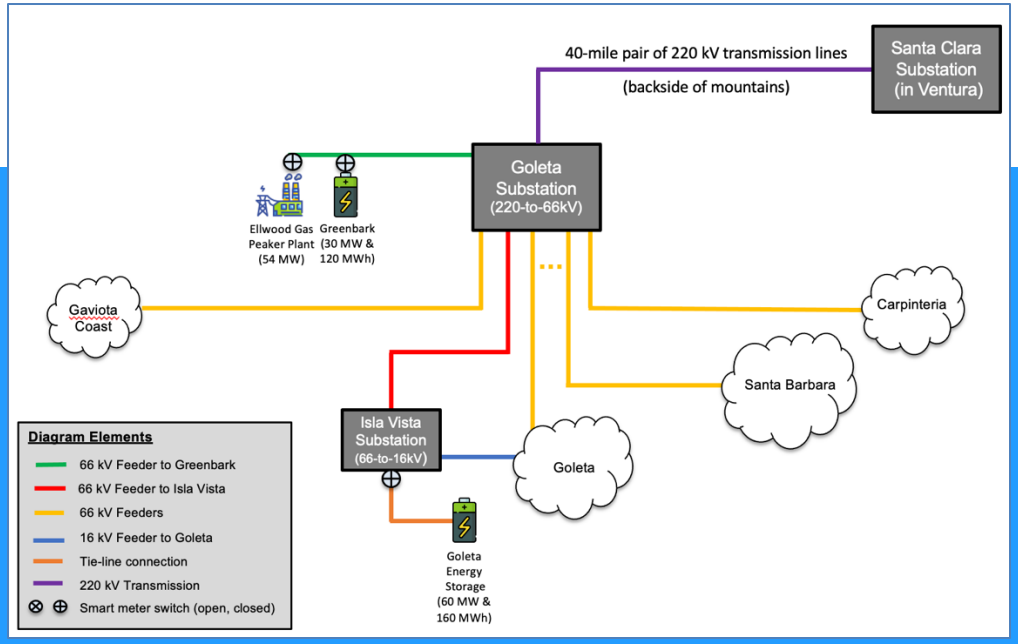
Clean Coalition

Local Energy Storage

delivers unparalleled economic, environmental, and resilience benefits – and Goleta leads the way



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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.

Distributed Energy Resources (DER) deliver an unparalleled trifecta of economic, environmental, and resilience benefits

Distributed means local, within distribution grid

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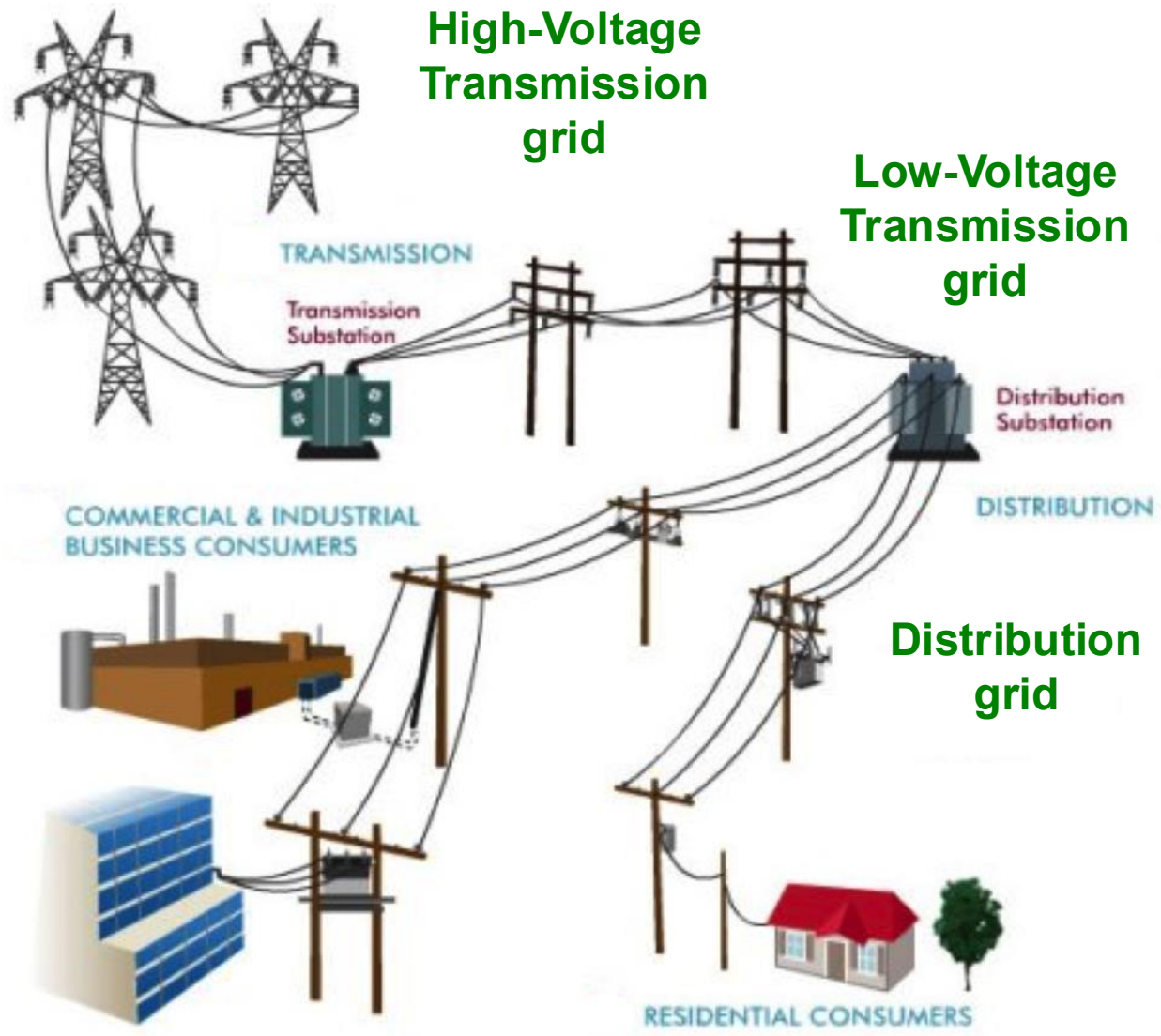

Transmission stress & cost is a massive problem

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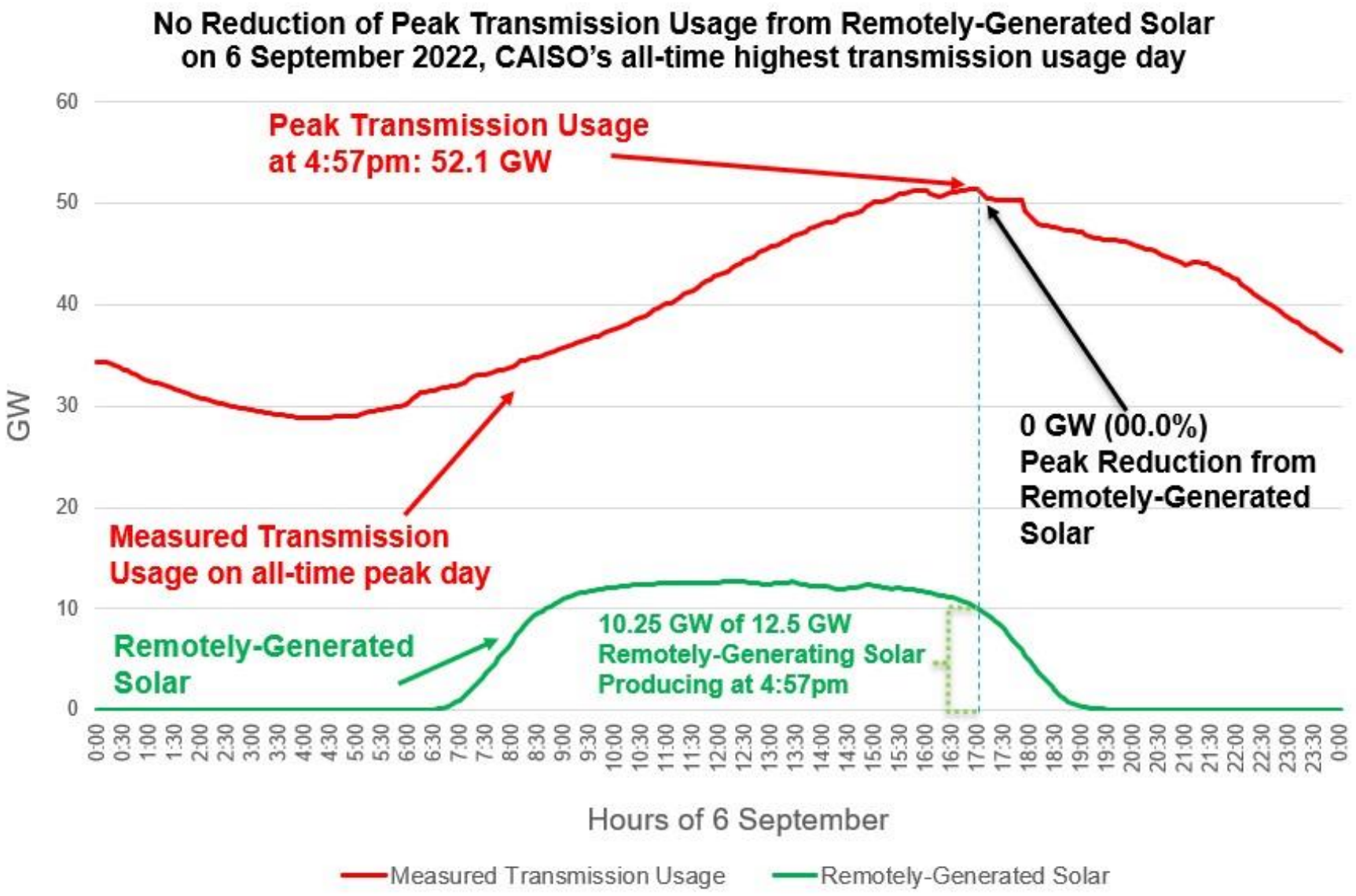
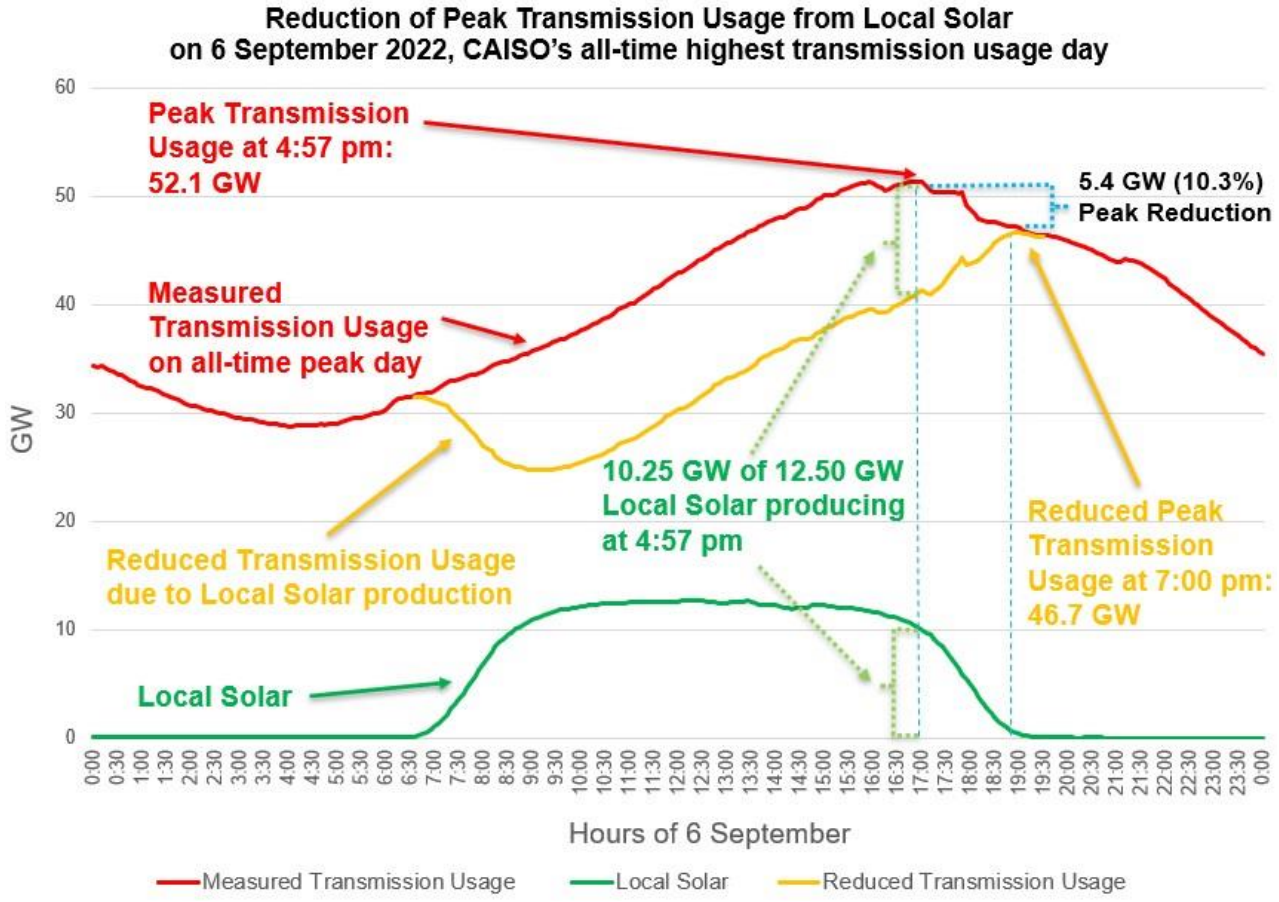


Local Solar reduces transmission stress & costs



1. Local Solar reduces Peak Transmission Usage by close to 50% of the installed local solar capacity. The effect is amplified by energy storage. It also maximizes delivery of remote renewables.
2. Bringing down the peak with distributed generation and demand flexibility will reduce transmission investments, saving ratepayers hundreds of billions of dollars over the next two decades.
3. Reducing the Peak Transmission Usage by around 10% is enough to prevent most major outages.

GLP is a transmission-vulnerable case study

Goleta Load Pocket (GLP) is a transmission-vulnerable case study

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.

Goleta leading the way on Local Energy Storage

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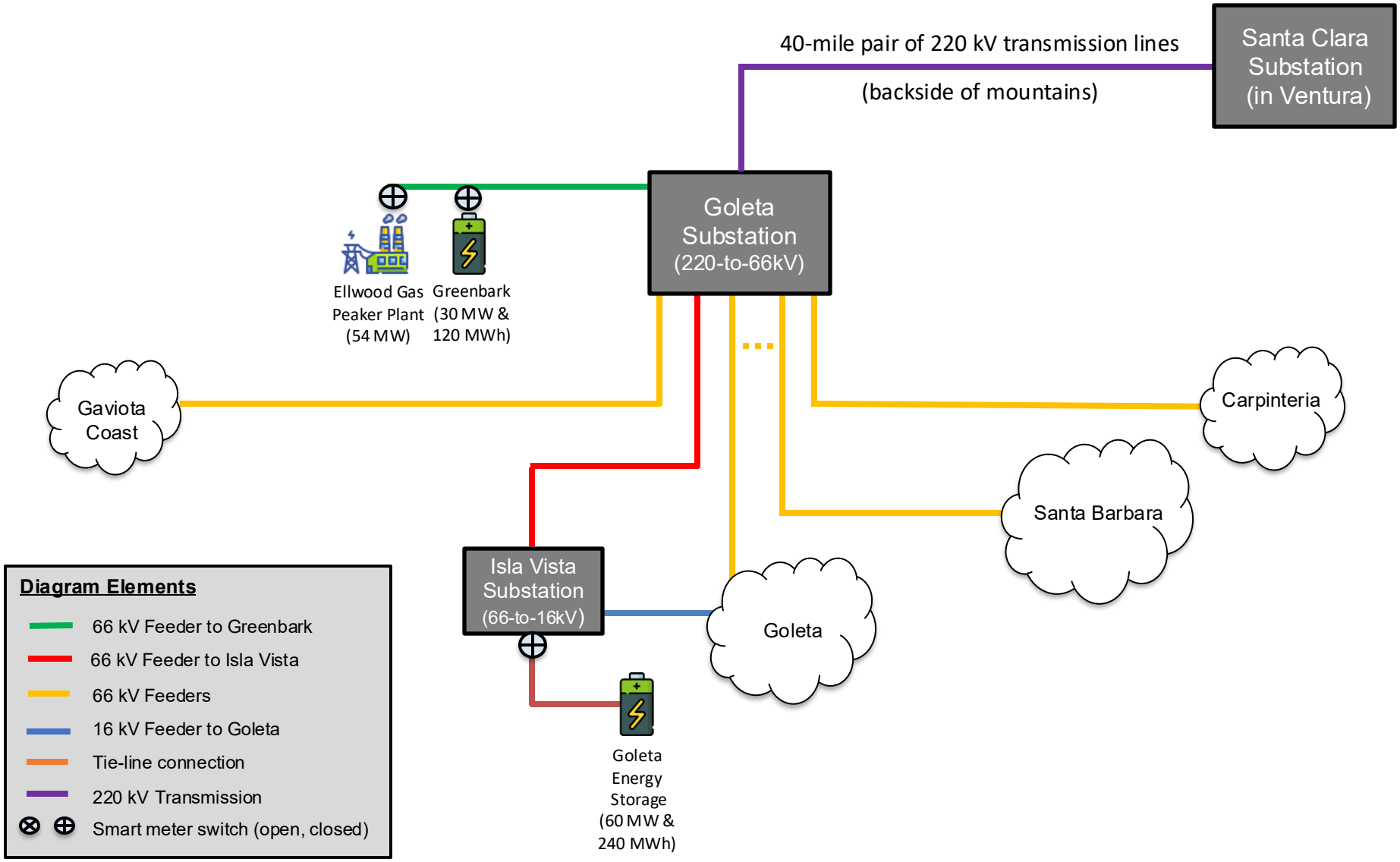

Local Energy Storage enable Community Microgrids

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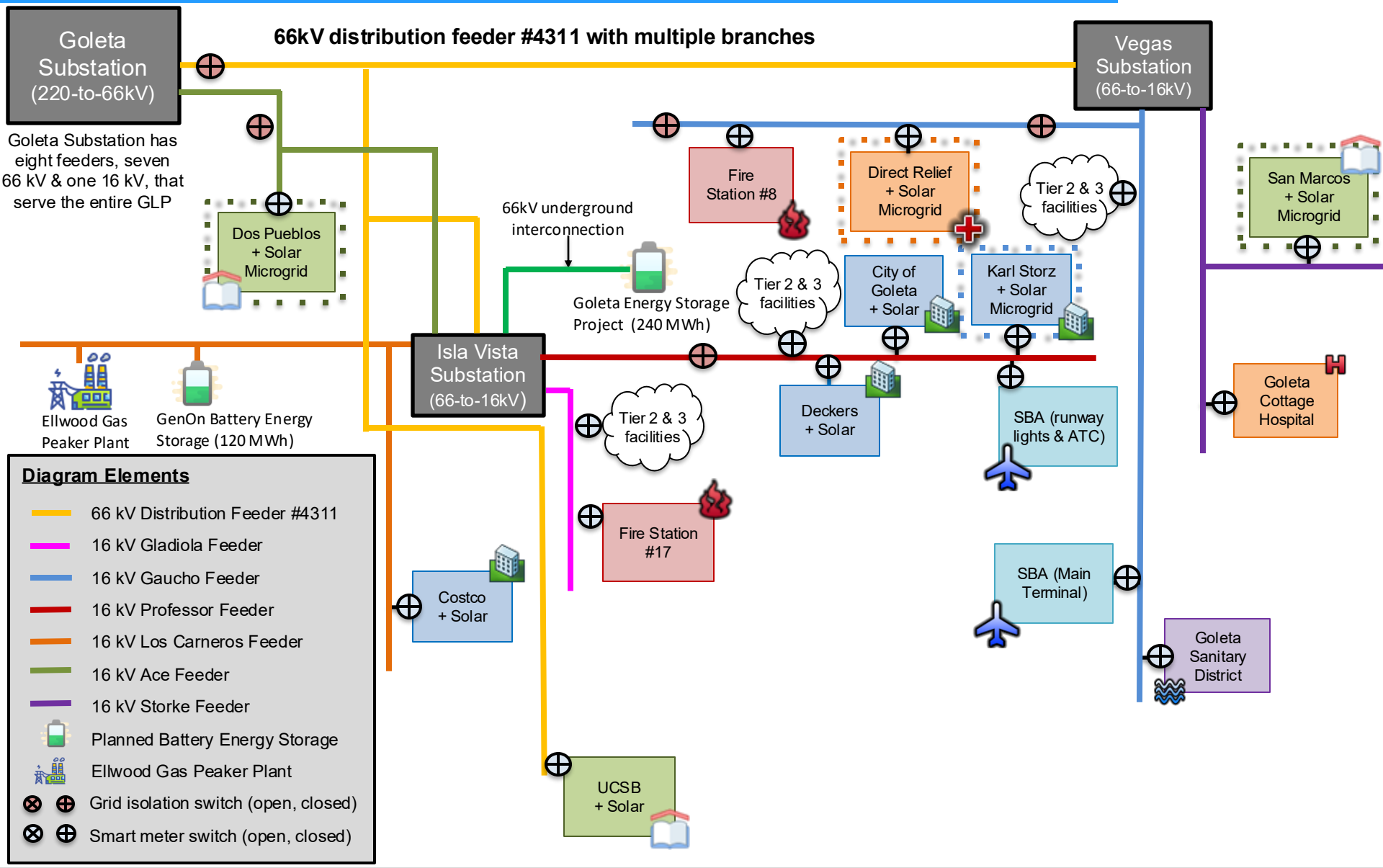

IVCM is being staged for MIP funding

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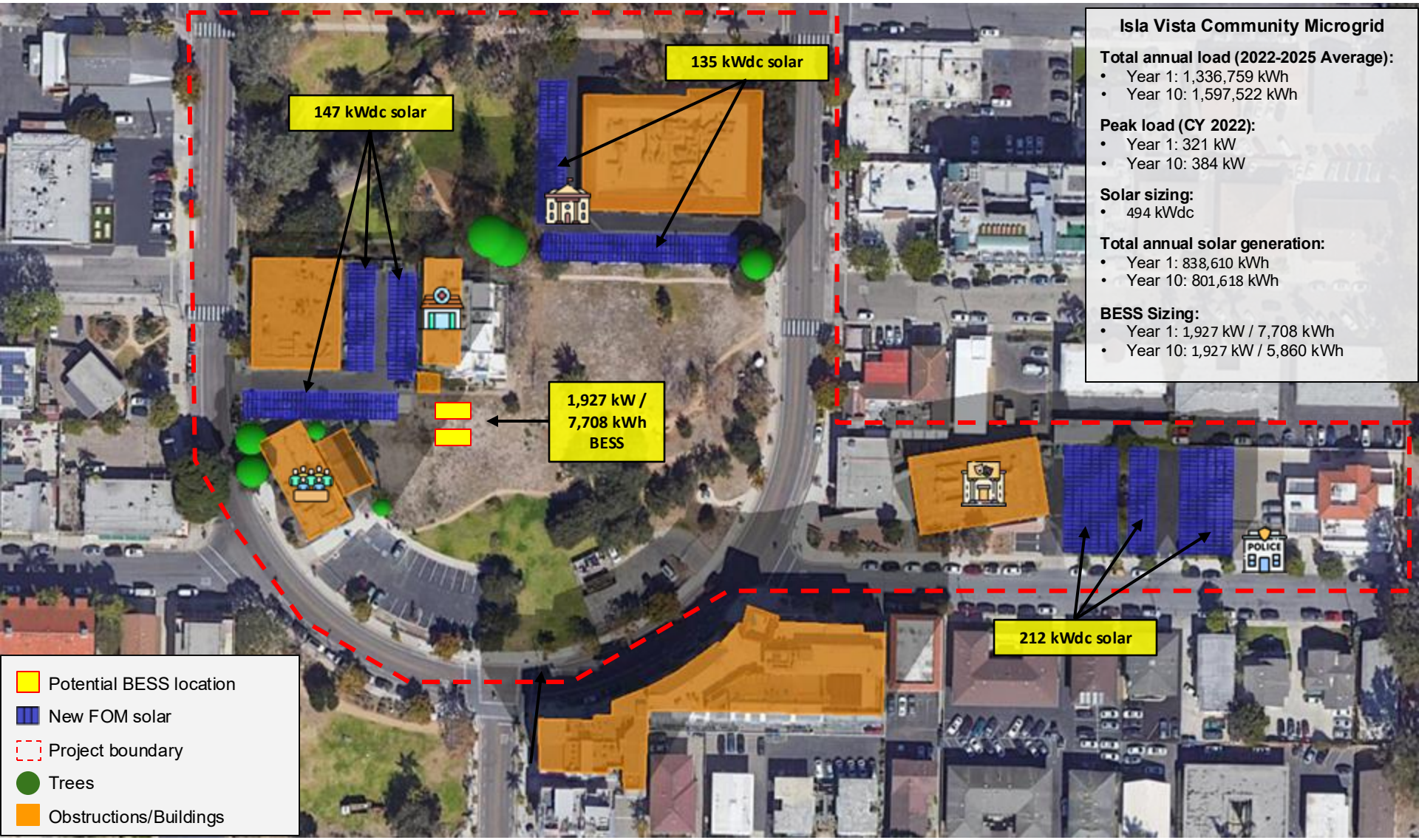
Isla Vista Community Microgrid (IVCM) is being staged for funding via California's Microgrid Incentive Program (MIP)

IVCM project resource map - 494 kWdc solar



Isla Vista Community Microgrid

Total annual load (2022-2025 Average):
- Year 1: 1,336,759 kWh
- Year 10: 1,597,522 kWh

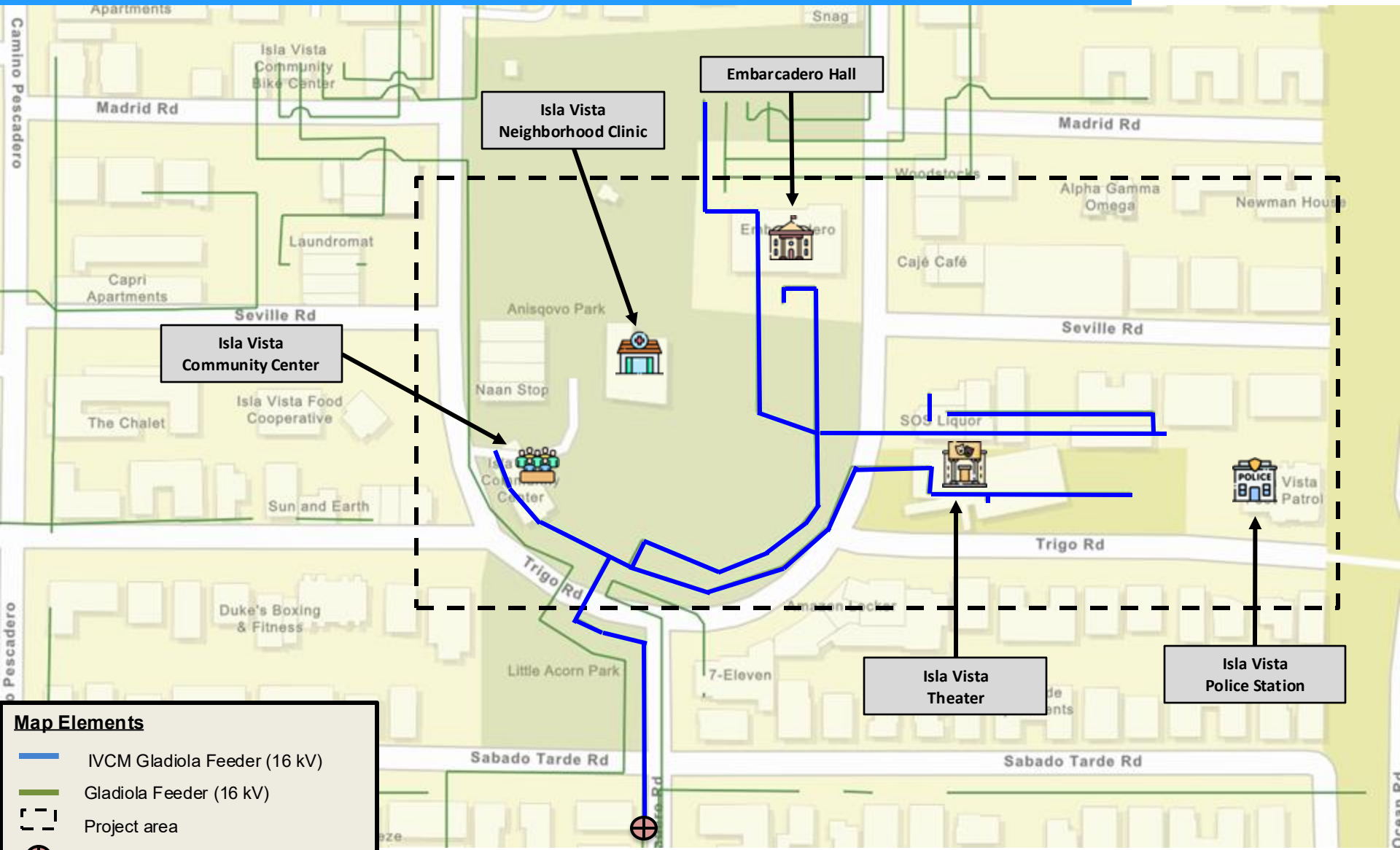
Peak load (CY 2022):
- Year 1: 321 kW
- Year 10: 384 kW

Solar sizing:
- 494 kWdc

Total annual solar generation:
- Year 1: 838,610 kWh
- Year 10: 801,618 kWh

BESS Sizing:
- Year 1: 1,927 kW / 7,708 kWh
- Year 10: 1,927 kW / 5,860 kWh

IVCM project area



IVCM resilience duration energy flow
40 hours of resilience in Year 10 (with charge/discharge losses)
494 kWdc (1,250 kWac) solar & 1,927 kW / 5,860 kWh BESS (Year 10)

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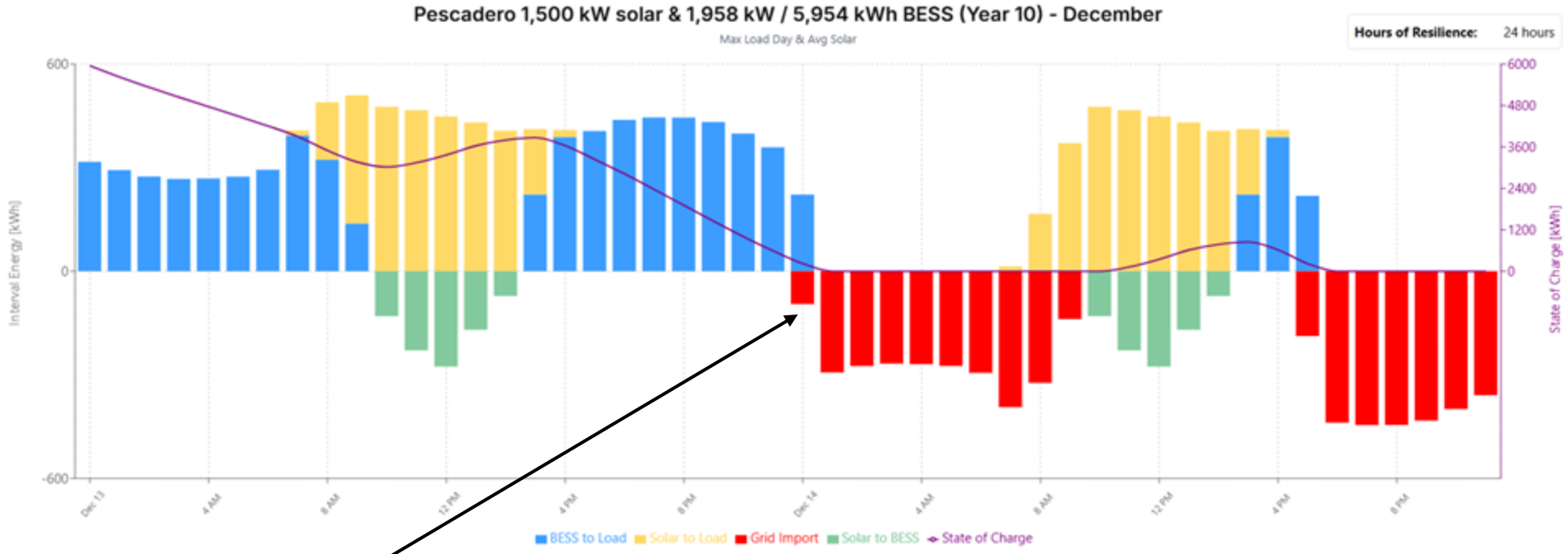
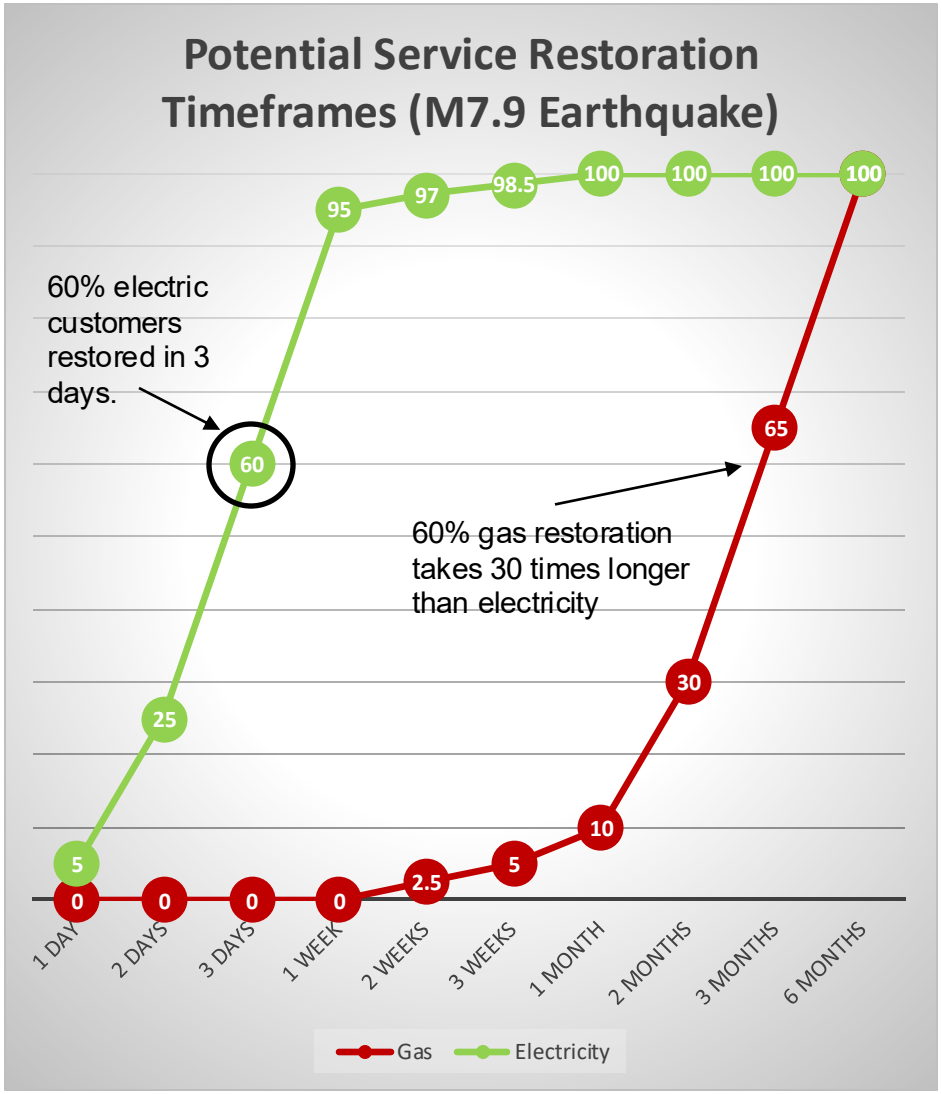


41th hour has a shortfall of 153 kWh with the BESS providing 89 kWh and solar providing 6 kWh

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

Community Microgrid Initiative

The Clean Coalition established the Community Microgrid Initiative in 2010 to harness local solar and energy storage to deliver an unparalleled trifecta of economic, environmental, and resilience benefits to communities.

https://clean-coalition.org/community-microgrid-initiative/

Greenbark BESS is perfect LES case study

Clean Coalition

Greenbark Battery Energy Storage System (BESS) is a perfect Local Energy Storage (LES) case study

And it is in Goleta

Five distinguishing Greenbark features

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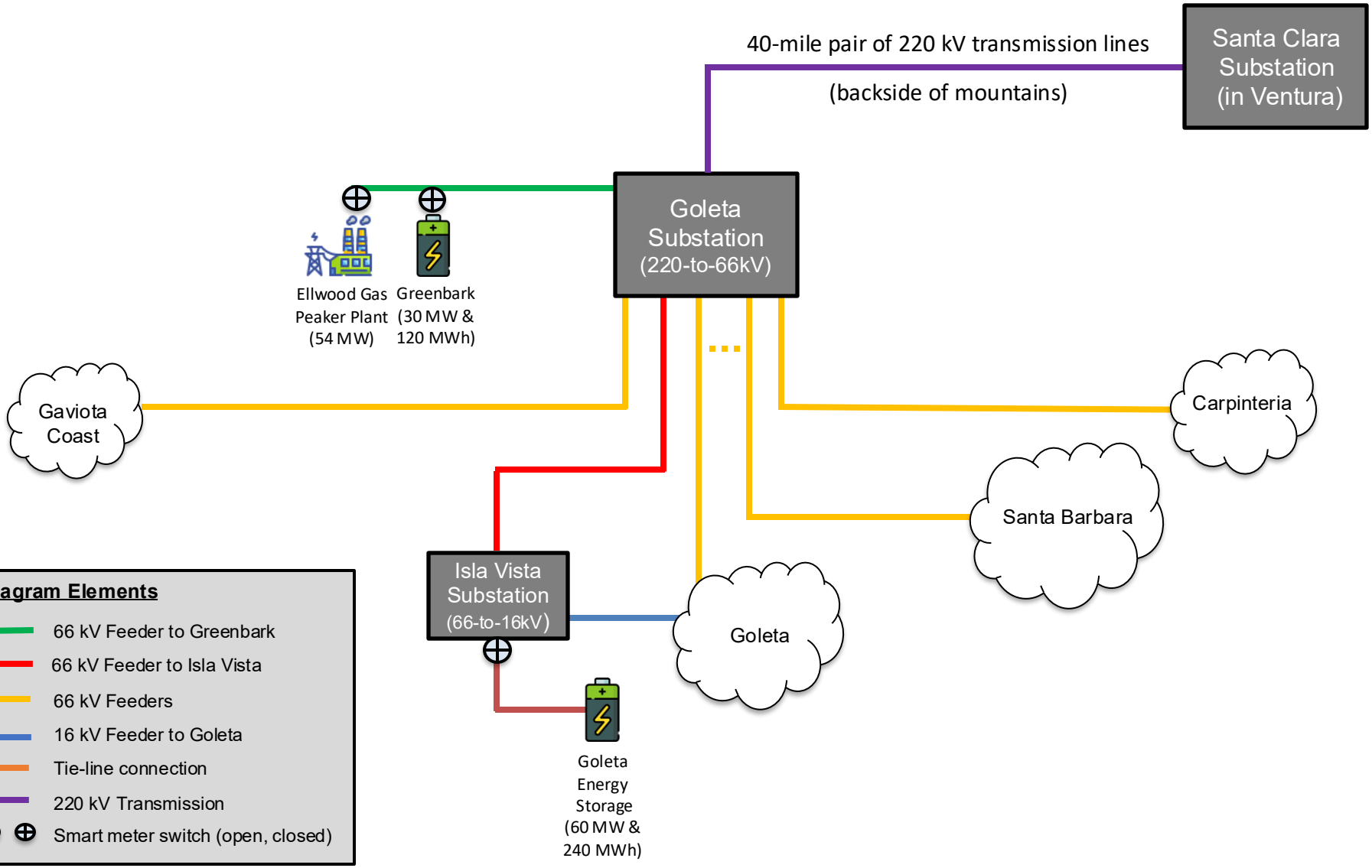
1. Perfect location to provide resilience across the entire Goleta Load Pocket (GLP).
2. Maximum solar energy, from both local & remote locations, thereby minimizing gas power plant usage (curtail gas instead of solar).
3. Significant distances from other facilities, including housing.
4. Same safe BESS technology that is already deployed in multiple GLP locations, including in the Goleta Energy Storage project and the Valecito Energy Storage Resilience project in Carpinteria.
5. Significant economic benefits to the local community, in addition to all California ratepayers (all ratepayer pay equally for transmission grid investments).

Greenbark is sited at the perfect location

Greenbark is sited at the perfect location to provide resilience across the entire Goleta Load Pocket (GLP)

Greenbark in perfect location to serve entire GLP



Backfeeding energy to the Goleta Substation from other Goleta locations is highly constrained

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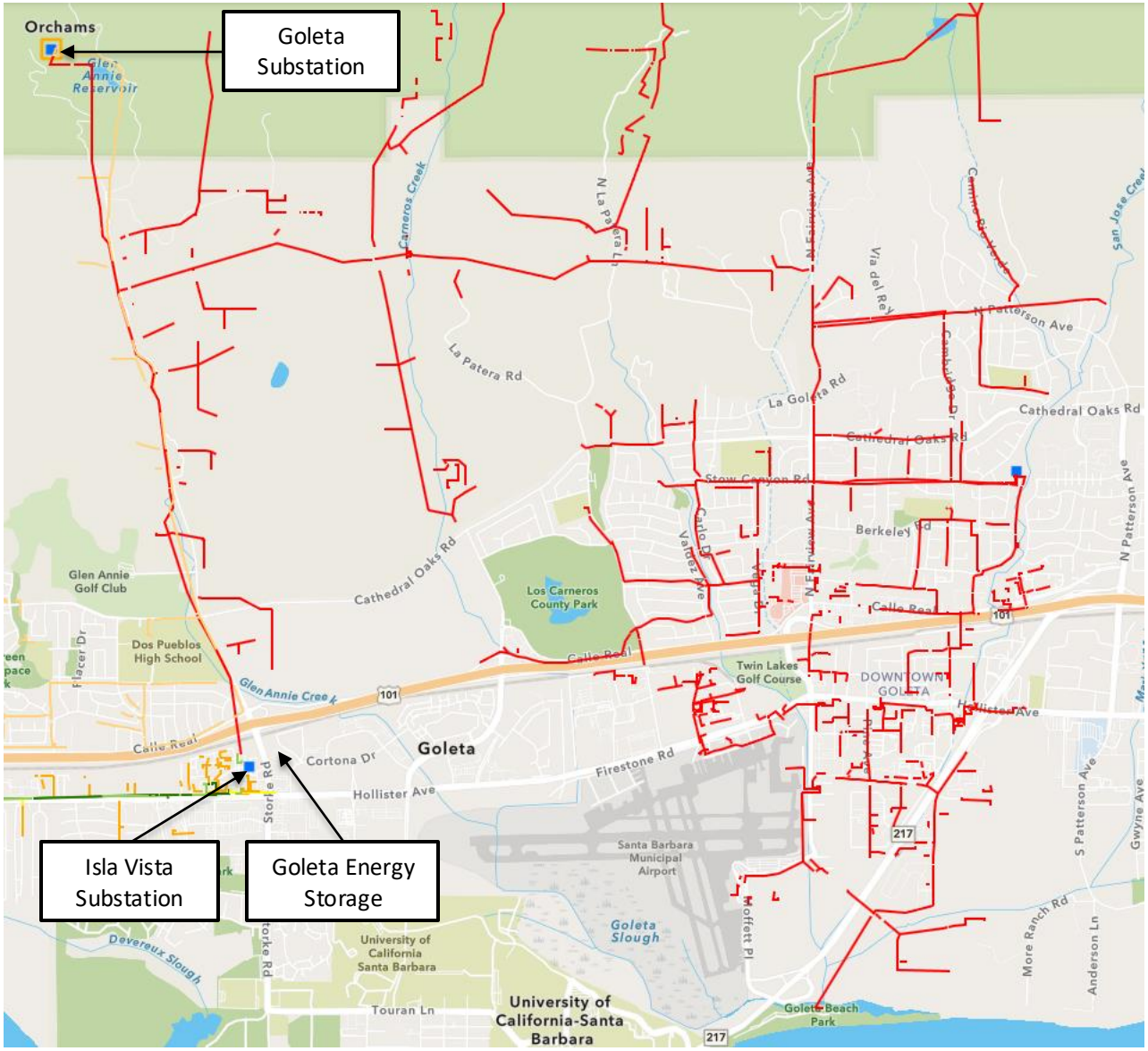

Greenbark will maximize solar for the GLP

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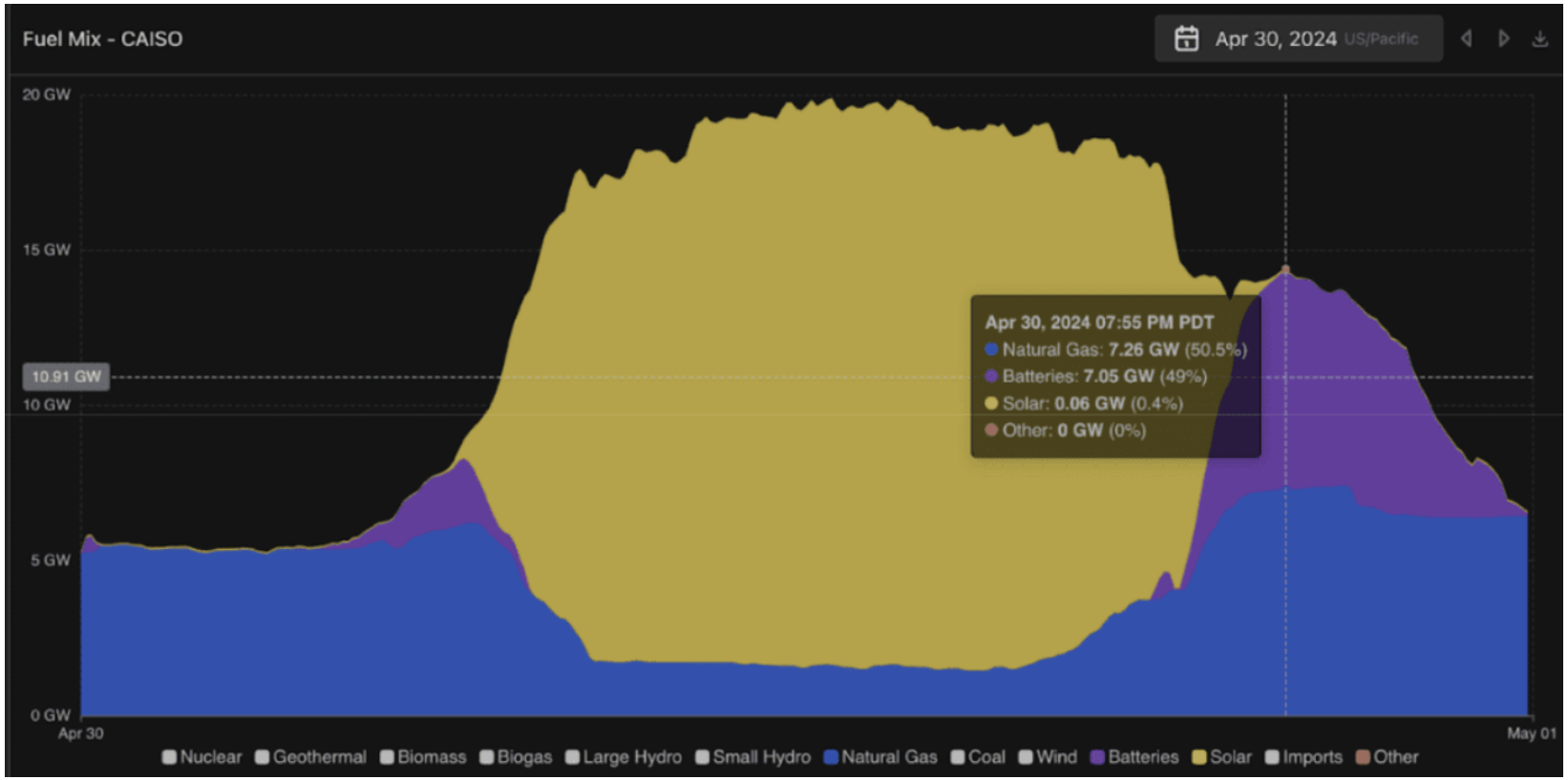
Greenbark will maximize solar for the Goleta Load Pocket (GLP)

And minimize gas power plant usage in Goleta and beyond

Greenbark will enable maximized solar in the GLP



Graph demonstrates the fuel mix during one day in 2024, showing that batteries (purple) displace natural gas (blue) during the evening, and solar dominates during the day (GridStatus 2024, https://blog.gridstatus.io/caiso-batteries-apr-2024/).

Transmission stress & cost is a massive problem

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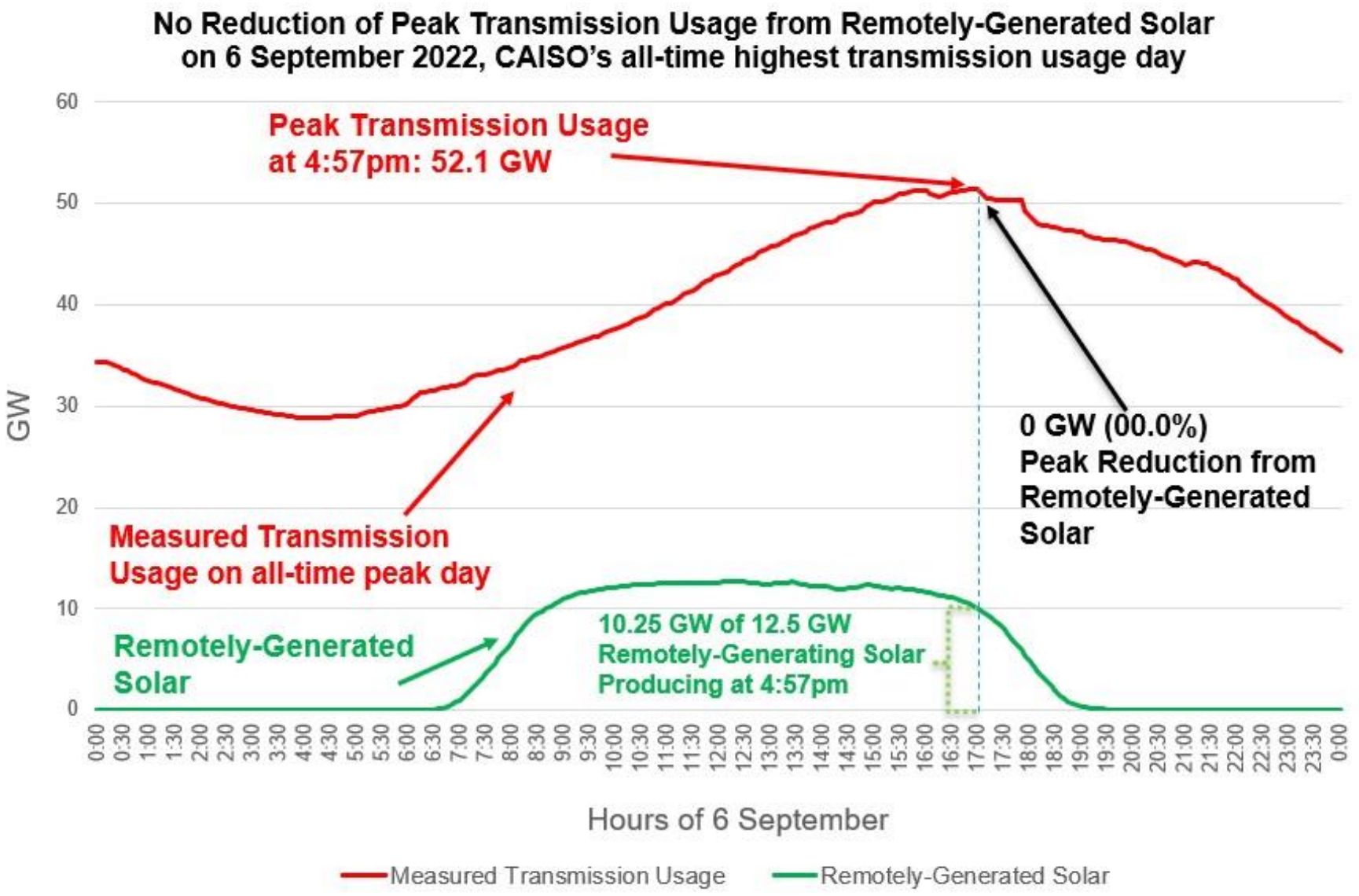
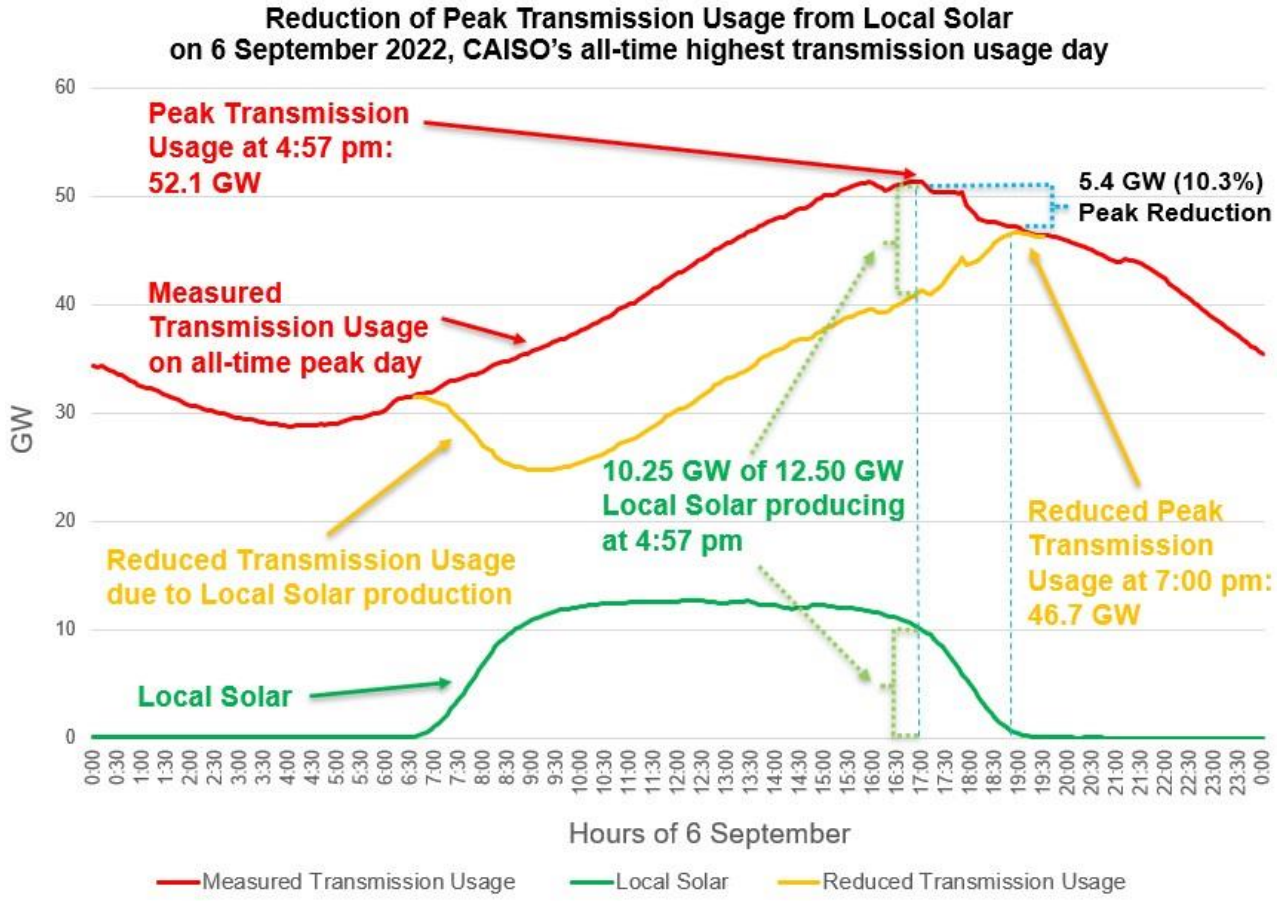


Local Solar reduces transmission stress & costs



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Greenbark is sited at a significant distance to other facilities, including housing, and safe BESS technology

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Greenbark is sited at a significant distance to other facilities, including housing

And designed with same safe BESS technology that is has been successfully operating in the GLP for five years

The operational Goleta Energy Storage project is 60 feet from housing

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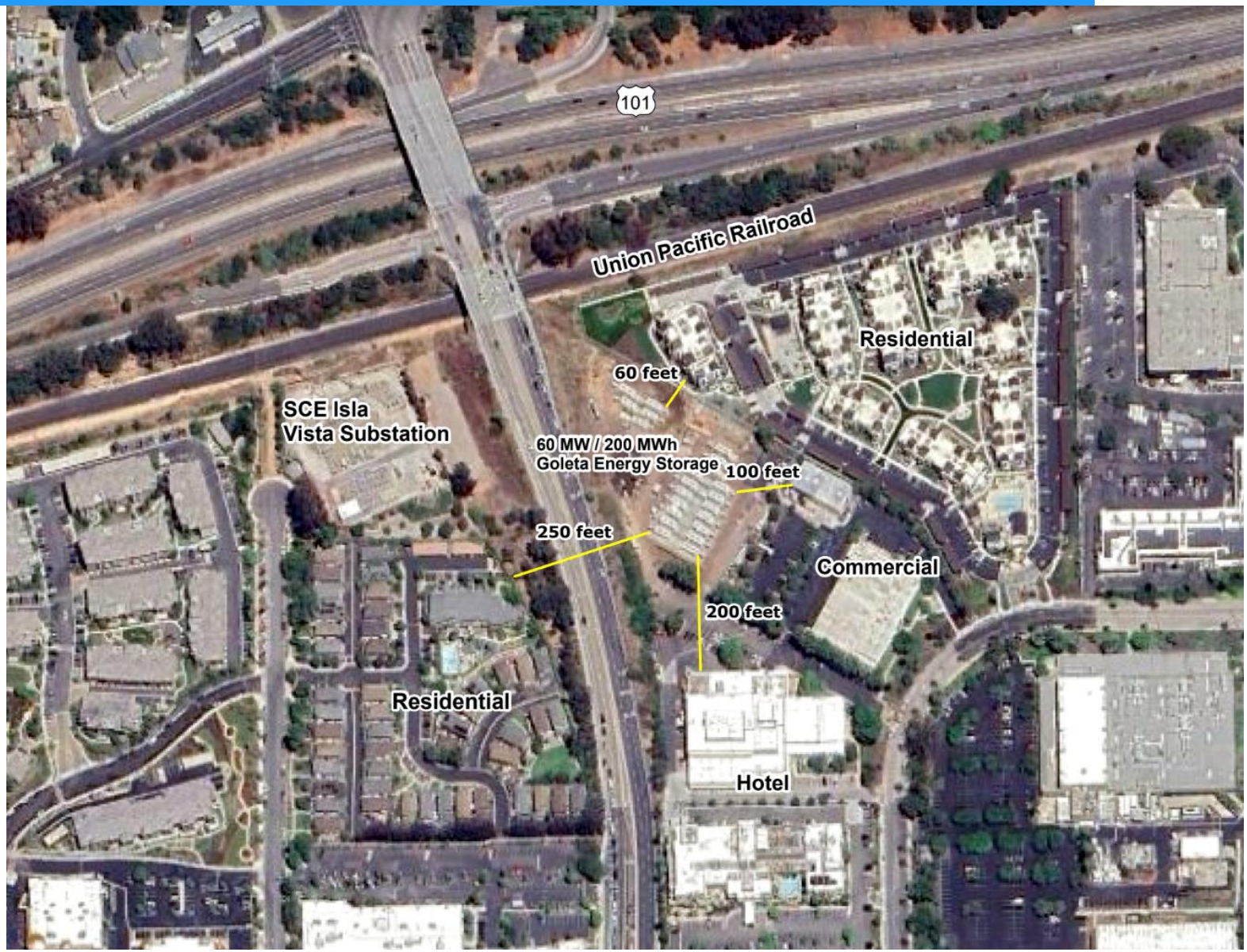

Greenbark (120 MWh) is 5x further from housing

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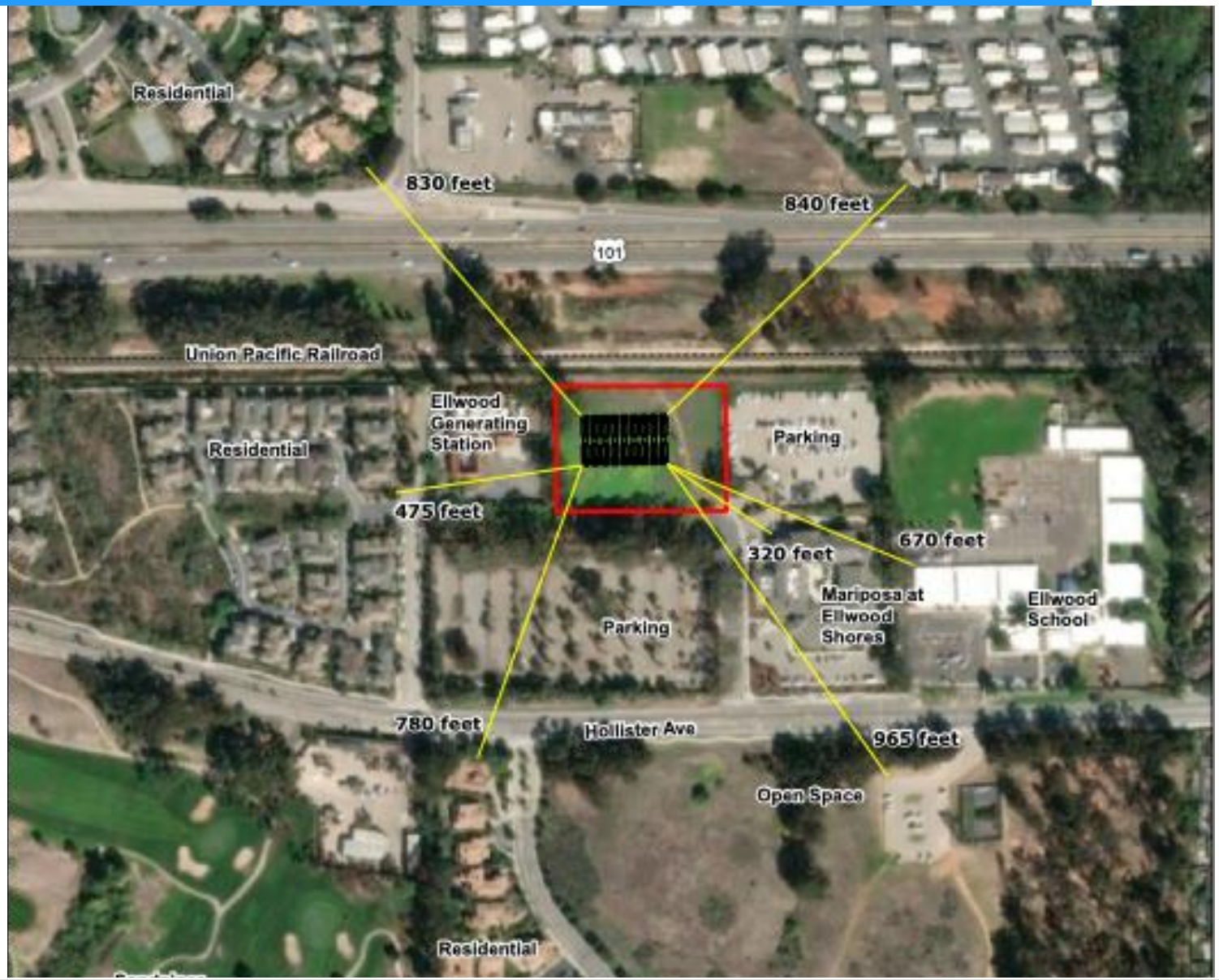

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Greenbark delivers significant local economic benefits

Greenbark will create significant economic benefits to the local community

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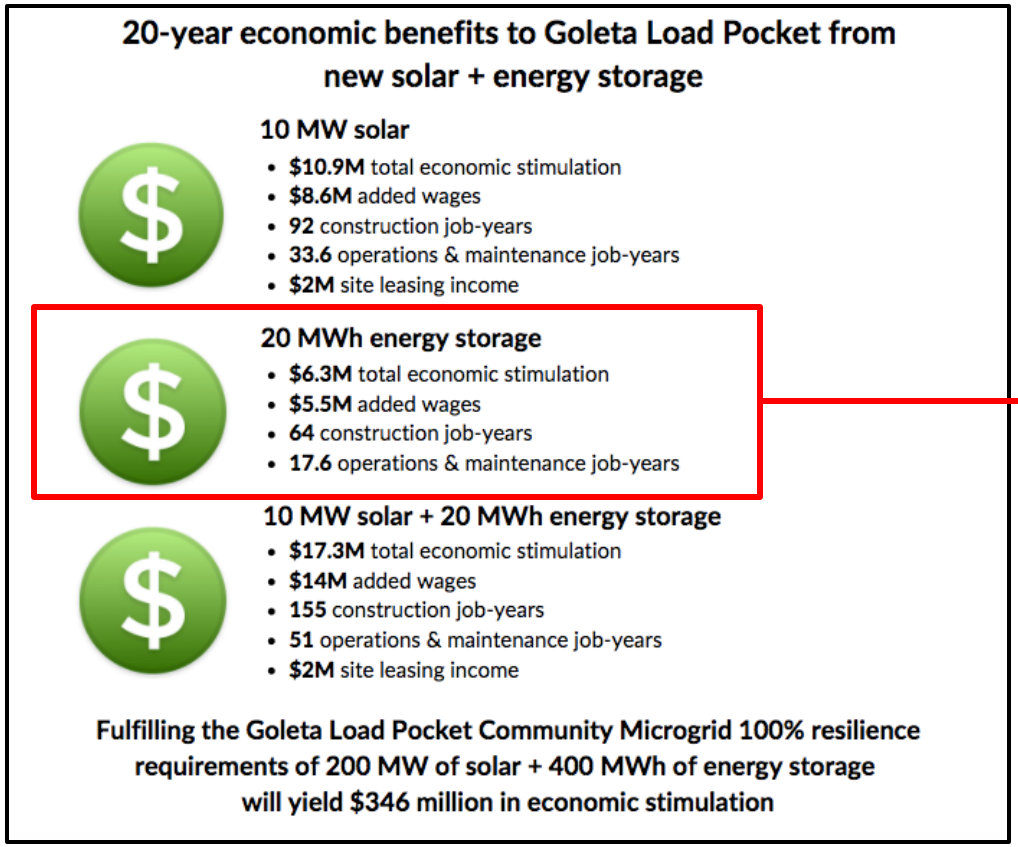
Economic benefits to the GLP from new solar + energy storage



Clean Coalition's 20-year economic benefit study

Greenbark (120 MWh energy storage)

- $37.8M total economic stimulation
- $33M added wages
- 384 construction job – years
- 105.6 operations & maintenance job – years

These results were calculated using the Clean Coalition's 20-year economic benefit study, which was developed using the National Renewable Energy Laboratory's (NREL) Jobs and Economic Development Impact (JEDI) models.

Backup slides

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How to Enable Distributed Energy Resources (DER)

How to enable Distributed Energy Resources (DER)

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- Adhere to science and resist irrationality.

- Unleash solar on built-environments, without restriction beyond normal building & safety codes:
  - Rooftops.
  - Parking lots.
  - Parking structures.

- Enable distributed energy storage by preempting gratuitous burdens beyond normal building & safety codes:
  - Battery Energy Storage Systems (BESS) are now regularly being deployed at commercial & industrial sites in sizes of 10 MWh, which require about 2,500 square feet of siting space, including room for servicing and perimeter bollards and/or fencing.
  - Local BESS are often being deployed in combination with local solar in order to deliver unparalleled resilience to facilities and communities.

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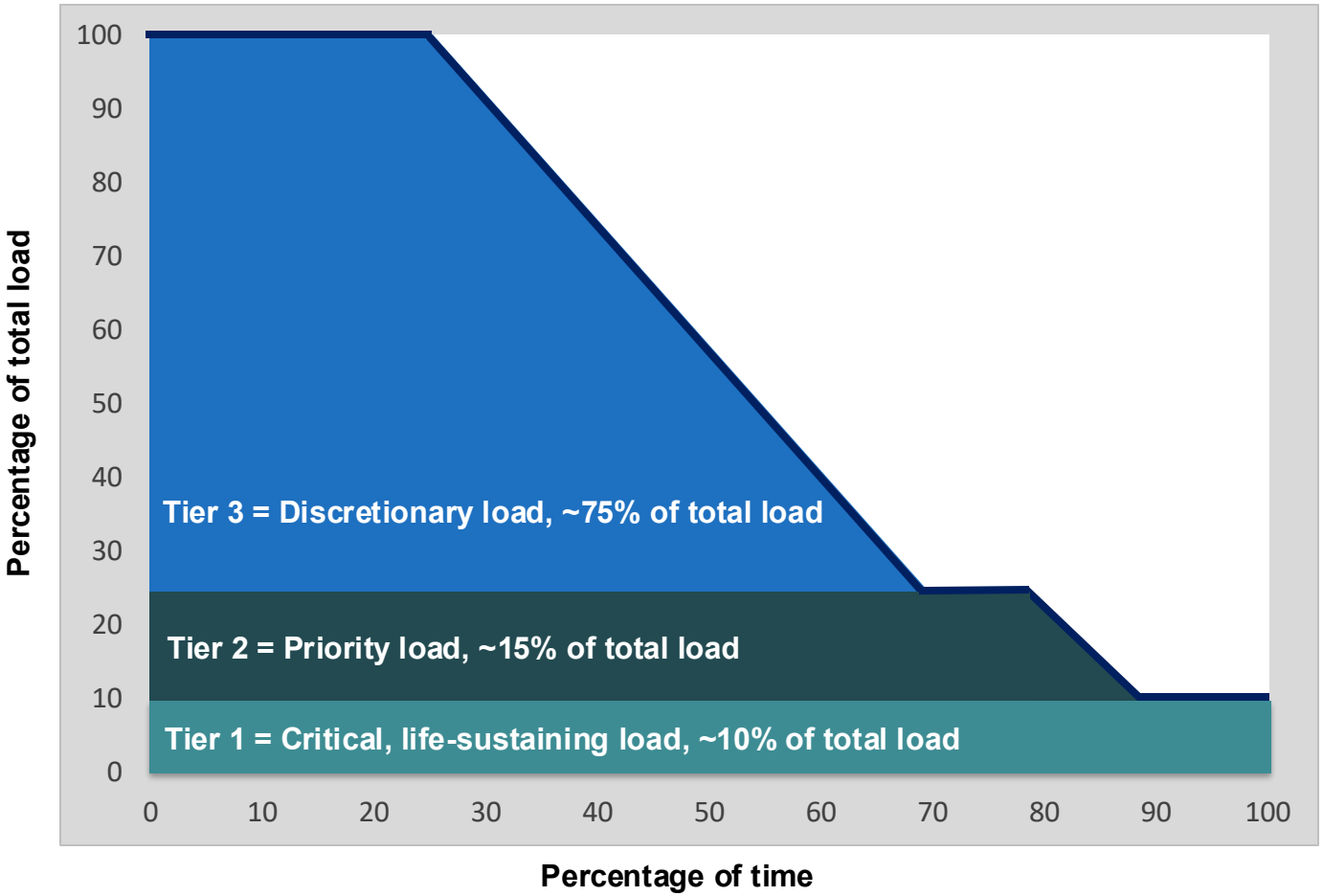
Value-of-Resilience (VOR)

Typical load tier resilience from Solar Microgrids



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.

Diesel generators are designed for limited resilience

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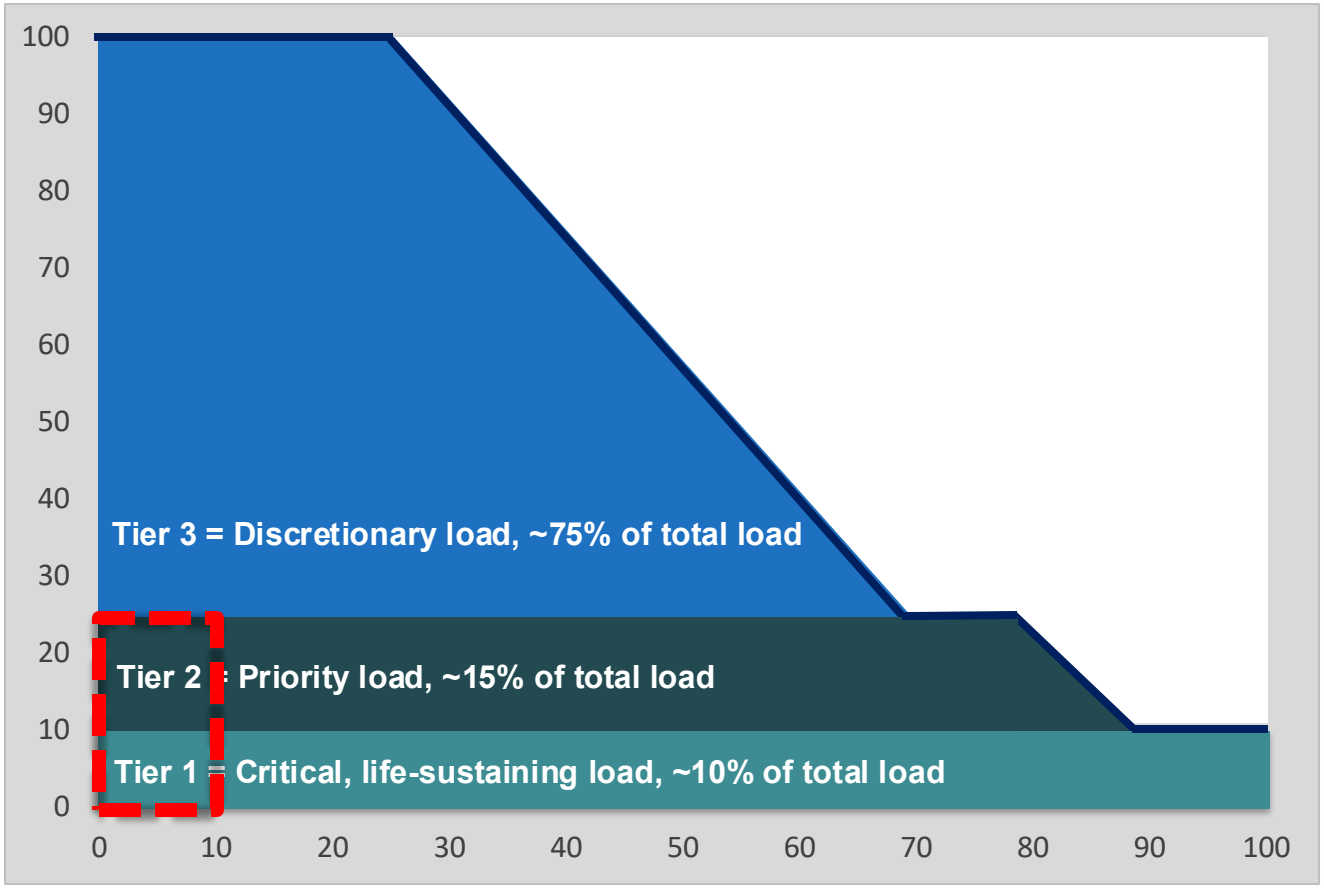

A typical diesel generator is configured to maintain 25% of the normal load for two days. If diesel fuel cannot be resupplied within two days, goodbye. This is hardly a solution for increasingly necessary long-term resilience. In California, Solar Microgrids provide a vastly superior trifecta of economic,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

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VOR123

VOR123 is the value-of-resilience (VOR) from Solar Microgrids methodology that the Clean Coalition has developed to normalize VOR across all types of facilities & geographies. The VOR normalization is founded in tiering loads into three categories: Tier 1 (critical), Tier 2 (priority), and Tier 3 (discretionary). Since each Tier has its own resilience requirement and VOR, this methodology is called VOR123.

VOR123 webinar

https://clean-coalition.org/news/webinar-valuing-resilience-solar-microgrids-thursday-5-nov-2020/