rooftops, parking lots, and parking structures, are not considered to be utility-scale solar facilities.

The amended definition needs to be applied in the following two places:

1. Santa Barbara County Comprehensive Plan, Land Use Element
2. Santa Barbara County Land Use and Development Code, Definitions

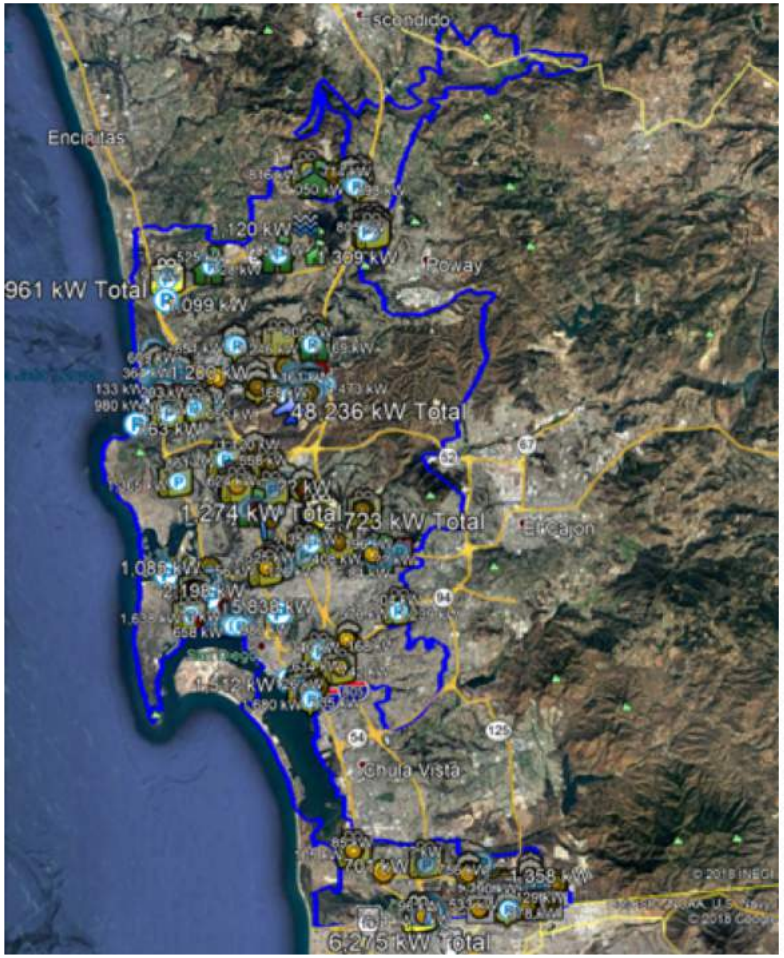
Strauss Wind Energy Project

Clean Coalition

- The Strauss Wind Energy Project is an approximately **98-megawatt (MW)** wind project that will include 29 wind turbines and **generate enough clean, renewable energy to power nearly 45,000 California homes.**
- It is located approximately **3.5 miles southwest of the city of Lompoc and east of Vandenberg Air Force Base**.
- The Project is **located on the same site as the previously proposed Lompoc Wind Project**. The County approved the Lompoc Wind Project in 2009 and it was ready to be constructed before the previous developer walked away.
- The new developer has greatly improved the project by;
  - **Reducing the turbine count from 65 to 29**
  - Further **reducing the impact to oak trees by 90%** from its original proposal
  - Pledging to **replace each lost oak tree with 10 new plantings**.
- Besides electrical benefits, the project will generate an **estimated $40 million in tax revenue during its 30-year lifecycle**, putting it among the top ten tax contributors in Santa Barbara County.
- It will also **create about 150 well-paying construction jobs during the building phase in addition to using locally sourced materials.**

San Diego Solar Siting Survey

Clean Coalition

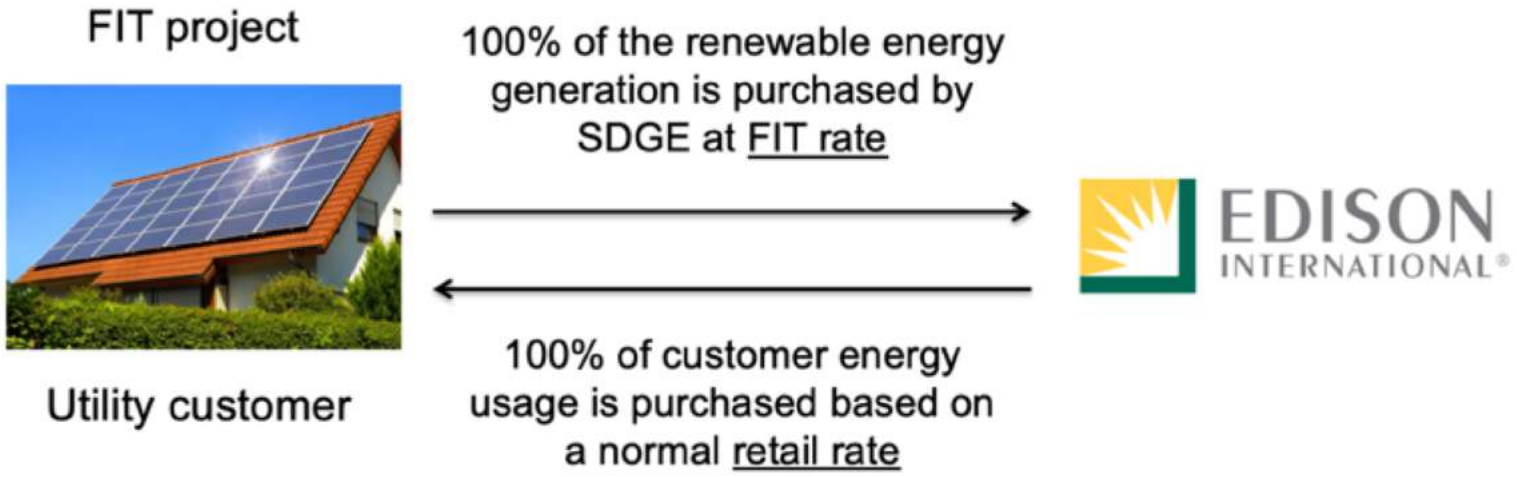


Total:	% of survey:	24.0%		72.9%		2.8%		0.2%		0.2%	
		Summary by Structure Types									
		Roof_Flat	kW_Total	Pkg_Lot	kW_Total	Pkg_Garage	kW_Total	Roof_Angled	kW_Total	Water	kW_Total
Totals:		237	119,630 kW	478	363,748 kW	25	14,189 kW	5	1,086 kW	1	1,120 kW
ZIP	Rank										
92037	19	3	1,746	9	6,125	-	-	-	-	-	-
92093	11	-	-	25	16,674	3	1,141	-	-	-	-
92101	4	4	5,040	18	32,242	2	3,136	-	-	-	-
92102	25	3	1,512	4	2,227	-	-	-	-	-	-
92105	31	-	-	3	1,547	-	-	-	-	-	-
92106	23	-	-	3	5,306	-	-	-	-	-	-
92108	2	6	1,292	38	48,419	4	1,575	-	-	-	-
92109	6	-	-	22	24,542	-	-	-	-	-	-
92110	8	14	9,200	13	13,951	-	-	-	-	-	-
92111	9	13	7,004	22	14,854	-	-	-	-	-	-
92113	12	6	3,092	23	10,192	-	-	-	-	-	-
92115	20	3	1,432	5	4,704	-	-	-	-	-	-
92117	27	1	26	3	2,940	-	-	2	571	-	-
92120	18	11	5,071	9	2,926	-	-	-	-	-	-
92121	10	8	3,762	23	15,659	-	-	-	-	-	-
92122	21	4	707	6	3,724	3	1,358	-	-	-	-
92123	7	13	7,715	14	15,533	2	819	-	-	-	-
92126	14	7	2,758	15	8,827	1	497	-	-	-	-
92127	5	11	8,365	30	19,369	-	-	-	-	-	-
92128	13	9	4,149	15	8,505	-	-	-	-	-	-
92129	24	1	210	6	5,068	-	-	-	-	1	1,120
92130	15	2	301	16	9,051	1	1,099	-	-	-	-
92131	29	1	273	1	1,505	-	-	-	-	-	-
92134	30	-	-	-	-	3	1,673	-	-	-	-
92136	26	-	-	5	3,667	-	-	-	-	-	-
92145	3	29	8,054	82	39,668	-	-	3	515	-	-
92154	1	56	38,565	34	33,193	-	-	-	-	-	-
92161	28	-	-	5	2,198	1	245	-	-	-	-
92173	16	21	4,922	12	3,944	-	-	-	-	-	-
92182	17	6	1,383	14	4,494	5	2,646	-	-	-	-
92199	22	5	3,053	3	2,695	-	-	-	-	-	-

Over 500MW of solar siting potential on built environments

Feed-In Tariffs (FITs) and Dispatchability Adders

- The Clean Coalition designs market-based, cost-effective FITs with streamlined interconnection
  - A FIT is a standardized, long-term, guaranteed contract that allows smaller local renewable energy projects to sell power to the local utility or other load-serving entity
- FITs work far better than NEM or auctions to unleash commercial-scale renewables.
- Our FITs use Market Responsive Pricing, which allows subsequent contract prices to adjust based on market response to pricing of current contracts— ensuring that energy contracts are always set at the best market price to ensure deployments while protecting ratepayers.
- A Dispatchability Adder, a fixed ¢/kilowatt-hour (kWh) capacity bonus on top of the FIT rate, to attract energy storage that make renewable energy fully dispatchable.



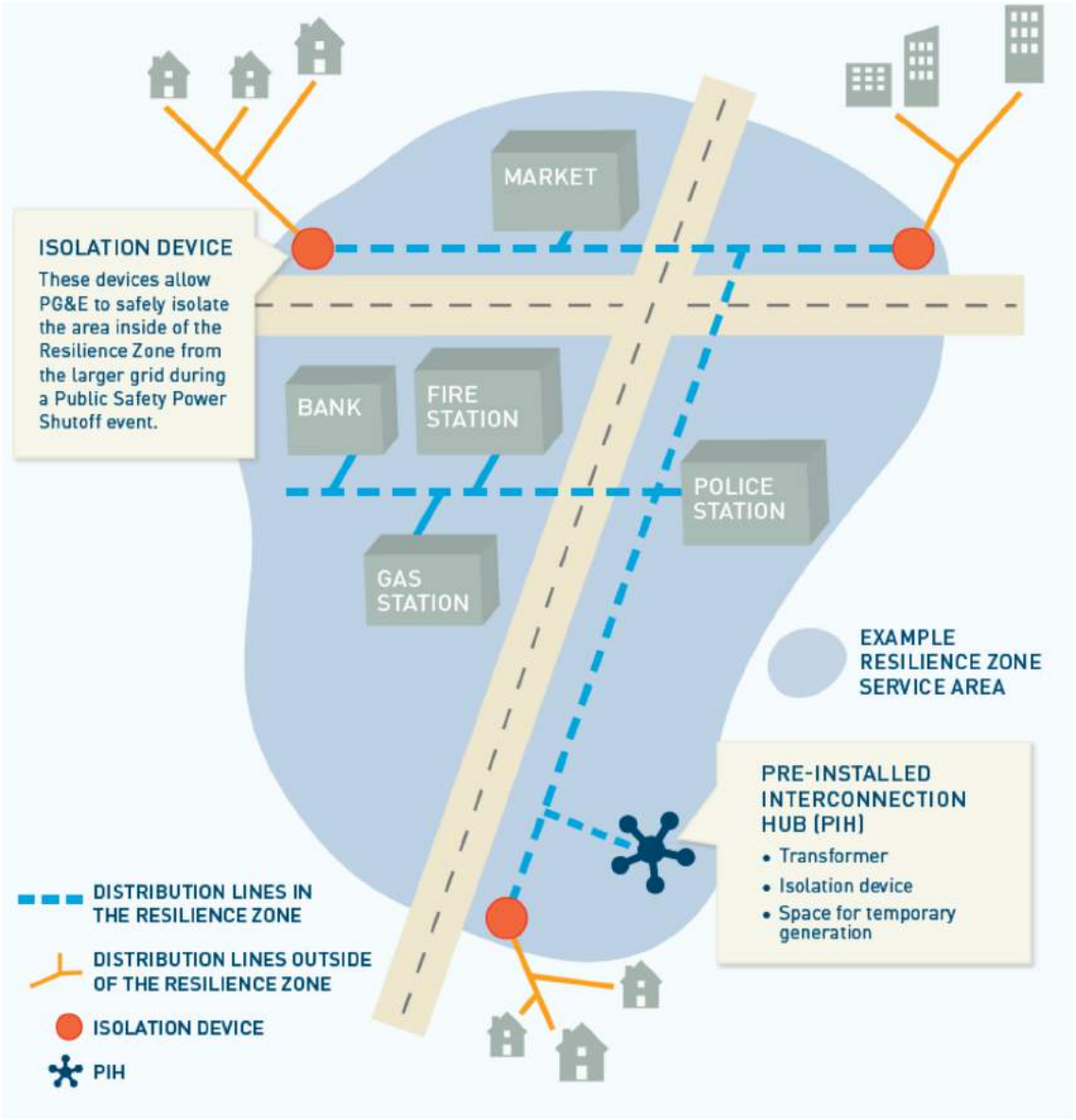
Ellwood peaker and the need for grid isolation switches

Puente Peaker Plant in Oxnard

- During extensive power outages caused by the Thomas Fire and Montecito Debris Flows damaging the transmission lines serving the county, the Ellwood peaker plant did not turn on for reasons not entirely clear. Likely had to do with worker safety in repairing damages power lines that did not have proper grid isolation switches.
- 50 MW Ellwood peaker should be replaced by 50MW multi-hour battery.
- Investor owned utilities need to install proper grid isolation switches to island from future damaged power lines.

PG&E Resilience Zones = Community Microgrids

Clean Coalition



Source: PG&E, Jul2019