SAN MATEO COUNTY ENERGY WATCH

OFFICE OF SUSTAINABILITY
COUNTY OF SAN MATEO

RICAPS

Regionally Integrated Climate Action Planning Support

Multi-city Working Group

May 23, 2023

RICAPS technical assistance is available through the San Mateo County Energy Watch program, which is funded by California utility customers, administered by Pacific Gas and Electric Company (PG&E) under the auspices of the California Public Utilities Commission and with matching funds provided by C/CAG and additional funding provided by Peninsula Clean Energy.

Agenda

Welcome & Agenda- Avana Andrade, Senior Sustainability Specialist, Office of Sustainability

- **Berkeley Ruling Update**: Paul Sheng, SMC, Blake Herrschaft, PCE, Ryan Gardner, Rincon Consultants

Announcements-

- Re-introduction to our agency partners
- Update about inventories
- Neighborhood electrification pilot query
- Accessing PG&E's collaborative planning tool

Planning for Long-Term Grid Reliability - Neil Raffan, Regulatory Analyst, Integrated Resource Planning, CPUC

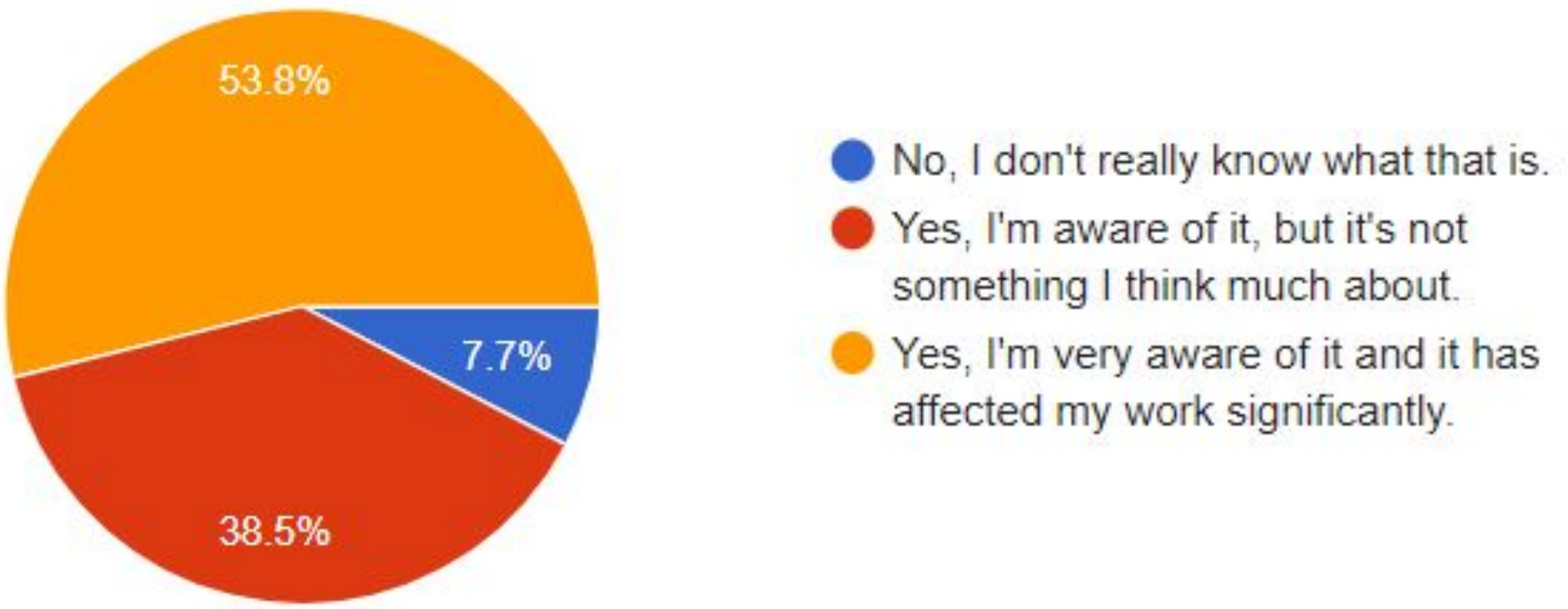
Grid Reliability Planning - Satvir Nagra, Director of Asset Planning, PG&E

Peninsula Clean Energy's 24/7 Plan - Sara Matta, Power Resources and Compliance Manager, Peninsula Clean Energy

Berkeley vs. CA Restaurant Association

Lawsuit: Pre-Meeting Survey Results

Is the recent ruling on your radar?



Berkeley vs. CA Restaurant Association
Lawsuit Timeline

- Berkeley adopted ordinance prohibiting installation of natural gas piping within newly constructed building
- California Restaurant Association (CRA) sued
- District Court dismissed the case
- CRA appealed
- 9th Circuit panel reversed district court decision

Berkeley:

- Has not received a stay or injunction and is still enforcing their ordinance as of 5/11/23
- Has filed an application to extend the deadline to file a petition for a rehearing en banc to 5/31/23

Existing Building Impacts in 60 Seconds

Anything that does not explicitly ban NG is unaffected by this lawsuit

- Prewiring
- Two-way AC
- Points based checklist

Caveat – This is what we are hearing from legal review so far, this is not legal advice.

Put Ordinance on Hold

New Ordinance

- Electric Preferred
  - EPCA Exemption protects electric preferred for new construction
  - Less clear for existing buildings
- Air Quality Based i.e Zero NO_x
  - EPCA does not apply to AQ Emissions
  - Local govt has express authority to regulate AQ Emissions - Health & Safety Code § 39002

Wait and See

- Decide ahead of time that if a lawsuit is threatened you will:

A – Drop the ordinance (Palo Alto)
B – Engage in a lawsuit based on 7 point exemption test

Other Options – CEQA/Qualified Climate Action Plan

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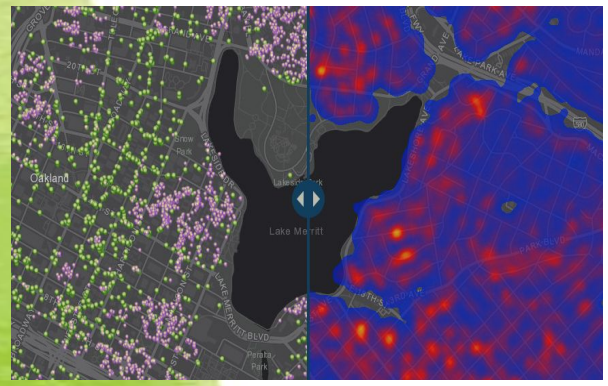
- PCE is investigating development of an AQ based ordinance.
- Could allow follow through to existing buildings (similar to BAAQMD)

Announcement
PG&E Zonal Electrification Collaboration Tool

The Gas Asset Analysis Tool has various data layers to assess electrification potential of a given geographic area



Steps to Access

1. Contact Rachel Wittman (r7wu@pge.com) to request access to the tool for your city, county, or other organization
2. Sign an NDA to protect sensitive customer information
3. Schedule an overview and demo of the tool
4. Receive login for your org and start collaborating

Why an NDA?

- Although we republish the data contained in the tool without personal information like customer names, addresses, and contact information, information such as usage, income, and more are considered Personally Identifiable Information (PII).
- To protect our customers' privacy, it is a necessity to ensure this PII is only accessed on a "need to know" basis and is not shared beyond what is intended.

Electrification and Grid Reliability: 5 Key Takeaways for Local Governments

From Ari Gold-Parker, E3

1. **Distribution system (i.e. local lines) reliability is concerned with local distribution system outages, which are the most common outages**
   a. The ***outages people are more likely to experience in San Mateo County*** are ***related to distribution system outages*** due to weather, PSPS events, smaller-scale equipment failures, not issues with the bulk system, and ***not from inadequate resources to serve load***. These are not common.

2. **Bulk system reliability is concerned with bulk grid outages and rolling blackouts, which are even less common than distribution outages**
   a. This means that ***when we're talking to the public about the impacts electrification may cause to the grid, that distribution system outages are generally not driven by customer load***. Most electrification loads would actually improve our utilization of the grid by adding loads off-peak, which is basically de-stressing the grid. To the extent we are adding new loads on-peak, that could require more investment.

Electrification and Grid Reliability: 5 Key Takeaways for Local Governments Contd…

From Ari Gold-Parker, E3

3. New loads may require new investments

a. Utilities and state agencies plan for small, regional, and statewide investments in the grid as part of regular distribution, transmission, and resource adequacy planning processes

4. Costs of electrification will be very heterogeneous and some customers may need expensive electric service and/or panel upgrades; however, these investments may also be needed for air conditioning or EV charging.

a. As demand for electrification rises, the utilities and state regulators will plan and invest accordingly. State regulators and electric utilities are actively planning for electrification loads at every level of system planning.

5. Utility and CCA planning processes are in place so that new loads should not impact reliability

Planning for Long-Term Grid Reliability - CPUC's Integrated Resource Planning Process

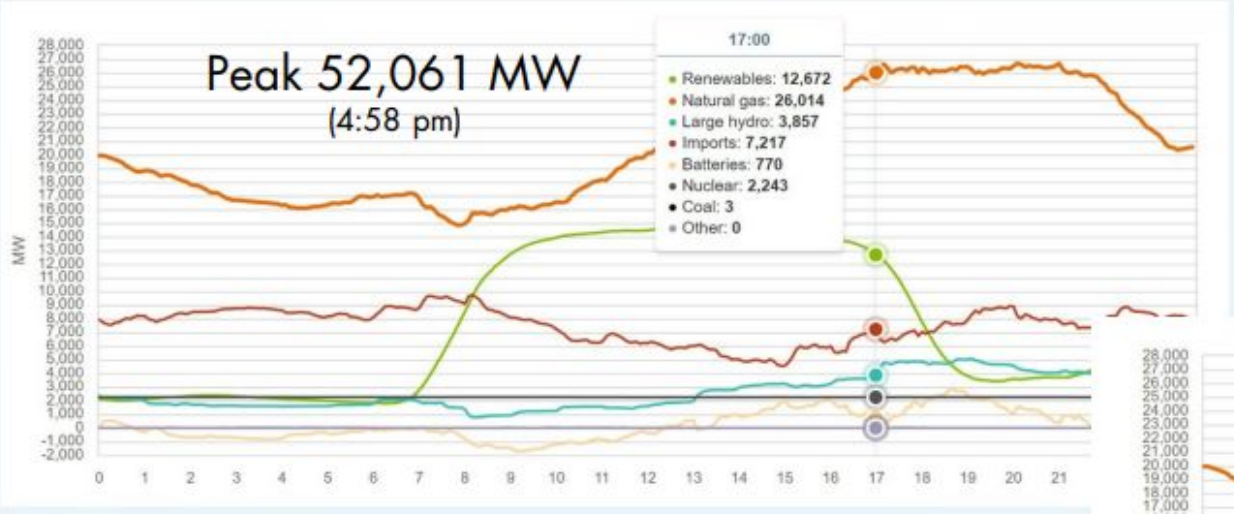
Regionally Integrated Climate Action Planning Support – RICAPS – San Mateo County Multi-city Working Group

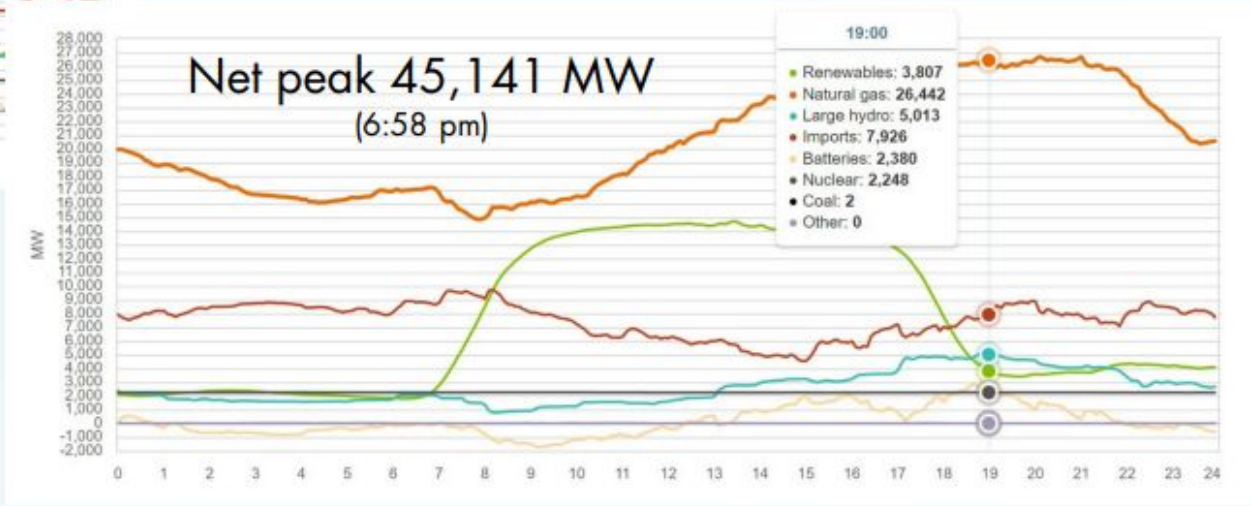
Neil Raffan, Senior Regulatory Analyst – Integrated Resource Planning | Energy Division

May 23, 2023

California Public Utilities Commission

SEPT 6 PEAK AND NET PEAK RESOURCE STACK





California ISO

Who We Regulate

Privately owned utilities, including:

- Electric
- Natural gas
- Water
- Telecommunications
- Rail
- Passenger transportation companies

Integrated Resource Planning (IRP) in California Today

- The objective of IRP is to reduce the cost of achieving greenhouse gas (GHG) reductions and other policy goals by looking across individual load serving entity (LSE) boundaries and resource types to identify solutions to reliability, cost, or other concerns that might not otherwise be found
- Goal of the 2022-23 IRP cycle is to ensure that the electric sector is on track, between now and 2035, to support California's economy-wide GHG reduction goals and achieve the SB 100 target of 100% renewable and carbon-free electricity by 2045
- The IRP process has two parts:
  - First, it identifies an optimal portfolio for meeting state policy objectives and encourages the LSEs to procure towards that future
  - Second, it collects and aggregates the LSEs' collective efforts for planned and contracted resources to compare the expected system to the identified optimal system. The CPUC considers a variety of interventions to ensure LSEs are progressing towards an optimal future.

Scope of this Discussion

What is "electric grid reliability"

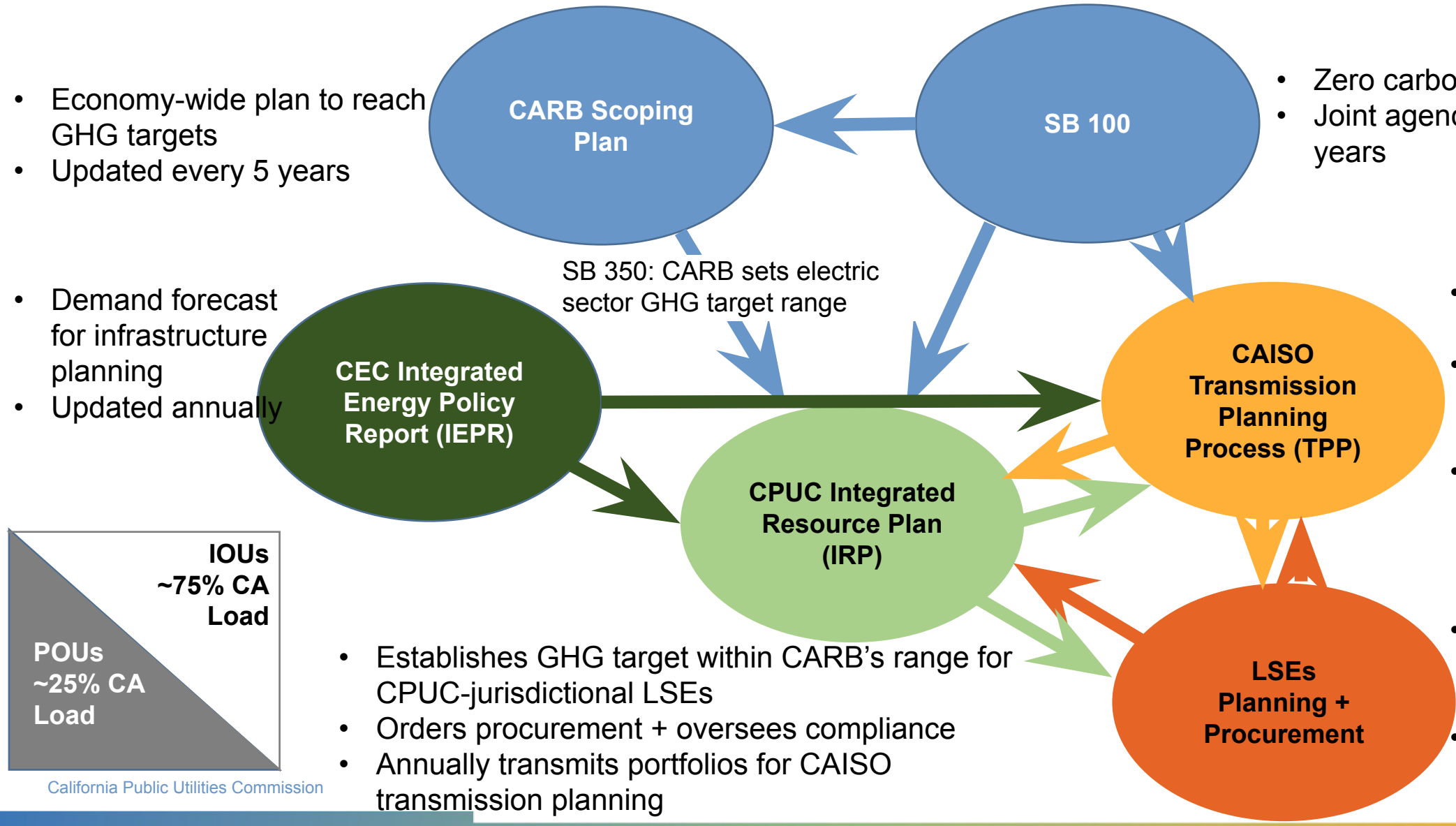
- Reliability = maintaining electricity service for customers, "keeping the lights on"
- Broadly speaking: two kinds of reliability that describe different types of power outages

	Distribution system reliability	"Bulk system" reliability, a.k.a. "Resource Adequacy"
Type of outage	• Local outage on part of the distribution system	• System-wide blackout • Rolling blackouts
Overall outage drivers	• Weather • Equipment failures or maintenance	• Not enough generation (and/or transmission) to meet peak load
Direct causes of outages	• Tree falling on power line • Public Safety Power Shutoff (PSPS) due to fire risk • Planned maintenance projects	• Inadequate generation to meet peak load • Peak load exceeding forecast • Generator or transmission outage

Ari Gold-Parker, E3 – RICAPS 4/25/2023

- CPUC IRP process must ensure reliability at the bulk system level
  - Complements parallel processes at the distribution level
- California Independent System Operator (CAISO) Balancing Authority Area
  - Serves a significant majority of the state's load
  - Trade with neighbors across the west very important
- Electricity generation & storage
  - Power stations
  - Distributed energy resources
- Transmission
- Emerging scope: risk of wildfires causing generation or transmission outages

California's Electricity Planning Ecosystem



- Economy-wide plan to reach GHG targets
- Updated every 5 years

- Zero carbon electricity by 2045
- Joint agency report, every 4 years

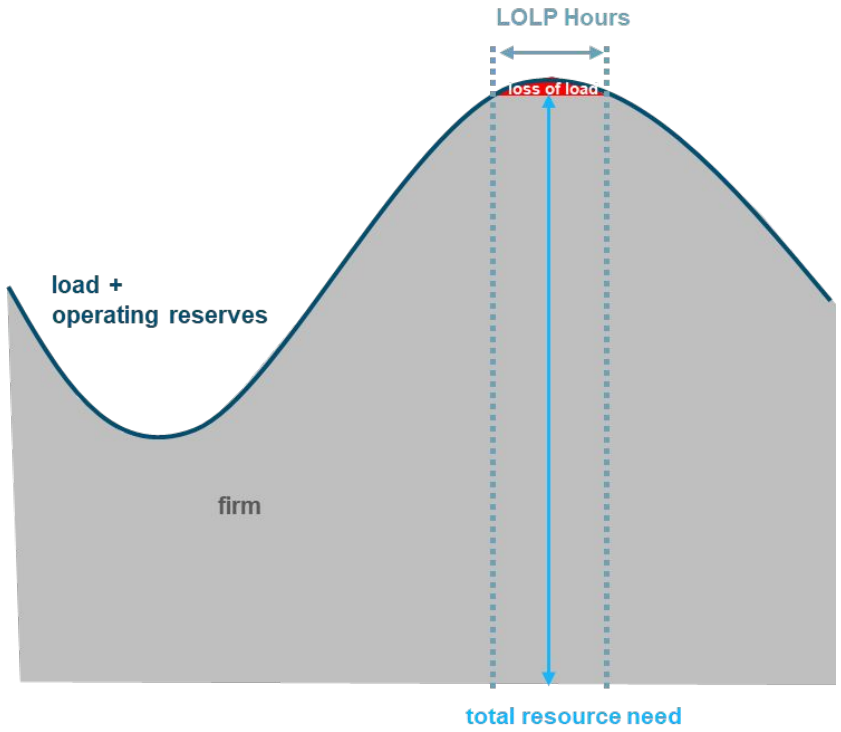
- Demand forecast for infrastructure planning
- Updated annually

- Assess transmission needs
- Conceptually approves new projects
- Updated annually

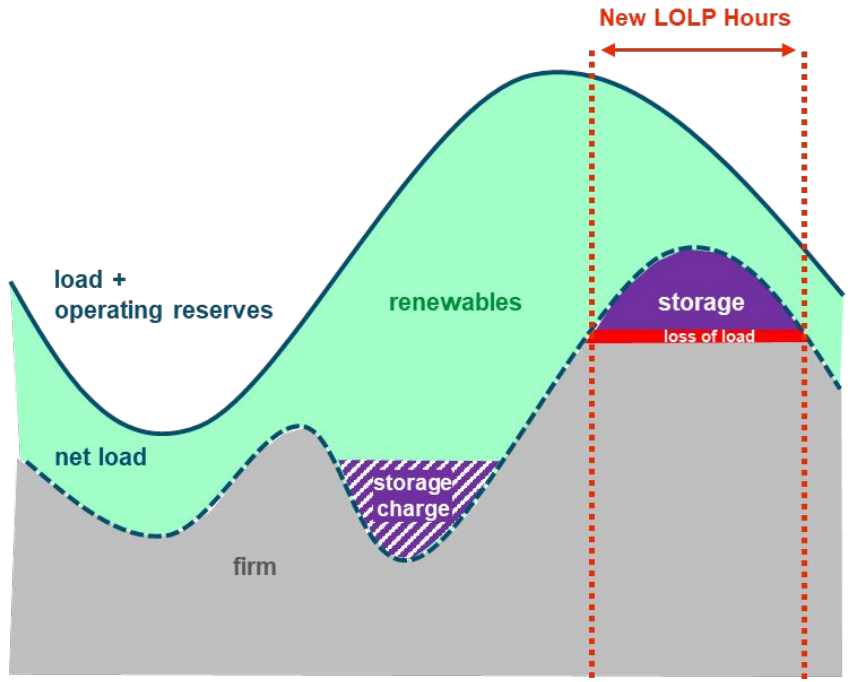
- Establishes GHG target within CARB's range for CPUC-jurisdictional LSEs
- Orders procurement + oversees compliance
- Annually transmits portfolios for CAISO transmission planning

- Plans filed per SB 350 + CPUC guidance
- Procurement in compliance w/ CPUC directives

1-in-10 year reliability standard & shifting risk



24-hour period, traditional reliability planning



24-hour period, current reliability planning

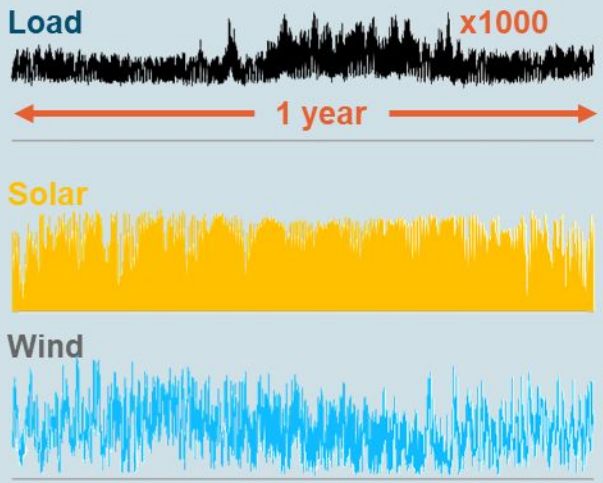
- We plan for the probability of load being lost (i.e., demand not met) being less than once every 10 years
- Our system is shifting from only "firm" resources (e.g., gas-fired electricity) to large supply from renewables
- Risky period (loss of load probability – LOLP) has shifted to after the sun sets

Key Steps for Reliability Planning using LOLP Modeling

Step 1: Model + Data Development

Develop a robust dataset of the loads and resources in a loss of load probability (LOLP) model

LOLP modeling evaluates resource adequacy across all hours of the year under a broad range of weather conditions

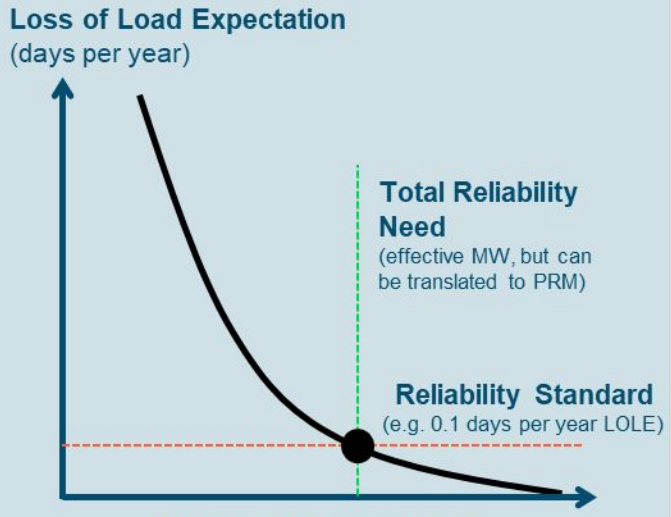


Robust probabilistic models + datasets are the foundation of any resource adequacy analysis

Step 2: Need Determination

Identify the Total Reliability Need to achieve the desired level of reliability

Factors that impact the amount of effective capacity needed include load & weather variability, operating reserve needs

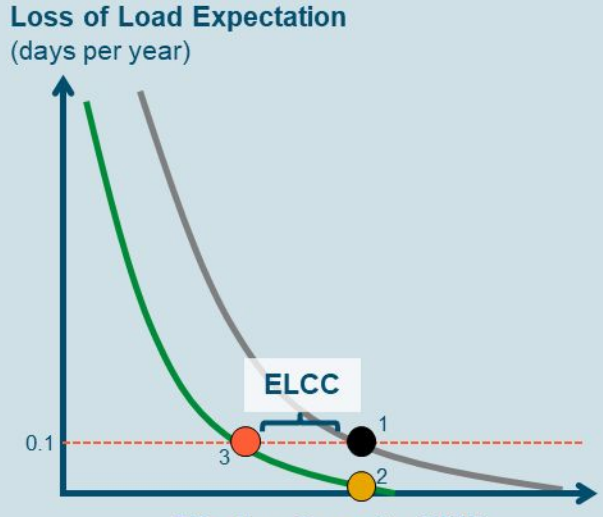


LOLP modeling provides Total Reliability Need in effective capacity MW to meet <0.1 days/yr LOLE, can be converted to a PRM

Step 3: Resource Counting

Calculate resource capacity contributions using effective load carrying capability

ELCC measures a resource's contribution to reliability needs relative to perfect capacity, accounting for performance across all hours

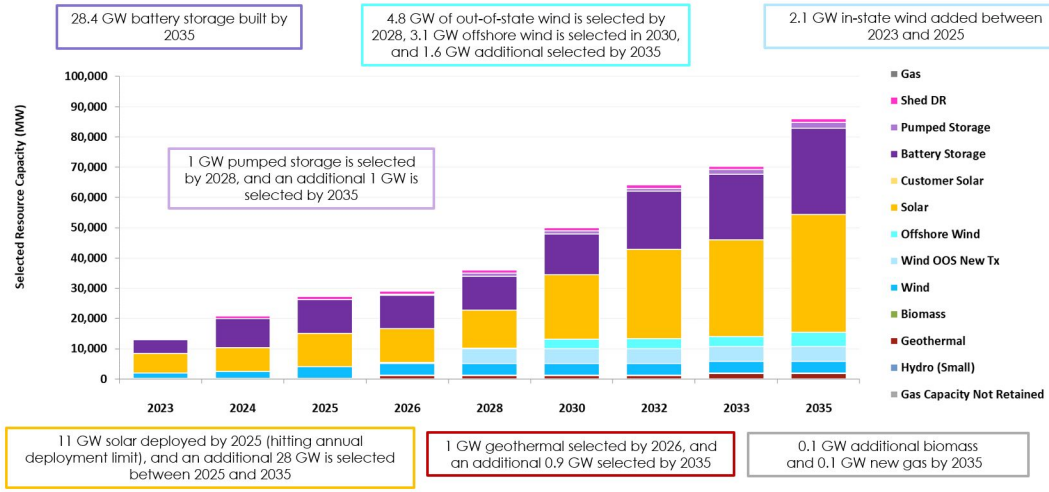


Effective or "perfect" capacity based accounting (UCAP or ELCC) counts all resources on a level playing field against that total reliability need

Optimize demand, generation & transmission

- Inputs to IRP process
  - Electricity demand forecast
  - Constraints including reliability, GHG-reduction
  - Resource options
  - Transmission options
- Outputs
  - New resources needed – type, amount, timing
    - Including demand-side
  - Existing resources to retain
  - New transmission needed
    - High-level, for detailed planning by CAISO

Selected resources – 30 MMT 2023-2024 TPP HE Base Portfolio

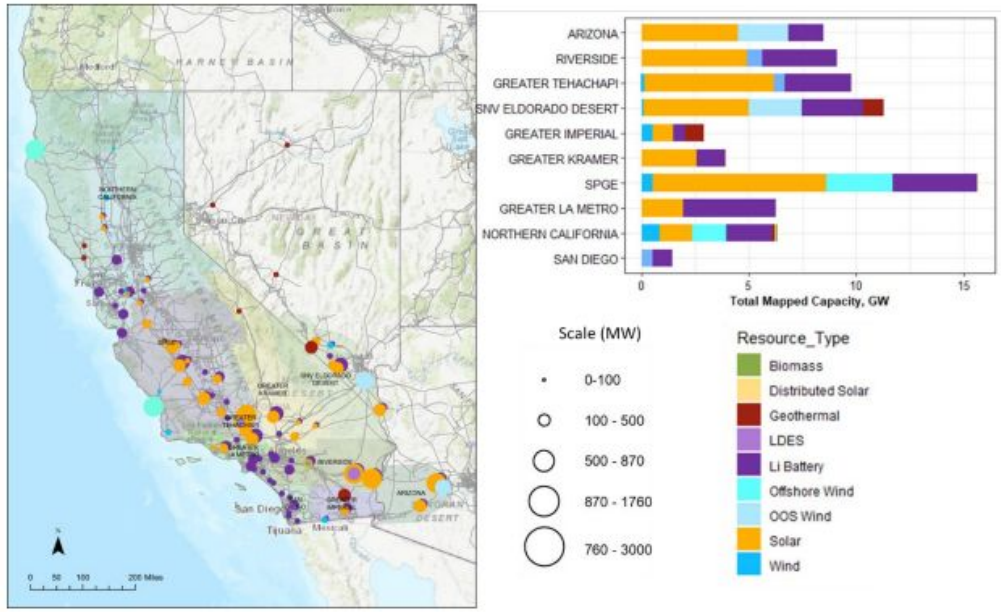


What & when…

Presentation Slide: Proposed Portfolios and Busbar Mapping for the 23-24 TPP
p.19

Where

Final Modeling Assumptions for the 23-24 TPP Report, 02/23/2023
p.5

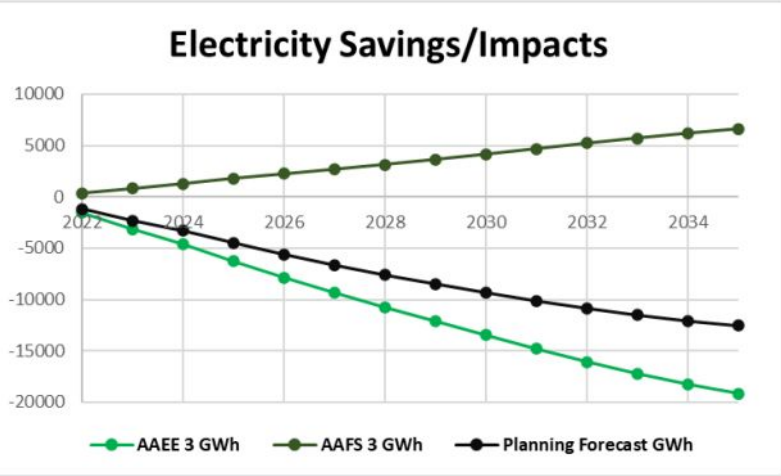


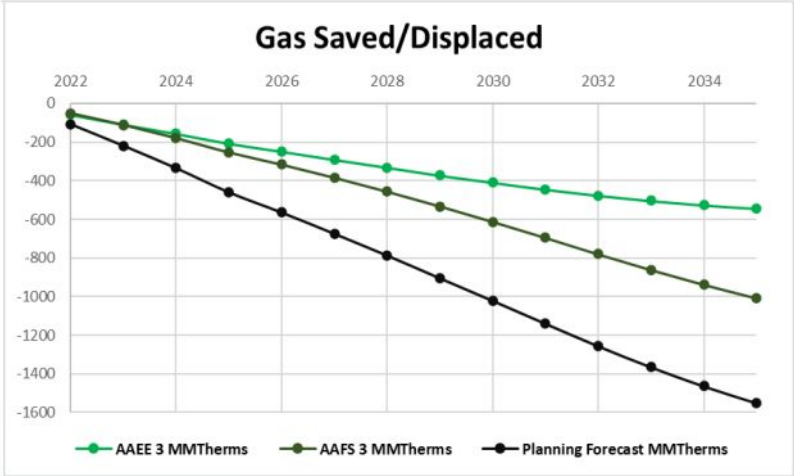
Resource procurement: turning plans into action

- LSEs exist to ensure their customers' demand is met
  - CAISO wholesale electricity market matches demand with supply
- To ensure state objectives are met, CPUC regulates California's electricity market via several approaches:
  - Resource Adequacy (RA) program
  - Integrated Resource Planning (IRP) process
  - Renewables Portfolio Standard (RPS) program
  - Demand-side proceedings (e.g., High DER, Demand Flexibility, etc.)
- RA program requires mandatory procurement of reliable capacity by LSEs 1-3 years ahead
- IRP process looks further out, particularly re the need for new resources
  - 18.8 gigawatts of clean new reliable capacity required online 2021-2028
  - Transitioning to a programmatic approach

Electricity demand forecast includes building electrification

2022 Planning Forecast
AAEE 3 & AAFS 3





- **Both AAEE and AAFS reduce gas consumption statewide**
- **While AAEE 3 also reduces electricity consumption, AAFS 3 adds an incremental amount; however, the overall combined electricity consumption is still reduced**

22

- Building electrification = Additional Achievable Fuel Switching (AAFS)
- ~6,000 GWh per annum by 2035, more than offset by Additional Achievable Energy Efficiency (AAEE)
- For context, total demand is ~250-300,000 GWh per annum
- Also consider 2022 State Strategy for State Implementation Plan: proposed zero-emissions space and water heaters from 2030
- Impact on net peak is what matters for reliability

California Energy Commission, Updating Additional Achievable Fuel Substitution with the California Air Resources Board State Implementation Plan December 7, 2022

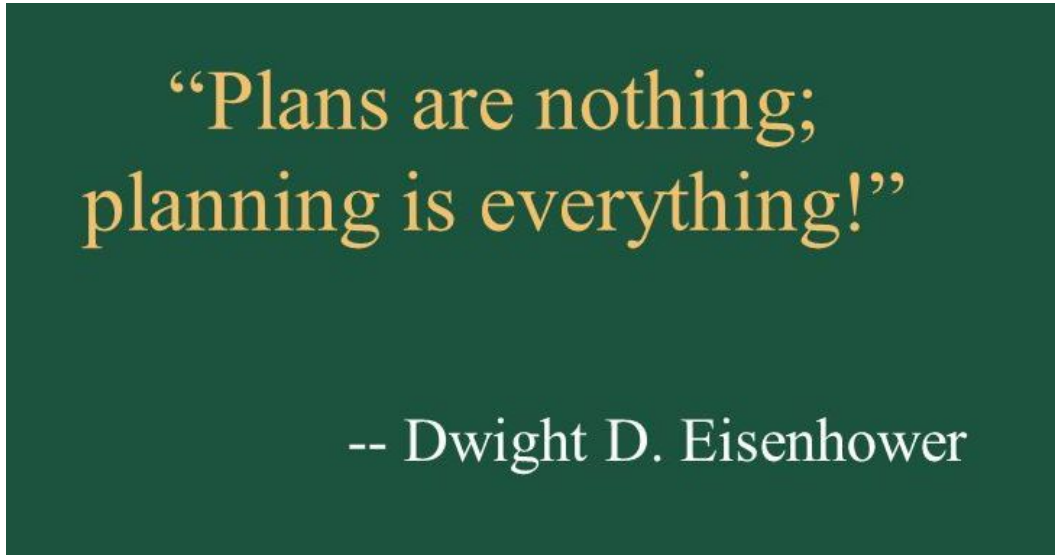
Considerations for RICAPS Multi-city Working Group

- Electrification is a key strategy to decarbonize our economy
- Our electricity system planning processes - demand forecasting, IRP, and transmission planning - are designed to consider/guide/implement transport and building electrification
- Current bulk system reliability challenges are after sunset in late summer
- Building electrification is expected to increase demand in winter; potentially transition to a winter peaking system ~mid-to late-2030's
- Stakeholder participation in planning processes is crucial

Further Information

- 2022-2023 IRP Cycle Events and Materials (ca.gov)
- California Energy Commission: Energy System Reliability Docket Log
- California Energy Commission: 2022 IEPR Docket Log

- Neil Raffan, Regulatory Analyst, IRP
  - 415.703.2013
  - Neil.Raffan@cpuc.ca.gov



Grid Planning Overview

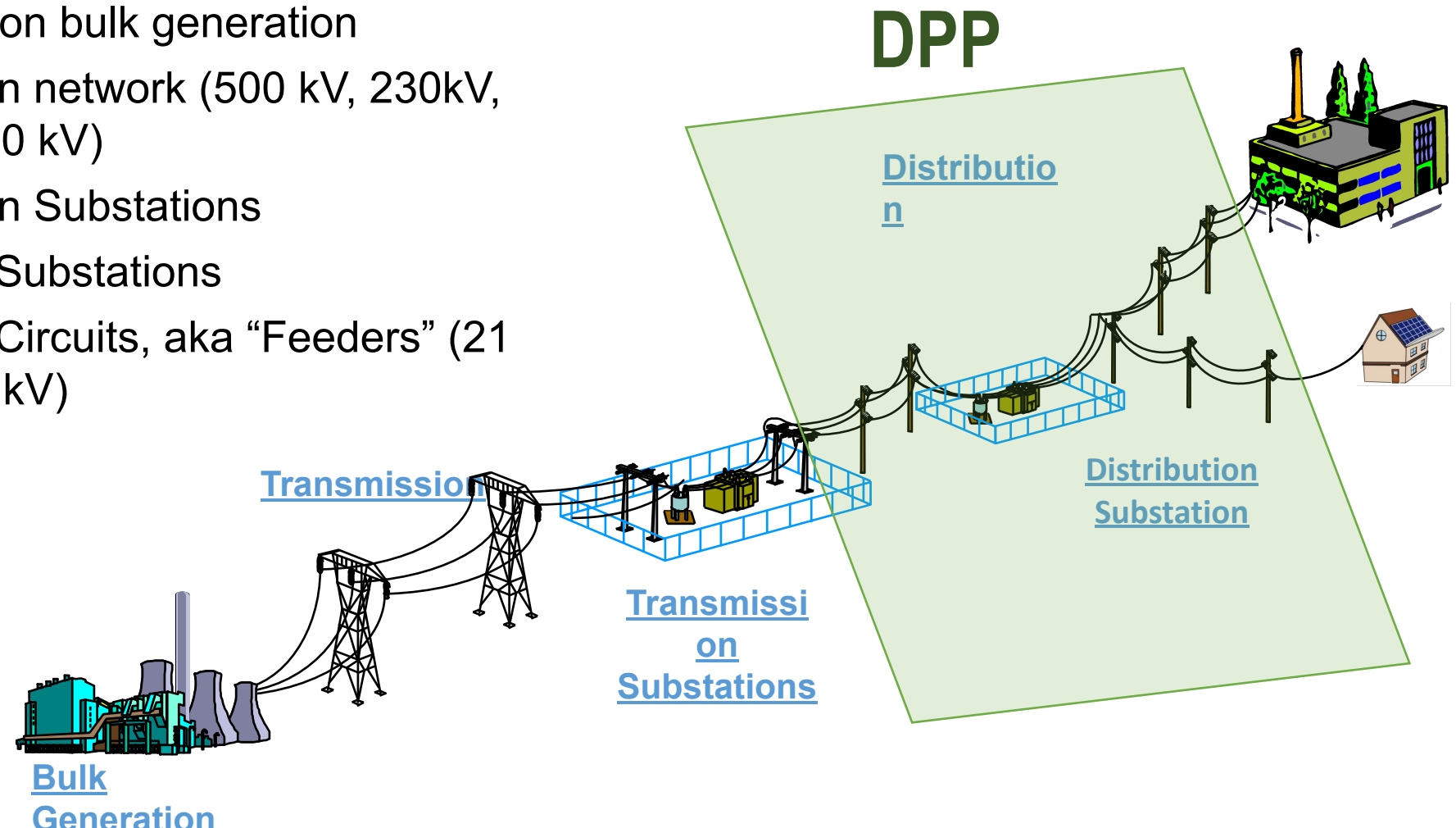
May 23, 2023

Distribution Planning Process (DPP)

Electric Power System Overview

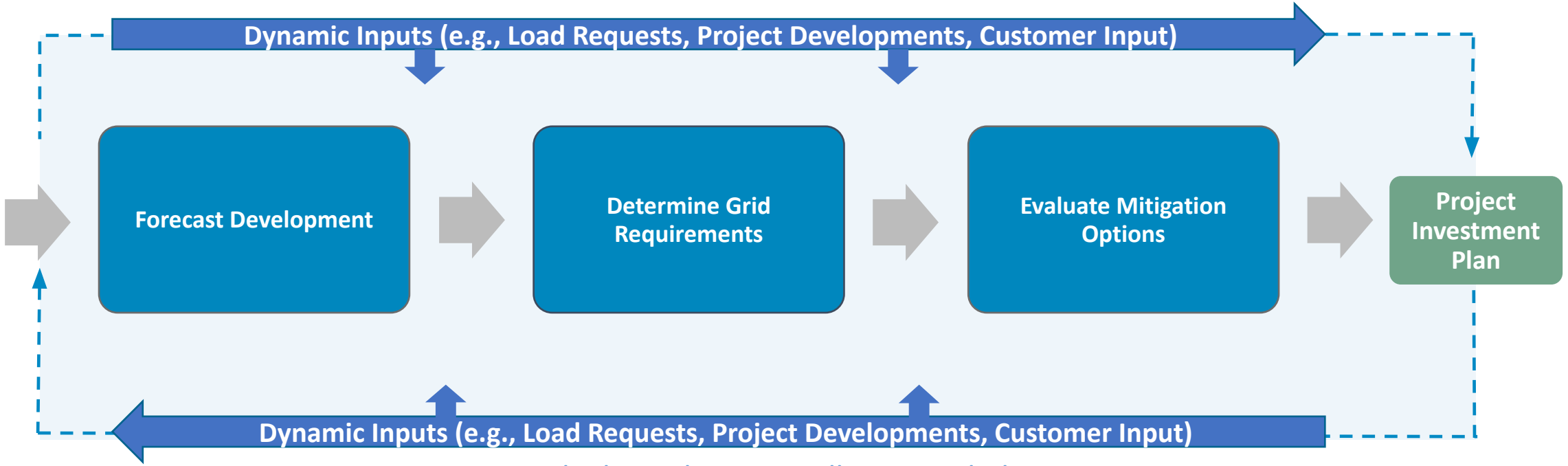
The electric power system broadly consists of:

- Central-station bulk generation
- Transmission network (500 kV, 230kV, 115 kV, 70/60 kV)
- Transmission Substations
- Distribution Substations
- Distribution Circuits, aka “Feeders” (21 kV, 12 kV, 4 kV)



Distribution Planning Process Overview

The current **Distribution Planning Process** is an **annual**, **dynamic process** that identifies projected **distribution capacity** deficiencies and determines mitigation plans to address those projected deficiencies.



Revisit and adjust plans annually, as needed

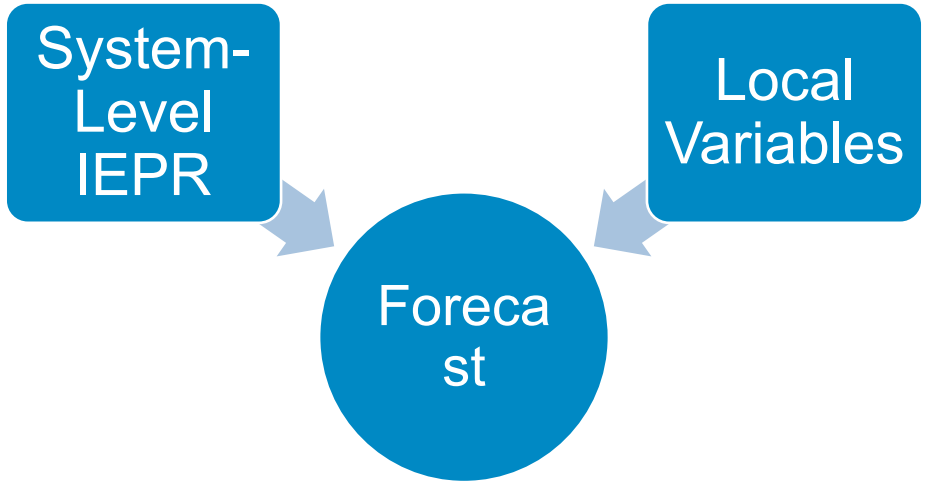
Forecast Development*

Load Forecast

- Utilize California Energy Commission's (CEC) Integrated Energy Policy Report (IEPR) (top down) forecast of system-level electric load growth
- Utilize localized variables (bottom up) such as historical area loading, economic indicators and temperature data
- Develop 1-in-10-year temperature-adjusted load forecast at the substation and circuit levels
- Load Service Applications
  - Account for requests for new load service at specific locations with specific in-service dates
  - Customer engagement on load applications

DER Forecast

- CEC's forecast of system-level DER growth disaggregated to circuit and substation level and added to forecast
  - DER hourly profiles are incorporated into the load forecast
  - DERs can increase load (e.g., EVs) or decrease load (e.g., solar PV)



*Detailed process for each IOU to be presented in upcoming Distribution Forecast Working Group (DFWG) Meeting

Determine Grid Requirements

Considerations

- Impact of projected forecasts on existing capacity equipment and configurations
- Maintain safety and reliability for customers
- Effects of planned utility projects and transfers
- Maintain operability to transfer customers under emergency conditions
- Diversity of specific geographic load and customer mix
- Effects on protection schemes
- Incorporation of local knowledge on customer needs and inputs

General Process

- Determine Thermal Capacity Needs
- Evaluate Voltage and Power Quality Needs

Evaluation of Mitigation Options

Transfers/Operational changes

- Utilize existing capacity, where available

Incremental Upgrades

- Identify smaller system upgrades to enable use of existing capacity

New Capacity

- Determine if a capacity increase is needed (e.g., new circuit, substation capacity increase, new substation)

DER Solutions

- e.g., DIDF sourcing, Customer-driven projects

Guiding Principles

- Cost effectiveness for customers
- Ensure all grid requirements are met (e.g., capacity, voltage, reliability)
- Ensure system reliability and power quality
- Considerations:
  - Customer needs
  - Forecasted loads and dependable information about future growth
  - Impact on grid operations
  - Mitigation options that address multiple grid requirements
  - Ensure equal treatment for all customers

Scope of Distribution Capacity Improvement	Typical Timeline
Distribution line work to increase capacity or reconfigure circuits	12-36 months
Add a new circuit from an existing substation	24-36 months
Add or replace a substation transformer at an existing substation	36-48 months
Build a new substation	5-10 years depending on agency with CEQA oversight responsibility

Ongoing Improvements to the DPP

- Engaging with Fleets to obtain multi-year load data and profiles
- Use of CEC's IEPR forecast scenarios that are aligned with state policies on electrification
- Increased complexity is driving the need for more advanced distribution planning tools and processes
- Leveraging existing outreach efforts with communities and customers to better inform the DPP
- Improving ICA data (e.g., hosting capacity data) to better inform customers on interconnection options
- Exploring the use of load flexibility/management to facilitate interconnection and provide bridging solutions
- Explore utilities orchestration of flexible load management and DERs

PENINSULA CLEAN ENERGY

Peninsula Clean Energy: 24/7 Renewable Procurement

RICAPS Meeting

May 23, 2023

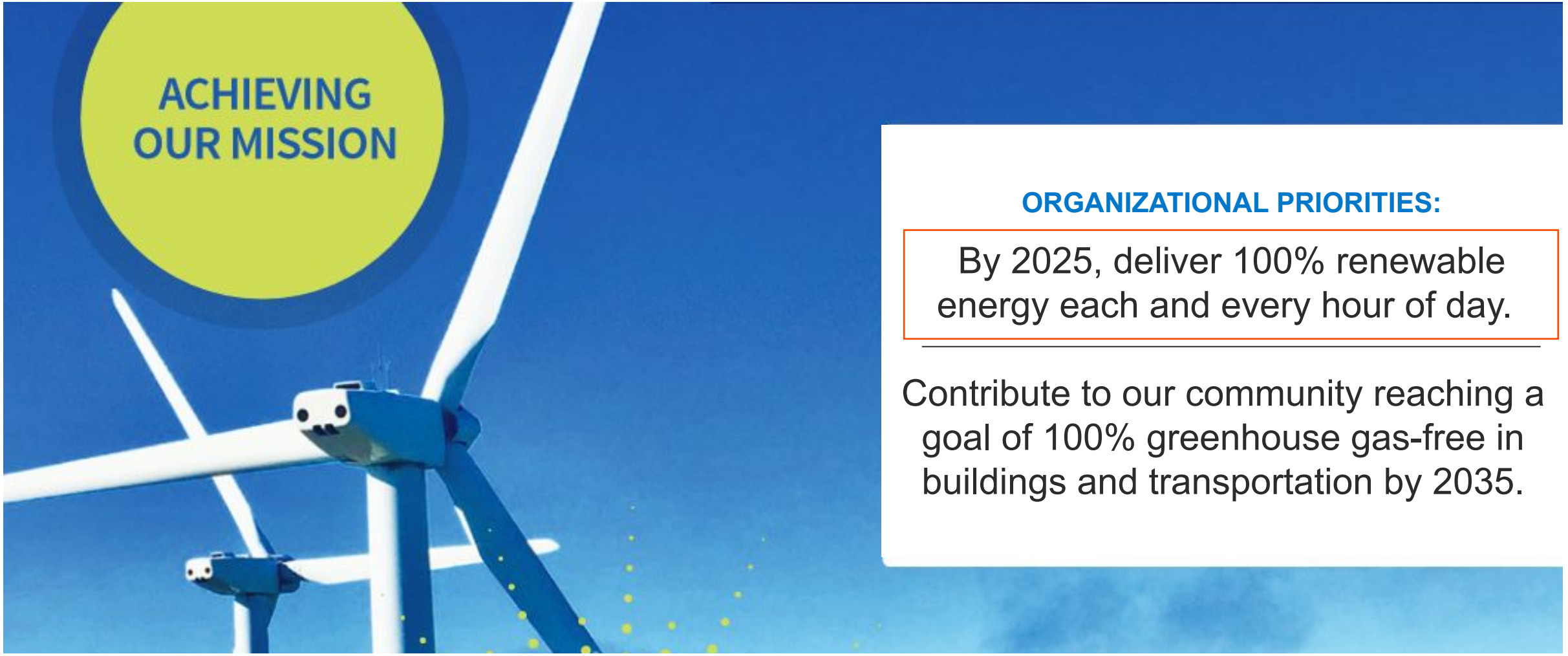
Outline

- Peninsula Clean Energy Introduction and review of how CCAs work
- Electricity Procurement Considerations
- 24/7 Renewable Procurement
- Load Forecasting
- Peak Load Forecasting
- Summary

Introduction to Peninsula Clean Energy

- Community Choice Aggregator serving San Mateo County and the City of Los Banos
- Total service area population ~810,000
- 310,000+ customers
  - 10% C&I, but accounts for 60% of load
  - 90% Residential
- 97% overall participation rate
- Peak Load: 750 MW
- Annual Load: 3,600 GWh

Peninsula Clean Energy's Mission

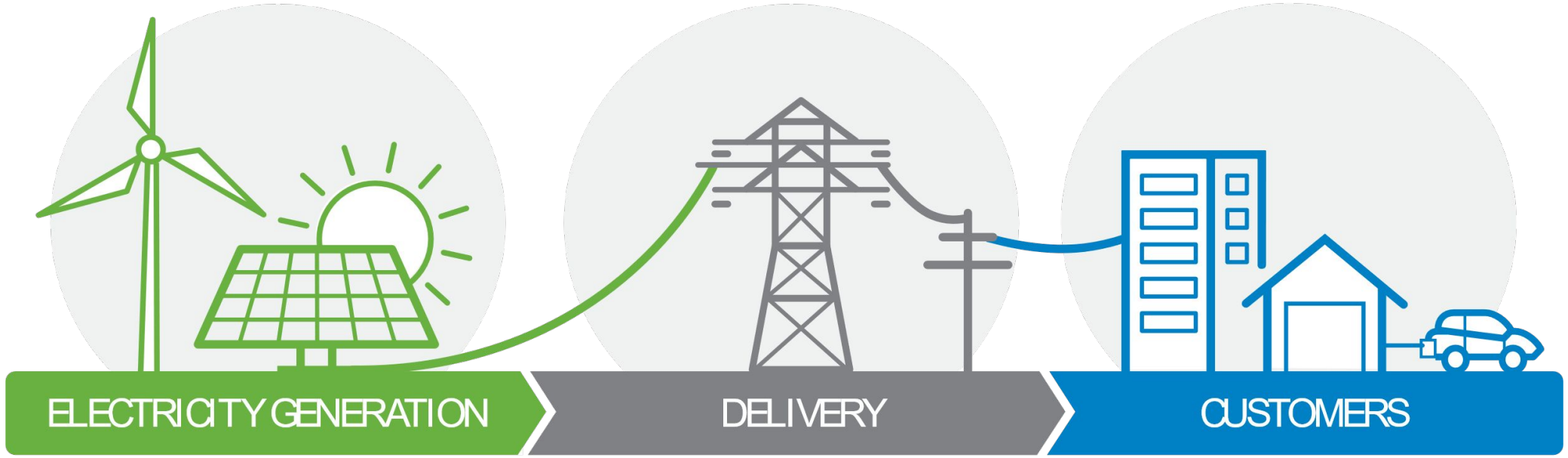


ORGANIZATIONAL PRIORITIES:

By 2025, deliver 100% renewable energy each and every hour of day.

Contribute to our community reaching a goal of 100% greenhouse gas-free in buildings and transportation by 2035.

Peninsula Clean Energy's Role in Electricity Service



Peninsula Clean Energy provides electricity from clean sources at lower rates than PG&E

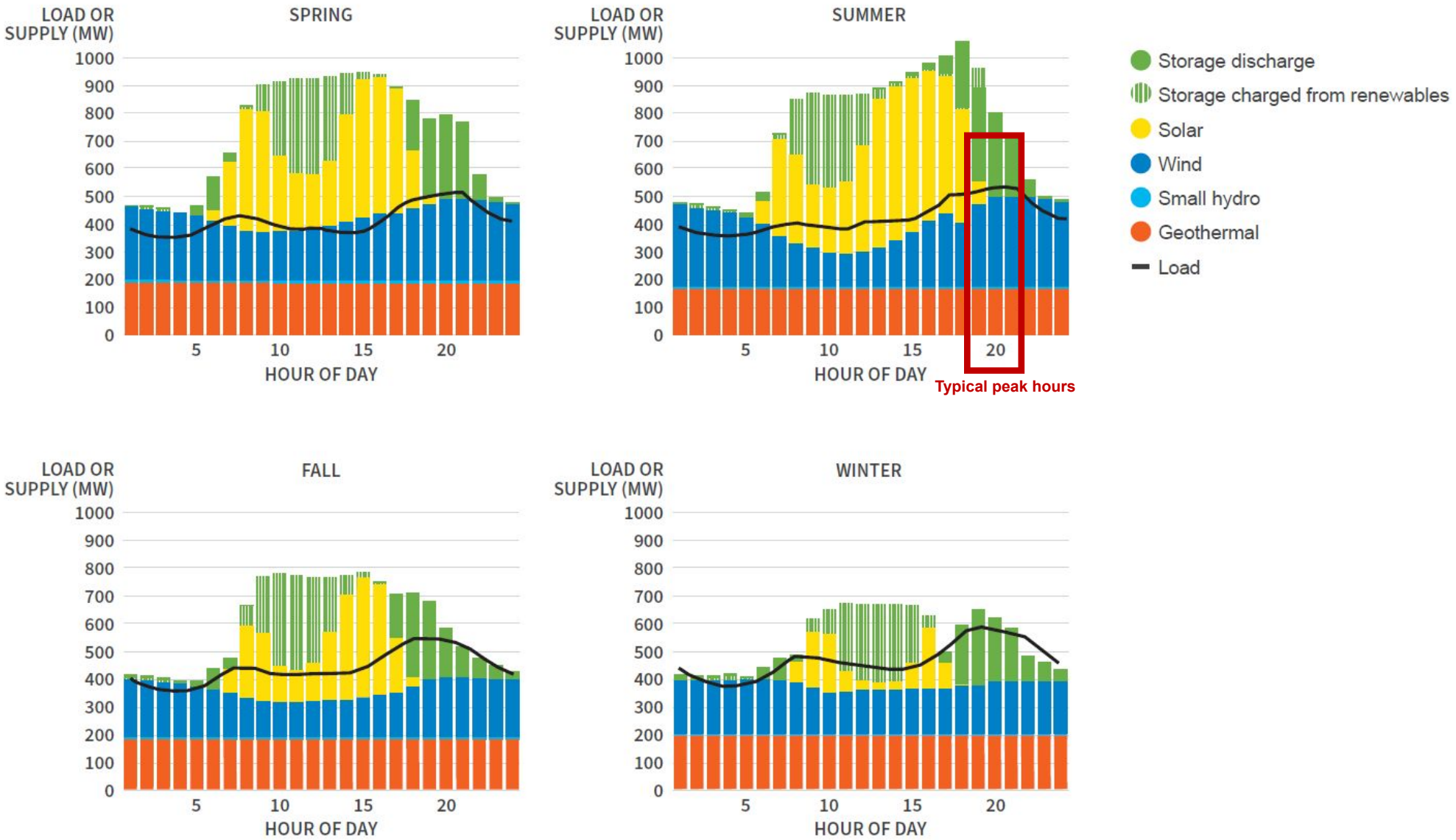
PG&E owns the power lines that deliver the power we generate, and they send a consolidated bill

Customers of Peninsula Clean Energy are helping the environment and saving money

Electricity Procurement Considerations

- Most electricity generation suppliers in CA (like Peninsula) must procure:
  - Renewable content ("RPS")
    - Minimum: state RPS requirements; or higher internal goals like SMC's 100% renewable goal
  - Resource adequacy ("RA")
    - Based on forecast peak load plus a "planning reserve margin"
  - Energy market price protection (hedging)
- Peninsula Clean Energy's 24/7 Procurement Approach allows us to contract for all three requirements at once, ensuring that we are holistically planning for and building our share of the California grid needs
- A "non-24/7" approach requires separate procurement for each product, and can lead to disjointed planning, or "tragedy of the commons"

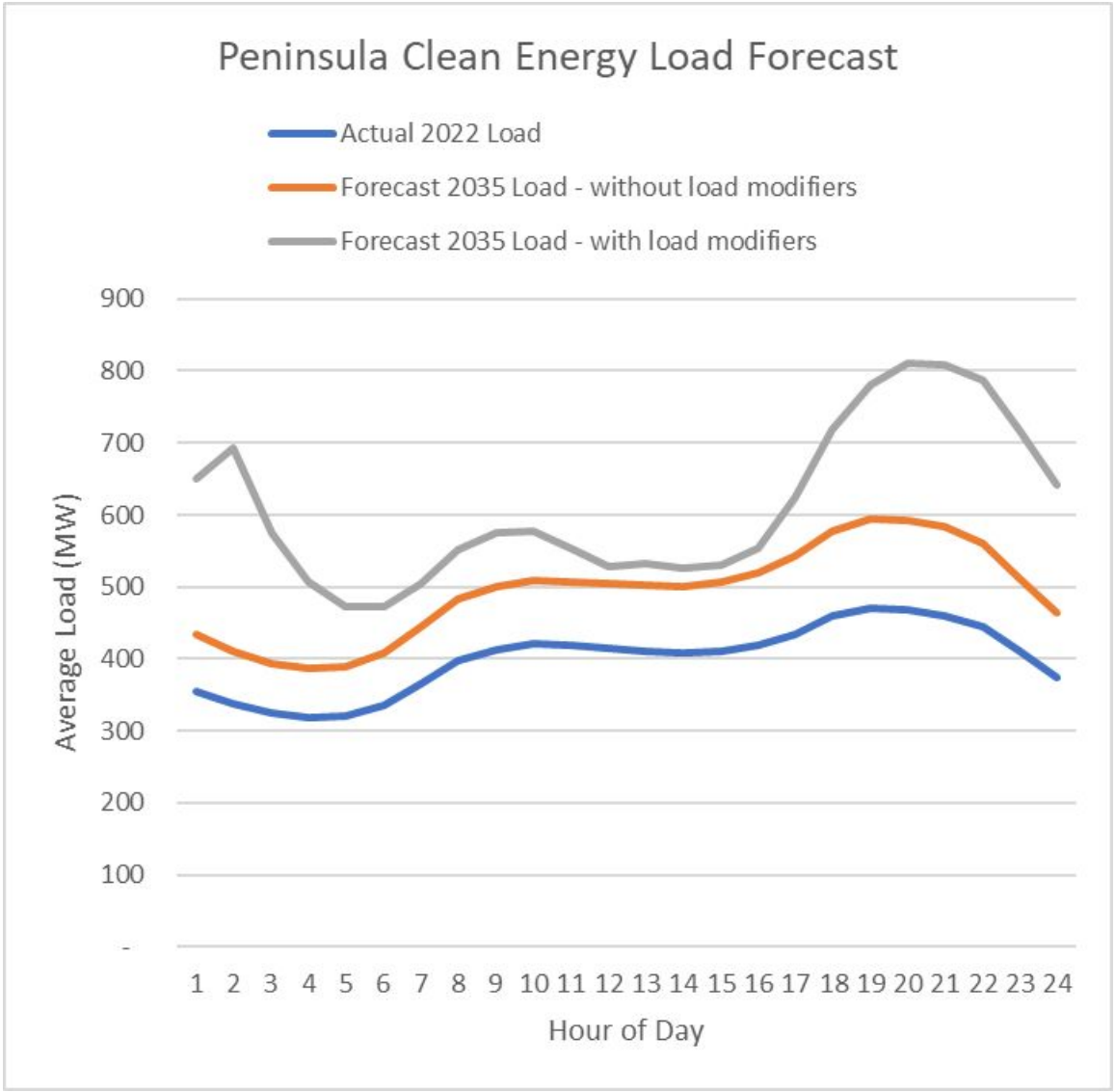
24/7 Renewable Energy Procurement



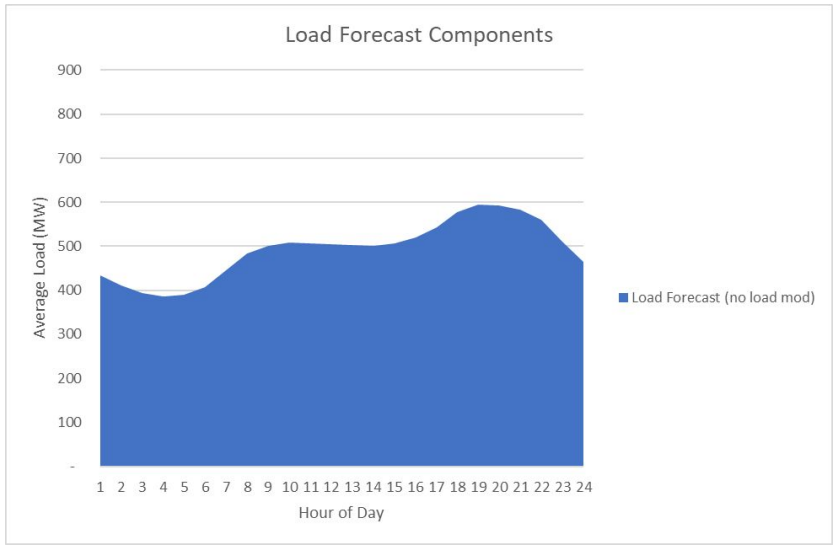
Non-24/7 Renewable Energy Procurement

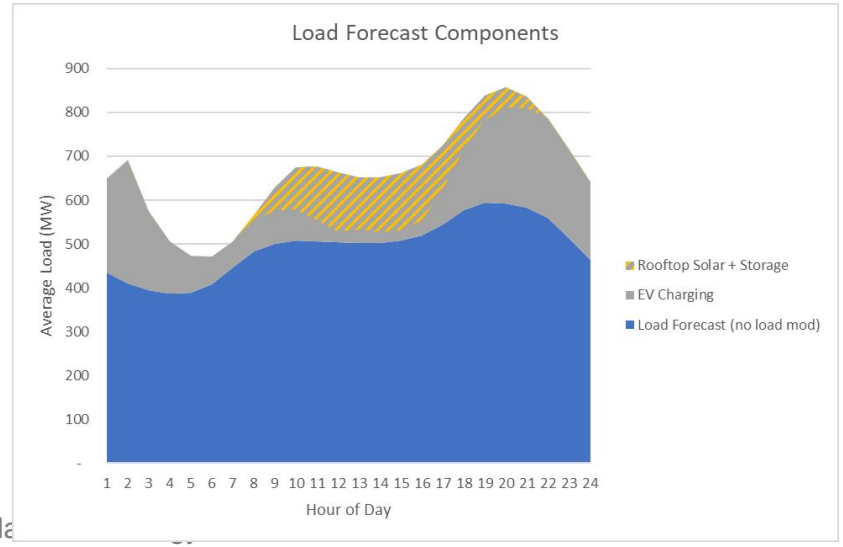
Load Forecasting Considerations

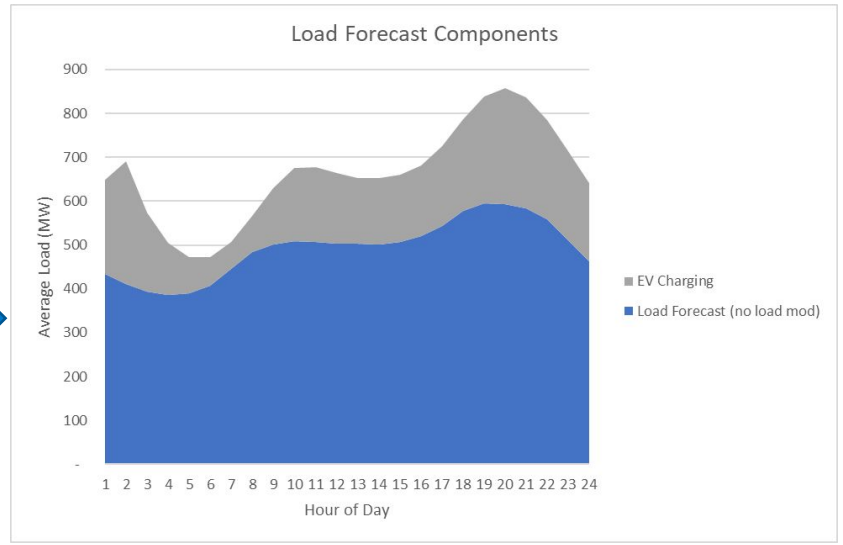
- Peninsula Clean Energy creates long-term (20+ years) hourly load forecasts for our service territory that include:
  - Rapid EV adoption
  - Moderate rooftop solar adoption
  - Moderate growth in housing stock and commercial activity
  - Adjustments for post-COVID behavior
- We are currently working on adding specific effects of building electrification to our forecast.

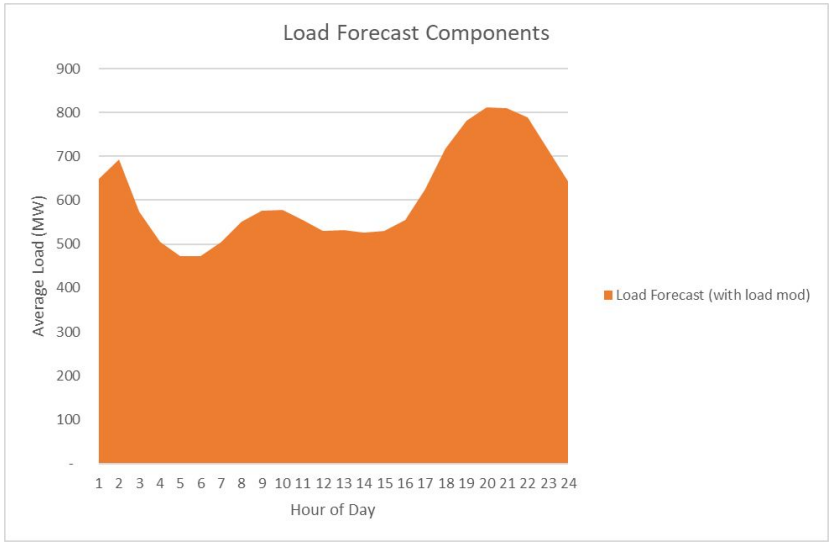


Load Forecast Components (2035 shown)



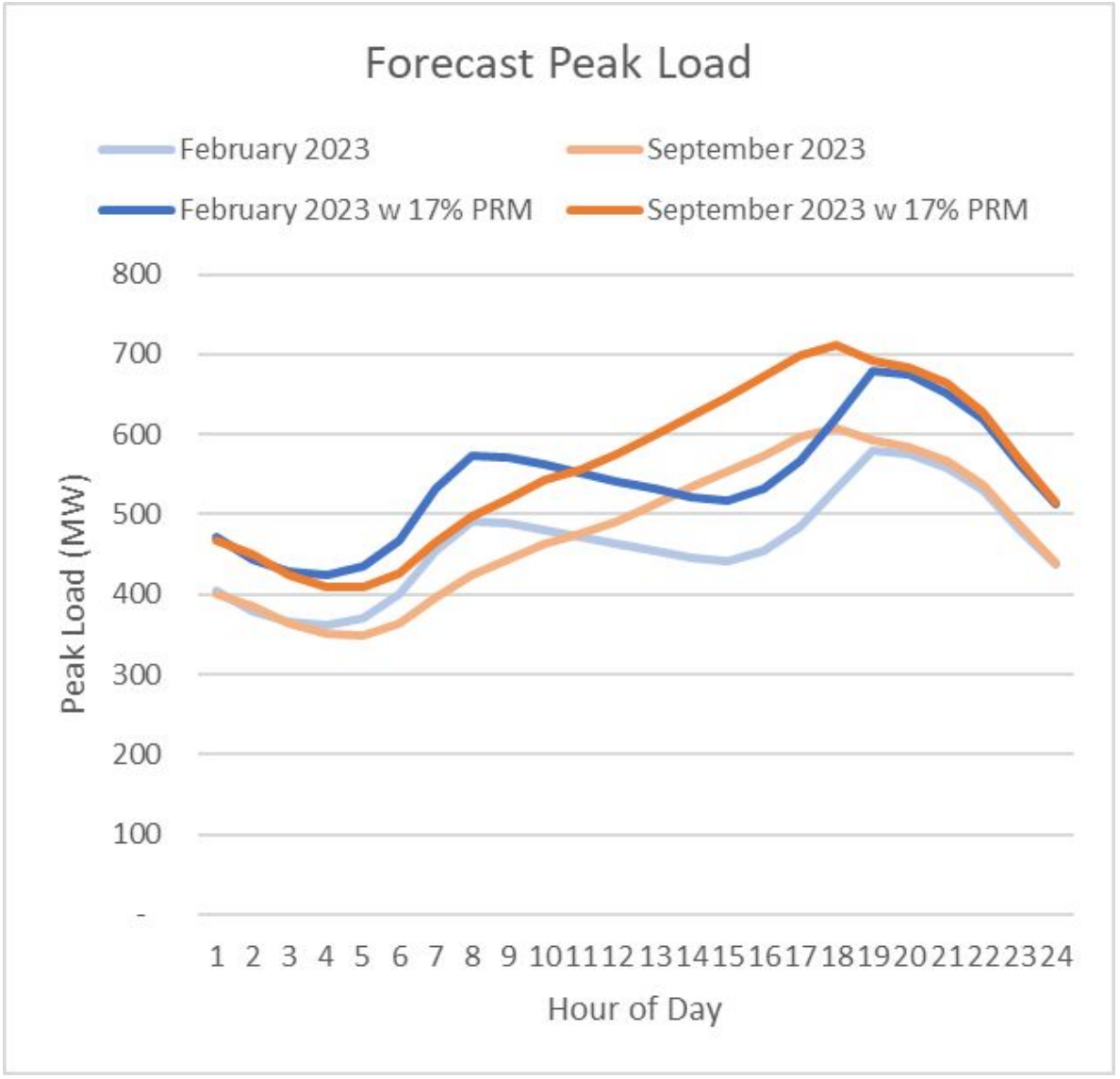






Peak Load and Resource Adequacy

- Peninsula Clean Energy forecasts the 24-hr load on the peak load day of each month
  - Peak load is based on a 50% exceedance weather month - not very conservative.
  - For comparison Sept 2022 in our service area was <2% exceedance weather month.
- Additional 17% “planning reserve margin” is added to our forecast to account for more extreme weather (more extreme than the 50% exceedance)



Summary

- Peninsula Clean Energy's 24/7 Renewable strategy helps San Mateo County and Los Banos holistically plan for our "fair share" of grid reliability.
- Peninsula Clean Energy is forecasting and planning for high EV adoption and moderate growth in other areas.
- Peninsula Clean Energy is forecasting and planning for 24-hr peak load needs for San Mateo County and Los Banos.

Thank you!

www.PenCleanEnergy.com

Please go to the link in the chat to take your *quick* survey!