Battery Energy Storage Systems

Public Meeting

Presented to the Solano County Planning Division
on July 18, 2024
Department of Resource Management

Introduction: Allan Calder

Allan Calder, Planning Manager, Department of Resource Management
AMCalder@solanocounty.com

Introduction: Craig Lewis

Craig Lewis, Executive Director, Clean Coalition
craig@cleancoalition.org

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craig@cleancoalition.org

Clean Coalition Mission

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

Clean Coalition experience with BESS

1. The Clean Coalition is a leading proponent of Solar Microgrids and Community Microgrids to deliver an unparalleled trifecta of economic, environmental, and resilience benefits to communities.

2. The Clean Coalition has supported several grid-scale BESS that are thoughtfully sited, including to deliver key benefits to the grid.

3. Craig Lewis serves on the Board of Advisors of a flow battery technology company called BioZen, which is developing solutions that are founded in biomimicry – using naturally occurring materials and mimicking natural systems.

Definitions

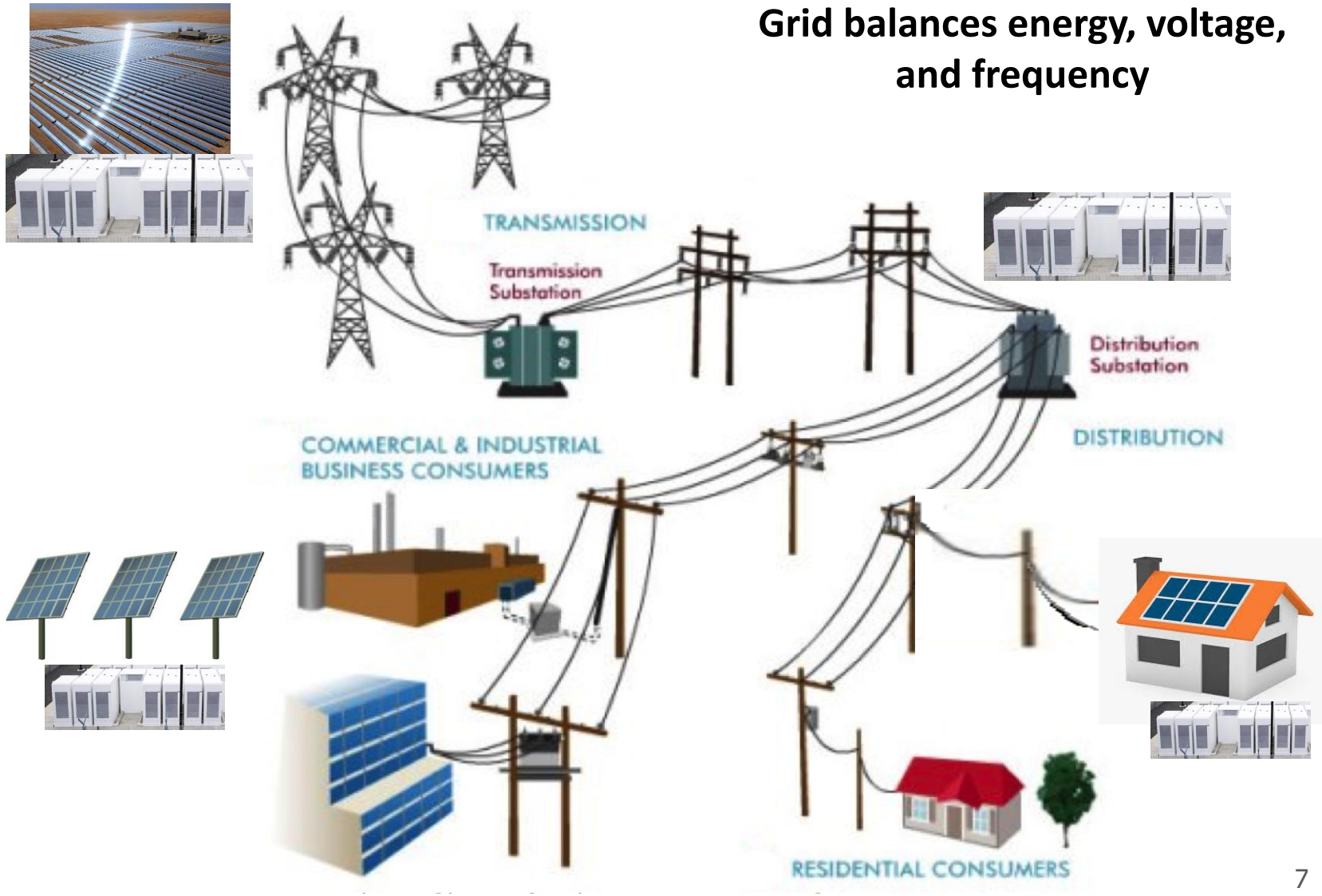
A **Megawatt (MW)** is a unit of power that measures the rate of energy transfer per second. One Megawatt of power can light up approximately **1,000 homes** (theOGM).

On average, a typical home in North America uses approximately 900 kilowatt-hours (kWh) per month, which is equivalent to 30 kWh per day. One megawatt-hour (MWh) is equivalent to 1000 kilowatt-hours (kWh).

A typical passenger vehicle emits about **4.6 metric tons** of carbon dioxide per year. This number can vary based on a vehicle's fuel, fuel economy, and the number of miles driven per year (EPA)

Overview of the grid and where BESS play

Grid balances energy, voltage, and frequency

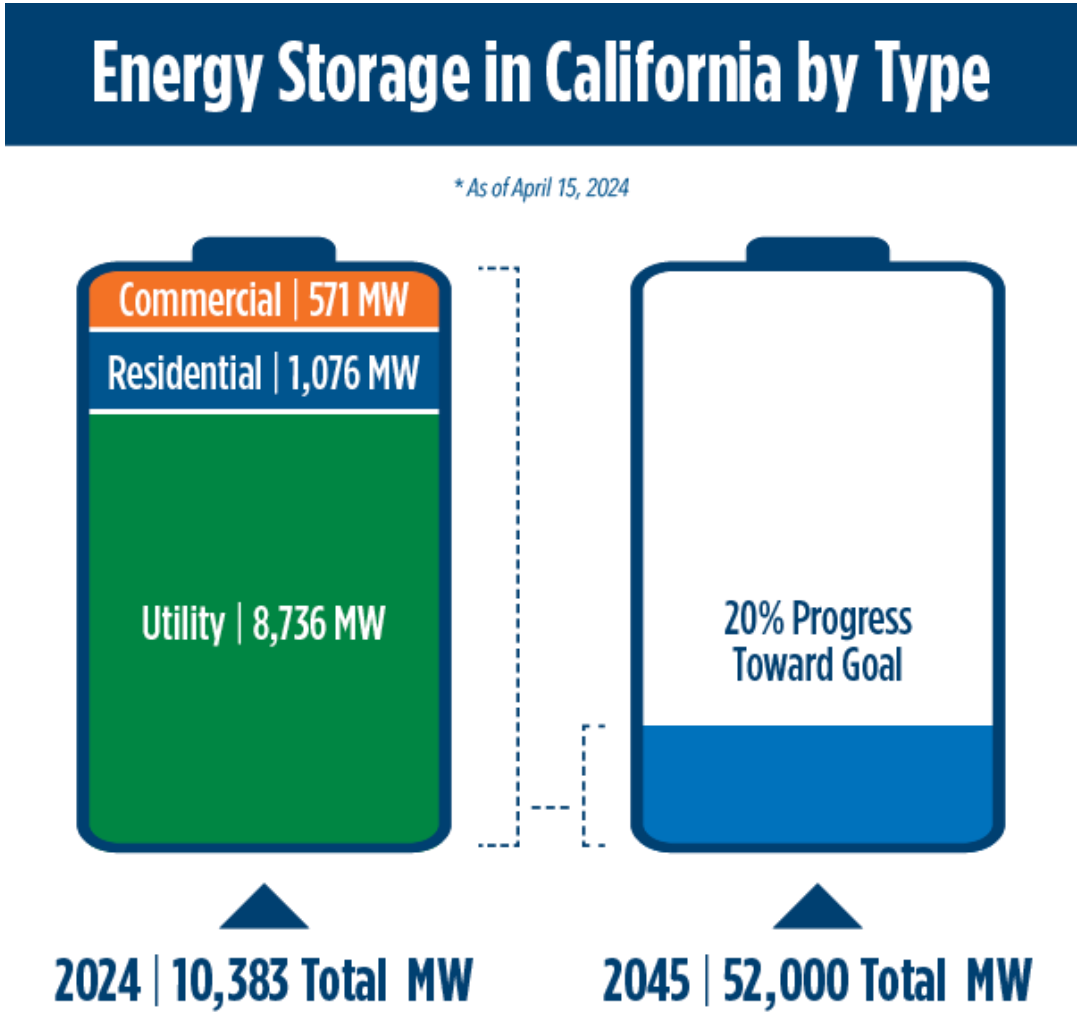


The future is hard to predict, but do extreme technophiles really want to live under the sea?

Similarly, do extreme technophobes want to revert to horse & buggy?

BESS are proliferating rapidly

- From 2018 to 2024, battery storage capacity in California increased from 500 megawatts (MW) to more than 10,300 MW, with an additional 3,800 MW planned to come online by the end of 2024.
- The state projects that 52,000 MW of battery storage will be needed by 2045.



BESS Pros & Cons

BESS deliver a bevy of grid services

	Services to Grid and Cust.	Grid Domains		
		Tran.	Dist.	Cust.
Energy & AS Markets and Products	Energy	✓	✓	✓
	Frequency Regulation	✓	✓	✓
	Spin/Non-Spin Reserve	✓	✓	✓
	Flexible Ramping	✓	✓	✓
	Voltage Support	✓	✓	✓
	Blackstart	✓	✓	✓
Resource Adequacy	System RA Capacity	✓	✓	✓
	Local RA Capacity	✓	✓	✓
	Flexible RA Capacity	✓	✓	✓
T & D Related	Transmission Investment Deferral	✓	✓	✓
	Distribution Investment Deferral		✓	✓
	Microgrid/Islanding		✓	✓
Site-Specific & Local Services	TOU Bill Management			✓
	Demand Charge Management			✓
	Increased Use of Self-Generation			✓
	Backup Power			✓

Source: CPUC Energy Storage Procurement Study (May 2023)

BESS Pros

1. **Enabling intermittent renewables** by storing solar & wind energy to be spread 24x7.
2. **Saving ratepayers money** by preempting much more expensive investments in the grid. Location matters, and interconnecting at load, substations, and generation can all provide high value.
3. **Providing grid services** by balancing energy, voltage, and frequency – and staging to do so even when the broader grid
4. **Yielding economic benefits** in the form of direct and indirect economic stimulation where the BESS are located, including via job creation and tax benefits to the local jurisdictions, and enhancing the grid to enable other forms of economic expansion.

BESS are relatively new, and caution is sensible

- Otay Mesa was one of the first large BESS deployed.
- Used BESS technology & designs from 7 years ago.
- Batteries are enclosed in a building, allowing gases to accumulate.

Source: The San Diego Union-Tribune, 26 May 2024

BESS have impacts on the environment, as do all developments

BESS Cons

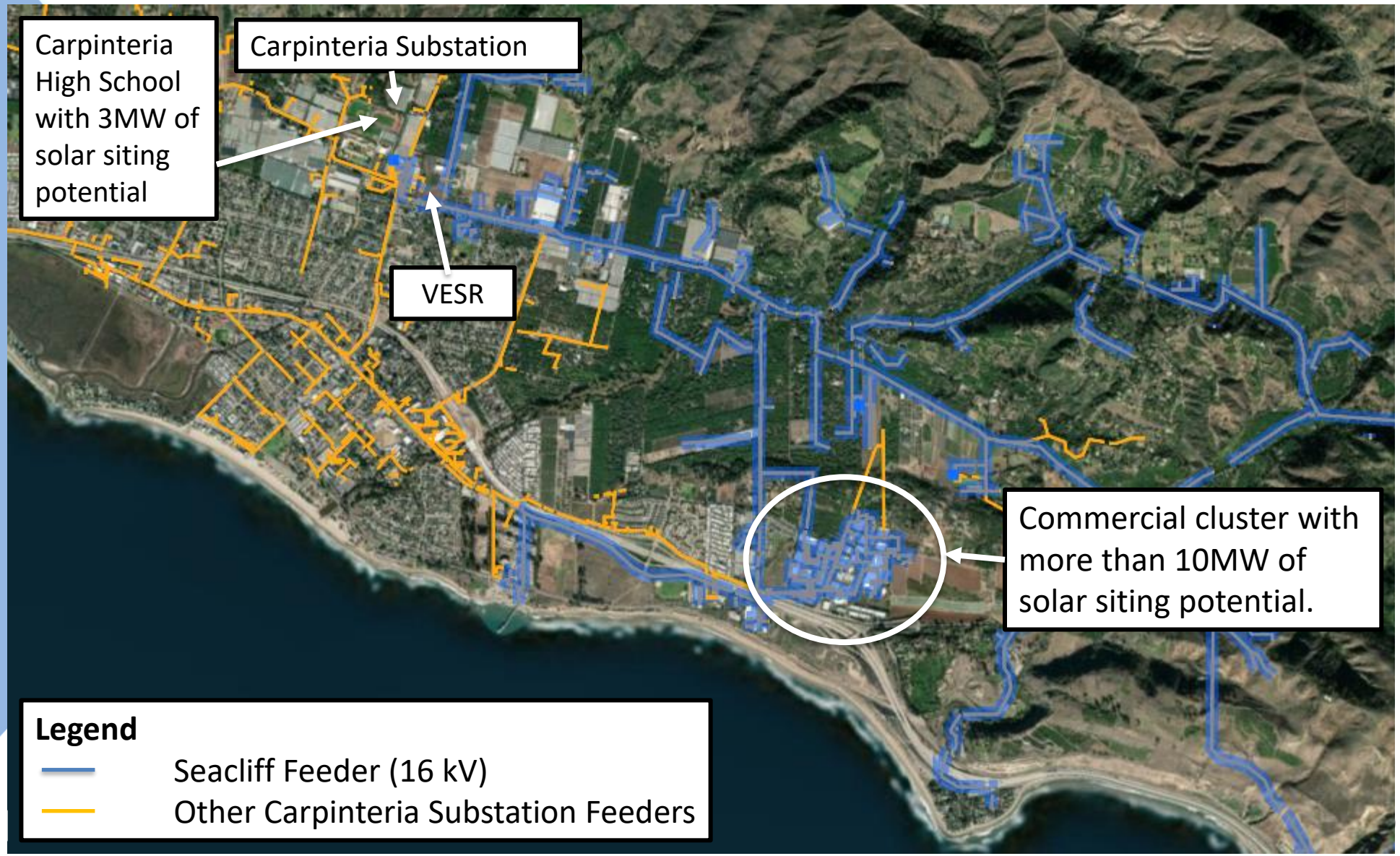
1. **Safety questions** that experience is indicating are equivalent to Class A fires, same class as house fires.
2. **Land use concerns** that can impact the natural and/or cultural environments.
3. **Lifecycle considerations** that span from mineral extraction to recycling etc.

BESS Examples

Valecito Energy Storage Resilience (VESR)

- VESR is the first grid-scale BESS in Santa Barbara County, on 1 acre of leased agricultural land and 200 feet from a residential neighborhood and 1,000 feet from Carpinteria High School.
- Tesla BESS, 10MW & 40MWh, successfully operating since January 2021.
- Providing reliability & resilience to an extremely grid-constrained community.

VESR enables resilience for the community



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”).

Goleta Load Pocket (GLP)

The GLP is the perfect opportunity for a comprehensive Community Microgrid.

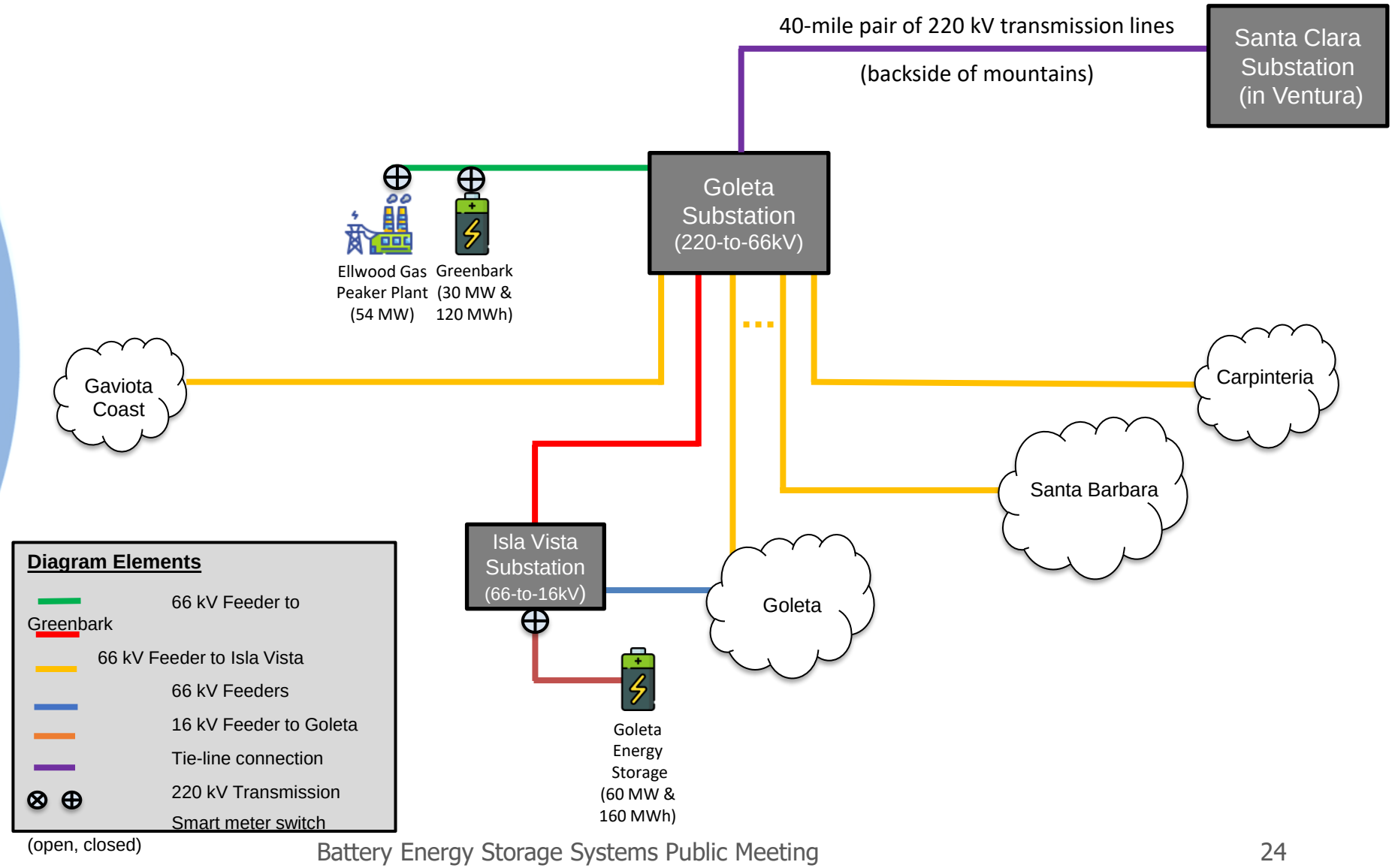
- 200 MW of solar is equivalent to about 5 times the amount of solar currently deployed in the GLP and represents about 25% of the energy mix.
- Multi-GWs of solar siting opportunity exists on commercial-scale built-environments like parking lots, parking structures, and rooftops; and 200 MW represents about 7% of the technical siting potential.
- Other resources like energy efficiency, demand response, and offshore wind can significantly reduce solar and storage requirements.

Greenbark will be the third BESS in the GLP

Greenbark BESS: Key Benefits

1. Perfect location adjacent to the Ellwood gas peaker plant such that resilience can be provided across the entire Goleta Load Pocket (GLP) – and retirement of the gas peaker will be accelerated.
2. Significant distances from other facilities, including housing (235 feet to the closest housing).
3. Same safe BESS technology that is already deployed in multiple GLP locations.
4. Negligible traffic & noise impacts.
5. Significant economic benefits to the local community.

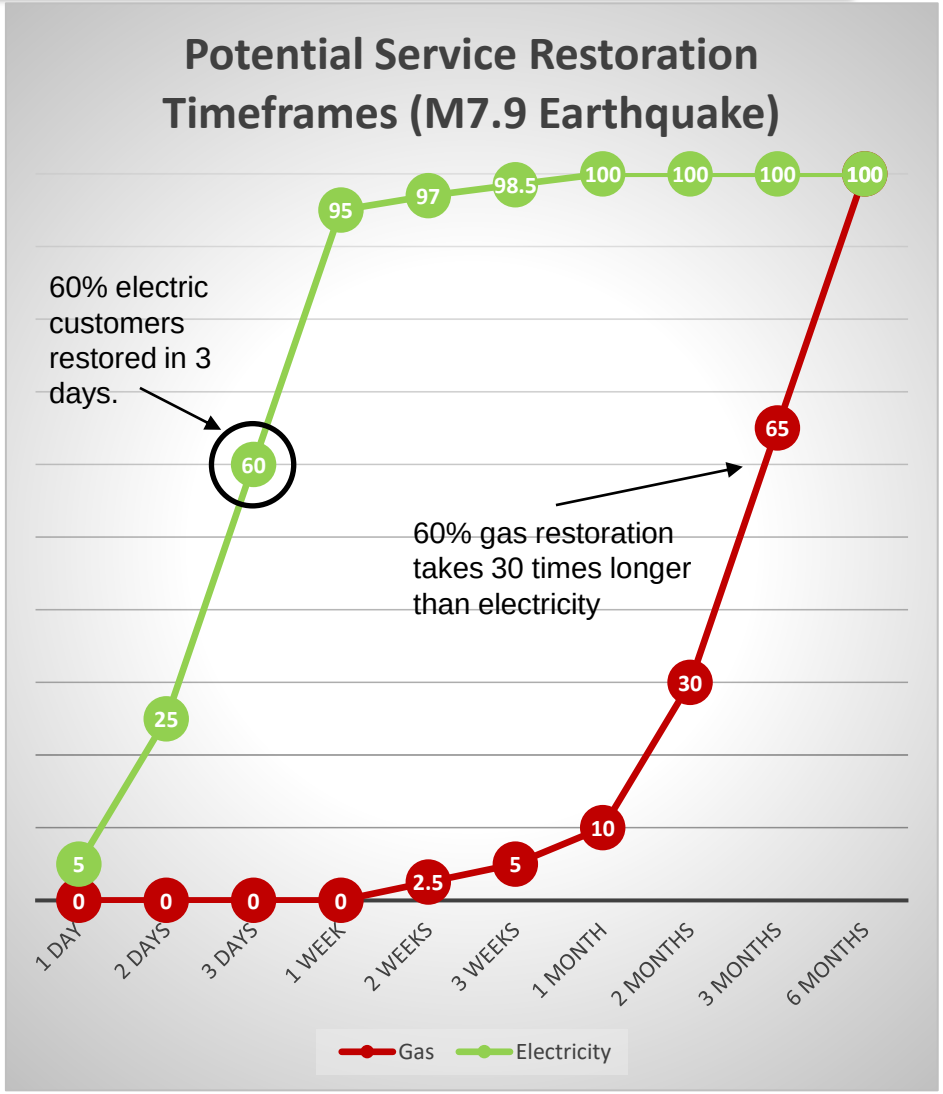
Greenbark in perfect location to serve entire GLP



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.

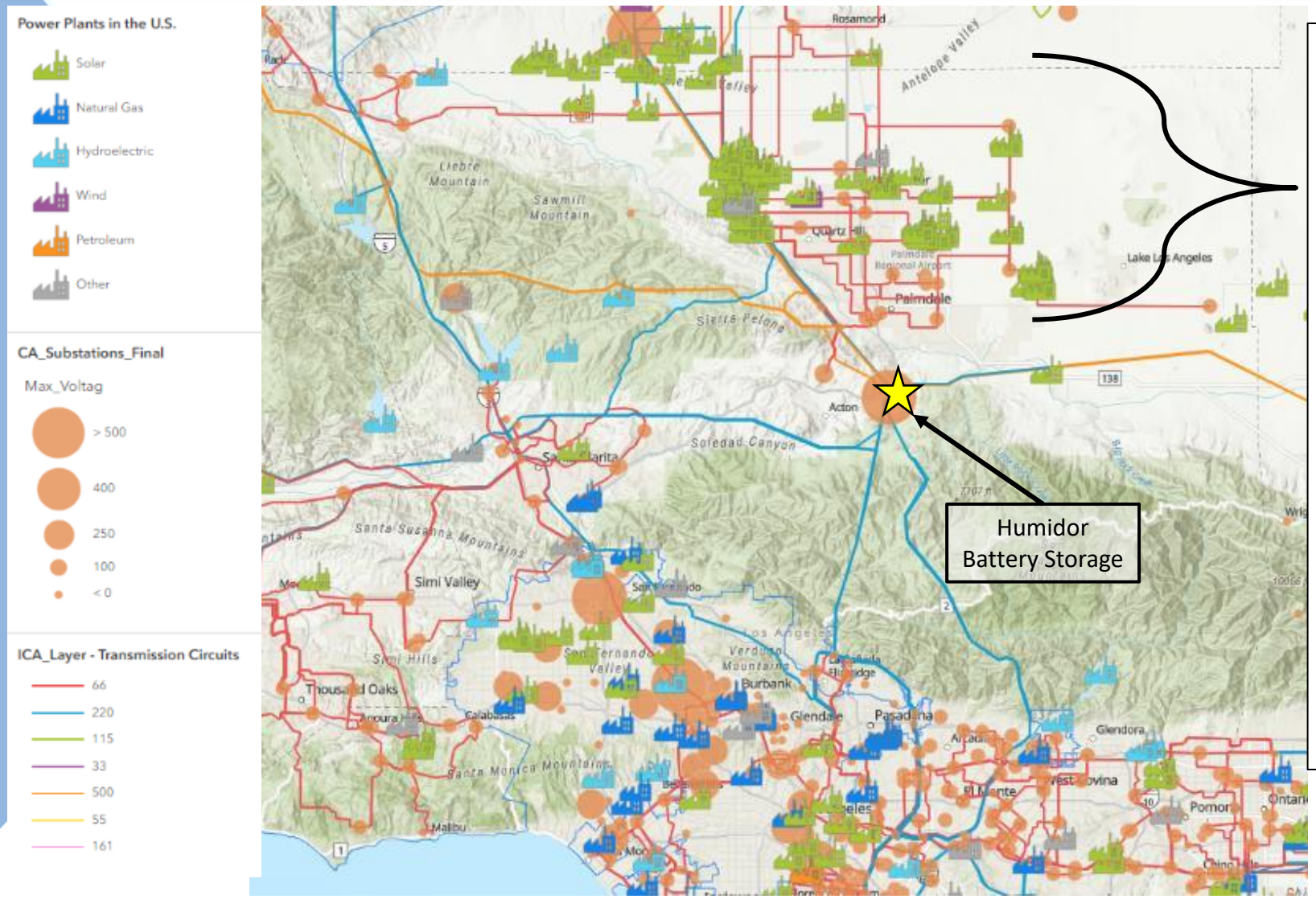
2010 San Bruno Pipeline Explosion



Humidor is a major BESS to serve California grid

- 400MW & 1,200MWh Battery Energy Storage System (BESS)
- Located on 12 acres in North Los Angeles County, about midway between Glendale and Lancaster, and interconnecting to a major substation.
- Designed to enhance grid reliability across California and to bridge renewables into the Los Angeles basin, the State's largest load pocket and one of the dirtiest.
- Utilizes disturbed land on industrial zoning, surrounded by roadways, rail lines, and industrial facilities.
- Generates substantial economic benefits:
  - $2 million per year in tax revenue for LA County.
  - 100 high-paying union jobs during construction and several ongoing jobs once operational.
  - $100,000 of annual benefits to be paid for local community initiatives

Humidor: Reliability while reducing gas

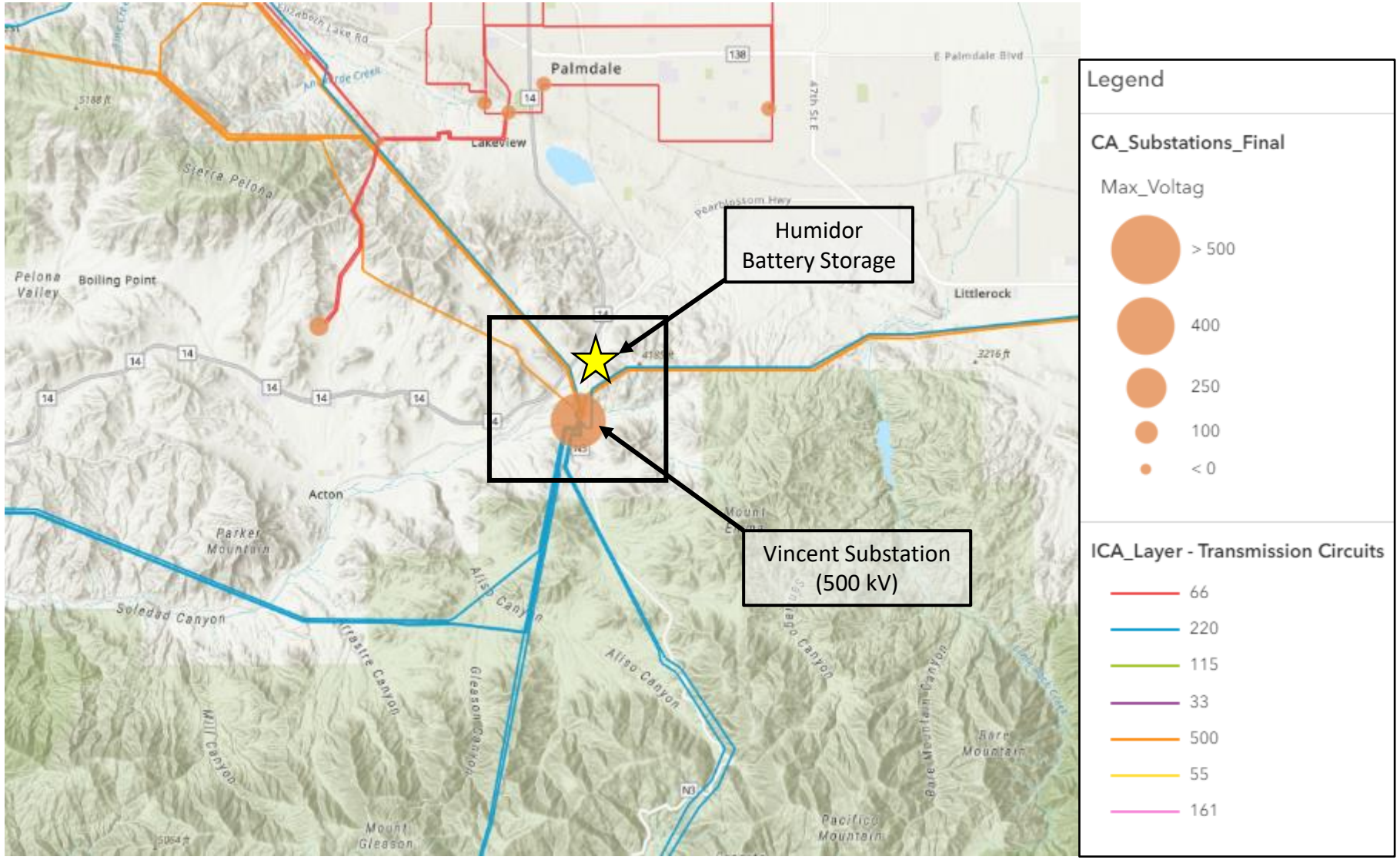


There is a significant amount of solar in the central valley that is attempting to flow down into Los Angeles (LA).

CAISO is careful about adding more solar in the central valley due to grid congestion, so it is slowing down the deployment of additional solar. Too much grid congestion can cause grid outages.

The Humidor Battery Storage Project will address multiple challenges: deliver solar energy to Los Angeles, prevent curtailment, meet peak grid demand, and alleviate congestion. This will help smooth supply and demand, reducing blackout risks.

Humidor: Location near grid intersection



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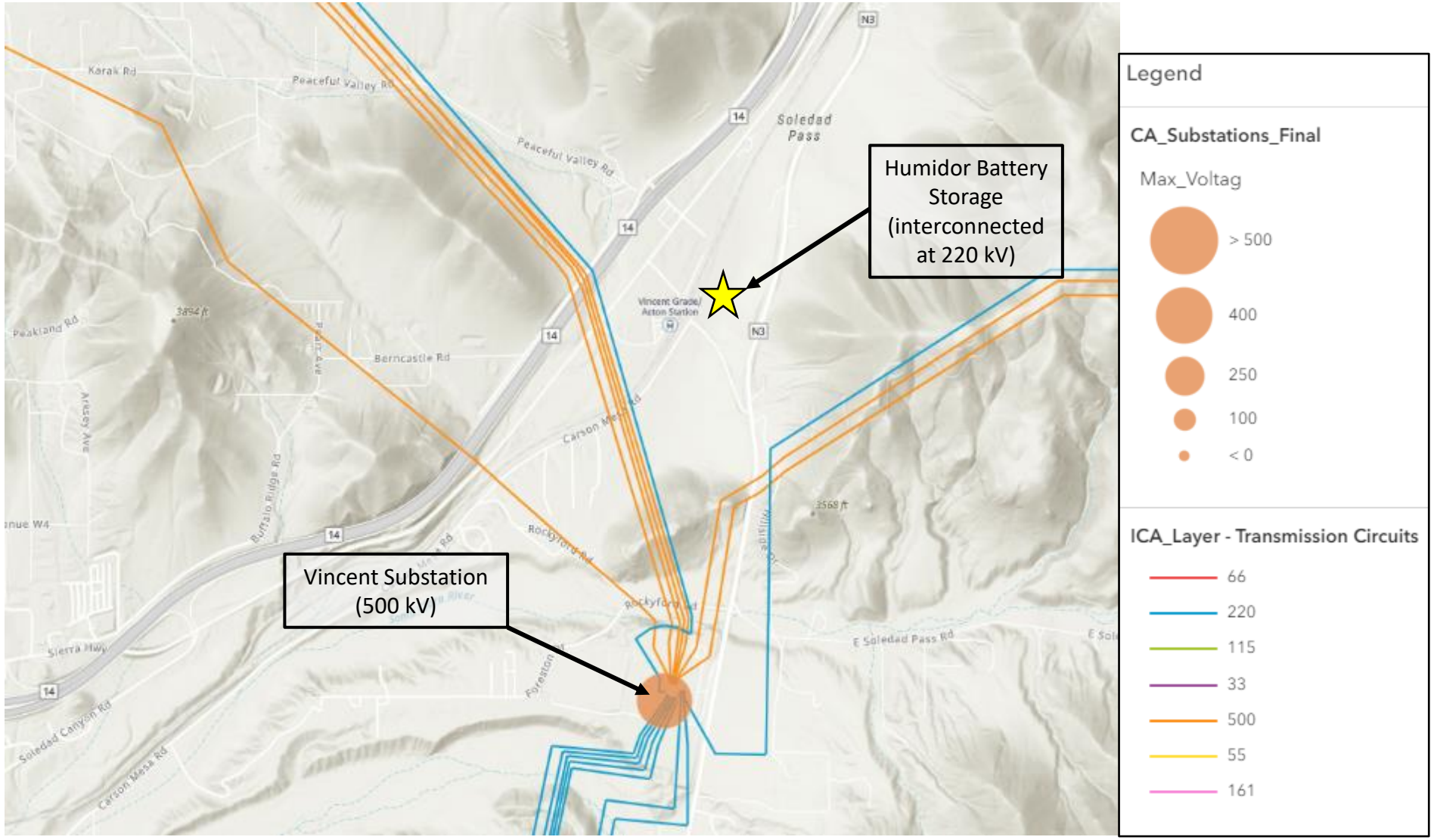


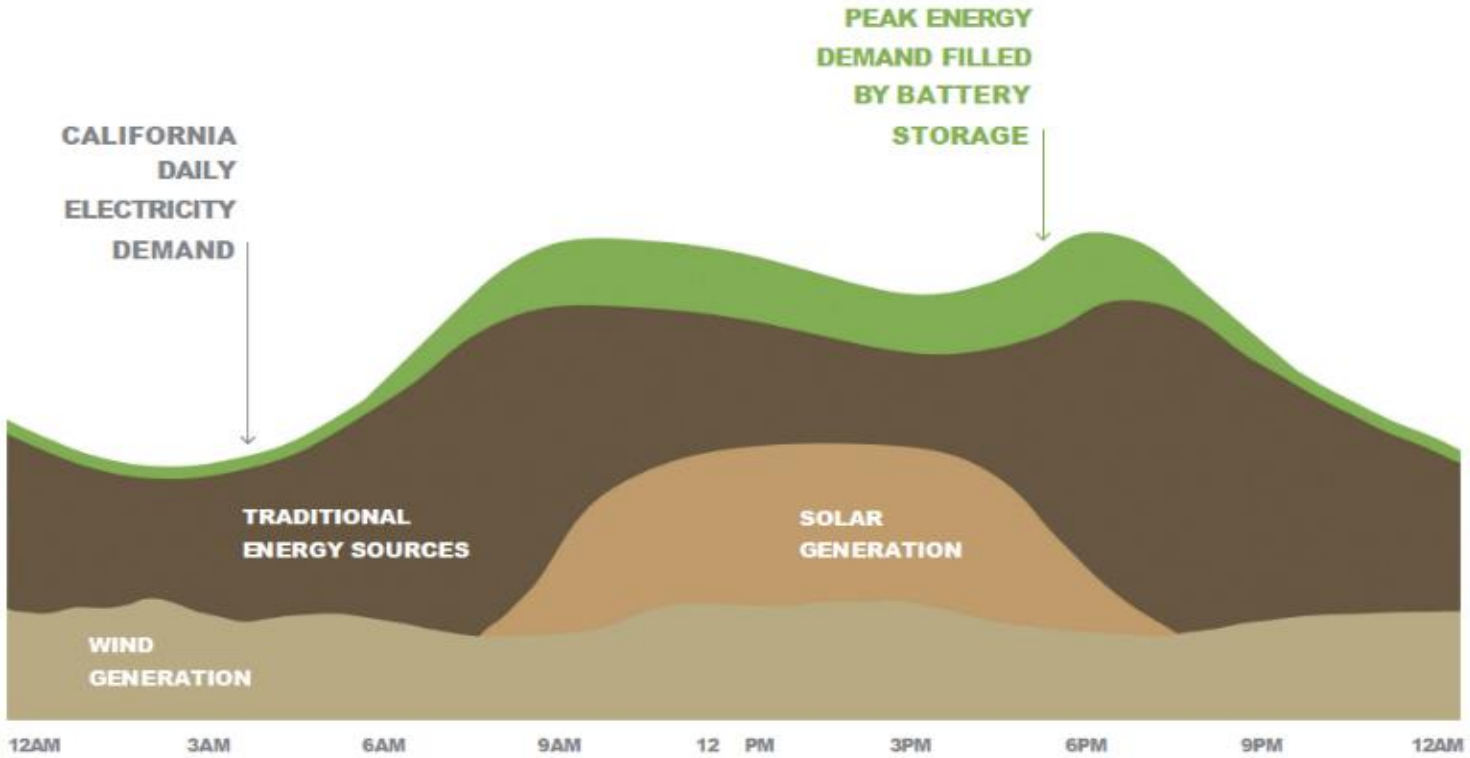
Effects of energy storage on peak demand

MEETING PEAK ENERGY DEMAND WITH BATTERY STORAGE

Every day, California enjoys energy production from wind 24/7 and solar during the day, with traditional sources such as natural gas power plants filling the gap. As California energy demand peaks with a growth in daily use, battery storage is being called upon to fulfill the additional demand to avoid brownouts or blackouts.

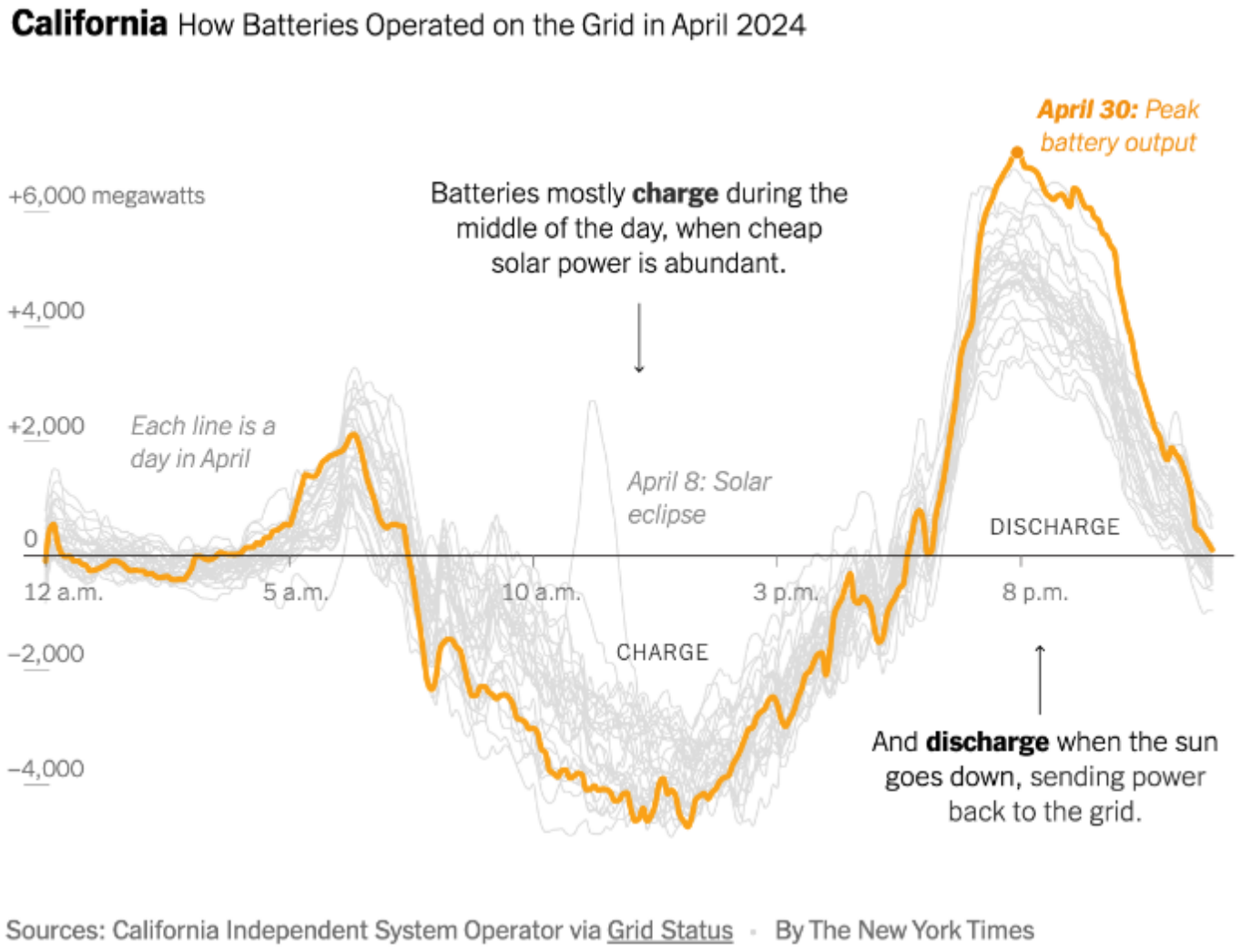
"ELECTRICITY STORAGE COULD HELP THE UTILITY GRID OPERATE MORE EFFICIENTLY, REDUCE THE LIKELIHOOD OF BROWNOUTS DURING PEAK DEMAND, AND ALLOW FOR MORE RENEWABLE RESOURCES TO BE BUILT AND USED."

- U.S. ENVIRONMENTAL PROTECTION AGENCY, ELECTRICITY STORAGE, ENERGY & ENVIRONMENT WEBPAGE



U.S. Energy Information Administration, Today in Energy Webpage

Batteries help midday solar serve evening load



Introduction: Nedzlene Ferrario

Nedzlene Ferrario, Principal Planner, Current Planning
NNFerrario@solanocounty.com

BESS in Solano (Ned), 15 minutes,

BESS Applications,
Moratorium
Timeline

AB 205: Alternative Permitting Pathway

- Alternative permitting pathway for large renewable energy generation (>50 MW) and storage projects (>50 MW or 200 MWh) to receive a permit from California Energy Commission rather than local city or county.

Process

- Pre-filing consultation 30 days before application submittal, County invited
- Files complete application
- Staff review and tribal consultation

AB 205: Alternative Permitting Pathway

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Process

- CEC Staff Assessment (including draft EIR) complete within 150 days of application
- 60-day public comment period
- Updated EIR and Staff Assessment
- Action at noticed Public Hearing

AB 205: Alternative Permitting Pathway

- Public Hearing, required findings include:
  - Overall net positive economic benefit to the local government
  - Applicant has entered into a community benefits agreement
  - Applicant-certified prevailing wage, skilled and trained workforce
  - The project will comply with all applicable laws, ordinances, regulations, and standards, if not, the project is required for public convenience and necessity
  - CEQA findings, do not have a significant impact on the environment

Questions and Answers

Next Steps (Allan) 5 mins

- Timeline and Next Steps