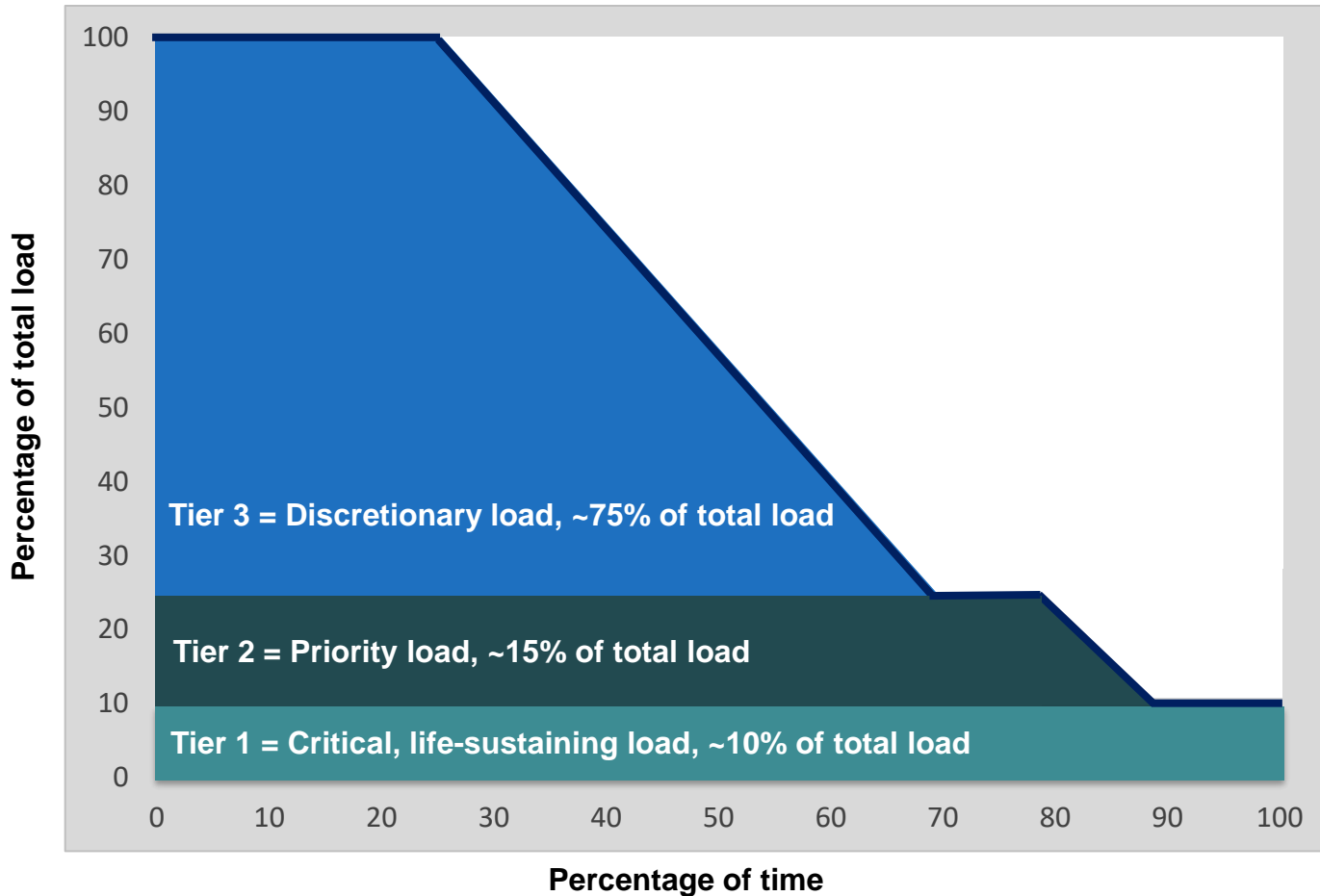




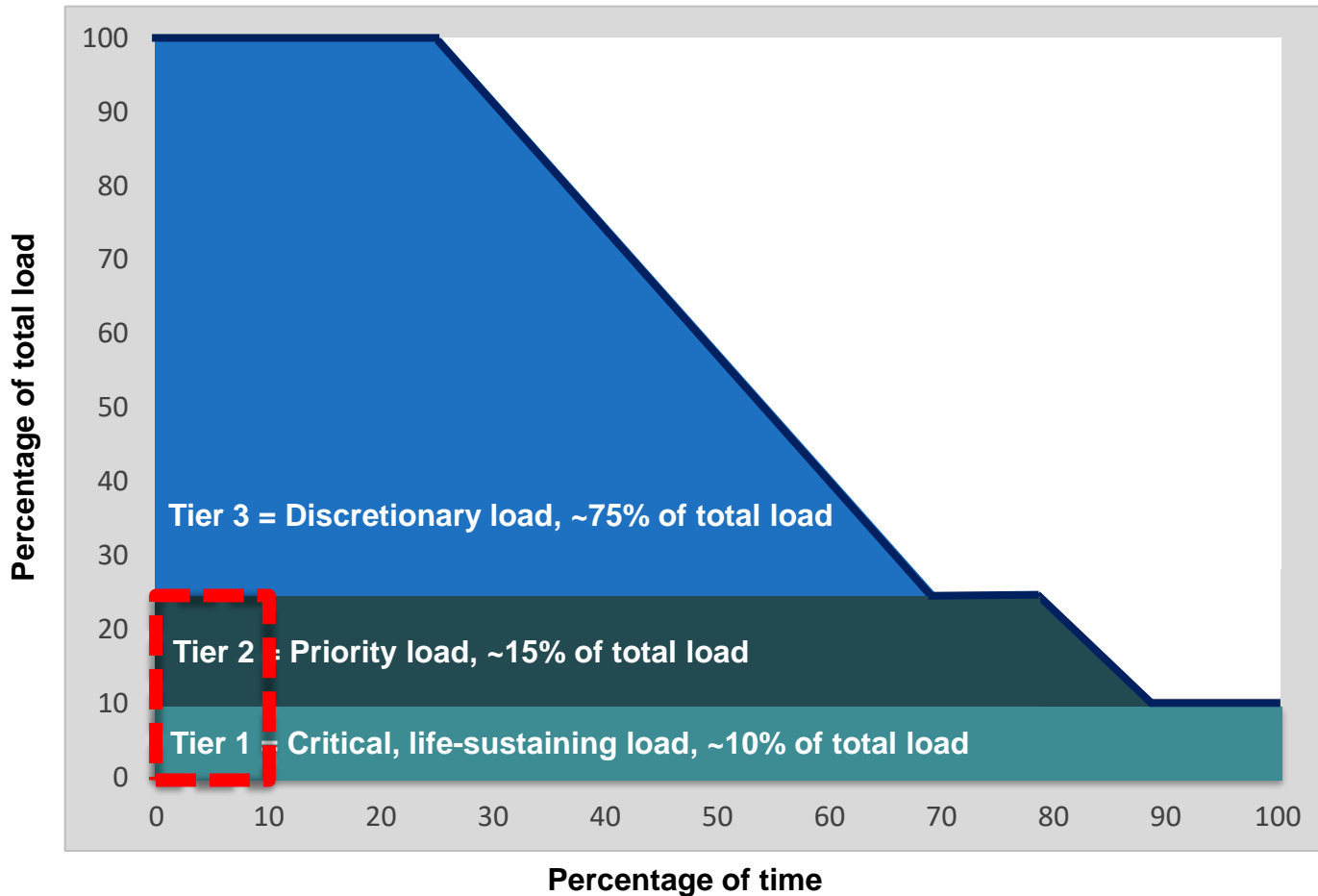
Microgrids for maintaining Critical Community Facilities

Craig Lewis
Executive Director
Clean Coalition
650-796-2353 mobile
craig@clean-coalition.org

- A microgrid is a combination of energy resources, definitely including generation & storage, that are coordinated to serve specified loads, including in an islanded fashion.
- A Solar Microgrid is a behind-the-meter (BTM) microgrid that solely relies on solar for energy generation when islanded.
- A Hybrid Solar Microgrid is a Solar Microgrid that includes additional sources of energy generation, beyond just solar.
- A Community Microgrid a microgrid that covers a target grid area and relies on existing distribution feeders (ie, power lines) to operate when islanded. Community Microgrids typically include both front-of-meter (FOM) and BTM resources, including Solar Microgrids, and require effective participation from utilities, which have mostly erected barriers to date.



Percentage of time online for Tier 1, 2, and 3 loads for a Solar Microgrid designed for the University of California Santa Barbara (UCSB) with enough solar to achieve net zero and 200 kWh of energy storage per 100 kW solar.



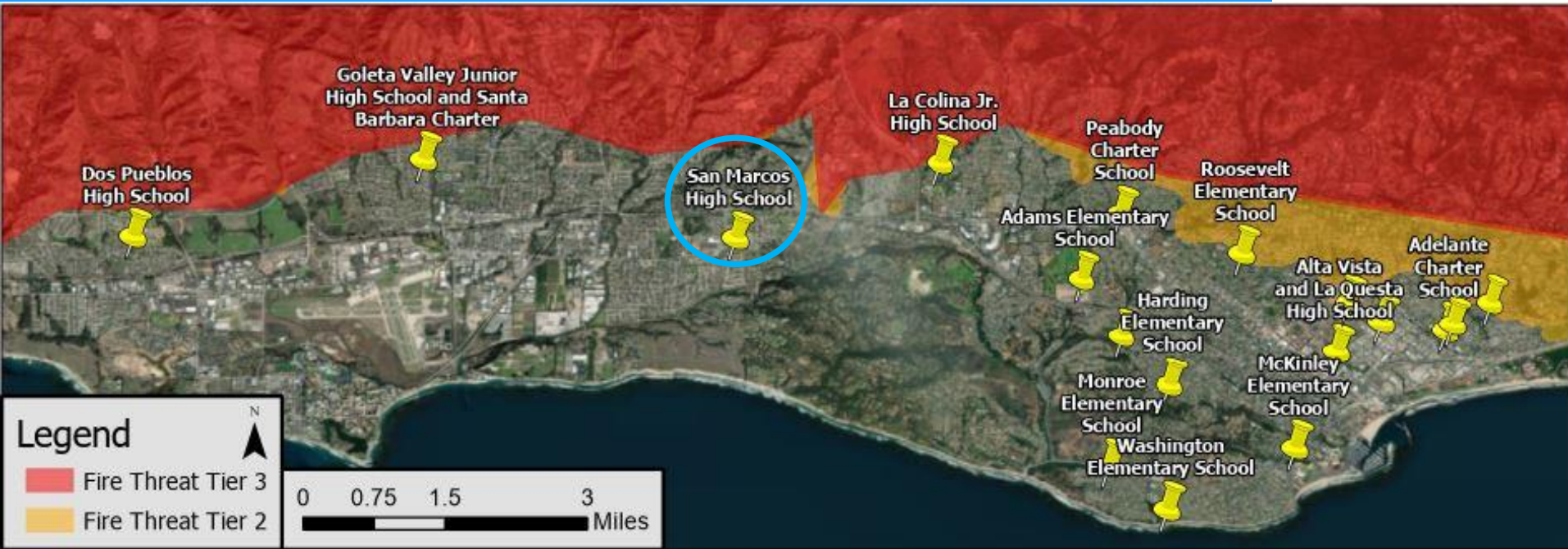
A typical diesel generator is configured to maintain 25% of the normal load for two days. If diesel fuel cannot be resupplied within two days, goodbye. This is hardly a solution for increasingly necessary long-term resilience. In California, Solar Microgrids provide a vastly superior trifecta of economic, environmental, and resilience benefits.

Facility tiers

		Tier 1 facility	Tier 2 facility	Tier 3 facility
Load tiers	Tier 1 load			
	Tier 2 load			
	Tier 3 load			

- = Critical for the entire community, such as Tier 1 loads at Tier 1 facilities like fire stations
- = Priority for the entire community, such as Tier 2 loads at Tier 1 facilities and Tier 1 loads at Tier 2 facilities like multi-unit housing facilities that can provide safe and easy sheltering in place
- = Priority for individual facilities but not the entire community
- = Discretionary loads that are not impactful to the community, whether on or off

Santa Barbara Unified School District (SBUSD) case study



- The entire Santa Barbara region is surrounded by extreme fire risk (earthquake & landslide risk too) and is extremely vulnerable to electricity grid outages.
- The SBUSD is a major school district that increasingly recognizes the value-of-resilience (VOR) and has embraced the Clean Coalition's vision to implement Solar Microgrids at a number of its key schools and other critical facilities.
- SMHS is in the middle of the extensive SBUSD service area.

San Marcos High School Solar Microgrid

San Marcos HS

4750 Hollister Ave, Santa Barbara CA 93110

Solar PV

Annual PV Production Target: 1,164,000 kWh

Battery Energy Storage Resiliency

Average State of Charge Reserve (SOCr): 28.50 kWh

Tier 1 Average Load: 4.36 kW

Tier 2 Average Load: 4.32 kW

EV Charging Infrastructure

Stalls	ADA Stalls	Non-ADA Stalls	Existing EVSEs	5-Year Install
514	22	492	0	37

Notes

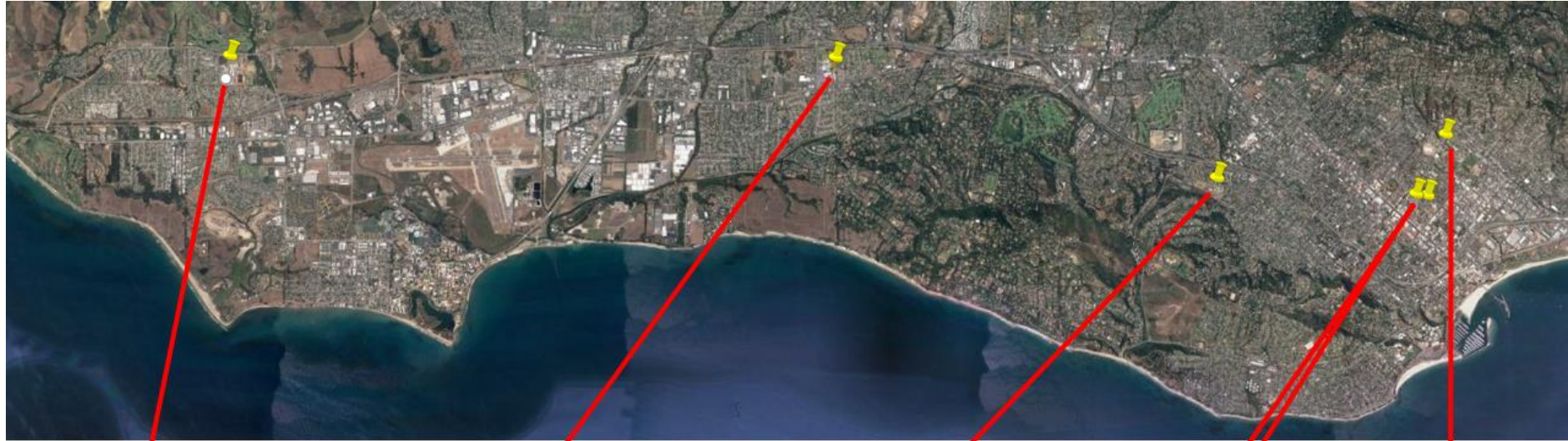
1. This site is a designated community resilience center and Red Cross emergency shelter.
2. No lighting in main lot (some perimeter).
3. Main parking lot to be redesigned and existing portables relocated prior to solar construction. Will need to add ADA stalls under solar canopy and POT as part of main parking lot reconfiguration.
4. Will need to cover existing ADA stalls in NW Lot with the south ends of canopies C-5 and C-6 and two existing light poles will need to be removed.
5. Long homerun through campus from canopies C-5 and C-6, approximately 1,450'. Short homerun of approximately 150' crossing drainage swale from main parking lot to POL.
6. Small parking area under C-4 may be challenging to cover/upgrade ADA compliance.
7. Good BESS location adjacent to main service enclosure.
8. Suggest participation in future SCE EV Charge program. Due to location of EV charging areas, SCE likely to drop a new dedicated service feed.

Santa Barbara Unified School District
District-Wide Solar PV Energy and Resiliency RFP
PV, BESS, and EV Charge Site Plan

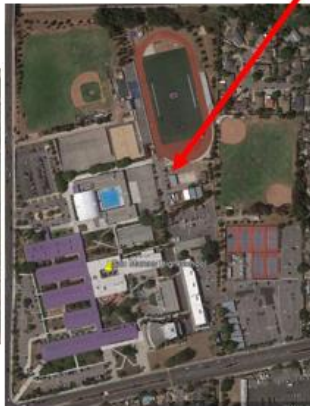
5/18/2020



Six SBUSD Solar Microgrid sites



Dos Pueblos High School



San Marcos High School



La Cumbre Junior High School

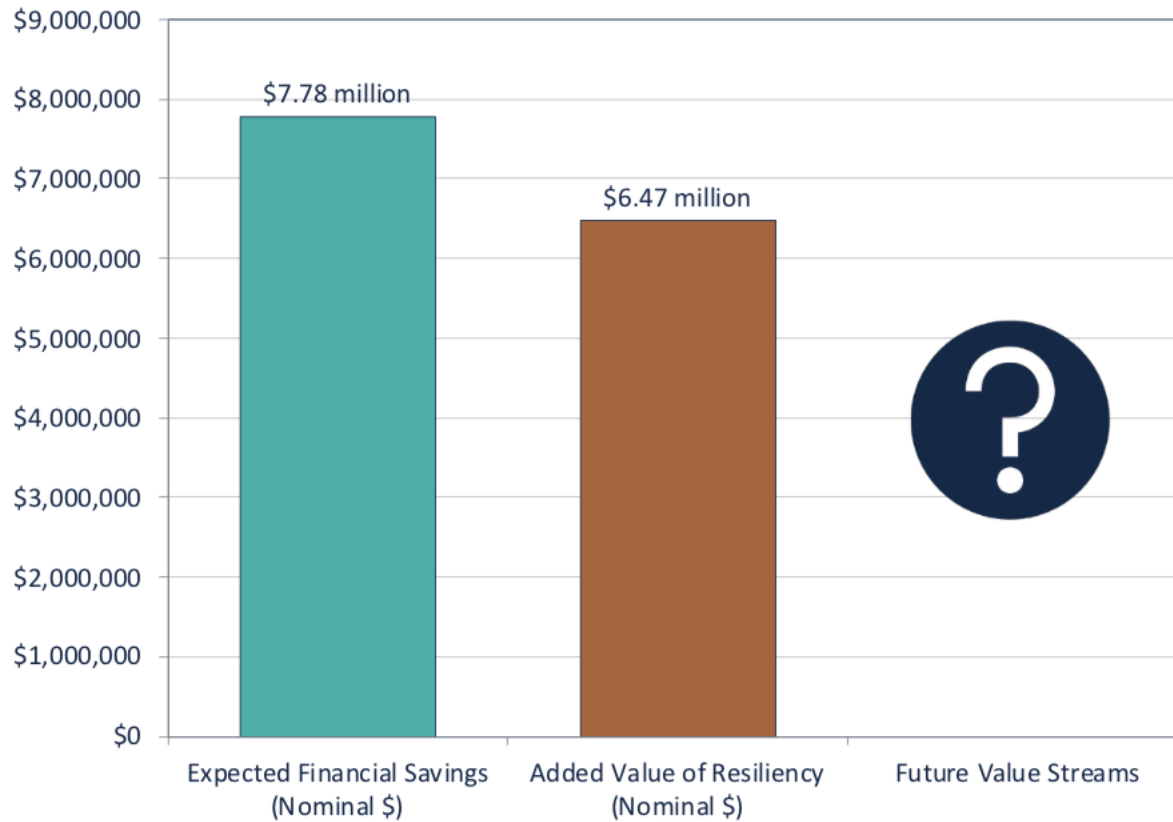


District Food Warehouse
& District Office



Santa Barbara High School

Lifetime (28-year) Bill Savings and Added Value of Resiliency



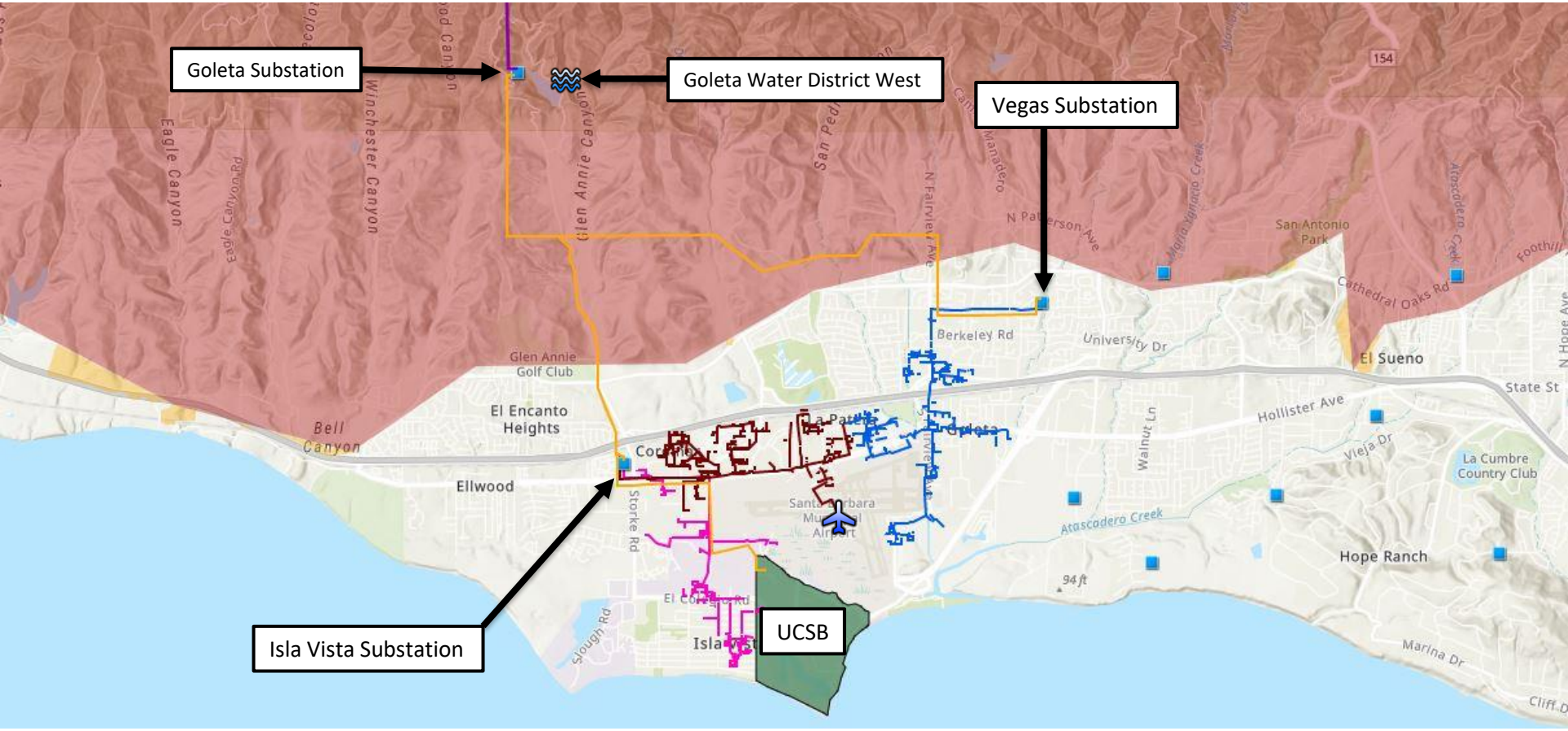
Goleta Load Pocket (GLP)
Community Microgrid
case study

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.

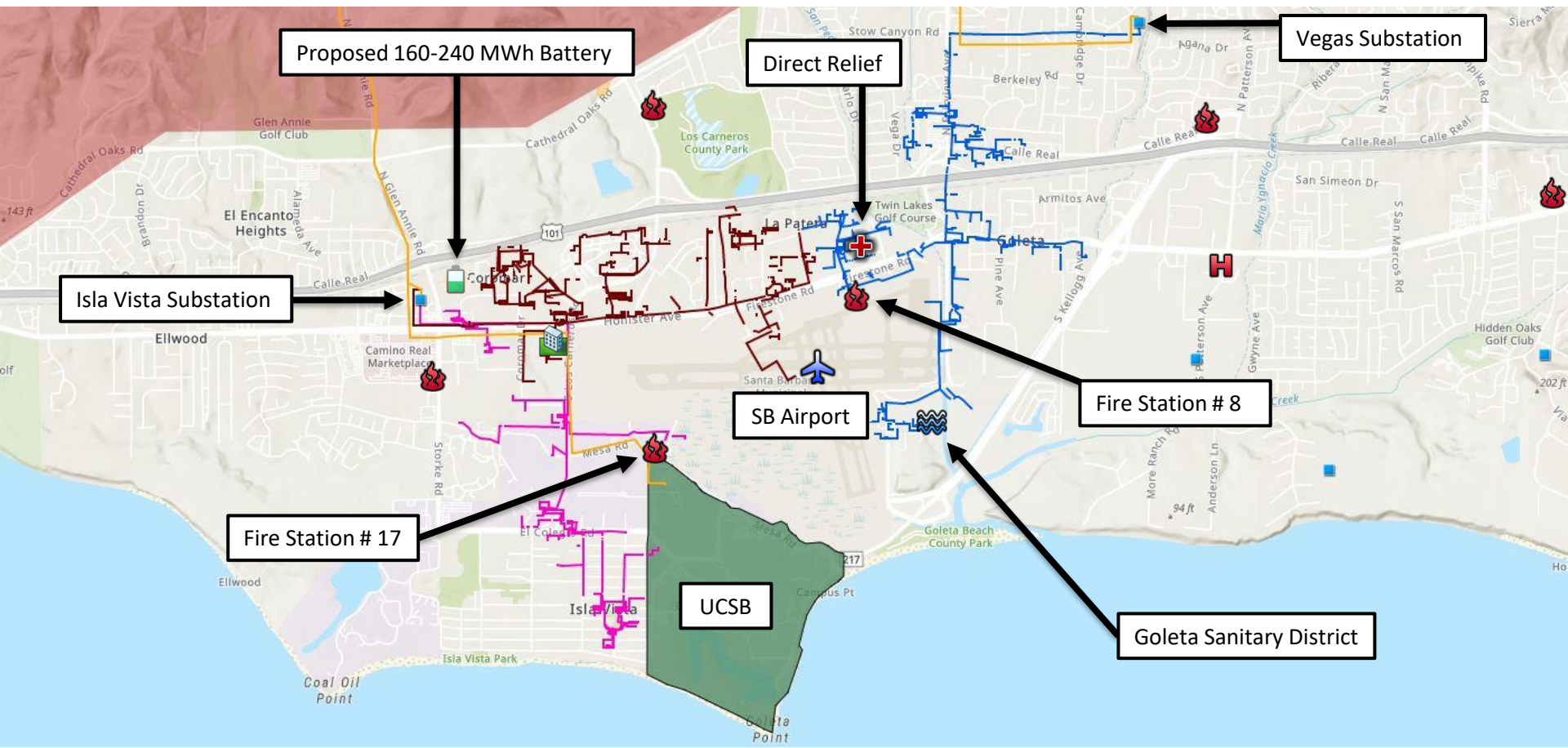
Target 66kV feeder at the core of the GLP



Legend

220 kV Transmission	16kV Gladiola Feeder	Tier 3 Fire Threat	Santa Barbara Airport
66 kV Feeder #4311	16kV Gaucho Feeder	Tier 2 Fire Threat	Sanitary or Water Districts
Substations	16kV Professor Feeder	University of California Santa Barbara (UCSB)	

Target 66kV feeder serves critical GLP loads



Legend			
	220 kV Transmission		16kV Gladiola Feeder
	66 kV Feeder #4311		16kV Gaucho Feeder
	Substations		16kV Professor Feeder
	Santa Barbara Airport		Tier 3 Fire Threat
	Fire Stations		University of California Santa Barbara
	Sanitary or Water Districts		Goleta Valley Cottage Hospital
	Direct Relief		Deckers
	Proposed 160-240 MWh Battery		

Target 66kV feeder grid area block diagram

