Distributed Energy Resources (DER) and the Goleta Load Pocket

An unparalleled trifecta of economic, environmental, and resilience benefits

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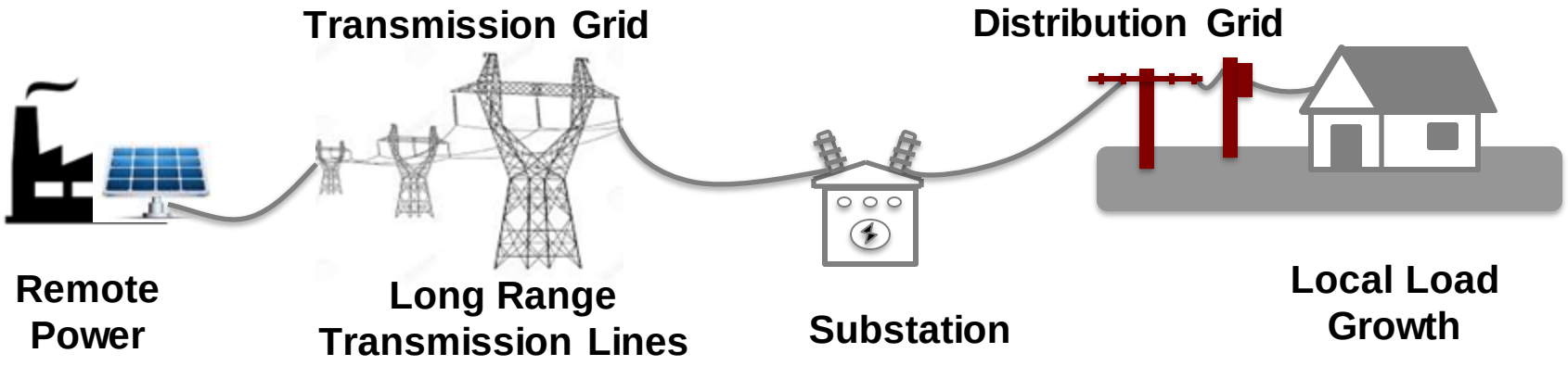
Mission

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.

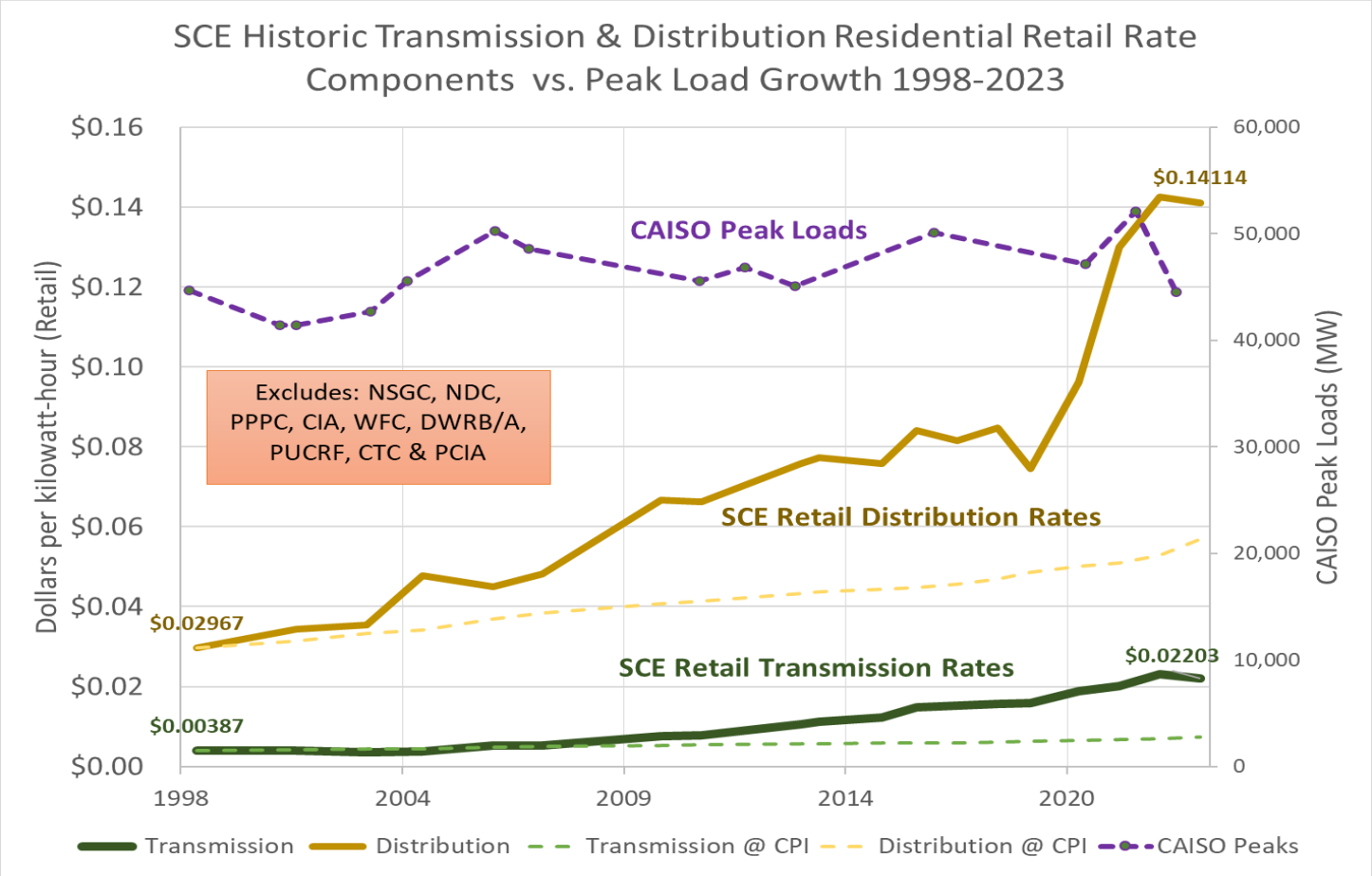
The existing system is not designed to achieve California's energy and climate goals cost-effectively



The electric grid was designed with 20th century principles based on a one-way flow of energy. Remotely-generated energy is transmitted across long distance transmission lines and delivered to end users located in load centers (on the distribution grid). Problems include:

- Generating energy remotely is inefficient and results in a more complicated grid.
- Building out the grid with new transmission infrastructure is extremely expensive.
- A larger grid is hard to maintain, especially with infrastructure transversing areas at high risk of wildfires.
- *Local residents don't benefit from installations of huge solar farms in the desert.*

Rate increases are outpacing inflation



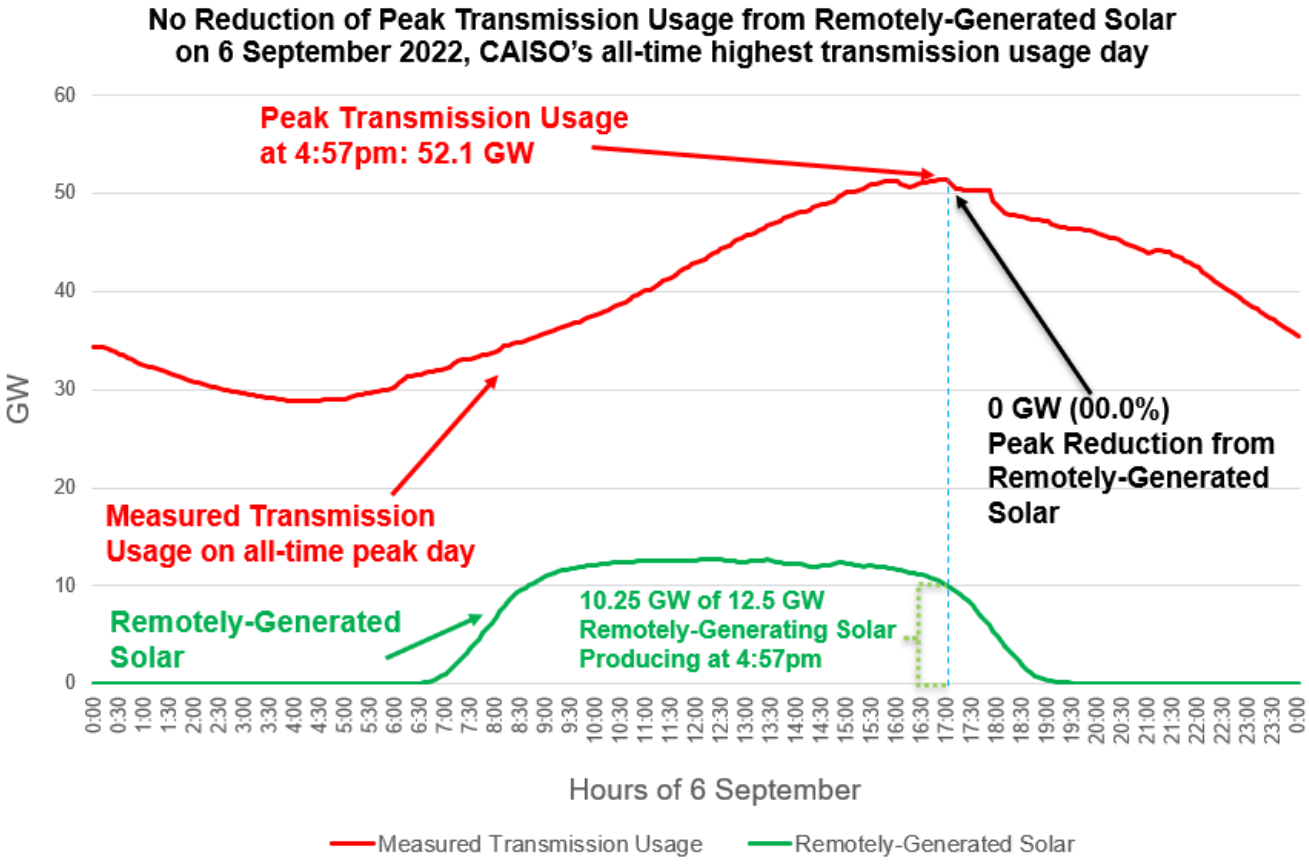
Over the past decade utility rates have increased by:

- PG&E: 127%
- SCE: 91%
- SDG&E: 72%

Meanwhile, the overall cost of living, as measured by the Consumer Price Index, has only increased by 28%.

Types of DER

- Solar
- Energy Storage
- Wind turbines
- Fuel Cells
- Electric Vehicles
  - Includes batteries and managed charging
- Demand Response
  - Appliances like air conditioning can be controlled to reduce energy usage at key times.
  - Load flexibility includes shifting energy usage away from times when the grid is congested.
- Microgrids
- Energy Efficiency
- Virtual Power Plants
- Time-of-use arbitrage



DER Benefits

Ratepayers are footing the bill to achieve California's ambitious energy/climate goals. We deserve to share in the benefits as well.

- Economic savings from lower-cost energy.
- Investment in the local economy (jobs and wages).
- Creation of carbon-free energy (and less reliance on carbon-intensive energy from the grid).
- Reduced local air pollution.
- Promoting community-scale resilience.
- Deployments occur far faster than remote projects (CEQA exemption for built environments).
- Increased grid efficiency due to reduction in demand for transmission-interconnected resources.
  - Less energy is wasted, and less grid congestion results in a system that functions more effectively.
- Reduces the need to build the grid out further, limiting skyrocketing rate increases.

Direct Relief Microgrid limited by existing Net Energy Metering size constraints

Microgrid only serves Direct Relief needs:

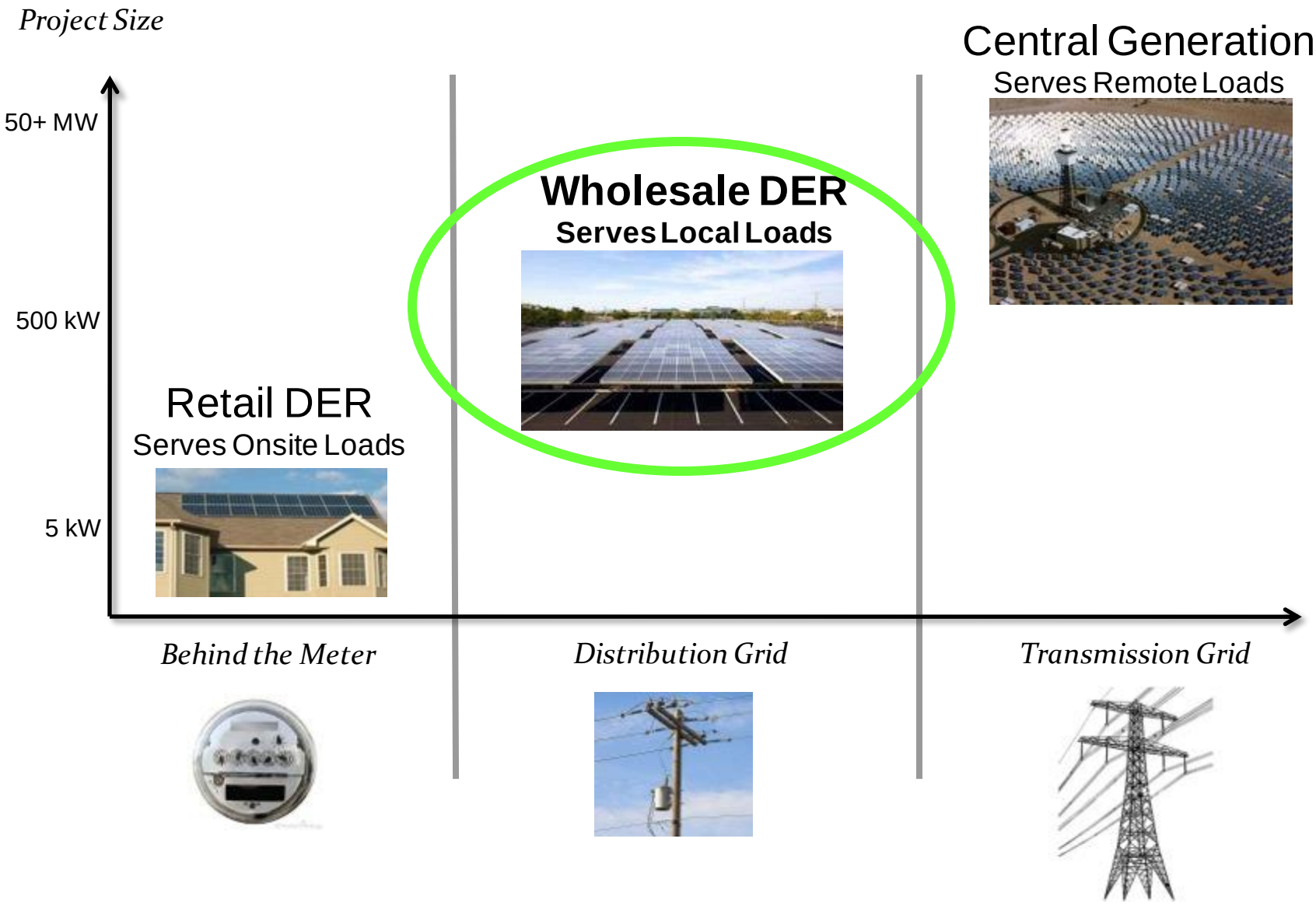
- 70% of roof and 100% of massive parking area solar potential is unused.
- Additional storage not able to be considered due to policy prohibitions around exporting energy from a battery to the grid – even though the energy is 100% stored solar.

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!

Solar Microgrid located at Direct Relief headquarters in Goleta, CA

Wholesale Distributed Energy Resources defined



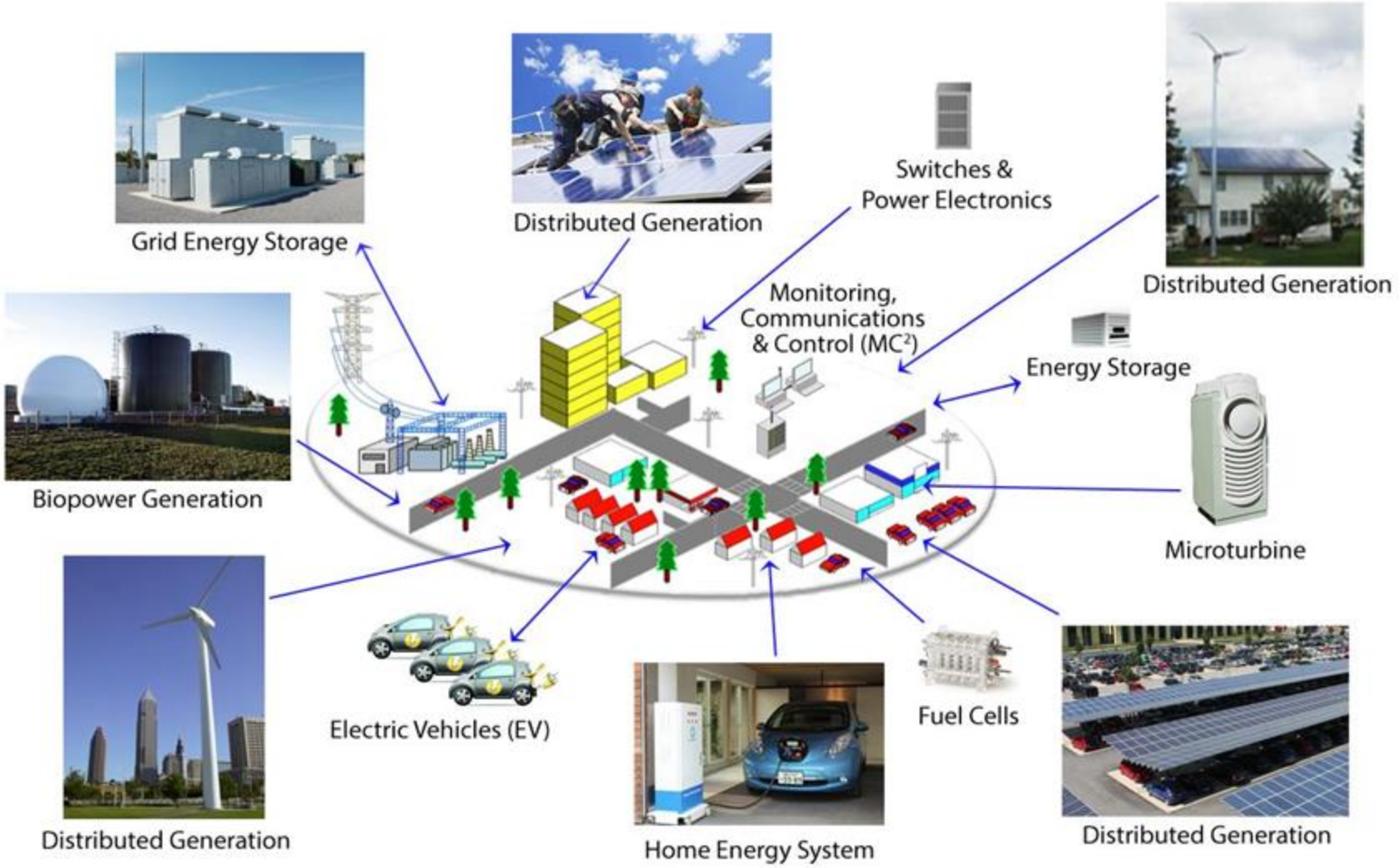
Goleta Load Pocket (GLP)

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.

The Grid of the Future

- Community Microgrids: generation, storage, & controls enabling resilience for a section of the grid.
- Solar Microgrids: Community Microgrid building blocks. These are microgrids for individual facilities.

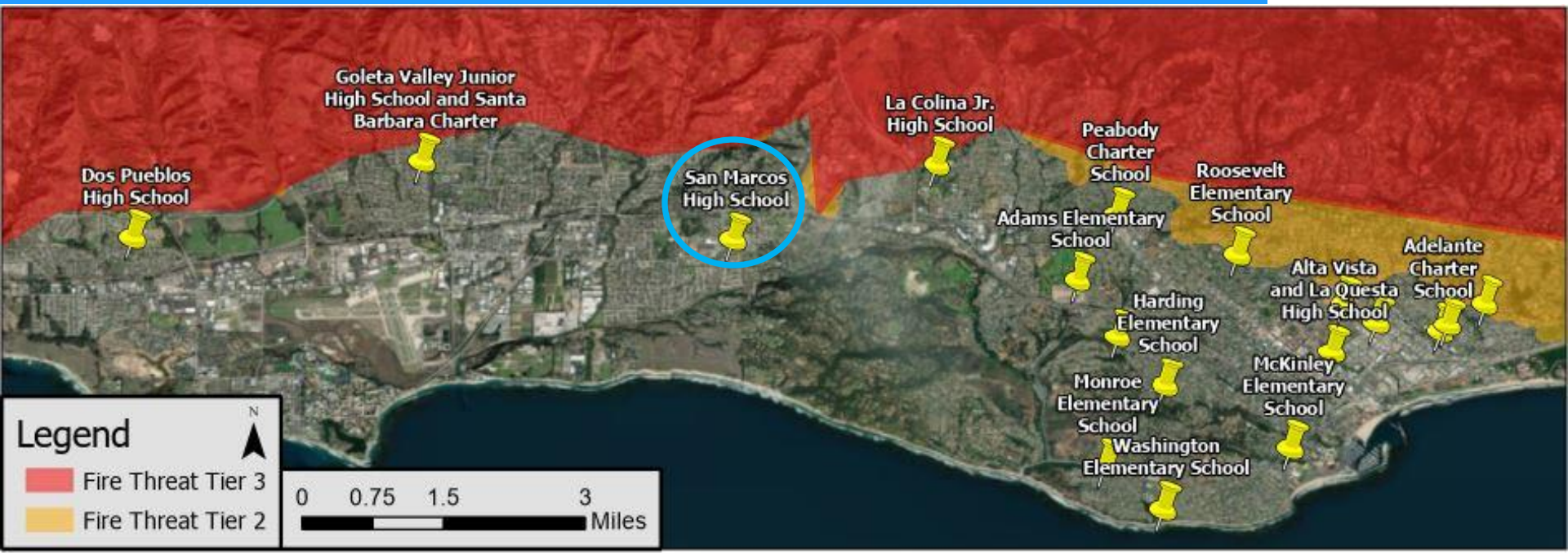


What is Needed to Commercialize Microgrids?

When it comes to commercializing microgrids, the state needs to create pathways to enable swift deployments at sites that can be considered low hanging fruits. Distributed Energy Resources and microgrids are tools that can help us achieve multiple goals simultaneously.

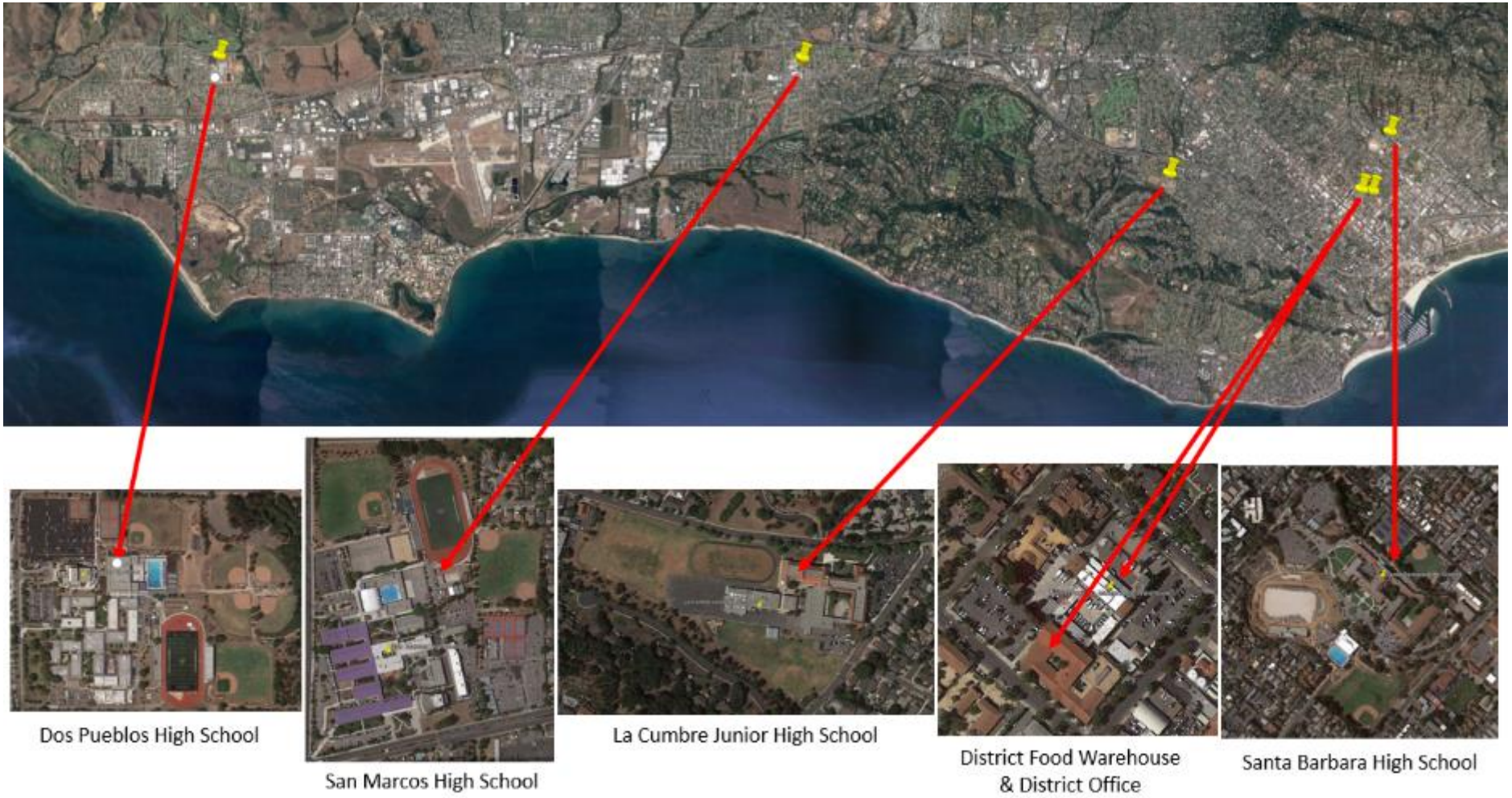
- Schools
- Emergency Shelter Sites
- Multi-family homes
- Government buildings
- Disadvantaged communities
- Load Pockets (areas that are geographically isolated and/or difficult to deliver electricity to)
- Rural areas, particularly those that are in High Fire Threat Districts.
- Areas that are reaching limits in hosting capacity.
  - Locations where transmission upgrades will take multiple years to complete (such as Humboldt County).

Provisioning Resilience for the Santa Barbara Unified School District (SBUSD)



- All 14 sites chosen to move forward with these projects at the SBUSD will have solar carports.
- 6 sites are contracted for Solar Microgrids and another 8 sites for solar only, with an approximate total over all the sites of 5 MW of solar and MWh of energy storage.
- 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.

Six SBUSD Solar Microgrid sites

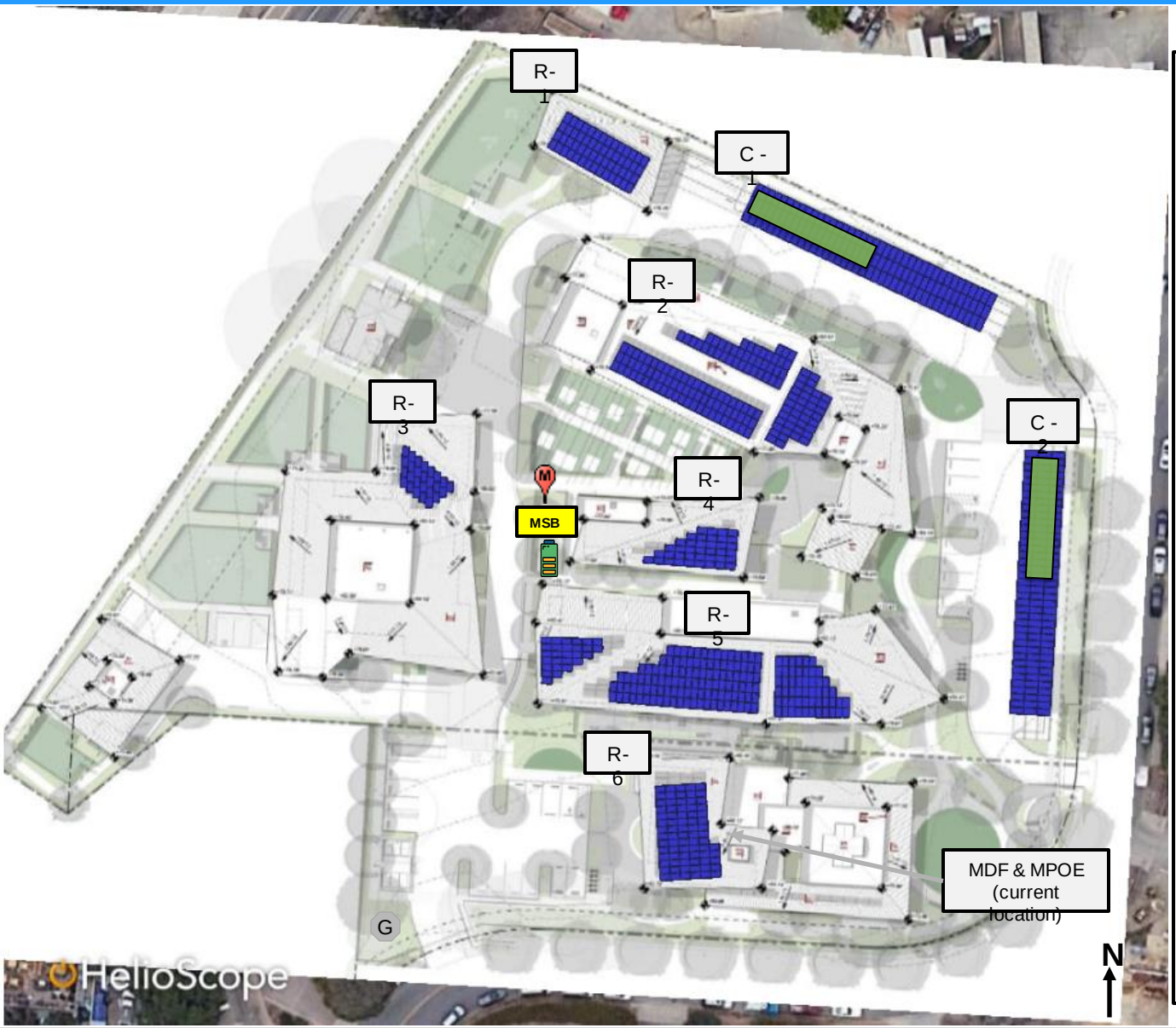


Facilitating Battery Projects in the GLP

- Deploying energy storage is critical to meet the goal for 200 MW of generation and 400 MWh of energy storage needed for resilience in the GLP.
- We work to build coalitions of support for local battery energy storage systems that will benefit the region.
- The Vallecito Energy Storage Resilience project is a 40 MWh project located in Carpinteria.
- *The project is a building block for a Community Microgrid in Carpinteria. We've* also done the preliminary design for solar+storage at Carpinteria High School.
- At least 50 MWh of energy storage is needed to replace the Ellwood Peaker Plant.
- The area near the Ellwood plant is an ideal location for a battery project because the grid is already designed to handle the energy.

Puente Peaker Plant in Oxnard

Resilience for SB Humane (Reference Solar layout)



SB Humane

5399 Overpass Rd, Goleta, CA

- Service Meter
- MSB — Main Service Switchboard 1600A, 480/277V, 3PH 4W
- G — 350 kW Generac diesel generator
- 22 potential level-2 EV ports (dual ports)
- 326 kW/1,305 kWh BESS location

Total Solar Siting Potential: 339 kW

- Total Annual Solar Generation: 548,145 kWh
- 41% NZE of Master Load Profile
- 32% NZE of Baseline Load Profile

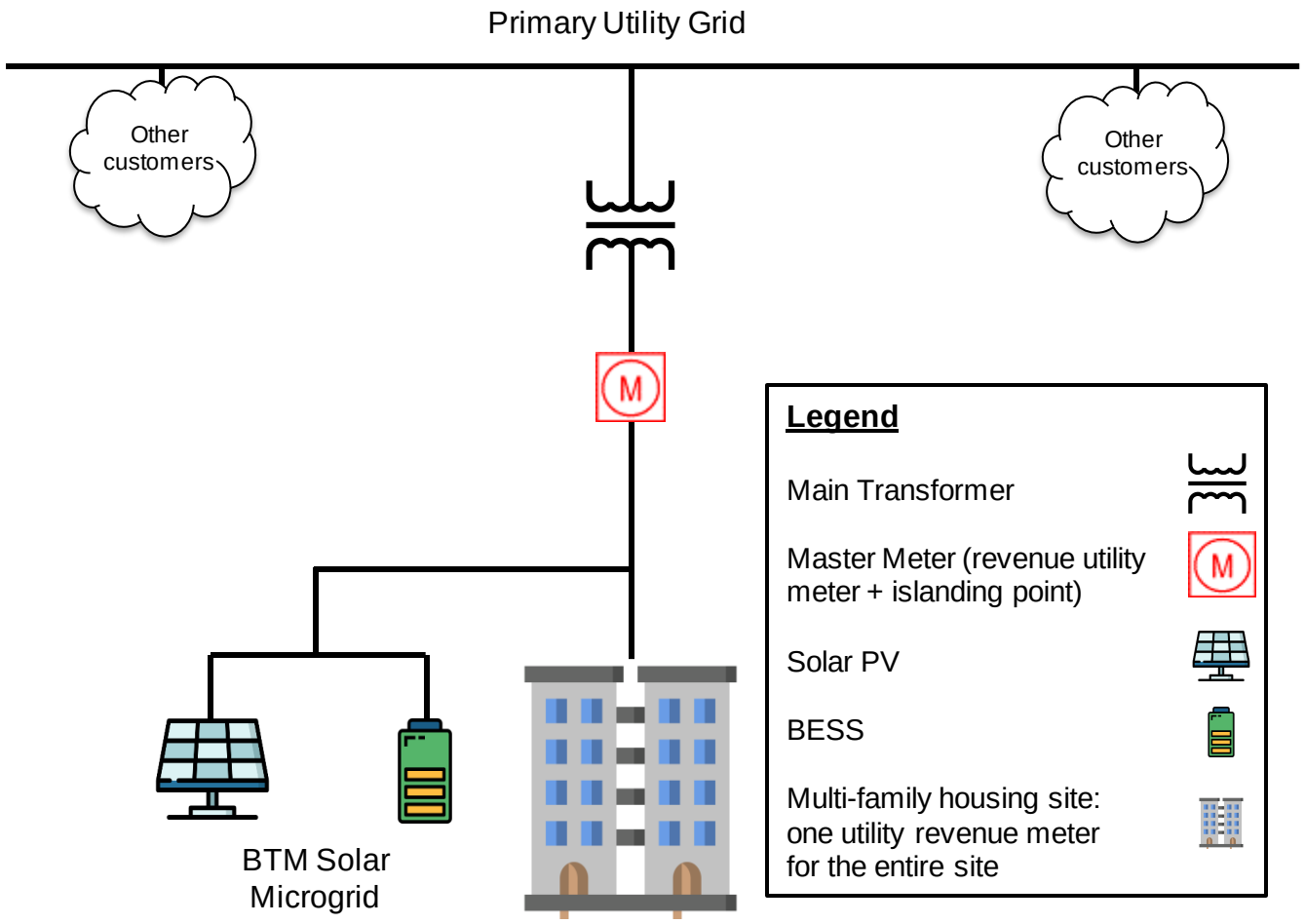
C-1	63.2 kW Solar Parking Canopy
C-2	63.2 kW Solar Parking Canopy
R-1	22.1 kW Service Bldg I rooftop solar
R-2	59.3 kW Dog Bldg A rooftop solar
R-3	10.3 kW Intake Bldg F rooftop solar
R-4	15.4 kW Cat & Rabbit Bldg B rooftop solar
R-5	75.4 kW Clinic Bldg C rooftop solar
R-6	29.6 kW Admin & Education Bldg D & E rooftop solar

Total Annual Loads:

- Baseline Load Profile: 1,341,232 kWh
- EV Load Profile: 368,879 kWh
- Master Load Profile: 1,710,111 kWh
- Critical Load Profile: 872,988 kWh

Critical Loads: Buildings A, C, F, & H

Resilience for Apartments Using a Master Meter



Resilience is possible at apartments in a streamlined/standard fashion using a master meter.

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 Wholesale Distributed Energy Resources as policies and market mechanisms are innovated.
- Bring solutions to the GLP, including Demand Response, Electric Vehicle Charging Infrastructure, and Energy Efficiency.
- 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.