Date of Hearing: April 2, 2025

ASSEMBLY COMMITTEE ON UTILITIES AND ENERGY
Cottie Petrie-Norris, Chair
AB 222 (Bauer-Kahan) – As Introduced January 8, 2025

SUBJECT: Data centers: energy usage reporting and modeling

SUMMARY: Mandates that developers of artificial intelligence (AI) models publically report the energy used to train the model, and mandates data centers to report energy usage to the California Energy Commission (CEC). It establishes the authority of the CEC to implement efficiency requirements on data centers in the state. Finally, the bill requires that the California Public Utilities Commission (CPUC) minimize the financial impact of building new electrical infrastructure for data centers on ratepayers.

Specifically, **this bill:**

1) Requires developers to inform data centers that they are training an artificial intelligence model/algorithm.

2) Requires developers to request the energy usage from the data center.

3) Mandates data centers to report energy used to developers of artificial intelligence models when the training of the model is complete, or when the model is going to be used commercially.

4) Requires developers to estimate and publish the amount of energy used to develop a model and make this information publically available.

5) Requires data centers to report details of energy usage to the CEC.

6) Mandates the Energy Commission to adopt energy efficiency performance standards for data centers, including requiring load-management capabilities and demand response programs.

7) Requires the CPUC to minimize shifting the costs for new energy infrastructure built by electrical corporations to serve new data centers onto ratepayers.

EXISTING LAW:

1) Mandates the CPUC to ensure that all charges from a public utility shall be just and reasonable. (Public Utilities Code § 451)

2) Mandates the CEC to develop energy policies that conserve resources, protect the environment, ensure energy reliability, enhance the state's economy, and protect public health and safety. (Public Resources Code § 25301(a))

3) Requires the CEC to generate an Integrated Energy Policy Report, or IEPR every two years, which will include, among other things, an assessment of resources and a forecast of reliability and energy usage. (Public Resources Code § 25302)

4) Grants the CEC the authority to hold public hearings and stakeholder processes to best assess the necessary reporting and efficiency standards for buildings. (Public Resources Code § 25402(b)(4))

FISCAL EFFECT: Unknown. This bill is keyed fiscal and will be referred to the Assembly Committee on Appropriations for its review.

CONSUMER COST IMPACTS: Unknown. This bill seeks to mandate transparency and efficiency standards for AI algorithms and data centers, as well as protect consumers from data center-related infrastructure costs. This may lower costs to consumers.

BACKGROUND:

How do Data Centers and Artificial Intelligence Use Energy?
Data centers are facilities that house large volumes of high-performance computers, information technology, storage systems, and computing infrastructure. They are crucial for maintaining internet-based communications and providing services such as cloud-based computing, training and inference of artificial intelligence algorithms, as well as mining for cryptocurrency. There are multiple parts of the data center that consume energy, with the primary consumption found in the servers and storage, as well as the cooling system (Figure 1).[1]

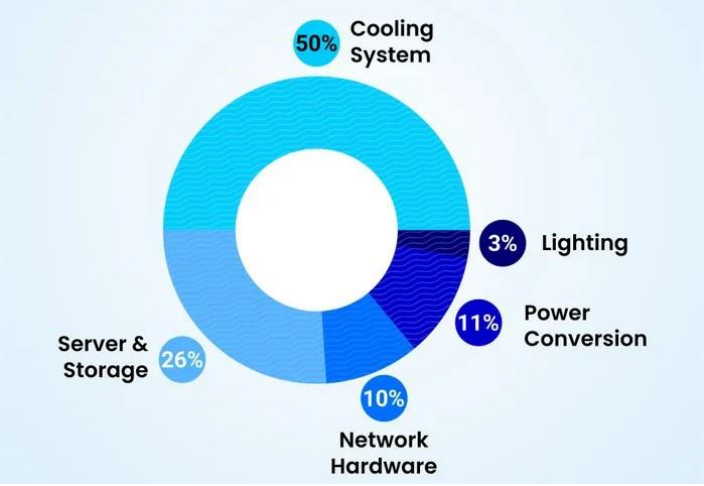

Figure 1: Parts of a data center that use energy.[2]

Artificial intelligence models are trained on datasets to recognize certain patterns and make decisions without human intervention. This training can take hours or up to months. To generate more sophisticated models, the size of the datasets increase, as does the demand for computational resources (measured in floating point operations per second or FLOPS). As training compute demand grows, the need for larger data centers and the requirement for more energy grows as well.

[1] Wu, Jiahong, Yuan Jin, and Jianguo Yao. "EC 3: Cutting cooling energy consumption through weather-aware geo-scheduling across multiple datacenters." *IEEE Access* 6 (2017): 2028-2038.
[2] ibid

Power required for AI models - Energy usage for training AI algorithms has increased significantly over the last 10 years, despite advances in hardware efficiency (Figure 2).[5] For example, GPT -3 required 1.2 Gigawatthours (GWh) to train,[6] while GPT-4 required over 50 GWh of energy to train (equivalent to powering approximately 3,600 homes for a year or 0.02%

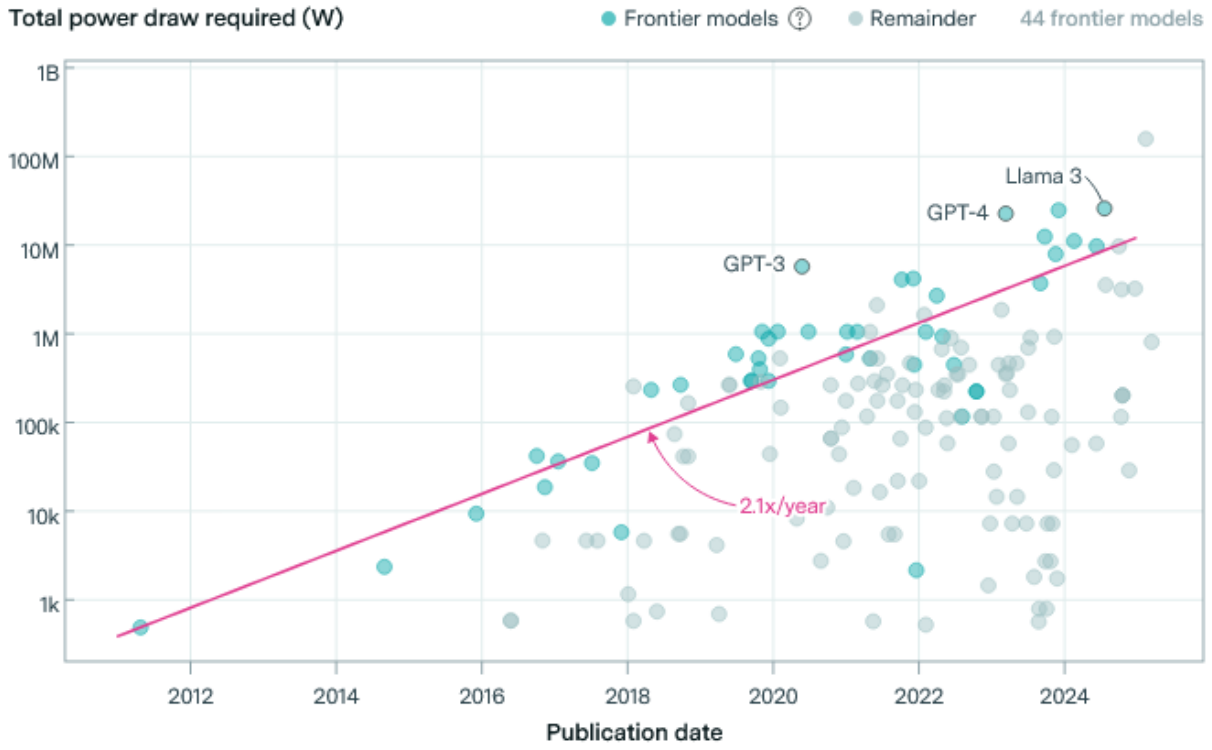

Figure 2: Power draw, or the instantaneous power consumption, required for training frontier and other ai models.[3] Frontier models are the most advanced AI systems with complex capabilities and increased societal risk.[4]

of the electricity California generates in a year).[7] Training phases are energy intensive and are required to make AI models; however, once the model is made, the energy usage is not over. After training, the AI models are put to use in a process called inference. Every time the model is used it has an additional energy demand. Each query is relatively small, but can lead to significant energy consumption, especially if models will be used continually throughout the day by every Californian. AI queries, like ChatGPT, require about 10x the energy of a standard Google search.[8] If an AI model is commercially available, over the life of the model, the inference phase is likely to demand more energy than the training phase.

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[3]Epoch AI (2024), "The power required to train frontier AI models is doubling annually". Published online at epoch.ai. Retrieved from: 'https://epoch.ai/data-insights/power-usage-trend' [online resource]
[4] Bullock, Charlie, et al. "Legal Considerations for Defining." *Institute for Law & AI Working Paper* 2-2024 (2024).
[5] Epoch AI (2024), "The power required to train frontier AI models is doubling annually". Published online at epoch.ai. Retrieved from: 'https://epoch.ai/data-insights/power-usage-trend' [online resource]
[6] De Vries, Alex. "The growing energy footprint of artificial intelligence." Joule 7.10 (2023): 2191-2194.
[7] Ariel Cohen, "AI Is Pushing the World Toward an Energy Crisis" May 23, 2024
[8] Aljbour, Jordan, Tom Wilson, and P. Patel. "Powering Intelligence: Analyzing Artificial Intelligence and Data Center Energy Consumption." *EPRI White Paper no. 3002028905* (2024).

The AI Energy Boom – The AI industry is growing rapidly, and the demand to train new AI models is accelerating, resulting in data center development and construction. California has more than 270 data centers, concentrated largely around Santa Clara, close to the headquarters of Alphabet, Apple, and Meta. Data centers are already the single largest load for the municipal utility, Silicon Valley Power.[10,11] Pacific Gas and Electric (PG&E), who provides distribution service in Santa Clara County, is expected to add 3.5 GW of new load attributed to data centers in the next four years, equivalent to adding ~2-3 million new homes on to the grid.[12] As of 2023,

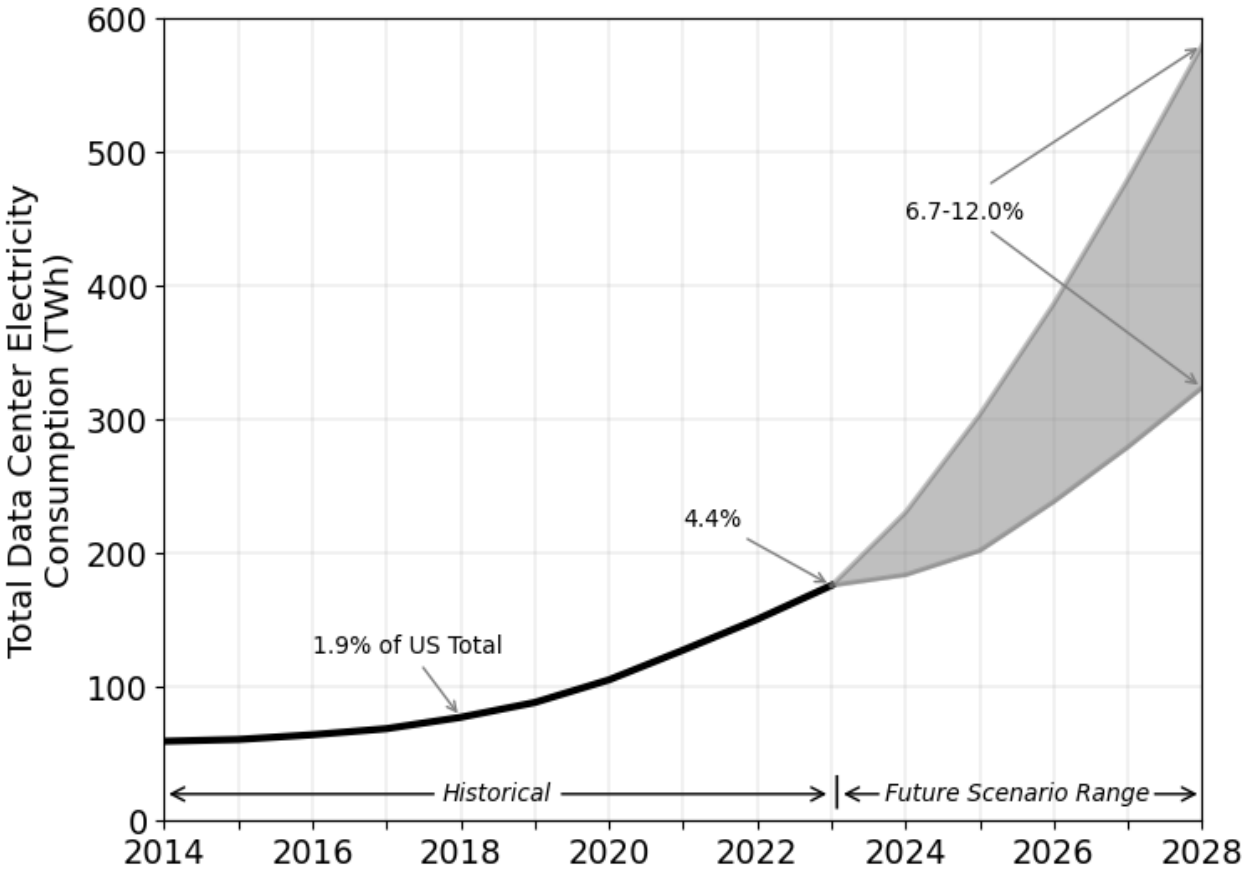

Figure 3 Data Center Energy Use. The graph shows U.S. data center annual energy use between 2014-2016 at about 60 TWh. Starting in 2017 server numbers and the use of Graphic Processing Units (GPUs) accelerated nationwide, primarily for artificial intelligence. By 2023, data centers were 4.4% of total U.S. energy consumption. By 2028, data centers are predicted to use between 6.7 and 12% of the country's electricity.[9]

[9] Shehabi, Arman, et al. "2024 United States Data Center Energy Usage Report." 2024.
[10] Sebastian Moss, "Silicon Valley Power says data center load to double by 2035, will need geothermal power and batteries" *Data Ceneter Dynamics*, December, 2023
[11] Melody Petersen, "Explosion of power-hungry data centers could derail California clean energy goals," *Los Angeles Times.* August 12, 2024
[12] Nuclear Regulatory Commission, "What is a Megawatt" February 12, 2024

4.4% of *all* energy used in the United States is consumed by data centers (Figure 3). A study from Lawrence Berkeley National Laboratory predicted that by 2028, data centers would use between 6.7 and 12% of the country's electricity.[13]

Procurement and the Maintenance of Aging and Dirty Power to Feed Energy Hungry Data Centers – Increased demand is leading to continued investment in brown energy and reinvestment in nuclear energy. On September 20, 2024, Constellation Energy announced it will reopen Three Mile Island nuclear power plant, the site of the worst commercial nuclear accident in U.S. history, in a deal with Microsoft to power its cloud computing and artificial intelligence program.[14] Meta is building a $5 billion dollar data center project in Louisiana that will require a 2,300 MW expansion in natural gas power.[15] Southern Company, a major U.S. utility plans to extend the life of three coal-fired power plants in Mississippi and Georgia in order to meet increased data center growth.[16] Researchers at Caltech and UC Riverside recently assessed the public health impact as a result of AI energy usage. They found that by 2030, data centers could contribute to 1,300 premature deaths in California, carry $20 billion in health care costs, and rival the greenhouse gas emissions of every car in California on a health cost basis.[17]

Consumer Cost Shift Concerns – With this remarkable boom in AI and data center development, there has been increased scrutiny on who is paying for this growth.[18] Consumer advocates, regulators, ratepayers and even utility companies across the country are starting to spotlight problems in the existing system to manage large load customers.[19] For example, in the mid-Atlantic region, the regional power grid has experienced a huge amount of new data center growth in the state of Virginia. PJM Interconnect, the grid operator, needed to secure additional power during periods of extreme weather in the region. The exorbitant expense of this additional power is causing a rise in consumer bills by 20% in five states by 2025.[20] Many blame the sudden growth of additional power demand, leading to shortages and increased costs. Similar concerns have been voiced in Oregon as well.[21] In addition to this supply squeeze, consumer advocates are also concerned about the discounts that data centers receive for their utility rates. For example, Google negotiated $0.06 per kilowatthour for their energy from Dominion Energy in South Carolina. This is less than half of the residential rate.[22] Consumer advocates argue that these rate discounts are compensated by the rest of the residential and small business ratepayer base. PG&E and other utilities push back on these assertions, suggesting that improvements and

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[13] Shehabi, Arman, et al. "2024 United States Data Center Energy Usage Report." 2024.
[14] https://www.constellationenergy.com/newsroom/2024/Constellation-to-Launch-Crane-Clean-Energy-Center-Restoring-Jobs-and-Carbon-Free-Power-to-The-Grid.html
[15] Jeffrey Tomich, "Meta goes all in on gas to power a mega data center," *Politico*, November 2024
[16] Zachary Skidmore, "Southern Company to extend life of three coal plants due to data center energy demand," *Data Center Dynamics*, February, 2025
[17] Han, Yuelin, et al. "The Unpaid Toll: Quantifying the Public Health Impact of AI." *arXiv preprint arXiv:2412.06288* (2024).
[18] Brad Plumer and Nadja Popovich, "A New Surge in Power Use Is Threatening U.S. Climate Goals" *New York Times*, March, 2024.
[19] Evan Halper and Caroline O'Donovan. "As data centers for AI strain the power grid, bills rise for everyday customers," *Washington Post,* November 1, 2024.
[20] ibid.
[21] Mike Rogoway, "Data center boom could trigger higher power rates, energy shortage," *The Oregonian*, October 13, 2024.
[22] Evan Halper and Caroline O'Donovan. "As data centers for AI strain the power grid, bills rise for everyday customers," *Washington Post,* November 1, 2024.

growth to the grid will lead to cheaper utility bills for all customers.[23] Beyond increasing demand and paying discounted rates, the final cost shift concern from regulators and consumer advocates is the increasing need for infrastructure and investment in the grid to accommodate new load. This will be discussed at greater length below.

AI Energy Demand Skepticism – Current predictions around growth in AI and data centers have led some to believe that there is an inappropriate hysteria around the future energy demands in the industry. Some scholars note that similar concerns were voiced in the 1990s but that technological advances prevented the predicted energy crunch.[24,25] Advances in efficiency are likely to change the AI landscape through new model design, innovations in chip and hardware efficiency, and better cooling technologies.[26,27,28,29] The release of the AI model DeepSeek, which required significantly less computing power to train, supports the possibility that energy costs in training AI may not continue to grow as expected.[30] Recent studies have also shown that if demand response and load flexibility programs are implemented at data centers, peak loads on the grid can be avoided. As a result, these studies suggest there are sufficient existing resources for an expanding AI load, and interconnection of new data centers can often be expedited.[31]

Shedding Some Light on the Problem: The need for more information – The speed at which the data center industry is growing has led to a sudden unpredictability in the future energy market. This growth is occurring alongside other changes to electricity demand such as enhanced electrification in the building and transportation sectors, and climate change induced extreme events. There is little transparency into data center energy usage; transparency which would enable understanding or predict market dynamics. Most tech companies and data center operators don't volunteer their energy and water usage information. However, Google and Oracle have published standard efficiency metrics regarding their power usage (power usage effectiveness or PUE) for individual data centers, and Baidu has published efficiency metrics of their water usage (water-usage effectiveness or WUE) for individual data centers. Consumer groups, academics, and regulators are calling for expanded transparency and the rapid generation of new data regarding AI's direct electricity use.[32] There are ongoing efforts to mandate transparency across the United States and Europe. This includes the European Union Energy Efficiency Directive,[33] which passed in 2023, regulating European data centers. The directive implemented mandatory data center reporting (energy and water usage), required the usage of

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[23] Melody Petersen, "Explosion of power-hungry data centers could derail California clean energy goals," *Los Angeles Times.* August 12, 2024
[24] Masanet, Eric, et al. "Recalibrating global data center energy-use estimates." Science 367.6481 (2020): 984-986.
[25] Shayle Kann, "A skeptic's take on AI electricity load growth", *Latitude Media*. March 6, 2025.
[26] Google, "Announcing Trillium, the sixth generation of Google Cloud TPU," May 14, 2024
[27] Shayle Kann, "Can chip efficiency slow AI's energy demand?" *Catalyst*, July 18, 2024
[28] Kylie Foy, "New tools are available to help reduce the energy that AI models devour" *MIT News,* October 5, 2023.
[29] Aljbour, Jordan, Tom Wilson, and P. Patel. "Powering Intelligence: Analyzing Artificial Intelligence and Data Center Energy Consumption." EPRI White Paper no. 3002028905 (2024).
[30] Guo, Daya, et al. "Deepseek-r1: Incentivizing reasoning capability in llms via reinforcement learning." arXiv preprint arXiv:2501.12948 (2025).
[31] Norris, Tyler, et al. "Rethinking Load Growth: Assessing the Potential for Integration of Large Flexible Loads in US Power Systems." (2025).
[32] Eric Masanet, Nuoa Lei, and Jonathan Koomey, "To better understand AI's growing energy use, analysts need a data revolution" *Joule*, September 18, 2024.
[33] Energy Efficiency Directive 2023/1791

waste heat, prioritized the use of renewable energy, and required the integration of efficiency standards in data centers. In the United States Senate, Ed Markey put forward the recent "Artificial Intelligence Environmental Impacts Act of 2024," which would have, among other provisions, initiated a study on the environmental impacts of AI, and established a consortium of stakeholders to address these impacts. The bill did not make it to the floor in 2024. There have also been multiple state efforts to address data center transparency, efficiency and cost-shifting, including Virginia and Georgia.

COMMENTS:

1) *Author's Statement.* According to the author: "Across California, energy-intensive data centers are being built to support the rapid expansion of the artificial intelligence (AI) industry. These data centers increase energy demand and frequently require expansions to the electrical grid; together, these factors threaten to increase energy costs for Californians. AB 222 creates accountability for data centers by increasing transparency around their energy use, adopting energy efficiency standards, and preventing grid development costs from being passed onto ratepayers. California's energy costs are already among the highest in the country, and ratepayers should not be forced to bear the additional costs of AI development."

2) *Definition of Data Center*."Data Center" is already defined in California Title 24, Part 6, Building Energy Efficiency Standards. With much of the responsibility for regulation falling on the CEC, it makes sense to stay consistent with existing definitions. *The committee recommends replacing the definition of data center with the existing language found in the state's energy code, including the addition of the definition of computer rooms.*

3) *Data Center Size Subject to Regulation.* According to PG&E's data center project pipeline report, the growth in the state's data centers that are going to have substantial impact on their grid are over 5 MW (Table 1).[34] The EU reporting requirements cover data centers with an energy demand of over 500 kW. Currently, this bill includes the value of 10 megawatthours or less of annual energy consumption to be subject to the requirements of the bill. This is a relatively small value, approximately the energy of a single home in a year, and therefore not appropriately targeted at data centers of particular interest. *The committee recommends replacing the value of "10 megawatthours or less" in the definition of "data center" in § 25345(d)(2) with "an energy demand of at least 5 megawatts."*

4) *Clarifying Reporting.* This bill mandates a number of reporting steps between AI model developers and data centers, and from data centers to developers. The author's stated goal is to require AI developers to publicly report the amount of energy used to train commercially available AI models. *The committee recommends removing many of the complicated and circular reporting requirements between developer and data center, and instead retaining the language mandating the public reporting requirement in § 25345.1.*

[34] PG&E Corporation, *2024 Investor Update*. June 12, 2024

5) *Energy efficiency regulation and reporting at data centers.* The CEC has already generated some energy consumption forecasting for data centers through information from the utilities in the 2024 IEPR. However, the list of data useful to the energy demand forecast can change. The CEC mandates regulatory and reporting requirements for energy usage and efficiency fof buildings of multiple functions. In order to implement these mandates, the CEC first undergoes a series of public hearings and stakeholder meetings to assess an appropriate regulation and reporting framework for each new building type. This leaves significant regulatory discretion to the CEC to respond to a rapidly changing industry. *The committee recommends placing the data center reporting and efficiency requirements into similar mandates enforced by the CEC in the Public Resources Code § 25402(b) and to allow the specifics of these mandates to be determined by the CEC's public process.*

Table 1: PG&E Data Center Pipeline[35]

Site location	Data Center Request	Load Requested (MW)
San Jose	Customer 5 (2025)	70
	Customer 7 (2025)	20
	Customer 17 (2025)	10
	Customer 3 (2025-2029)	500
	Customer 4 (2026)	90
	Customer 6 (2026)	20
	Customer 8 (2026)	10
	Customer 2 (2027)	100
	Customer 1 (2028)	600
	Customer 19 (2027-2029)	200
	Customer 9 (TBD)	10
	Total	1,635
Hayward	Customer 11 (2024)	50
	Customer 5 (2027)	75
	Customer 1 (2028)	800
	Customer 10 (2028)	50
	Total	975
Fremont	Customer 13 (2025)	90
	Customer 12 (2026)	40
	Customer 1 (2028)	100
	Total	230
Gilroy	Customer 11 (2026-2027)	160
Milpitas	Customer 8 (2026)	10
	Customer 1 (2028)	200
	Total	210
San Francisco	Customer 6 (2025)	10
	Customer 14 (2028)	60
	Total	70
Sunnyvale	Customer 15 (2027)	100
Richmond	Customer 1 (TBD)	35
Santa Clara	Customer 16 (TBD)	100
	TOTAL	3.5 GW

6) *Who pays for the cost of new infrastructure?* As infrastructure needs rise parallel to growth of data center demand, communities are asking who is going to pay for it. Often, the cost of new infrastructure for large industrial customers is borne by the utility and ultimately paid for by the ratepayers.[36] However, there has never been an equivalent predicted growth in energy load attributed to a single industrial customer base in this short time frame.[37] In addition, without some protections, data centers and data center customers may have incentive to shop rates for electricity across the country, potentially leaving expensive new infrastructure stranded. This concern is reflected in recent emergence of large load tariffs requiring 5-year upfront payments and 20-year commitments for new data centers in Kentucky, as well as American Electric Power in Ohio requiring payment for 85% of projected energy use each month for its large load customers to cover infrastructure costs, even if the customer uses less. In California, PG&E submitted an application at the CPUC seeking a new Electric Rule No. 30.[38,39,40] Electric Rule No. 30 would, among

[35] PG&E Corporation, *2024 Investor Update*. June 12, 2024
[36] Extracting Profits fromthe Public: How UtilityRatepayers Are Paying for Big Tech's Power
[37] Çam, Eren, Marc Casanovas, and John Moloney. "Electricity 2025: Analysis and Forecast to 2027." (2025).
[38] P.S.C. KY. NO. 13 1st Revised Tariff Sheet 1-1
[39] Sonal Patel, "AEP Ohion Propoises New Utility Tariff for Data Centers to Offset Infrastructure Costs," *Power*,October 24, 2024.

many provisions, require large-load customers to pay for the actual costs of electric facilities in advance of interconnection (with the exception of transmission network upgrades). These costs would be refunded if the load materializes.

On November 1, 2024, the Federal Energy Regulatory Commission (FERC) held a technical conference to discuss reliability risks, cost allocation and cost shifts from large-load customers to residential customers. In this conference, FERC unanimously voted to launch a review of AI-enabled data centers.[41]

The language in the bill maintains the CPUC shall determine whether new data center "costs and expenses are just and reasonable in accordance with Section 451." This would not change the CPUC's existing mandate to assess these new costs, but affirm it. Therefore, this language will not meaningfully impact the CPUC's assessment of data center-related costs. The bill also mandates "minimizing shifting of cost," to ratepayers for infrastructure upgrades. The opposition to this measure has claimed that this provision "would only serve to delay construction of the necessary infrastructure to get data centers online and all but ensure that data centers are not constructed in California." However, the committee views this provision as affirming the CPUC's existing authority rather than mandating a new, more stringent cost protection for ratepayers.

7) *Double Referral.* This bill is double-referred. Should it pass out of this committee, it will next be considered in the Assembly Committee on Privacy and Consumer Protection.

8) *Related Legislation*

SB 57 (Padilla, 2025) establishes a special electrical corporation tariff for transmission and distribution services to data centers. This tariff requires, among many provisions, that the cost of grid investments and infrastructure are recovered from the data center and that the energy used to run data centers meets the state's climate change goals. Status: Referred to the Senate Energy, Utilities and Communications Committee.

SB 58 (Padilla, 2025) establishes a tax credit incentive program for data centers that use energy resources that produce zero carbon emissions. Status: Referred to the Senate Revenue and Taxation Committee.

AB 93 (Papan, 2025) requires data centers to meet specific water efficiency standards as well as local mandates. It requires the State Energy Resources Conservation and Development Commission to develop guidelines to maximize the use of natural resources in accordance with California and federal guidelines to address new technological needs. Finally, the bill requires data centers to report their water usage as part of a water usage demand analysis Status: Referred to the Assembly Committees on Water, Parks, and Wildlife and Local Government.

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[40] A.24-11-007, *Application of Pacific Gas and Electric Company (U39E) for Approval of Electric Rule No. 30 for Transmission-Level Retail Electric Service* (Nov. 21, 2024).
[41] FERC, "FERC Orders Action on Co-Location Issues Related to Data Center Running AI" https://ferc.gov/news-events/news/ferc-orders-action-co-location-issues-related-data-centers-running-ai

9) *Prior Legislation.*

SB 1298 (Cortese, 2024) Authorizes the CEC to exempt from certification a thermal power plant with generating capacity of up to 150 megawatts (MW) if that power plant is used solely as a backup generation for a data center. Status: Died – Assembly Committee on Rules.

SB 253 (Wiener), or the Climate Corporate Data Accountability Act, Requires any partnership, corporation, limited liability company, or other U.S. business entity with total annual revenues in excess of $1 billion and that does business in California to publicly report their annual greenhouse gas (GHG) emissions, as specified by the California Air Resources Board (ARB). Status: Chapter 382, Statutes of 2023

SB 261 (Stern) requires companies that do business in California and have gross revenues exceeding $500 million annually, excluding insurance companies, to report on their climate-related financial risk. It also requires the Air Resources Board (ARB) to contract with a qualified climate reporting organization to review and publish an analysis of those reports. Status: Chapter 382, Statutes of 2023

REGISTERED SUPPORT / OPPOSITION:

Support

California Environmental Voters
Compute Exchange INC.
Sierra Club
Sustainable Rossmoor
Transparency Coalition.ai

Opposition

California State Association of Electrical Workers
Coalition of California Utility Employees

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