

2024 IEPR: Data Center Forecast



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Feedback after November Workshops

- The data center forecast is too low
 - Does not consider new applications
 - Does not consider long-term growth (beyond what is included in the commercial sector forecast)
 - Does not account for redundancy (i.e., shifting load to a CA data center when a data center in another state is down)
 - PG&E submitted updated data to CEC on Dec 9 that shows substantially more requested capacity since their Sept submission
- Concerns about double-counting

This has been a continually evolving process, as we learn more every day. The data center methodology will be improved next year.



Data Received and Methods

Estimated Peak Load, using Assumptions from Existing Data Centers

SCE	<ul style="list-style-type: none">Capacity and confidence levels from data center applications and inquiries
PG&E	<ul style="list-style-type: none">Projections of capacity by year, based on ramping schedules included in applicationsData center inquiries
City of San Jose	<ul style="list-style-type: none">Received start dates, capacity, and ramping schedules for potential data center projects.

Utility-provided Data

SVP	<ul style="list-style-type: none">Annual peak demand for SVP system under 1-in-2 weather scenario.Broke out peak demand for data centers.
City of Palo Alto	<ul style="list-style-type: none">Annual peak demand for City of Palo Alto system under 1-in-2 weather scenario.Broke out peak demand for data centers.



Estimating Peak Load of Data Centers

Assumptions applied where needed, based on historical data for 60+ data centers in SVP territory:

- 1. Assume each data center starts at 5.0 MW in Year 0**
- 2. Ramp up year-over-year until the capacity requested is reached:**
 - a) 149% from Year 0 – 5**
 - b) 113% from Year 6 – 10**
- 3. Peak load of data center: ~67% of capacity**

Data Center Peak Load Estimate (MW) = Capacity (MW) * UF of 67%

Source: Silicon Valley Power (SVP). Data Center Load Estimation Data & Methods. SVP Engineering Division. Sep 11, 2024.



PG&E and SCE Applications

- For PG&E and SCE, projects were grouped by application status:
 - SCE projects already undergoing utility transmission and distribution planning
 - **Group 1:** Active applications with completed or to-be completed engineering studies
 - **Group 2:** Active applications prior to initiating engineering studies
 - **Group 3:** Project inquiries

Application Status	PG&E (% total capacity)	SCE (% total capacity)
T&D planning	-	6%
Group 1	63%	9%
Group 2	8%	27%
Group 3	30%	63%

Source: CEC Staff (with data inputs from PG&E and SCE)



PG&E and SCE Methodology Updates

- For PG&E and SCE, a confidence level was applied by application status:
 - SCE T&D planning
 - Group 1: completed or to-be completed engineering studies
 - Group 2: Active applications prior to initiating engineering studies
 - Group 3: Project inquiries

PG&E	Low	Mid	High
Group 1	50%	70%	70%
Group 2	-	-	50%
Group 3	-	-	10%

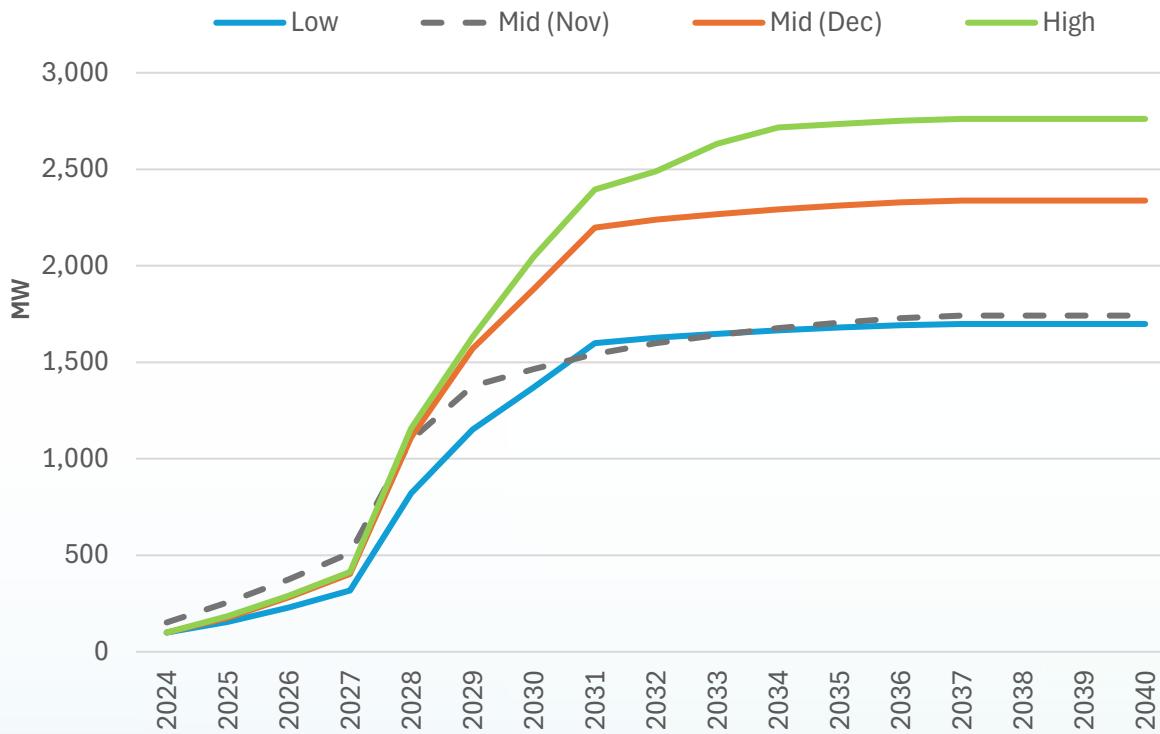
SCE	Low	Mid	High
T&D planning	100%	100%	100%
Group 1	50%	70%	70%
Group 2	-	50%	50%
Group 3	-	-	10% - 50% per SCE

Source: CEC Staff (with data inputs from PG&E and SCE)



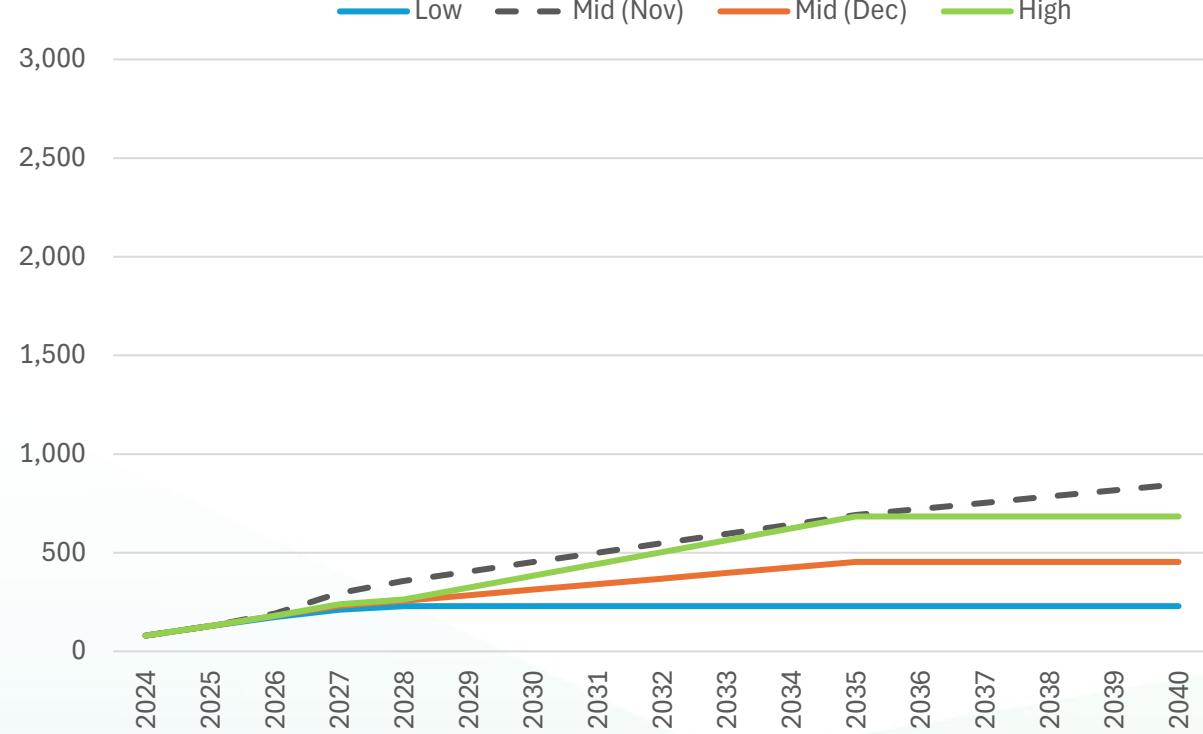
PG&E and SCE Data Center Peak Demand

PG&E



Difference between Mid (Nov) vs Mid (Dec) in 2040:
~ +600 MW

SCE



Difference between Mid (Nov) vs Mid (Dec) in 2040:
~ -394 MW



Data Center Growth Rate (CAGR)

History (Estimated):

	Palo Alto	SVP
2013 - 2022	19%	18%

Literature Review of Projected Growth in US Data Center Demand:

	McKinsey (Jan 23)	E3 (July 24)
Through 2030	10%	9-16%

CEC Forecast for 6 Utilities:

	Low	Mid	High
2024-2030	15%	19%	20%

Mid Case by Utility:

	Palo Alto	PG&E	SMUD	San Jose	SVP	SCE	Total - All Utilities
2024 - 2030	69% (2026-30)	52%	0%	47% (2029-30)	4%	21%	19%
2030 - 2040	0%	2%	0%	17%	3%	3%	3%

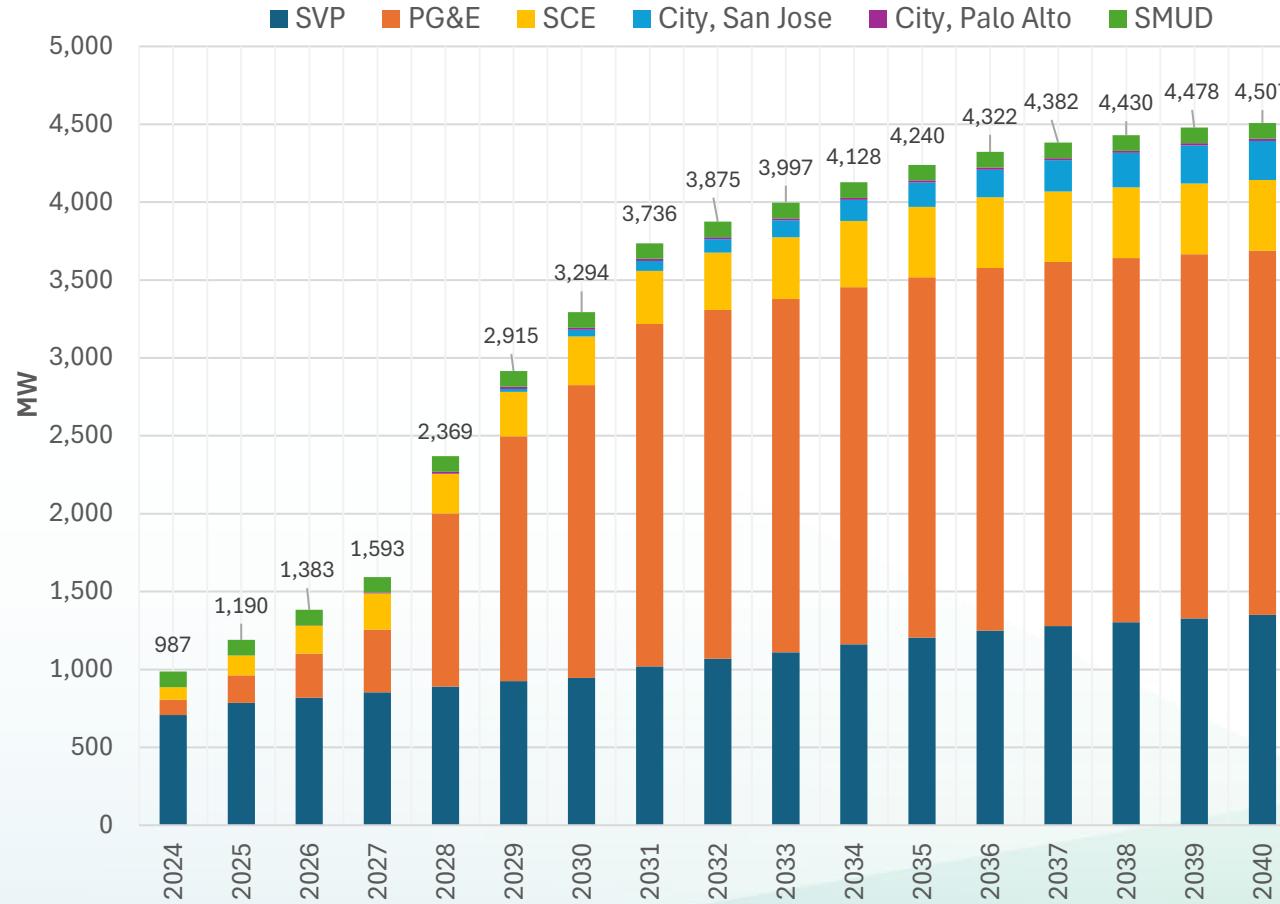
Source: CEC Staff



Data Center Peak Demand (MW)

Mid Case (Scenario 1): Dec Update

Mid Case (Scenario 1) December Update:
Annual Average Growth Rate, 2024 – 2030: ~19%



Total Demand (MW), Scenario 1 (Mid) Dec Update: (2025) ~1,190 (2026) ~1,383 (2040) ~4,510

Source: CEC Staff (with data inputs from PG&E, Palo Alto, SVP, San Jose, SCE) ⁹



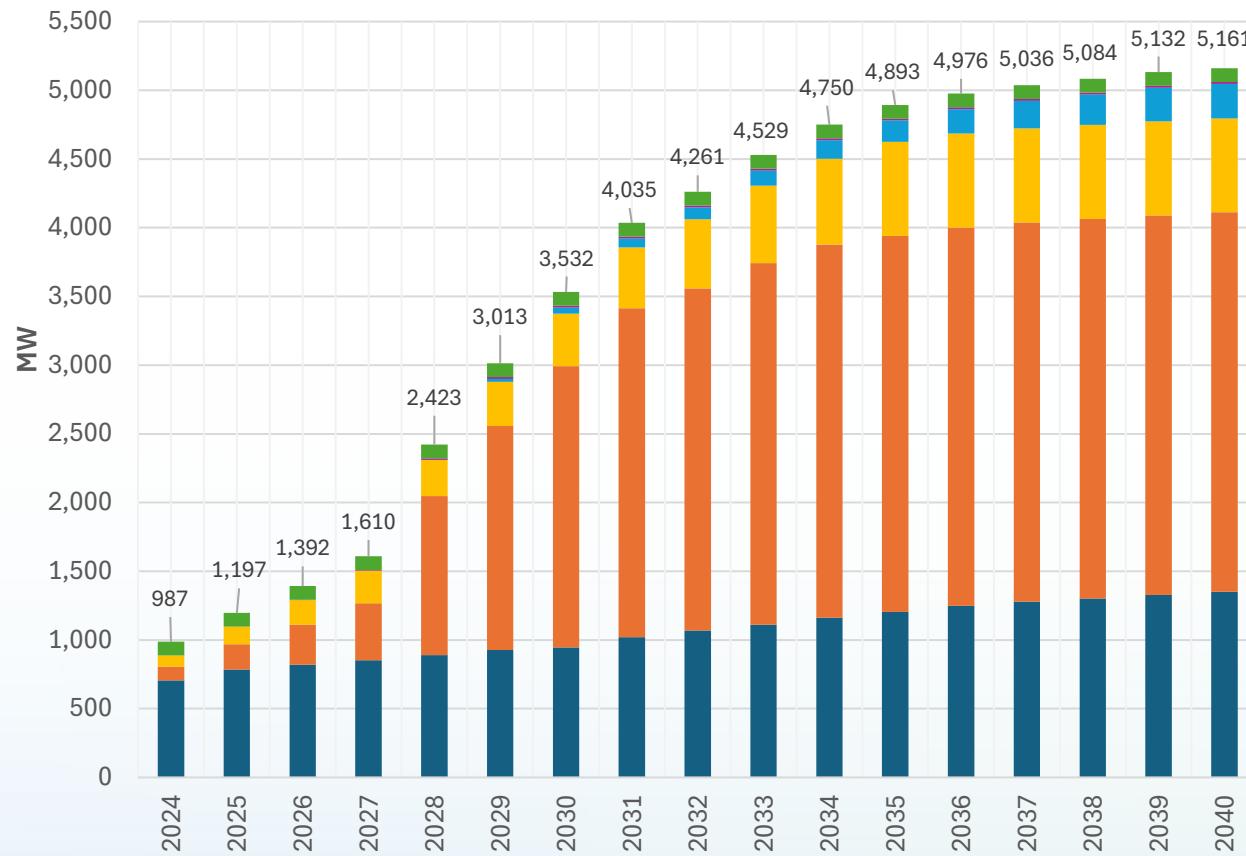
Data Center Peak Demand (MW)

High vs. Mid (Dec Update)

High Case:

Annual Average Growth Rate, 2024 – 2030: ~ 20%

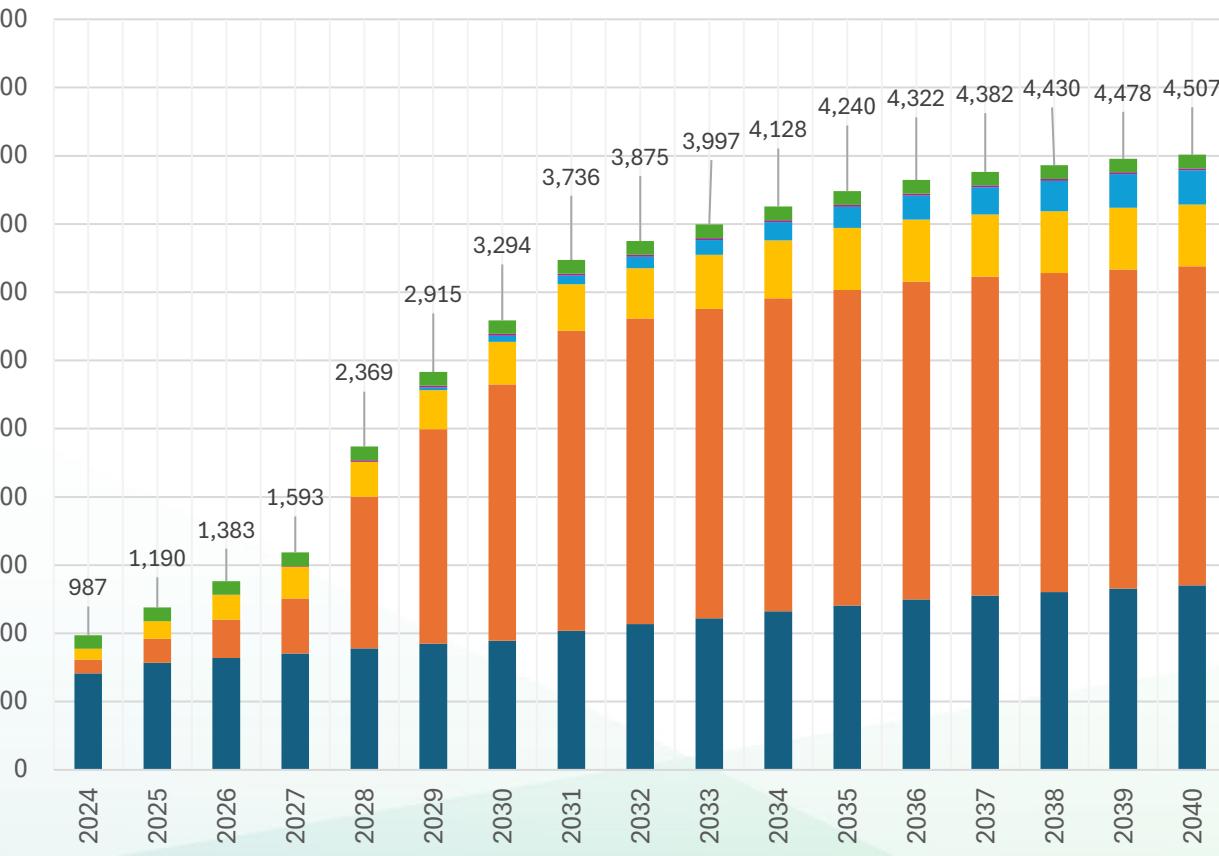
SVP PG&E SCE City, San Jose City, Palo Alto SMUD



Mid Case (Scenario 1) December Update:

Annual Average Growth Rate, 2024 – 2030: ~19%

SVP PG&E SCE City, San Jose City, Palo Alto SMUD



Scenario 3 High Total Demand (MW): (2025) ~1,200 (2026) ~1,400 (2040) ~5,160

Source: CEC Staff (with data inputs from PG&E, Palo Alto, SVP, San Jose, SCE)¹⁰



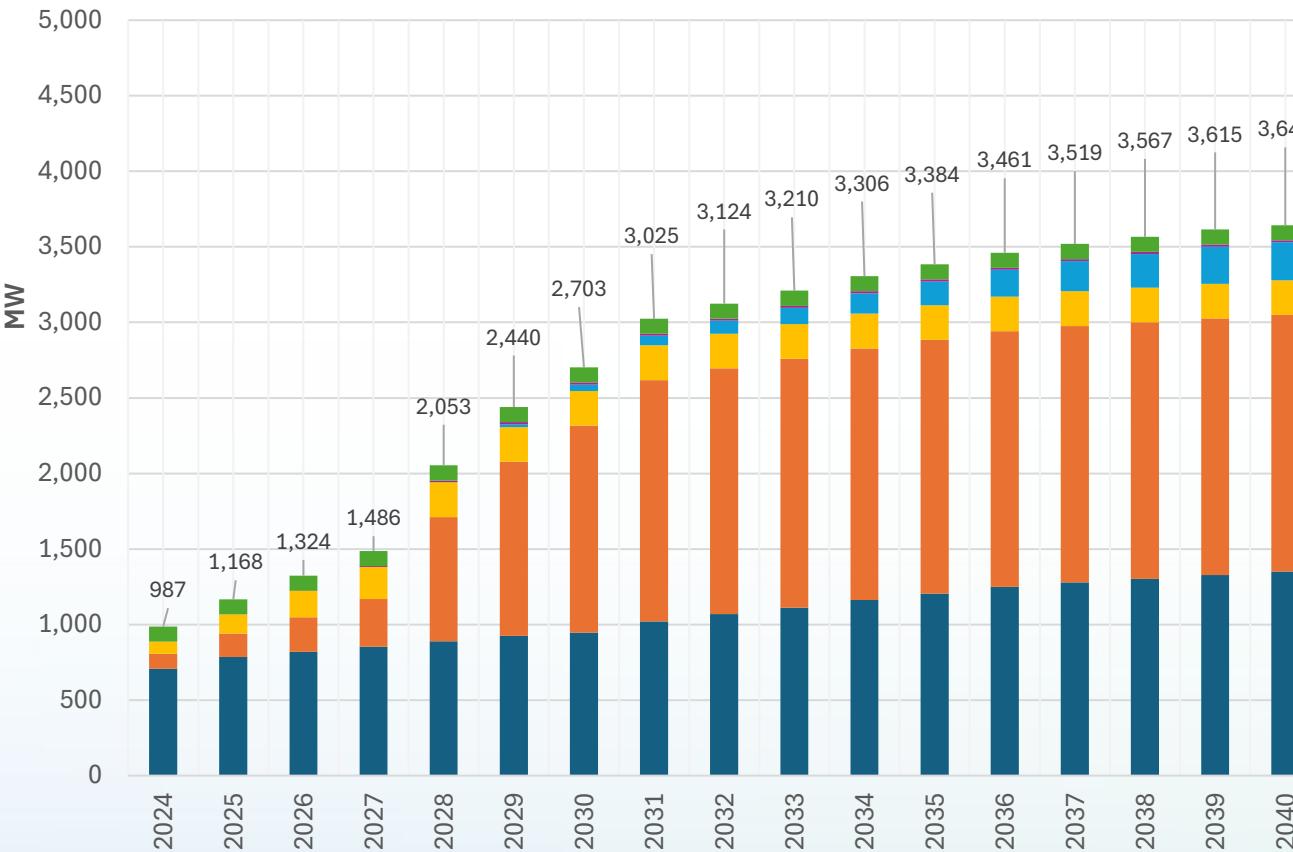
Data Center Peak Demand (MW)

Low vs. Mid (Dec Update)

Low Case:

Annual Average Growth Rate, 2024 – 2030: ~ 15%

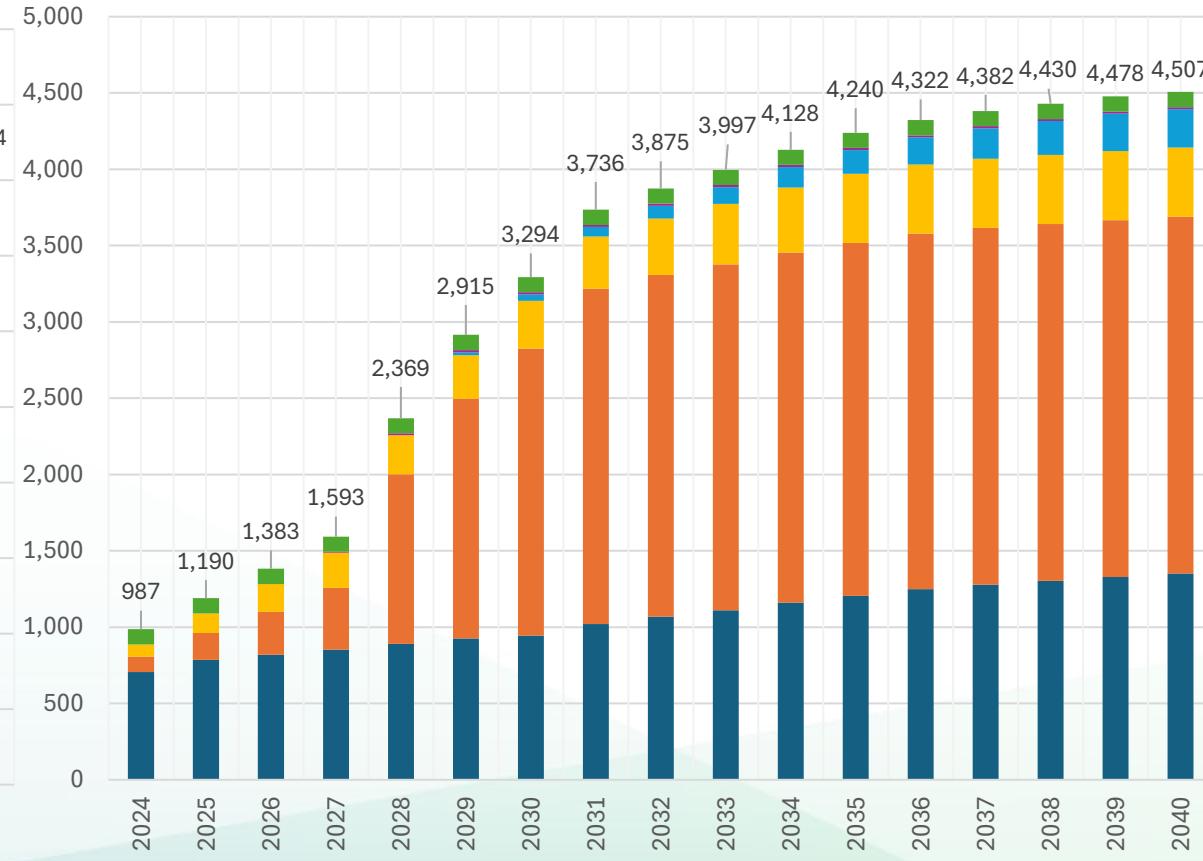
SVP PG&E SCE City, San Jose City, Palo Alto SMUD



Mid Case (Scenario 1) December Update:

Annual Average Growth Rate, 2024 – 2030: ~19%

SVP PG&E SCE City, San Jose City, Palo Alto SMUD



Scenario 2 (Low) Total Demand (GW): (2025) ~1,170 (2026) ~1,320 (2040) ~3,640

Source: CEC Staff (with data inputs from PG&E, Palo Alto, SVP, San Jose, SCE) ¹¹



Annual Demand (GWh) Methodology

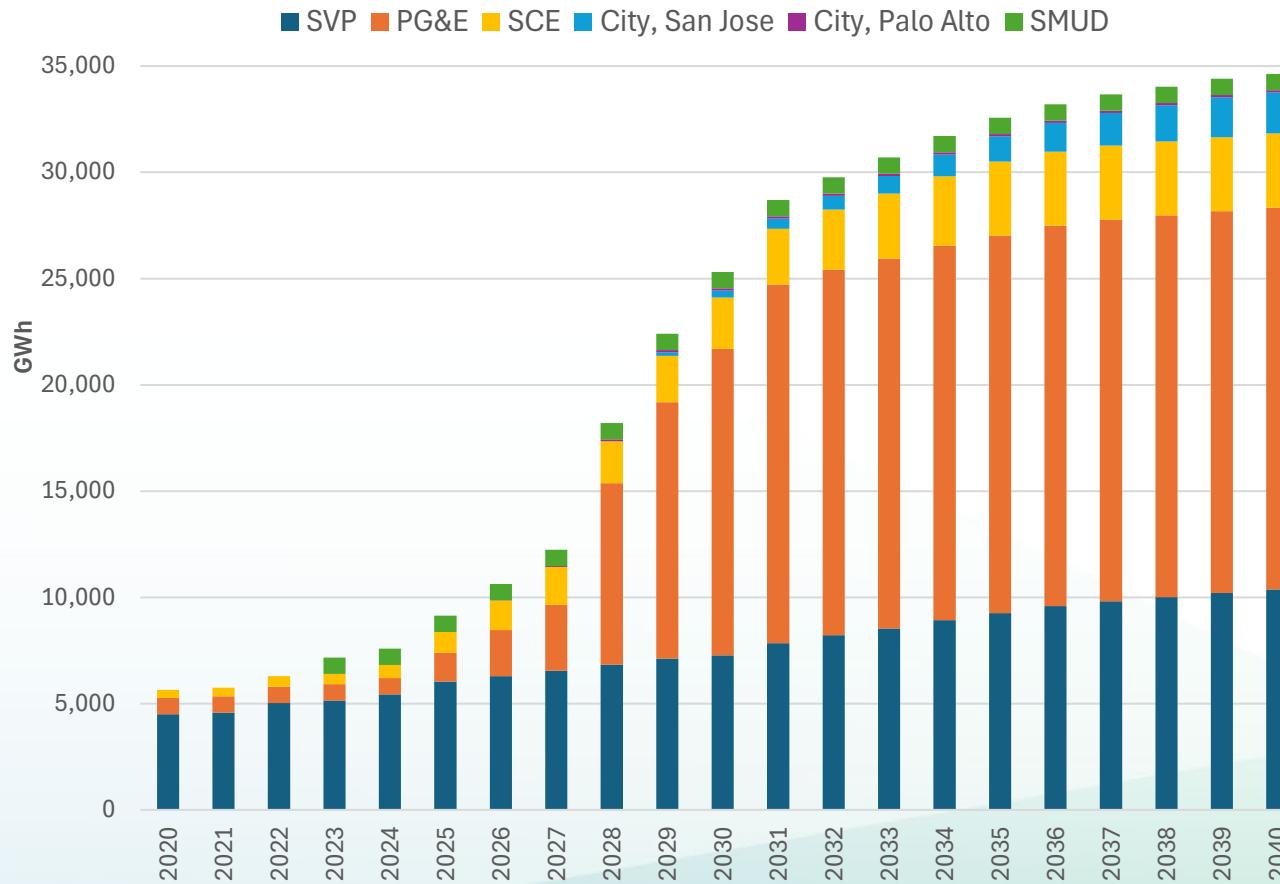
1. CEC staff analyzed interval meter data for a sample of data centers
 - a) Calculated average hourly load factors by weekdays and weekends
2. Assigned load factors to the corresponding day type in each forecast year
3. Multiplied the hourly load factors by the annual peak data center demand to get the 8760 data center load for each year
4. Aggregated the hourly load in each year to get the total annual GWh



Data Center Consumption (GWh)

Scenario 1 Dec Update

Scenario 1 (Mid) December Update:
Annual Average Growth Rate, 2024 – 2030: ~19%



Source: CEC Staff (with data inputs from PG&E, Palo Alto, SVP, San Jose, SCE)¹³

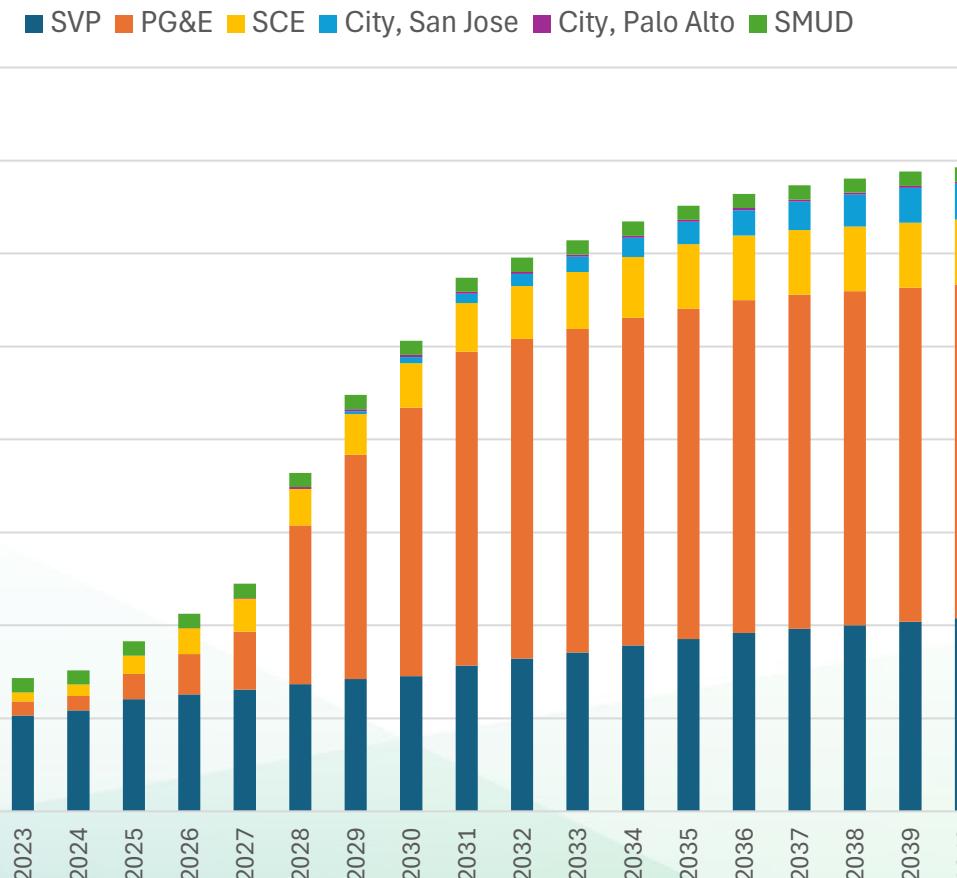
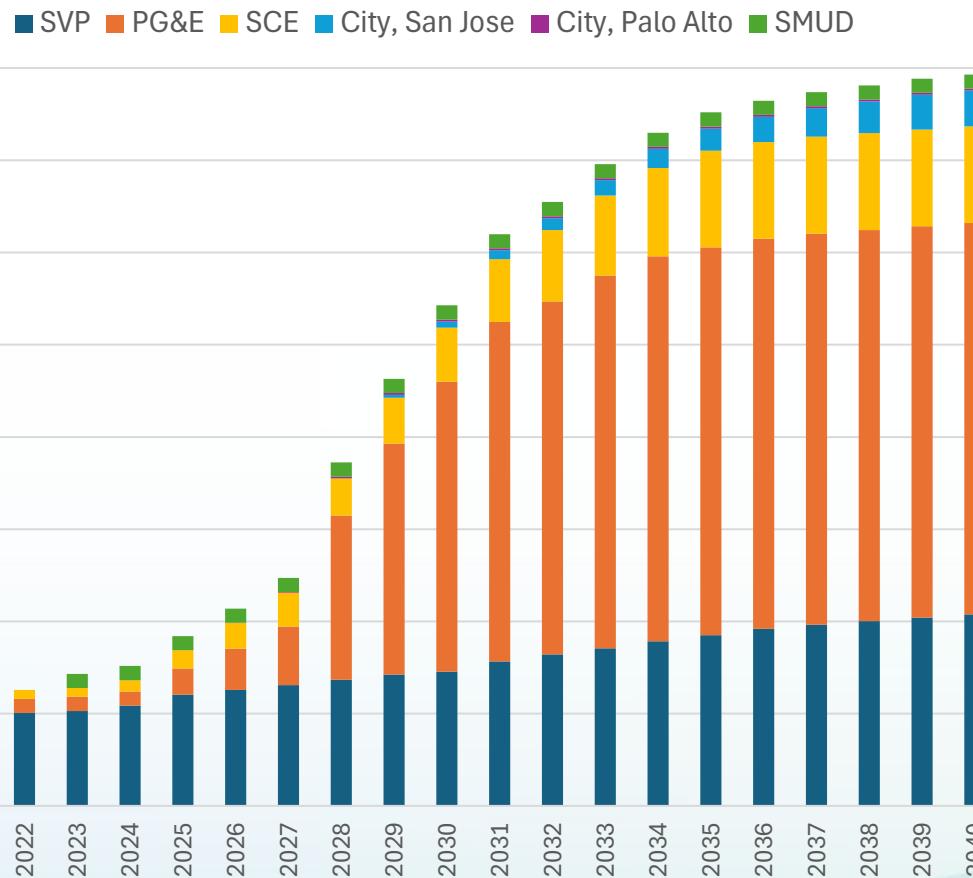


Data Center Consumption (GWh)

Scenario 3 vs. Scenario 1 Dec Update

Scenario 3 (High):
Annual Average Growth Rate, 2024 – 2030: ~ 20%

Scenario 1 (Mid) December Update:
Annual Average Growth Rate, 2024 – 2030: ~19%



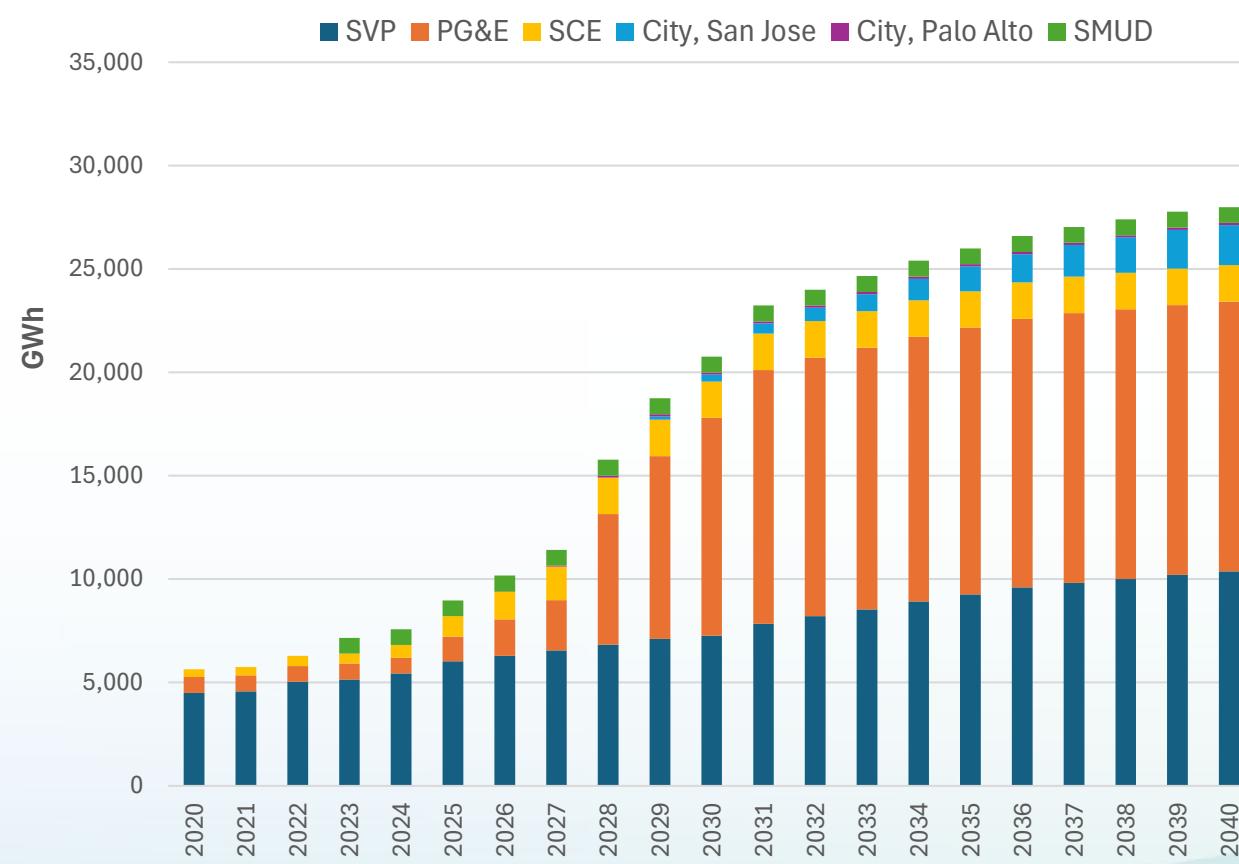
Source: CEC Staff (with data inputs from PG&E, Palo Alto, SVP, San Jose, SCE)¹⁴



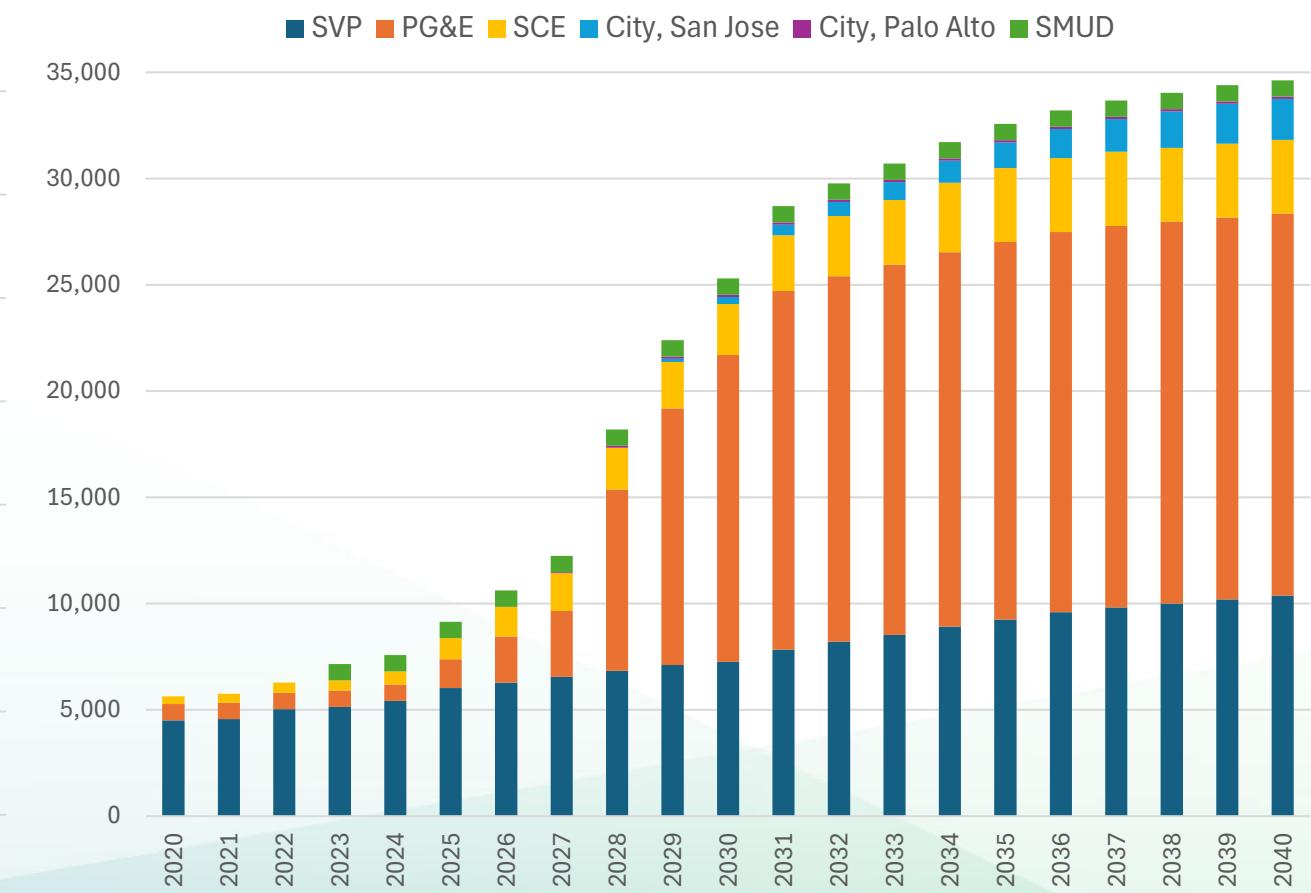
Data Center Consumption (GWh)

Scenario 2 Dec vs. Scenario 1 Dec Update

Scenario 2 (Low):
Annual Average Growth Rate, 2024 – 2030: ~ 15%



Scenario 1 December Update:
Annual Average Growth Rate, 2024 – 2030: ~ 19%





Forecasted Data Center Peak Demand by Year (MW)

PG&E

Year / MW	Low	Mid (Nov)	Mid (Dec)	High
2025	155	256	177	184
2026	230	375	282	291
2027	317	511	404	413
2040	1,699	1,742	2,338	2,761

SCE

Year / MW	Low	Mid (Nov)	Mid (Dec)	High
2025	128	128	128	128
2026	174	191	181	181
2027	211	295	231	238
2040	229	847	453	684

Source: CEC Staff