DOCKETED	
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IEPR Commissioner Workshop

Distribution System Planning

October 2nd , 2024

The Individual Customer Perspective

Single Family Home 240 Volt 100 Amp panel example:

Total amount of breakers to serve loads 190 Amps (A)

Main breaker or panel limit is 100 Amps (A)

Typical Peak Demand for year is 50 Amps (A)

Total amount of facilities needed to serve all the loads in the house is 190A or (190A & 240V) = 45.6kVA

Application for service demand based on panel size 100A or (100A x 240V) = 24kVA (Used for equipment sizing and IEPR reconciliation)

The IEPR estimated load is around 50A or (50A x 240V) or 12kVA

Do you think this is a valid estimate? If so, what year would this happen? What kind of load diversity is this assuming?

The Utility Perspective and Facility Sizing

PG&E Estimated IEPR Peak Load 23000MW:

Transmission Capacity Needed might be 20% higher

23000MW + 4600MW = 27600MW

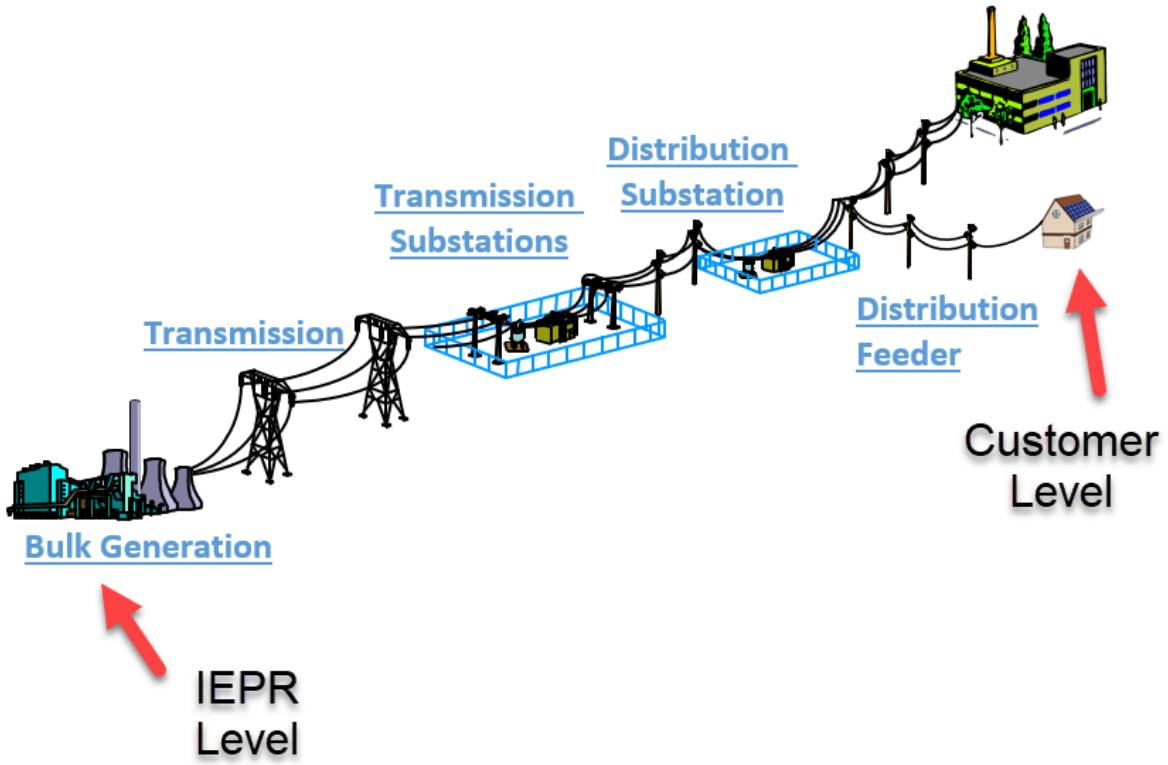
Substation Capacity Needed might be 20% higher

27600MW + 5520MW = 33120MW

Feeder Capacity Needed might be 20% higher

33120MW + 6624MW = 39744MW

The IEPR does not predict how much capacity at the various levels is needed to serve all the load or predict localized load diversity.



Typical capacity project timelines

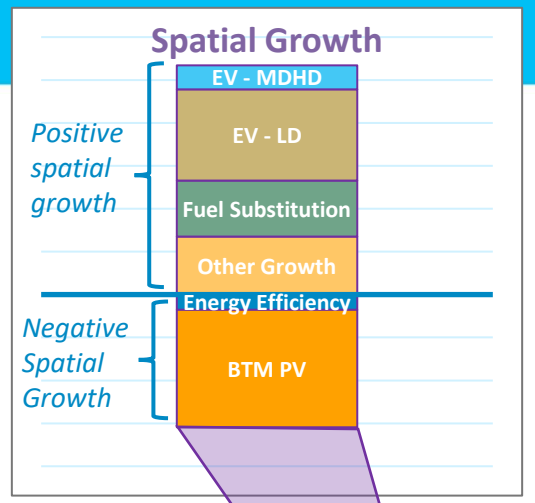
Scope of Distribution Capacity Improvement	Typical Timeline
Distribution line work to increase capacity or reconfigure circuits	12-36 months
Add a new circuit from an existing substation	24-36 months
Add or replace a substation transformer at an existing substation	36-48 months
Build a new substation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

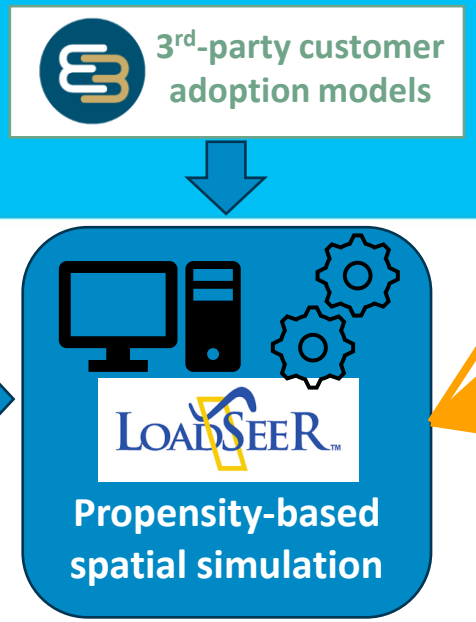
- Due to the uncertainty around size and location of new loads, PG&E primarily relies in information from customer applications.
- As a result of this process, PG&E's timeline to interconnect and develop upstream capacity is compressed.
- Majority of new business applications can connect without requiring a capacity project.
- In areas where a capacity project is required, PG&E uses interim solutions such as serving customer load as loads ramp up, developing projects in phases, implementing seasonal load limits, implementing a flexible connection, etc.

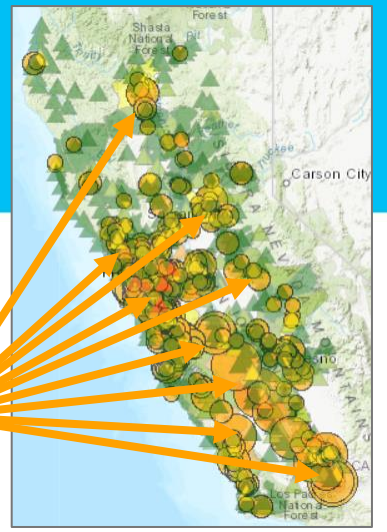
Load Growth Forecast

PG&E's system level growth forecast is capped by the Integrated Energy Policy Report (IEPR)

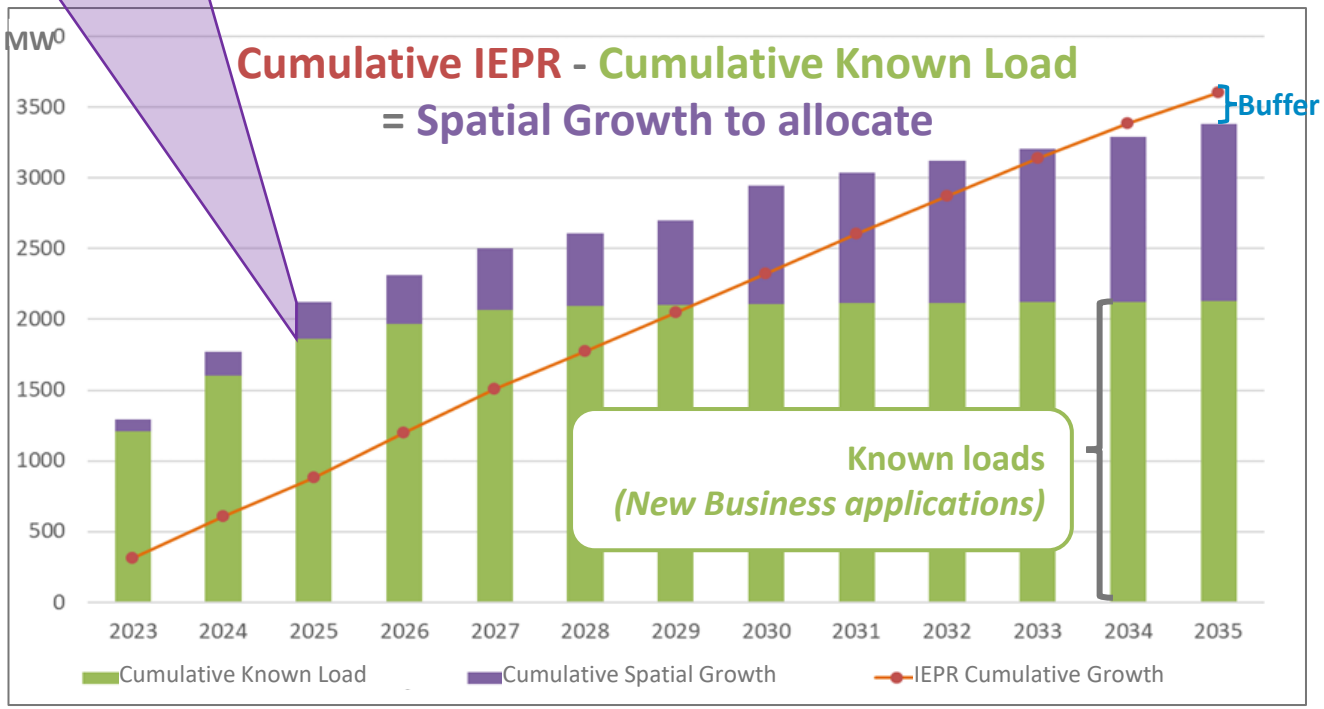
- CEC provides **IEPR** forecast
  - System level forecast
  - Subdivided by growth type
- PG&E deducts known loads, a.k.a. new business applications
  - Includes buffer to account for the next few months of applications
- Remaining **spatial growth** is **disaggregated** to distribution circuits based on customer likelihood of adoption
  - Propensities developed by partners such as E3
  - Simulation performed in LoadSEER







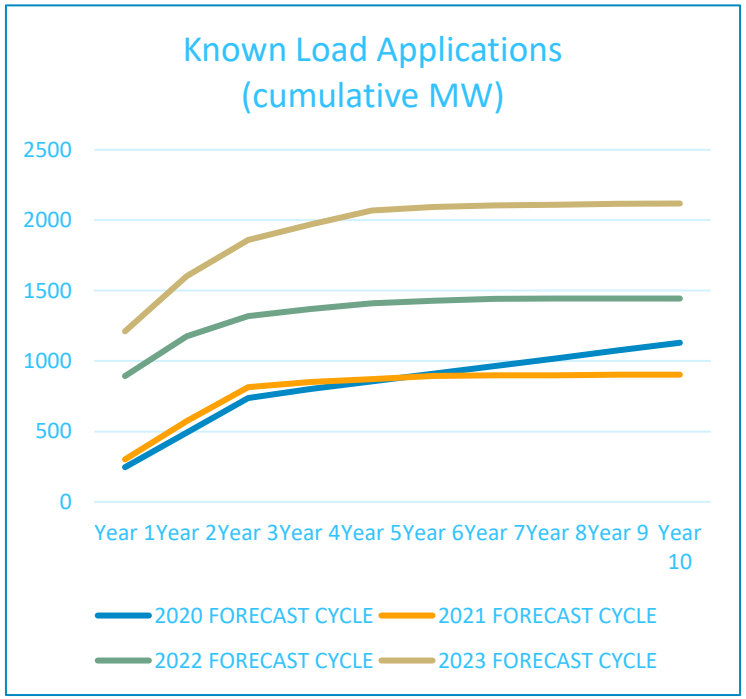
Annual spatial growth forecast disaggregated to ~3100 circuits



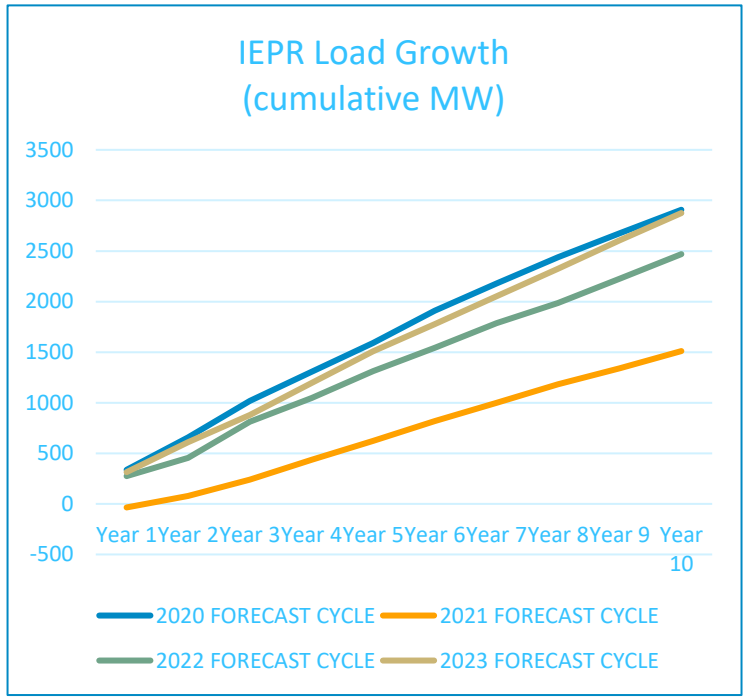
Load Growth Forecast

PG&E's system level growth is capped by the Integrated Energy Policy Report (IEPR)

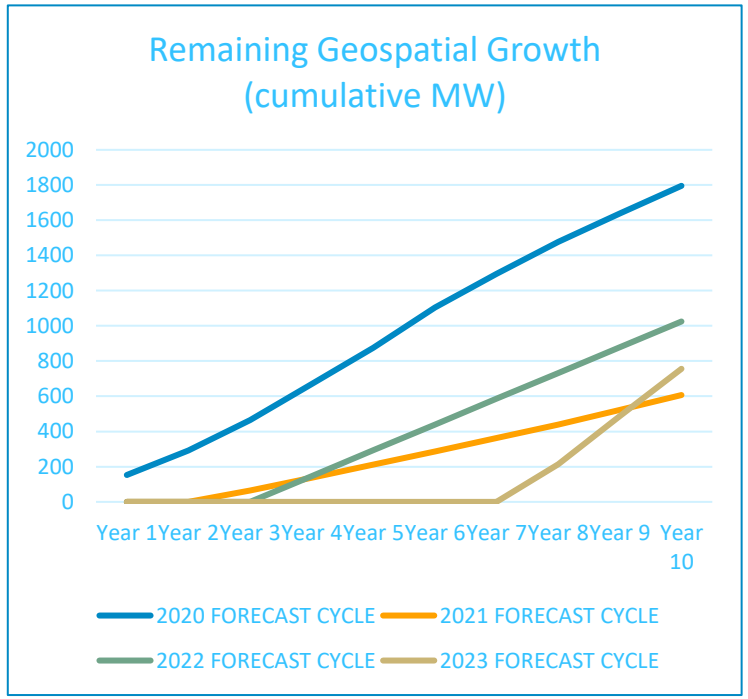
In recent years, the magnitude of known loads increased every forecast cycle…



…but load growth from the IEPR did not significantly rise…



…such that subtracting known loads left less and less geospatial growth.



**These charts exclude EV growth and EV applications, which are managed as a separate category. Applications and Growth include residential, commercial, industrial, and agricultural sectors. Cannabis, data centers, and infrastructure projects make up a significant proportion of the known load applications.*

Planning Tools: Architecture

Forecast Integration Tool
(a.k.a. WebApp)

Web-based Load Flow Modeling

Historical interval load data
(trillions of smart meter readings)
Forecast future service point load

Planned projects (hundreds/yr)
Planned transfers (hundreds/yr)
New business applications (~7500/yr)

LoadSEER™ Load Forecasting

ED GIS

As-Built Network Model

Mapping

SAP

New Business Applications

Service Planning

Distribution Plans, Reports, & Approvals

- New Business Reviews
- Large Load Studies
- Capacity Project Packages
- Grid Needs Assessment (Annual)

Substation + Transmission Engineering

Internal

Distribution Planning Process (DPP)

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.