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**The City of Palo Alto Comments on the California Energy
Commission Docket No 24-IEPR-03- Request Updated to Include
Datacenters**

Additional submitted attachment is included below.



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CITY OF
**PALO
ALTO** 250 Hamilton Avenue
Palo Alto, CA 94301
(650) 329-2539

The City of Palo Alto Comments on the California Energy Commission Docket No 24-IEPR-03:

Palo Alto Request's CEC to Update Load Forecast to Reflect Large Datacenter Growth

1. Large Increase in Datacenter Loads for Projects Already Under Construction

Palo Alto staff appreciates the opportunity to provide comments on the increasing loads in our territory so it can be appropriately used in planning. We are seeing load growth that substantially outpaces past growth and the CEC's planning forecast, and would not be captured in a regression using historical data as shown in Figure 1. Figure 2 shows the potential demand peaks with the new block load increases combined with the CEC's estimates for EV and building electrification load growth.

1.1 New Block Loads Under Construction

CEC forecasts for Palo Alto load have consistently underestimated actual Palo Alto loads for the past five to ten years. For example, the 2023 CEC IRP annual energy for 2024 was 11% lower than actuals for 2024. Now Palo Alto has seen sustained load growth and expecting approximately 20% growth in three years. Palo Alto has already seen 5% increase in annual load and peak load in the last year and 75% of the projects which are bringing the major load growth are still waiting on distribution system upgrades.

Palo Alto is seeing strong load growth from one large datacenter and expects additional load growth from two more large datacenters and several large multifamily housing projects. This kind of block load growth would not show up in any historical linear regression so Palo Alto reached out to CEC staff in 2024 to be sure the upcoming loads were reflected.

"Expected" vs. "High" Additional Block Loads

Expected Block Load Increase: For the expected Palo Alto staff have only incorporated 50% of the peak loads projected by customers for projects that are currently under construction.

High Block Load Increase: 75% of loads as projected by customers for projects currently under construction.



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Table 1 Additional Block Loads anticipated by 2030. Staff considers the “Expected Block Load Increases” to be most likely, which are only a portion of what the customers say they will be need and will be using.

ADDITIONAL BLOCK LOADS BY 2030	DATA CENTERS	HOUSING	OTHER
EXPECTED BLOCK LOAD INCREASES	7 MW	11 MW	2 MW
HIGH BLOCK LOAD INCREASES	21 MW	11 MW	7 MW

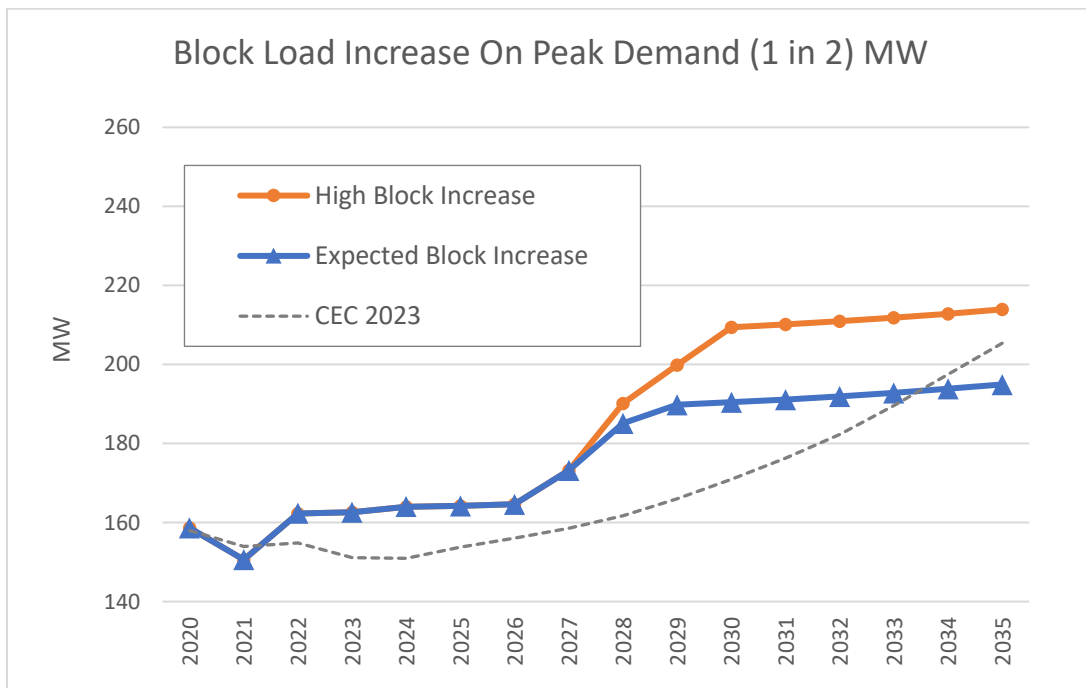


Figure 1. Block Load Increases to peak demand (1 in 2) in MW, with increases driven mostly by datacenters and large housing projects in Palo Alto. The CEC 2023 load includes EV and building electrification growth, but does not include the large block load growth. Neither the “Expected” nor the “High” Block load increases above include any EV or building electrification growth.

***Expected Block Load Increase: includes ~50% of load increase projected by customers for projects and upgrades currently under construction. Considered the most likely, but could be exceeded.**

****High Block Load Increase ~75% of customer projected loads for projects and upgrades currently under construction.**



1.2 EV & Building Electrification Loads

For consistency, Palo Alto staff is showing the CEC 2023 trend line added to the new “Expected” and “High” block load increases, so the additive nature of the new oncoming block loads with the additional projected load increases from EVs and building electrification is clear. The CEC estimates for EV and building electrification demand are slightly higher than Palo Alto staff estimates, but certainly possible. Palo Alto engineering staff is currently upgrading the distribution system under a “Grid Modernization Plan” which will accommodate loads even higher than the highest projection shown “High Block Load Increase + EV + Elec”. Although building electrification and EV loads are difficult to estimate far into the future, Palo Alto has a very high rate of retrofitting buildings for fuel switching, and the most aggressive all-electric preference local reach code possible. Palo Alto also has the highest percentage of EV ownership in the country.

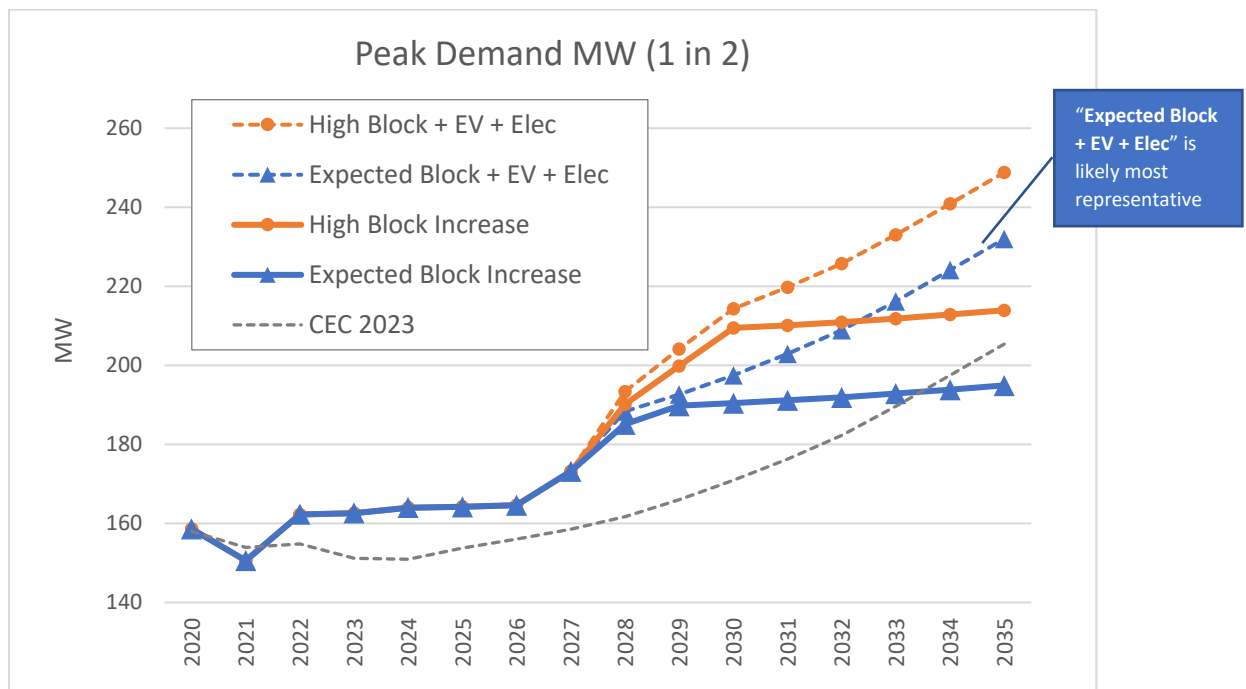


Figure 2. For consistency, Palo Alto staff is showing the CEC 2023 trend line added to the new “Expected” and “High” block load increases, so the additive nature of the new oncoming block loads with the additional projected load increases from EVs and building electrification is clear. Palo Alto staff considers the “Expected Block + EV + Building Electrification” loads to be most consistent with other territories with CEC planning assumptions.



Table 2. The 1-in-2, 1-in-5 and 1-in-10 Peak Load impact from (a) Expected Block Load Increases (no EV or building electrification load growth), (b) Total Palo Alto Peak Loads with Expected Block Load Increases and including CEC 2023 EV & Electrification and (c) Total Palo Alto Peak Loads with High Block Load Increases and including CEC EV and building electrification load growth. The forecast shown in (b) is likely the most consistent with other territories forecasts, but the additional datacenter loads could be exceeded in the future.

(a) New Base Loads after "Expected Block Load Increases" no EV or building electrification load growth											
Year	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
New Base Loads Incl "Expected Block Increase" (1 in 2) MW	164	165	173	185	190	190	191	192	193	194	195
New Base Loads Incl "Expected Block Increase" (1 in 5) MW	172	173	182	194	199	200	201	202	202	204	205
New Base Loads Incl "Expected Block Increase" (1 in 10) MW	177	178	187	200	205	206	206	207	208	209	211

(b) Palo Alto total loads with CEC 2023 EV & Electrification assumptions & conservative "Expected Block Load Increases"											
Year	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Total w/ "Expected" Block Load Increases (1 in 2) MW	164	165	173	188	193	198	203	209	216	224	232
Total w/ "Expected" Block Load Increases (1 in 5) MW	172	173	182	198	202	207	213	219	227	235	244
Total w/ "Expected" Block Load Increases (1 in 10) MW	177	178	187	203	208	213	219	226	233	242	251

(c) Palo Alto total loads with CEC 2023 EV & Electrification assumptions and with "High Block Load Increases"											
Year	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Total w/ "High" Block Load Increases (1 in 2) MW	164	165	173	193	204	214	220	226	233	241	249
Total w/ "High" Block Load Increases (1 in 5) MW	172	173	182	203	214	225	231	237	245	253	261
Total w/ "High" Block Load Increases (1 in 10) MW	177	178	187	209	220	231	237	244	252	260	269

1.3 Anticipated Annual Energy Loads

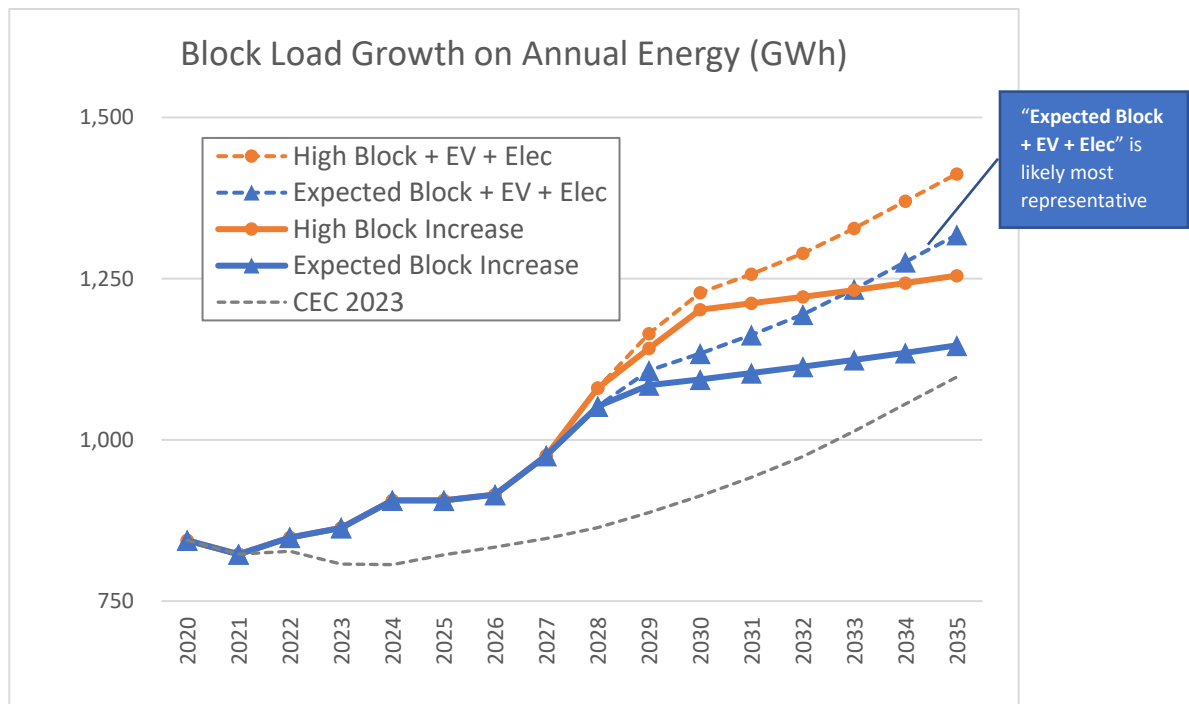


Figure 3. For consistency, Palo Alto staff is showing the CEC 2023 trend line added to the new “Expected” and “High” block load increases, so the additive nature of the new oncoming block loads with the additional projected load increases from EVs and building electrification is clear. The CEC estimates for EV and building



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electrification demand are slightly higher than Palo Alto staff estimates, but certainly possible. Palo Alto staff considers the “Expected Block + EV + Building Electrification” loads to be most consistent with other territories with CEC planning assumptions.

Table 3. For consistency, staff is showing (a) Expected Block Load Increases (no EV or building electrification load growth), (b) Total Palo Alto Peak Loads with Expected Block Load Increases and including CEC 2023 EV & Electrification and (c) Total Palo Alto Peak Loads with High Block Load Increases and including CEC EV and building electrification load growth. The forecast shown in (b) is likely the most consistent with other territories forecasts, but the additional datacenter loads could be exceeded in the future.

(a) Annual Energy: New Base Loads after "Expected Block Load Increases" no EV or building electrification load growth

Year	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
New Base Loads Incl "Expected Block Increase" (1 in 2) GWh	906	915	976	1,052	1,085	1,094	1,103	1,114	1,124	1,135	1,147

(b) Annual Energy: Palo Alto total loads with CEC 2023 EV & Electrification assumptions & conservative "Expected Block Load Increases"

Year	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Total w/ "Expected" Block Load Increases (1 in 2) GWh	906	915	976	1,052	1,108	1,134	1,163	1,195	1,234	1,276	1,318

(c) Annual Energy: Palo Alto total loads with CEC 2023 EV & Electrification assumptions and with "High Block Load Increases"

Year	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Total w/ "High" Block Load Increases (1 in 2) GWh	906	915	976	1,080	1,165	1,228	1,257	1,289	1,328	1,370	1,412



2. Upcoming Palo Alto Investments to Serve Increasing Electric Demands

With loads increasing first in commercial and then in residential districts, the City of Palo Alto is investing in increasing the distribution system to accommodate these loads. The following tables outline the substations currently being upgraded or planned for upgrade and other investments underway. Table 4 which follows outlines over \$250M in ongoing and budgeted capital upgrades for these new loads.

Table 4. Additional block loads coming on where construction and upgrades are already underway.

Agency	CPAU Substation	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Baseload with Expected Block Loads and no EV or Elec		159	151	162	162.6	164	164	165	173	185	190	190	191	192	193	194	195
Total Additional Block Loads w/ Construction Underway								1	11	24	28	28	28	28	28	28	28
Datacenter and 2 Elec. Schools	Hoover							1	3	6	7	7	7	7	7	7	7
1 All-electric School	East Meadow								1	1	1	1	1	1	1	1	1
2 Datacenters, 4 Multifamily Res	Adobe Creek								3	7	8	8	8	8	8	8	8
3 Multifamily Housing	Hansen Way								2	6	8	8	8	8	8	8	8
2 Multifamily Housing	Maybell								2	4	4	4	4	4	4	4	4

2.1 Grid Modernization for Electrification

- Project type Utilities Electric - System Improvement
- Project cost \$220 million to \$306 million

The Grid Modernization for Electrification project was developed to enhance grid resiliency and reliability of the electric distribution system, and continue to accelerate the City’s clean energy and decarbonization goals.

The City recently conducted an electrification study to evaluate the impacts of projected electrification loads on Palo Alto’s distribution and substation transformers, primary/secondary distribution circuits, and to propose upgrades needed to mitigate overloads. The estimated cost to construct the necessary electric system upgrades for a 100% electrification scenario is between \$220 million to \$306 million, depending on the approach. Of the nine substations in Palo Alto, the study recommends major design and equipment upgrades at two of the nine substations, and minor to moderate upgrades at four substations to meet projected loads to support 100% electrification.

The Grid Modernization Project involves replacing the existing 1,413 single phase pole top transformers rated less than 50kVA with approximately 1,400 of the same type of transformers rated 50kVA or larger. Additionally, 296,300 circuit feet of open wire secondary conductors in the distribution system will be replaced with aluminum aerial cable. These two design aspects will allow for 100% electrification of end uses in the Palo Alto community, aligning with one of the primary objectives of decarbonization.



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Table 5. Upcoming expenditures approved and budgeted for to accommodate 100% electrification of residential sector, and 25% electrification of commercial sector. \$25M Hoover Substation upgrade for one of the large datacenters already completed in October 2024.

Location	Work	Voltage	Cost	Year Needed	City Council Approval (Yr)	Design Start (Year)	Construction Start (Yr)	In-Service Year	Added Capacity (MW)	Total Capacity (MW)
Electrification										
OH Distribution System Modernization Phase 1	Increase Capacity in OH Primary and Secondary Systems for Electrification	12 kV	\$40M	2026	2024	2024	2025	2026	18	36
OH Distribution System Modernization Phase 2	Increase Capacity in OH Primary and Secondary Systems for Electrification	12kV	\$40M	2027	2025	2025	2026	2027	18	36
OH Distribution System Modernization Phase 3	Increase Capacity in OH Primary and Secondary Systems for Electrification	12kV	\$40M	2028	2026	2026	2027	2028	18	36
UG Distribution System Modernization Phase 4	Increase Capacity in UG Primary and Secondary Systems for Electrification	12kV	\$15M	2029	2027	2027	2028	2029	3	6
UG Distribution System Modernization Phase 5	Increase Capacity in UG Primary and Secondary Systems for Electrification	12kV	\$15M	2030	2028	2028	2029	2030	3	6
Total Distribution Line Capacity Increases									60	
East Meadow Substation	Install 2-45 MVA Transformers and Switchgear	60/12kV	\$25M	2028	2026	2026	2027	2028	43	45
Colorado Substation	Install 2-45 MVA Transformers and Switchgear	60/12kV	\$25M	2030	2028	2028	2029	2030	21	45
Hansen Way Substation	Install 2-45 MVA Transformers and Switchgear	60/12kV	\$25M	2032	2030	2030	2031	2032	36	45
Total Distribution Sub Capacity Increases									100	
Colorado Power Sub	New 115/60kV Transformer	115/60V	\$6M	2028	2026	2026	2028	2029	50	200
Total Transmisison Sub Capacity Increases									50	

Please do not hesitate to contact me if you have any questions.

Sincerely,

Lena Perkins, PhD

Senior Resource Planner
Utilities Department | City of Palo Alto
250 Hamilton Ave | Palo Alto, CA 94301
650.329.2539 lena.perkins@cityofpaloalto.org