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Description:	2A. Kurtis Kolnowski, PG&E
Filer:	Raquel Kravitz
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Incorporating Clean, Firm Resources into PG&E's Integrated Resource Planning

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Presenter(s): Kurtis Kolnowski – Manager, System Planning Analytics

CPUC IRP Overview

CPUC leads integrated resource planning process for jurisdictional entities and produces new portfolios about every year. Load-serving entities (such as PG&E) actively engage in this process and provide our own plans every 2-3 years.

Roles by Organization (very high level):

- The **CPUC** oversees IRP process for 40+ load-serving entities making up most of CAISO load.
 - CPUC produces a new resource portfolio about once a year. These are transmitted to the CAISO for transmission planning.
 - Energy Division Staff, their consultant E3, and others provide a consistent set of assumptions for use in resource planning.
- The **CEC** develops the load forecast to be assessed. The latest forecast is the 2024 Integrated Energy Policy Report (IEPR) released in February 2025.
- The **CAISO** assesses the load and resource portfolios and identifies transmission upgrades for the system.
- **Load-serving entities** develop their own IRPs every 2-3 years using assumptions consistent with the CPUC. They also report out on procurement progress and resource tracking and engage in all parts of the IRP process led by the CPUC.
- **Other intervenors and stakeholders** participate throughout the proceeding.

IRP Portfolio Key Considerations

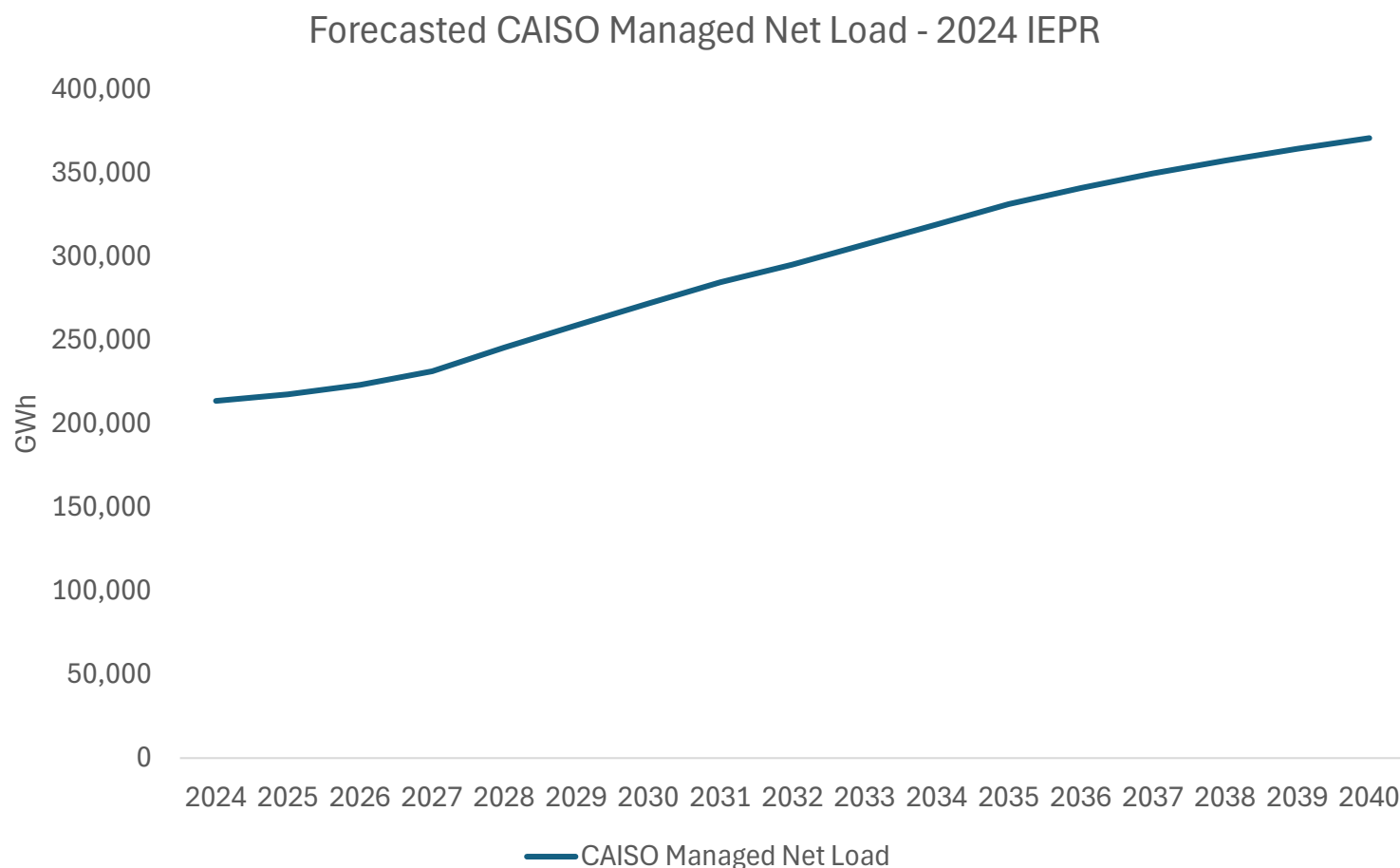
Resource plans optimize for reliability, sustainability, and affordability.

CPUC and LSEs run complex energy system models that optimize supply buildout to meet reliability standards and decarbonization targets at least cost.

- **Reliability**: Intended to ensure that the future energy system is designed to serve load with minimal downtime. Current standard is one loss of load event in every ten years.
- **Sustainability**: Portfolios must meet the greenhouse gas emissions, clean energy, and renewable portfolio standards set by legislation, state agencies, or CPUC decision.
- **Affordability**: The key variable optimized for is total system cost. Complex numerical solvers estimate a least cost portfolio of resources that meets the established reliability and decarbonization criteria.

CAISO Electric Load Forecast Growth

The 2024 CEC IEPR forecast shows CAISO annual demand growing by more than 74% between 2024 and 2040, driven by data centers and electrification. Clean, firm generation profiles align well with this new demand.



Data centers operate at a high utilization factor.

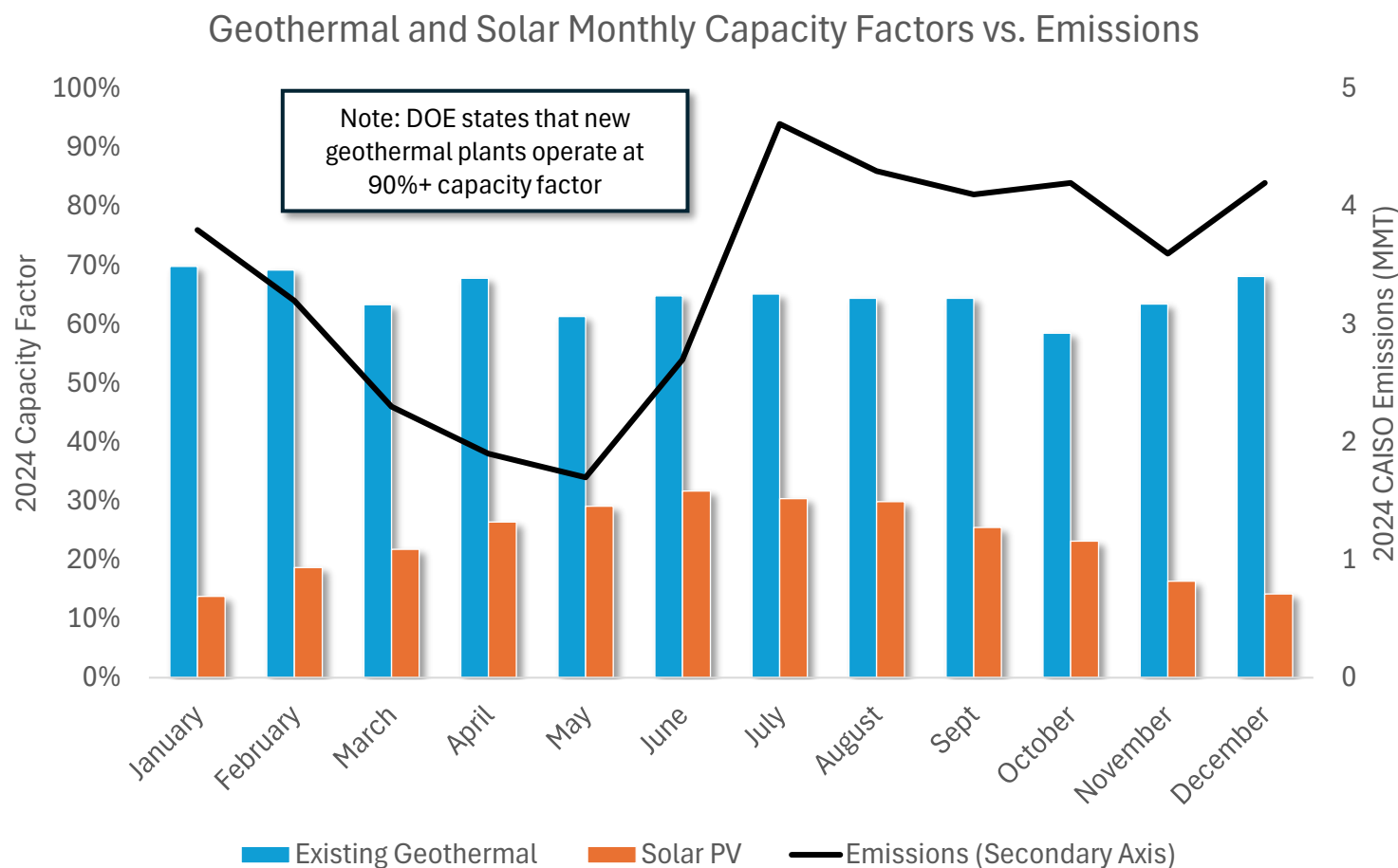
- Their load matches up very well with clean, firm generation profiles.

Electrification is driven by vehicles and buildings.

- Currently, most electric vehicle (EV) charging happens outside daytime hours where solar is not generating but clean, firm is.
- Building electrification (BE) load growth is centered outside summer months as electric heating equipment is installed.

Clean-Firm Generation's Role on System

Clean, firm generators provide energy during hours and seasons where intermittent resources are less available.



Clean, firm resources generate at a higher capacity factor (CF), providing energy more energy per installed MW.

- Solar PV generation significantly lower in the winter (CF is almost 20% lower than summer)
- As more intermittent renewables are added to the system, summertime emissions decline faster than wintertime.
- Less renewable energy present in winter for storage to shift.

Clean, firm resources generate overnight. Less storage losses incurred if supply can “follow load”.

Sources:

- EIA Table 6.07.B. Capacity Factors for Utility Scale Generators
- CAISO GHG Emission Tracking Report, December 2024

Thank You

Questions?

Kurtis Kolnowski, Manager – System Planning Analytics

Kurtis.Kolnowski@pge.com