STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the application of DTE Electric Company	)	
for approval of amendments to Rate D11 and	)	Case No. U-22061
related relief	)	

DIRECT TESTIMONY AND EXHIBIT OF JOHN RICHTER

On Behalf of

Great Lakes Renewable Energy Association

August 4, 2026

Table of Contents

I. QUALIFICATIONS

Q. Please state your name and business address.

A. My name is John Richter, and I have no business address, because I am retired.

Q. Who are you representing, and what is your title and role there?

A. I'm representing The Great Lakes Renewable Energy Association (GLREA). I am on the Board of Directors. I am also the Chairman of the Policy Committee.

Q. Who is the GLREA?

A. The GLREA is a 501(c)(3) (non-profit) corporation based in Michigan. Our Mission Statement is to "Promote the Use of Renewable Energy in Michigan and in the Great Lakes Region, By Empowering Our Members and the Public Through Advocacy, Education and Strategic Collaboration." And our Vision Statement is: "We believe that current and emerging clean, renewable energy solutions can provide 100% of the electrical energy demand in the Great Lakes Region. Furthermore, we believe that increasing development and access to clean, renewable energy that is locally produced, operated and utilized supports economic development, creates new good paying jobs and is essential to supporting healthier, more resilient communities that advance climate justice."

Q. Please describe your educational background.

A. I received a Bachelor of Science degree in Computer Engineering, with a minor in Economics, from Oakland University in 1982. I did some graduate work in software engineering at both Oakland University, and University of Detroit, Mercy. I did some alternative energy coursework at Oakland Community College. I received a Master of Science in Renewable Energy from Murdoch University in Perth, Australia in 2009. I've been through training at Michigan State University's Institute for Public Utilities Regulatory Research and Education's courses on "utility regulation", and "grid school."

Q. Please describe your relevant business experience.

A. At Frontier Communications, I was the Senior Manager of Hardware Integration. In this role, I performed request for proposals (RFPs) and request for quotes, set up the criteria for evaluating the responses, engaged in purchase negotiations, and performed project management for equipment installation, testing, and turn-up. I had a $25M capital budget for equipment purchases. I also created the Company's capacity forecasting model, and did net present value (NPV) analysis to determine which equipment sites should be closed and consolidated. I was promoted to Director, Product Platform Development, where I again did RFPs and equipment selection. As a Sr. Product Development Manager at Global Crossing, I created new business processes in support of new product launches.

During 2002, I consulted on renewable energy policy for the GLREA (among others). In that role, I did a presentation to Michigan legislators and staff on policies to incentivize renewable energy deployments. I was one of three invited presenters to the Northeast and Midwest Caucus meeting on a national RPS at the U.S. Capitol Building. And I was a member of the MPSC Collaborative on Renewable Energy. Under contract with American Council for an Energy Efficient Economy, I wrote a white paper on energy efficiency policy, which was presented to the Governor of Michigan. I was also featured in the PBS documentary film, *Michigan's Green Energy Economy.*

In 2010 and 2011, I was an adjunct instructor at Macomb Community College, teaching a course on solar energy. My resume is provided as **GLREA Exhibit-1**

Q. Have you previously presented testimony before the Michigan Public Service Commission ("MPSC" or the "Commission")?

A. Yes, in the following cases:

- U-18091, DTE Electric PURPA case (remand)
- U-18232, DTE REP (reopened)
- U-20165, Consumers Energy IRP case
- U-20359, Indiana Michigan Power rate case
- U-20471, DTE Electric IRP
- U-20561, DTE Electric Rate case
- U-20713, DTE Electric Renewable Energy Plan
- U-20836, DTE Electric Rate case
- U-21090, Consumers Energy IRP
- U-21172, DTE VGP
- U-21193, DTE Electric IRP
- U-21375 DTE Electric VGP
- U-21534, DTE Electric rate case
- U-21816, Consumers Energy REP
- U-21972 Consumers Energy VGP
- U-22058 DTE Electric special contracts

Q. What is the purpose of your direct testimony?

A. To provide useful background information on data center growth and the unique characteristics of data center load, and to argue for specific changes to the proposed tariff to better ensure grid reliability and capacity adequacy.

Q. Are you sponsoring any exhibits?

A. Yes:

Exhibit GLREA-1 Resume of John Richter

Q. Were these exhibits prepared by you or under your supervision?

A. Yes.

II. BACKGROUND

A. TSUNAMI OF DATA CENTER PROPOSALS

Q. What is a data center?

A. Amazon Web Services (AWS), one of the largest computing service companies defines a data center as:

> "A data center is a physical location that stores computing machines and their related hardware equipment. It contains the computing infrastructure that IT systems require, such as servers, data storage drives, and network equipment. It is the physical facility that stores any company's digital data."[1]

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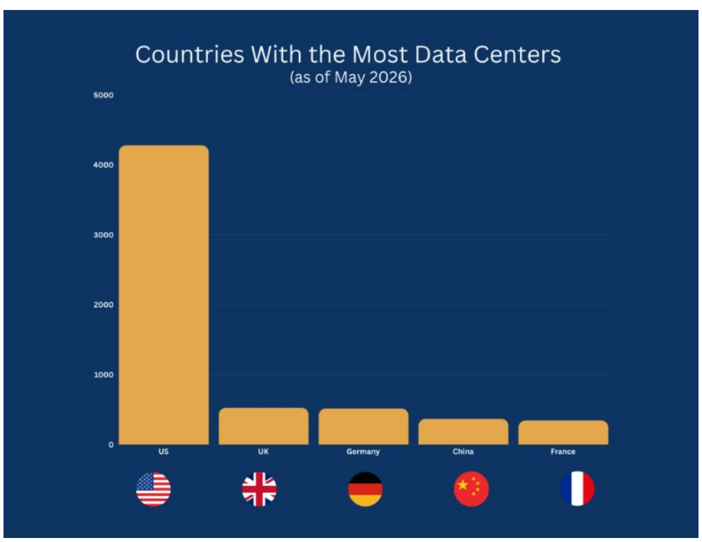
[1] Amazon Web Services, "What is a Data Center". Accessed on 5/27/26 at: https://aws.amazon.com/what-is/data-center/

Q. How many data centers there, and where are they?

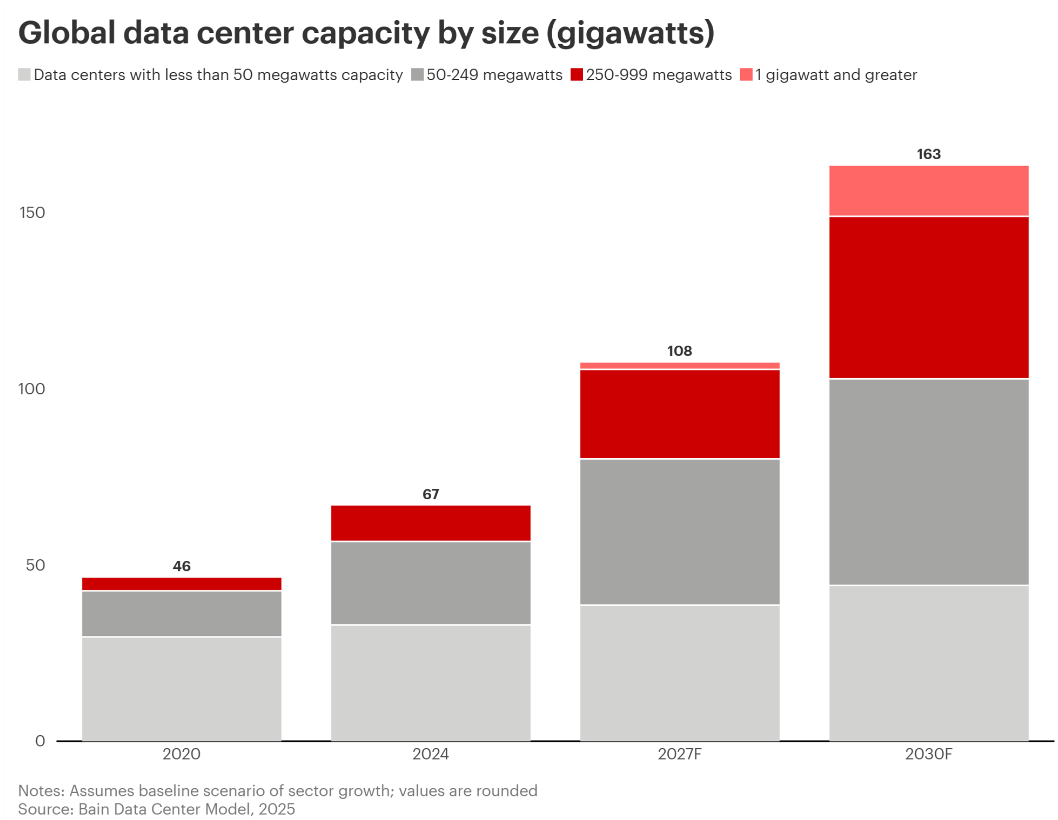
A. There are more than 11,000 data centers in the world today, and the US has eight times as many as any other country.[2]



[2] "Measuring the Data Center Boom: Facts and Statistics (2026)," *programs.com*, May 11, 2026. Accessed on 5/27/26 at: https://programs.com/resources/data-center-statistics/ and citing data from: https://www.datacentermap.com/

Q. Data centers have been around for decades, why have they become an issue for the grid only recently?

A. The term "data center" is extremely broad. Many of the older data centers are tiny by today's standards. In 2024, the average data center had a load of only 4 MW.[3] In 2020, there were only 46 data centers in the world larger than 250 MW of load. Today, we're planning data centers more than 38 times that size:[4]



[3] Ibid

[4] Padraic Brick, Tatum Quinn, Peter Hanbury, Aaron Denman, and Alessandro Cannarsi, "AI Data Center Forecast: From Scramble to Strategy," *Bain & Company*, accessed on 5/27/26 at: https://www.bain.com/insights/ai-data-center-forecast-from-scramble-to-strategy-snap-chart/ ; Clearview reports that the Delta Gigasite data center in Millard, UT is expected to draw 9,700 MW. Accessed on 5/28/26 at: https://cleanview.co/data-centers/us

As a result, over time, larger data centers will dominate:[5]

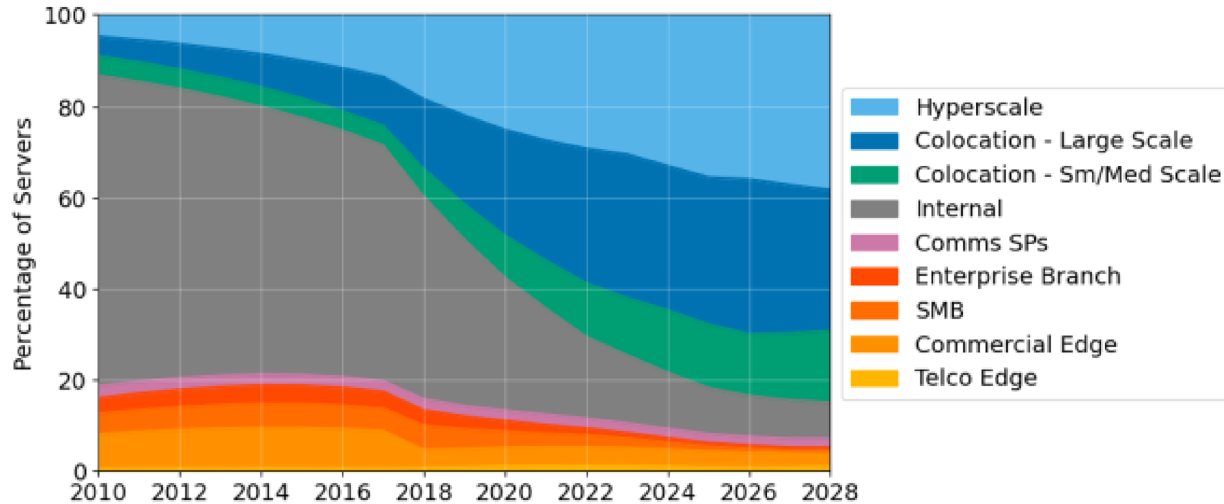


Figure 4.1. Distribution of servers by data center type.

[5]Arman Shehabi et al, "2024 United States Data Center Energy Usage Report," *LBL Publications*, December 2024, p 37. Accessed on 5/27/26 at: https://escholarship.org/uc/item/32d6m0d1

Q. What are these data centers being used for?

A. While many existing data centers are being used for traditional data processing, supporting websites or streaming, most of the new data center proposals are for artificial intelligence (AI). It's estimated that by 2030, 50%[6] to 70%[7] of data center computing will be for AI. There are two distinct AI activities: training a new AI model, or answering queries made to the AI, which is called "inference." The AI industry's focus is moving from training to inference, as it moves from development to sales.[8]

Q. How much energy can it take to train a new AI model?

A. Each new model is more complex and requires more processing and energy. For example, training the AI model ChatGPT-3 consumed 1,300 MWh.[9] It's successor, ChatGPT-4, consumed 50 GWh - 38 times as much energy.[10]

[6] Padraic Brick, Tatum Quinn, Peter Hanbury, Aaron Denman, and Alessandro Cannarsi, "AI Data Center Forecast: From Scramble to Strategy," *Brain & Company*, accessed on 5/26/26 at: https://www.bain.com/insights/ai-data-center-forecast-from-scramble-to-strategy-snap-chart/

[7] McKinsey Quarterly, slide 3 "The AI effect." Accessed on 5/26/26 at: https://www.mckinsey.com/quarterly/the-five-fifty/five-fifty-more-data-more-demand

[8] Digital Ocean, "AI Inference vs Training: Key Differences Explained," February 27, 2026. Accessed on 5/27/26 at: https://www.digitalocean.com/resources/articles/ai-inference-vs-training

[9] James Vincent, "How much electricity does an AI consume?" *The Verge*, February 16, 2024. Accessed on 5/27/26 at: https://www.theverge.com/24066646/ai-electricity-energy-watts-generative-consumption

[10] James O'Donnell and Casey Crownhart, "We did the math on AI's energy footprint. Here's the story you haven't heard," *MIT Technology Review*, May 20, 2025. Accessed on 5/27/26 at: https://www.technologyreview.com/2025/05/20/1116327/ai-energy-usage-climate-footprint-big-tech/

Q. How many new data centers are being proposed in the US and in Michigan?

A. In the US, the market intelligence company Clearview is tracking 614 operating data centers with a total load of 18 GW, and 936 planned data centers, with a planned load of an additional 330 GW. In Michigan, Clearview is tracking 2 operating data centers with a load of 3 MW, and 14 planned data centers with a planned load of 2,964 MW[11] Their list did not provide a load estimate for the Flex data center proposed in S. Lyon Twp. I attended the data center informational meeting in S. Lyon on January 22, 2026; the representative from developer Verrus stated that the project's load would start at 200 MW and ramp to 525 MW.

Q. How much money is being invested in data center expansion?

A. It is difficult to comprehend the size of this industry. The Wall Street Journal compared the capital investment of the four largest US tech companies as a percentage of the US Gross Domestic Product (GDP) and found that it exceeded the percentage of GDP spent on the US railway system at its peak development, the US interstate highway system, or the Apollo space program.[12]

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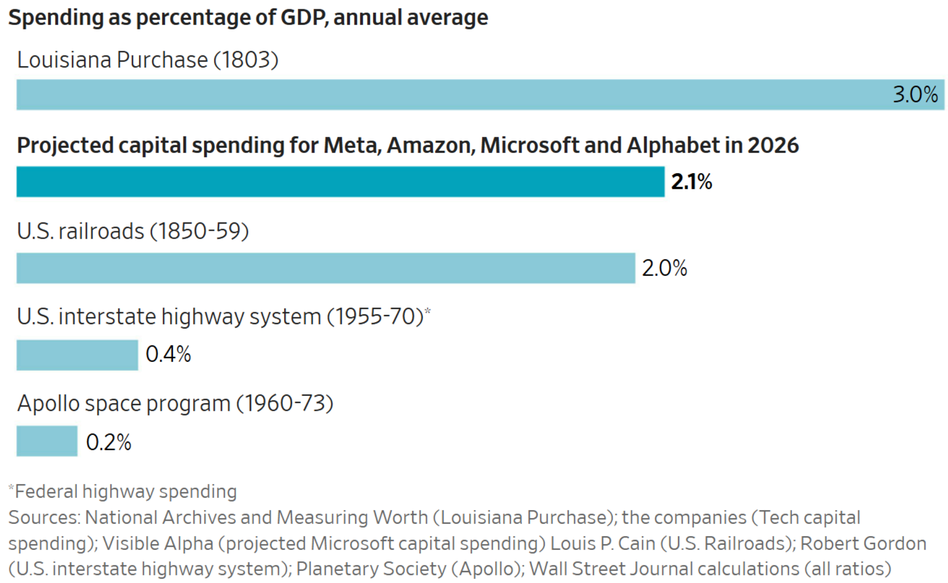
[11] Clearview, "Data Centers in the United States", and "Data Centers in Michigan," last updated May 2026. Accessed on 5/27/26 at: https://cleanview.co/data-centers/us and https://cleanview.co/data-centers/michigan, respectively

[12] Meghan Bobrowsky, Drew An-Pham, and Alana Pipe, "Big Tech's AI Push Is Costing a Lot More Than the Moon Landing," *The Wall Street Journal*, February 7, 2026. Accessed on 5/27/26 at: https://www.wsj.com/tech/ai/ai-spending-tech-companies-compared-02b90046?pos=1&page=1 (paywall)



Data center capital investment hit $770 B in 2025.[13] For comparison, the aggregate capital investment for 47 US investor- owned energy utilities was $215B in 2025.[14] In the first half of 2025, data center development and IT accounted for 92% of the growth in US GPD.[15] It's simply astounding.

[13] Rystad Energy, "Putting things in perspective: Data center investments now on par with renewables, oil and gas," March 25, 2026. Accessed on 6/3/26 at: https://www.rystadenergy.com/insights/putting-things-in-perspective-data-center-investments-now-on-par-with-renewables

[14] Jason Lehmann, Heike Doerr, and Dan Lowrey, "US utility capex forecast nudges higher on increased generation spending plans," *S&P Global*, September 23, 2025. Accessed on 5/27/26 at: https://www.spglobal.com/market-intelligence/en/news-insights/research/2025/10/us-utility-capex-forecast-nudges-higher-on-increased-generation-spending-plans

[15] Nick Lichtenberg, "Without data centers, GDP growth was 0.1% in the first half of 2025, Harvard economist says," *Fortune*, October 7, 2025. Accessed on 5/29/26 at: https://fortune.com/2025/10/07/data-centers-gdp-growth-zero-first-half-2025-jason-furman-harvard-economist/

Q. What historical technological development had an impact of the scale of data centers and the artificial intelligence?

A. The comparison made my multiple experts, including a former CEO of Google and the Pope, is the industrial revolution[16,17, 18] or the invention of the wheel.[19] It is very difficult to predict what our lives will be like in 20 or 30 years.

Q. How much will data centers affect demand for electrical energy in the US?

A. A 2024 study by Lawrence Berkeley National Laboratories (LBNL) estimated that data centers consumed 1.9% of US electrical energy in 2018, and 4.4% in 2023. LBNL projects that by 2028, data centers will consume between 6.7% and 12.0% of US electrical energy (see graph below).[20]

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[16] Arcelia Martin, "A New Era of Data Center Development Is Like a Second Industrial Revolution," *Inside Climate News*, 3/14/26. Accessed on 7/26/26 at: https://insideclimatenews.org/news/14032026/data-center-development-energy/

[17] Hannah Devlin, "AI 'could be as transformative as Industrial Revolution'," 5/3/23. Accessed on 7/26/26 at: https://www.theguardian.com/technology/2023/may/03/ai-could-be-as-transformative-as-industrial-revolution-patrick-vallance

[18] Nathan Schneider, "Pope Leo XIV compares AI to the Industrial Revolution – as new alternatives to big AI firms take shape," 5/26/26. Accessed on 7/26/26 at: https://theconversation.com/pope-leo-xiv-compares-ai-to-the-industrial-revolution-as-new-alternatives-to-big-ai-firms-take-shape-283249

[19] Bob Choat, "Unleash the AI Revolution: How Today's Tech Compares to Historic Innovations," *Medium*, 3/26/2023. Accessed on 7/26/26 at: https://medium.com/@bobchoat/unleash-the-ai-revolution-how-todays-tech-compares-to-historic-innovations-28c1be8d223

[20] Arman Shehabi et al, "2024 United States Data Center Energy Usage Report," *LBL Publications*, December 2024, p 5. Accessed on 5/27/26 at: https://escholarship.org/uc/item/32d6m0d1

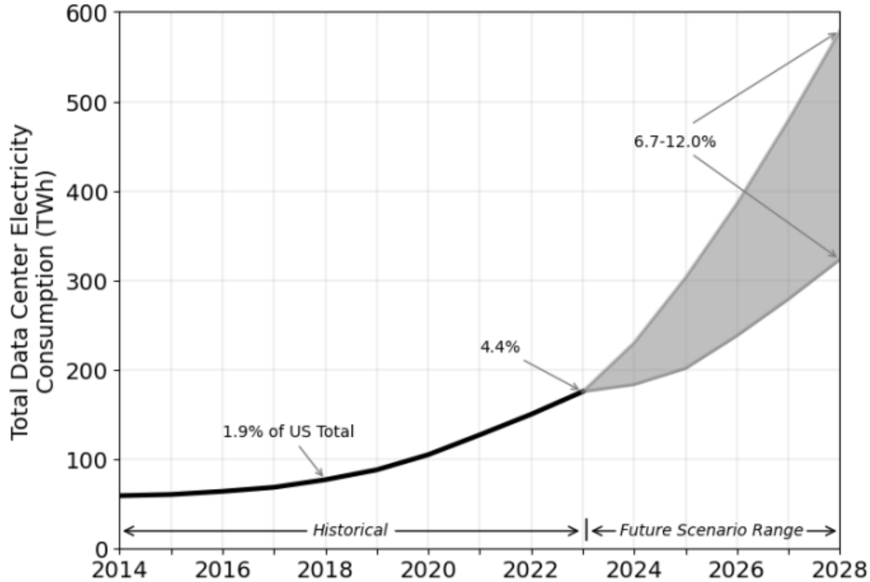
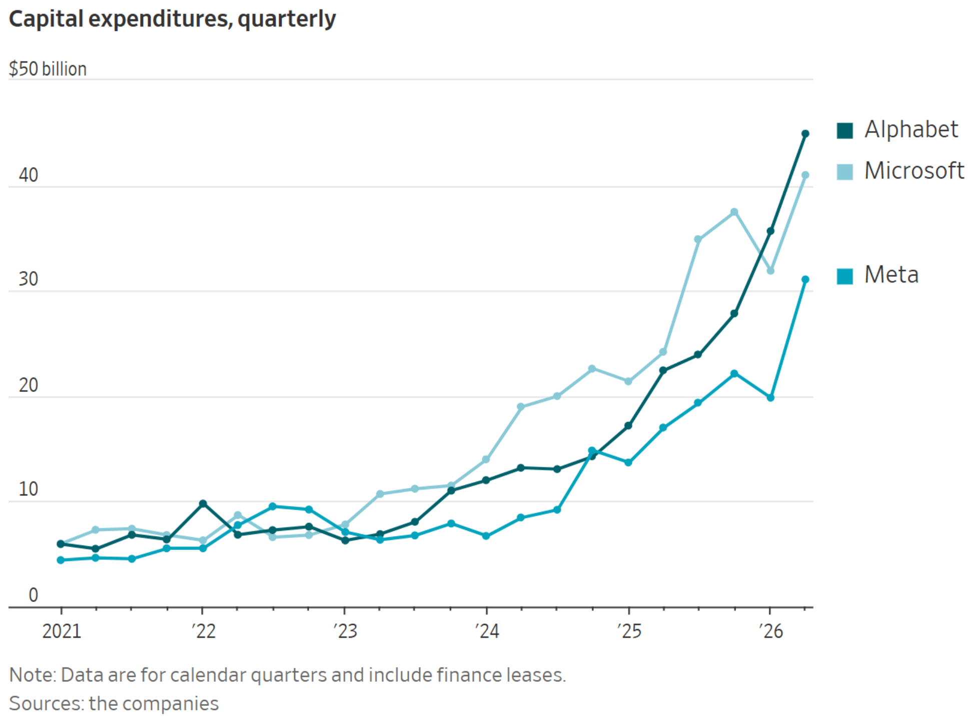


Figure ES-1. Total U.S. data center electricity use from 2014 through 2028.

AI companies have continued to accelerate their build out of data centers;[21] the estimates of power demand have since increased with it. In December of 2025, BloombergNEF forecast that data center demand would reach 106 GW, 36% above its projection in April, 2025. In July, 2026, it increased its estimate another 83%, to 194 GW, about 20% of the nation's electricity.[22]

[21] Meghan Bobrowsky, "Meta Stumbles as Tech Investors Demand Better Answers on AI Spending," Wall Street Journal, July 29, 2026. Accessed on 7/30/26 at: https://www.wsj.com/tech/ai/meta-stumbles-as-tech-investors-demand-better-answers-on-ai-spending-fc731909

[22] Luke James, "Data centers forecast to use 20% of US power by 2035 — analysts estimate usage will rocket to 194 gigawatts, 83% more than forecast seven months ago," tom's Hardware, July 22, 2026. Accessed on 7/27/26 at: https://www.tomshardware.com/tech-industry/data-centers/bnef-nearly-doubles-its-us-data-center-power-forecast-to-194gw



Jim Robb, president and CEO of the North American Electric Reliability Corp., told a House subcommittee that the rate of increase in electricity demand is "staggering." Summer peak demand is projected to rise by 200 GW, with winter demand growing faster. "That's 70% higher than what we projected at this time last year," Robb said.[23]

[23] Robert Walton, "January's Winter Storm Fern was 'classic near-miss' for US grid, says NERC's Robb," *Utility Dive*, March 20, 2026. Accessed on 5/29/26 at: https://www.utilitydive.com/news/januarys-winter-storm-fern-was-classic-near-miss-for-us-grid-says-nerc/815291/

Q. How much will data centers affect demand for electrical energy in Michigan?

A. That's difficult to say with any precision. Some proposals become operating data centers, and some never get built. The 1.4 GW Oracle data center under construction in Saline Twp. is projected to ramp to a load of 10,904 GWh/yr.[24] The proposed Google data center will consume 7,884 GWh/year,[25] for a total data center load of (10,904 GWh/yr. + 7,884 GWh/yr.) 18,788 GWh/yr. For comparison, DTE Electric's current projection of 2026 sales to retail customers is 39,635 GWh.[26] Therefore, the combined load of these two data centers will be approximately (18,788 GW/yr. / 39,635 GWh/yr.) **47%** of DTE Electric's retail sales. DTE Electric (DTEE) has said they are in discussions with an additional 6 GW of potential data center /projects, over and above the two in Saline Twp. and Van Buren Twp.[27]

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[24] U-21990, Exhibit A-3, row 4 "Incremental Data Center Load," columns (e) through (i)

[25] Direct testimony of K. L. Bilyeu, p KLB-9, Table 1

[26] U-21990, Exhibit A-3, row 4, column (c).

[27] Robert Walton, "DTE sees up to 8.4 GW data center opportunity," *Utility Dive*, May 1, 2026. Accessed on 5/27/26 at: https://www.utilitydive.com/news/dte-energy-data-center-earnings-reliability/819052/

Consumers Energy has testified that they have inquiries from over 30 different data center leads that total over 15 GW of load.[28] For comparison, as of December 2021, Consumers Energy had a total system generating capacity of 5,300 MW.[29] Intelligence platform Sightline Climate estimates that 30-50% of the US data center pipeline will not be built.[30] If half of the DTE "potential" projects and half of the Consumers Energy "inquiries" were built, it would represent (.5 x 6 GW) + (.5 x 15 GW) = 10.5 GW of additional load.

III. PROPOSED TARIFF

Q. Why did DTE Electric file its application in the instant case?

A. The Commission ordered it, in case U-21990, which approved special contract for a data center in Saline Twp. The Commission order stated:

> "Within 90 days of the date of this order, DTE Electric Company shall file an application for approval of a generally applicable large load customer tariff that aligns with the findings in the November 6, 2025 order in Case No. U-21859."[31]

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[28] U-21859, Direct testimony of Laura Connolly, 3 Tr 85

[29] Consumers Energy, "Electric Operation Statistics," December 2021. Accessed on 5/28/26 at: https://www.consumersenergy.com/about-us/electric-generation/electric-operations-statistics

[30] Olivia Wang, "Data center outlook: half of 2026 pipeline may not materialize," *Sightline Climate Outlook*, February 24, 2026. Accessed on 5/28/26 at: https://www.sightlineclimate.com/research/data-center-outlook

[31] U-21990, Commission order dated December 18, 2025, p 45

Q. Why is the Commission's review of the proposed large load tariff provisions critical?

A. Firstly, as I've discussed in the prior section, large load customers (i.e., data centers) could soon become a very large portion of Michigan's total electrical energy consumption. Secondly, review is critical because the Company's financial incentives are not well aligned with the interests of other ratepayers. New large loads will require the Company to either acquire significant amounts of new generating capacity, or to sign large PPA agreements, or both. Either approach to meeting the load growth provides the Company with a massive new profit opportunity. It is therefore reasonable to think that the Company will pursue contract terms and conditions that will encourage data centers to locate in its service territory, enhancing its profit opportunity. Service terms that reduce power quality, grid reliability, or capacity adequacy are essential to protect other customers. The Commission should regard the proposed tariff provisions from the reasonable perspective that the Company has a strong motive to encourage more data centers to locate here, perhaps overriding other considerations.

Q. What were the key provisions of the large load tariff approved in U-21859?

A. I've created a table of key provisions in U-21859, and added a column reflecting the Company's proposal in the instant case. For each provision, I've included the page number in the Commission's order dated November 6, 2025 in case U-21859, and the page number in the Company's filing in the instant case, for traceability.

Provision	U-21859	Page	U-22061 filing	Page
Applicability	>100 MW single-site > 100 MW across sites of > 20 MW Existing customers transfer to the new rate	105-6 115	>100 MW single-site > 100 MW across sites w/avg > 20 MW Only new customers	AW-8, AW-7
Contract length	15 yr after ramp Ramp ≤ 5 yrs 5-yr evergreen 4 -r notice prior	108	15 yr after ramp Ramp ≤ 3 yr 5-yr auto extension 3-yr notice prior to ext.	AW-8
Min bill demand (MBD)	80% of contract capacity	109	80% of contract capacity	AW-8
Exit fee	MBD x remaining contract term, including SAC Utility should mitigate exit fee	109-10	MBD x remaining ramp + 15 yr or remaining contract or 24 months	AW-12
Exit notice	Not mentioned	N/A	3 yrs for non-renewal 2 yrs and pay exit fee	AW-13
Load reduction	One-time reduction of no more than 10%, with 4-yr notice, or ex parte proceeding	111	"The contract capacity however established shall not be decreased during the term of the contract and subsequent renewal periods as long as service is required unless there is a specific reduction in connected load."	A-1 3 of 6
Collateral	Default: half the exit fee Irrevocable letter of credit or cash May apply for other options	112	Default: 100% of the termination fee Less at DTEE's sole discretion Mix of letter of credit, cash, or parent guarantee, at DTEE's discretion	AW-13
CIAC allowance	Should address in a rate case	114-5	Twice expected distribution revenue	AW-14
Admin fee	$100,000 True-up to actual costs	123	< 200 MW $100,000 ≥ 200 MW $200,000 No mention of true-up	AW-13
Load > contracted capacity	Not mentioned	N/A	Up to 5% of load for no more than 3 months out of 12	AW-11 A-1; 1 of 6

			Any reading > contract capacity becomes the new contract capacity	
New customer	Ex parte filing required, demonstrating costs are not being paid by other customers	117	Not filing mentioned Has a number of pending requests for service	AW-5

Q. Are there provisions in which the Company's proposal varies from the order in U-21589, in ways which you object to?

A. Yes, the "load reduction", "collateral", "load > contracted capacity", and "new customer" provisions have problematic terms.

Q. What do you find objectionable in the Company's proposed "load reduction" terms and conditions?

A. In U-21859, the Commission ordered that a specific degree of load reduction is allowed. In the Company's proposal, there is no *new* language (not existing in D11 already) on this issue. Additionally, the existing language is vague and open-ended:

> "The contract capacity however established shall not be decreased during the term of the contract and subsequent renewal periods as long as service is required *unless there is a specific reduction in connected load*."[32] (emphasis added)

[32] Exhibit A-1 of A. Willis, p 3 of 6, under "special terms and conditions:"

I'm guessing that this term was designed for a scenario in which an industrial customer removes some equipment from service, but it's unclear. If a data center customer under this rate sheet shut down or physically removed some racks of computing equipment, can they reduce their contracted capacity? Is there any limit on the amount of "specific reduction in connected load" that is allowed? None is specified, raising the possibility of significant stranded costs if a data center pulls equipment out of service and reduces their contracted capacity.

Q. How should the Commission remedy the load reduction provision?

A. The Commission should order it revised to match the one-time 10% reduction, or submit an ex parte filing per U-21859. Alternatively, the Commission could simply order that the sentence in D11allowing contract reduction be removed entirely, eliminating any option for a reduction in contracted load. This alternative would provide stronger customer protection from stranded assets.

Q. What do you find objectionable in the Company's proposed "collateral" terms and conditions?

A. In U-21859, the Commission recognized the importance of collateral:

> "Finally, even in instances in which exit fees are sufficient to protect against loads that fail to materialize or against customers that cancel or reduce service prior to meeting the minimum term of billing demand, it is also necessary to ensure that sufficient collateral is in place if the contracted large load customer ultimately becomes insolvent and unable to pay the required exit fee. This is particularly important for customers with lower credit ratings, as well as in the case of any potential industry-wide decline that also impacts the financial position of otherwise healthy corporate parents. It is against this backdrop that the Commission reviews the specific elements proposed by the company and the evidence from the intervening parties."[33]

And also:

> "…issues of collateral are more dependent on the specific creditworthiness of an individual Applicant… the Commission is adopting a set of *collateral requirements that can act as a default, while providing for Consumers to apply for approval to seek higher or lower collateral requirements on a case-by-case basis*… Thus, this default collateral provision will evolve over time… The default acceptable forms of collateral include a *standby irrevocable letter of credit or cash* (which earns interest) … Because of the uncertainty regarding the credit quality of an unknown large load customer, the Commission is not approving a parent guarantee as sufficient to meet this default collateral requirement, though the Commission remains open to considering the use of parent guarantees—either on their own or in concert with other collateral—on a case-by-case basis… If Consumers determines that a different amount of collateral (either higher or lower) or a different form of collateral (including a guarantee from a parent company) is appropriate for a given large load customer, Consumers shall include this information in the general application (as discussed below) *that will be required for each large load customer* prior to that customer moving on to Rate GPD. Consumers' application should demonstrate that it is reasonable and prudent to adjust the level(s) or form of collateral. The Commission will review this request, taking into account the risk level of the individual large load customer, including the credit rating of the customer and/or its parent company. If the Commission decides the different level or form of

[33] U-21859, Commission order dated November 6, 2025, p 104

> collateral presented in the filing is commensurate with the risk presented by the customer, it may approve a level different from the default. If either the default collateral or an approved alternative *collateral amount is insufficient in the event of a default and results in Consumers incurring stranded costs, and if Consumers then seeks recovery of the stranded costs, then the Commission will address recovery of those stranded costs at that point in time.* The ex parte application should include a demonstration that the alternative collateral The Commission finds that collateral exemptions are not required, in light of the utility's ability to require an amount lower than the default collateral provision approved by this order."[34]

Thus, the Commission set up default collateral requirements, and reserved the right to make case-by-case exceptions if the utility petitioned it to do so. The Commission did **not** grant the right to make collateral exceptions at the discretion of the utility. It required that letters of credit are "irrevocable," a critical legal term missing from DTEE's proposal. It did not accept a parent guarantee as an acceptable form of default collateral, unlike DTEE's proposal.

Q. Were there any collateral-related provisions ordered in U-21990, which were not present in U-21859?

A. Yes. Significantly, the Commission issued a directive placing liability on the Company in the scenario in which the customer is in default, and the collateral is insufficient to cover the shortfall:

[34] U-21859 Commission order dated November 6, 2025, p 112-4

> "In addition, in the event of a failure to pay the MBD under the PSA, or in the event of a termination, default, or other event whereby DTE Electric is required to draw on the letter of credit or parental guaranty, if the company determines that the specified collateral is not sufficient to cover the full amount of the remaining financial exposure associated with the ESA or the PSA (minus the value to customers), the Commission specifically cautions DTE Electric that any unrecovered costs shall not be borne by ratepayers and that DTE Electric bears responsibility for any remaining liability. All risk associated with the sufficiency of the collateral shall be borne by DTE Electric."

Additionally, in U-22058, the Company accepted liability in the same scenario:

> "…the Company acknowledges that it bears the risk of collateral insufficiency for costs that the Commission ultimately determines in excess of revenues received…"[35]

Note that the Commission orders in U-21589 and U-21990 provided very different statements regarding liability for collateral shortfalls in the event of customer default. In U-21990, the utility negotiated collateral quantity and quality with the customer and presented it to the Commission for approval. The Commission approved the collateral proposed, but (very properly) placed the liability for collateral insufficiency on the utility. In U-21589, the Commission set up default collateral requirements, and deferred any decision on the liability for collateral insufficiency to a future case, should that scenario arise. DTEE wants to have the best of both arrangements; unfettered discretion as to what kind of collateral is required, but no liability for collateral insufficiency.

[35] U-22058, rebuttal testimony of N. T. Foley, 3 TR 135 lines 1-3.

I also note that the Commission discussed the relationship between collateral requirements and the customer's credit worthiness. Over the 15-year (or longer) duration of a large load customer contract, the customer's credit worthiness could decline. DTEE addressed the importance of the customer's credit rating in U-22058, and included a provision that the customer must provide a letter of credit if their credit rating drops below a pre-defined level. This is called a "rating trigger"[36] or a "credit rating clause," [37] and is common in contract law and loan agreements. Such a clause was notably absent from the Commission's default collateral discussion in the order dated November 6 in U-21589.

Q. How should the Commission remedy the Company's proposed collateral provision?

A. First, I observe that regardless of the collateral, ratepayers are exposed to some risk if one or more data centers cancel their agreements. DTEE must build generation and transmission/distribution capacity to supply the full contracted amount of energy. The equipment purchased will have a lifetime significantly in excess of the 15-year term of the contract, and the customer is only required to pay for 80% of the energy they contracted to purchase. The protection provided with a 15-year duration and 80% MBD is not complete protection. With that said, in terms of collateral, I see two approaches:

1. The Commission could grant the Company control over the amount and type of collateral accepted and assign the Company full liability if the collateral is

[36] Konstantin Vasilev, "Rating Trigger," Cbonds, 2/14/24. Accessed on 7/24/26 at: https://cbonds.com/glossary/rating-trigger/

[37] Cobrief, "Credit rating clause: Copy, customize, and use instantly," 3/20/25. Accessed on 7/24/26 at: https://www.cobrief.app/resources/contract-clause-library/credit-rating-clause-copy-customize-and-use-instantly/

insufficient, as it did in U-21990. This approach is valid, but leaves other ratepayers at a slight risk, if one or more customer defaults drive the Company to the brink of bankruptcy. Recall that Consumers Energy was driven to the brink of bankruptcy due to imprudent costs incurred in the construction of the (eventually canceled) Midland nuclear power plant.[38] Despite the liability belonging to the utility, the MPSC approved rate increases to fund a "stabilization fund"[39]

2. The Commission could follow the precedent in U-21859 and require a percentage of the exit fee as collateral in cash or an irrevocable letter of credit. This approach gives the Commission and/or Staff considerable responsibility to assess the creditworthiness of the customer. If the Commission chooses this approach, it should increase the collateral amount to 100% of the exit fee; collateral of only 50% of the exit fee leaves ratepayers highly exposed in the event of customer default. Alternatively (and with higher risk), the Commission could keep the collateral requirement at 50% and include a credit rating clause to demand more collateral, if the customer's credit rating declines. Note that Oracle's credit rating was recently downgraded by both S&P and Moody's, and is now only one step above "speculative grade" status.[40]

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[38] Wikipedia, "Midland Cogeneration Venture." Accessed on 7/24/26 at: https://en.wikipedia.org/wiki/Midland_Cogeneration_Venture

[39] Association of Businesses Advocating Tariff Equity v. Public Service Com'n, 527 N.W.2d 533, 208 Mich.App. 248 (Mich. App. 1994), referencing MPSC case U-7830

[40] Vasundhara Sawalka, "Oracle's Credit Risk Nears an 18-Year High: Can AI Backlog Save Stock?" *Yahoo Finance*, July 21, 2026. Accessed on 7/25/26 at: https://finance.yahoo.com/markets/stocks/articles/oracles-credit-risk-nears-18-151000986.html

Q. What do you find objectionable in the Company's proposed "load > contracted capacity provision?"

A. This provision allows the customer to draw up to 5% more power than its contracted capacity, for up to 3 of 12 months. First, I note that there was no similar provision in the tariff approved in U-21859; this provision is a deviation from that model. Secondly, the provision's limit of 5% is with respect to the customer's contracted capacity and not the impact on the grid. To illustrate: for a customer with a contracted capacity of 2 GW, the increase would be limited to 100 MW (5% of 2 GW). A new 100 MW customer would trigger the large load requirements in and of itself, and this provision will allow an expansion that size without any Commission review. A 2 GW data center is not an unlikely example; a 9 GW data center is under construction in Utah,[41] and there are 10 and 11 GW data centers proposed in Wyoming and Texas (respectively).[42] Bloom Energy projects that by 2035, 32% of data centers will be 1 GW or larger.[43]

Additionally, the load expansion provision does not differentiate between excess load in the peak summer months vs. excess load the rest of the year. About 30-55% of a

[41] Oliver Milman, "'Irresponsible': backlash as Utah approves datacenter twice the size of Manhattan," *The Guardian*, 5/13/26. Accessed on 7/25/26 at: https://www.theguardian.com/us-news/2026/may/13/utah-approves-datacenter-backlash

[42] Aaron Foyer, "The 20 Largest Data Centers Being Developed in North America," *Shift Lab* by Orennia, 2/17/26. Accessed on 7/26/26 at: https://orennia.com/insights/the-20-largest-data-centers-being-developed-in-north-america

[43] "2026 Data Center Power Report," *Bloom Energy*, January, 2026, p 6. Accessed on 7/27/26 at: https://www.bloomenergy.com/wp-content/uploads/2026-power-report.pdf

data center's load is for cooling,[44] with an industry average of 40%.[45] So (absent a load profile), we may reasonably expect that these customer's peak load will occur during the summer months, when the grid is under the most stress. Adding 100 MW of load in the summer months could affect system reliability.

Q. How should the Commission remedy the Company's proposed "load > contracted capacity" provision?

A. It would be reasonable and prudent, for the sake of system reliability, for the Commission to require the Company to remove this provision entirely. Alternatively, if the Commission favors giving large load customers some latitude, the provision should be re-written. The cap should be the lessor of: 5% of the customer's contracted capacity, or 50 MW, and be restricted to the nine non-summer months, as defined in MISO capacity auctions. If, in the future, due to high levels of solar deployment, the critical time for meeting load is in the winter months (with low solar output), the provision may be changed.

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[44] "Data Center Cooling Costs," *Data Span*, 8/23/22. Accessed on 7/26/26 at: https://dataspan.com/blog/data-center-cooling-costs/

[45] "Energy consumption in data centers: air versus liquid cooling," *Eaton*, undated. Accessed on 7/26/26 at: https://www.eaton.com/us/en-us/markets/data-centers/data-center-cooling/efficiency/energy-consumption-in-data-centers-air-versus-liquid-cooling.html

Q. What do you find objectionable in the Company's proposed "new customer" provision?

A. Unlike the tariff approved in U-21859, this provision makes no mention of requiring Commission approval of contracts for all new customers. The absence of any such reference could be interpreted as allowing a new large load customer to connect to DTEE's grid without any Commission approval, just as other industrial customers on the D11 tariff may connect without Commission approval.

Q. How should the Commission remedy the Company's proposed "new customer" provision?

A. The Commission should require a clear statement in the tariff that all new large load customers must sign a power supply agreement, subject to review by the Commission, in a contested case.

IV. CONCERNS NOT ADDRESSED IN U-21859

Q What significant risks do data centers create, which the Commission did not address in its November 6, 2025 order in U-21859?

A. Data centers create at least two distinct, significant risks for the grid, which I will address in sequence: risk to grid reliability, and risk to resource adequacy.

A. Risk to Grid Reliability

Q. How do data centers pose a risk to grid reliability?

A. There are three different ways in which data centers have been shown to affect grid reliability: dramatic load volatility, simultaneous UPS trips and brief but powerful harmonics.

1. Data Center Load Volatility

Q. Is data center load volatility a recognized issue?

A. Yes. Former US Secretary of Energy (and former Governor of Michigan) Jennifer Granholm explained the issue on LinkedIn:

> "One of the least understood aspects of the AI-data-center boom is not the size of the load … it's the *volatility of the load*.
>
> Utilities have historically treated data centers as large but relatively flat demand sources — closer to steady industrial load than to highly dynamic systems.
>
> AI changes that. Why?
>
> Because frontier AI clusters may involve tens of thousands of GPUs operating in synchronized computational cycles. Instead of millions of independent computing tasks smoothing each other out, you increasingly get giant clusters behaving almost like a single machine.
>
> That means power demand can ramp sharply — and quickly. And the volatility doesn't stop with the chips.
>
> When GPU utilization spikes, heat spikes, cooling systems ramp, pumps and chillers respond, and power electronics react.
>
> At very large scale, those coupled swings can become significant grid events.
>
> A 1 GW AI campus experiencing a rapid 10% load swing means a 100 MW change in demand.
>
> That is utility-scale generation territory.
>
> And unlike traditional utility planning assumptions, these changes may occur in seconds — or subseconds — rather than over hours.
>
> This matters because the grid was largely designed around gradual load ramps, predictable industrial demand and hourly planning models.
>
> AI infrastructure may require a different architecture: 1) *onsite batteries for power smoothing*; 2) *advanced inverter systems*; 3) sophisticated reactive power management; 4)

> grid-aware workload scheduling and 5) *new interconnection standards*.
>
> Ironically, the future AI campus may look less like a passive customer and more like a miniature grid operator.
>
> The next era of grid planning may not just be about adding more power.
>
> It may be about *managing a fundamentally different kind of load*."[46] (emphasis added)

Granholm identifies several critical points, and I will return to the issues in her post at multiple points further in my testimony.

Q. What does this load volatility look like to the grid?

A. A transmission company in Wisconsin described it this way:

> "This 'new breed' of data centers often have extreme operating variability and need to ramp load up and down by hundreds of megawatts on a second-to-second basis. 'This is equivalent to turning Wisconsin's capital city of Madison on and off, repeatedly,' the firm said, *requiring specialty power electronic devices at mega-scale* to safely integrate the variable load."[47] (emphasis added)

Q. Can you provide a more technical view of data center load volatility?

A. Yes. When training a new AI model, data center load may vary wildly in milliseconds or even *microseconds*:

> "A.I.-related data centers, though, operate differently, with demand profiles that can shift dramatically from second to second. This is especially true for training operations when

[46] Jennifer Granholm, *LinkedIn*, 2026. Accessed on 7/26/26 at: https://www.linkedin.com/posts/jennifergranholm_one-of-the-least-understood-aspects-of-the-activity-7458242574542327808-bZoX/

[47] Mary B. Powers and Debra K. Rubin, "Energy Sector Debates New US Rules to Power Up More 'Large Load' Data Centers," *Energy News-Record*, December 15, 2025. Accessed on 7/26/26 at: https://www.enr.com/articles/62219-energy-sector-debates-new-us-rules-to-power-up-more-large-load-data-centers

> tasks might be spread across many graphics processing unit servers at a time. These power-hungry devices can ramp up in unison in seconds or even microseconds, driving demand spikes. Operations can then power down just as rapidly, which can create a surge on the connected grid. As a result, these facilities can affect grid reliability across a utility's network."[48]

Uptime Institute explains this common AI training phenomenon in more detail:

> "Uptime Intelligence estimates that in worst-case scenarios, the difference between the low and high points of power draw during training program execution can exceed 100% on a system level (the load doubles almost instantaneously, within milliseconds) for some configurations.
>
> *These extremes occur every few seconds*, whenever a batch of weights and biases is loaded on GPUs and the training begins. This is often accompanied by a massive spike in current, produced by power excursion events as GPUs overshoot their thermal design power rating (TDP) to opportunistically exploit any extra thermal and power delivery budget following a phase of lower transistor activity. In short, power spikes are made possible by intermittent lulls.
>
> This behavior is common in modern compute silicon, including in personal devices and generic servers. Still, it is only with large AI compute clusters that these fluctuations across dozens or hundreds of servers move almost synchronously."[49] (emphasis added)

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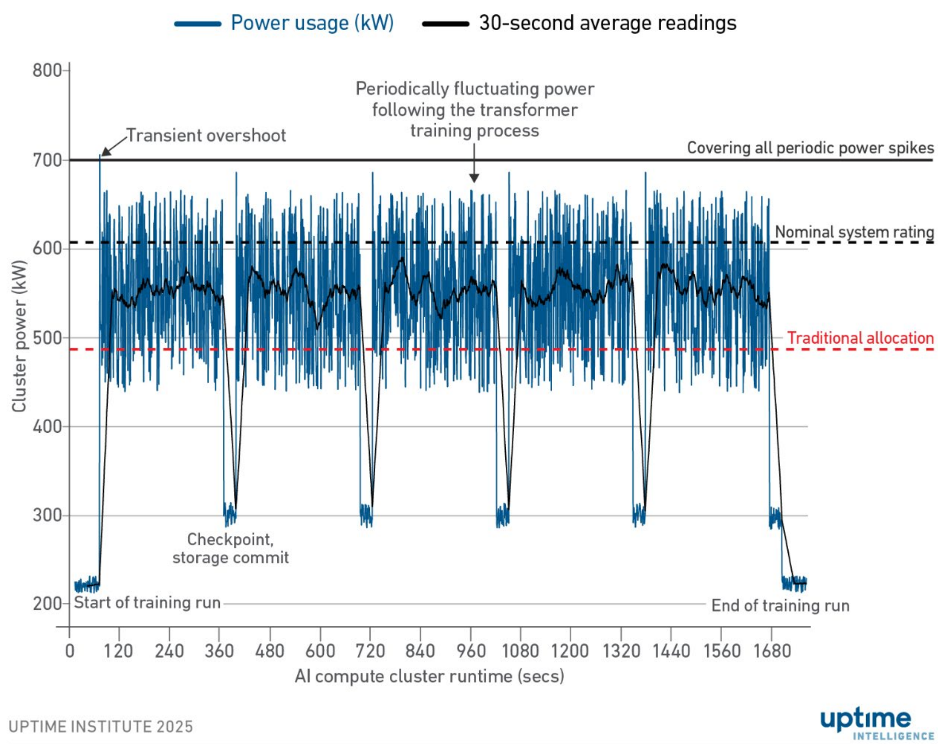
[48] Chuck Ross, "It's not just the load: A.I. data center grid impacts," *Electrical Contractor*, January 15, 2026. Accessed on 6/2/26 at: https://www.ecmag.com/magazine/articles/article-detail/it-s-not-just-the-load--a.i.-data-center-grid-impacts

[49] Daniel Bizo, "Electrical considerations with large AI compute," *Uptime Institute*, November 19, 2025. Accessed on 6/2/26 at: https://journal.uptimeinstitute.com/electrical-considerations-with-large-ai-compute/

Uptime Institute goes on to explain that a server cluster can spike *over its rated load*, and provides a graph of a training cluster's load over time, illustrating the spikes over rated load:[50] (emphasis added)

Figure 1 Power profile of a GPU-based training cluster (algorithmic not real-world data)



In electrical terms, no multi-rack workload is perfectly synchronous, while the presence of other loads will help smooth out the edges of fluctuations further. When including non-compute ancillary loads in the cluster — such as storage systems, networks and CDUs (which also require UPS power) — a lower safety margin above the nominal rating (e.g., 10% to 15%) appears sufficient to cover any regular peaks over the nominal system power specifications, even with the latest AI hardware.

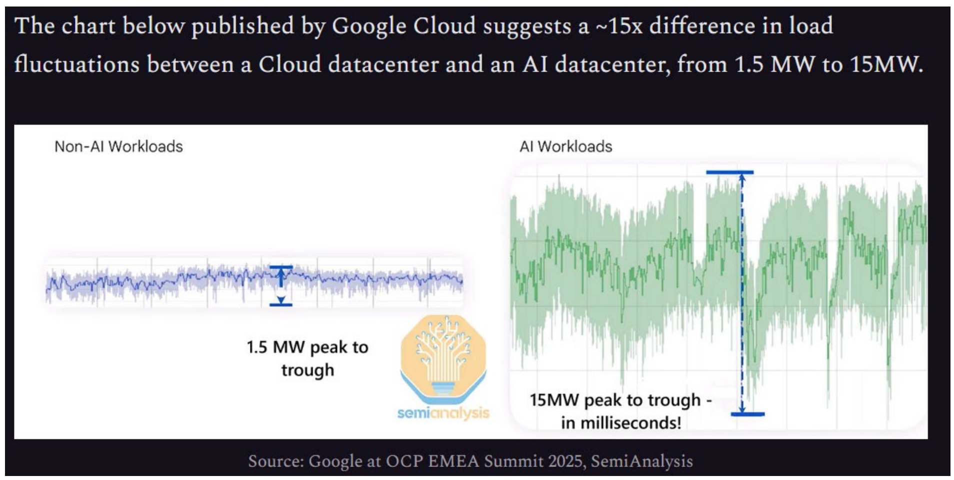
Q. How do these wild swings in power consumption by AI computing clusters affect the grid?

A. Semi Analysis opens with a bleak warning of the consequences of these load swings, before turning to a more technical description:

[50] Ibid

> "Not only is the scale massive, but AI training workloads have a *very unique load profile*, unexpectedly rising and falling from full load to nearly idle in fractions of a second. Our power grids were never designed to handle this pattern. At Gigawatt-scale, the worst-case scenario is *a blackout for millions of Americans*."[51] (emphasis added)

Semi Analysis provides a graph, showing how AI systems load swings wildly, but non-AI computing has much smaller changes in power draw:[52]



Semi Analysis goes on to discuss simulations, showing that AI data centers in Texas could trigger cascading power losses resulting in a blackout. It draws a parallel to the massive blackout in Spain and Portugal that started on April 28, 2005 with 2.2 GW of generation tripping off-line, resulting in cascading breaker trips and total collapse within 27 seconds.[53]

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[51] Jeremie Elliahou Ontiveros, Dylan Patel, and Ajey Pandey, "AI Training Load Fluctuations at the Gigawatt-scale – Risk of Power Grid Blackout?," *Semi Analysis*, June 25, 2025. Accessed on 6/2/26 at: https://newsletter.semianalysis.com/p/ai-training-load-fluctuations-at-gigawatt-scale-risk-of-power-grid-blackout

[52] Ibid

[53] Ibid

Q Does data center load volatility have impacts beyond grid reliability?

A. Yes. It's been recently reported that data center load volatility shortens the lifespan of gas-fired turbines, and has even caused the main generator shaft to snap, in at least one example.[54]

Q Load fluctuations are nothing new, why do data centers represent a new risk?

A. The load volatility of load centers is different in both scale and speed. The grid adapts to changing load via two different mechanisms over two different time periods. In the short term (seconds) the grid relies on the kinetic energy stored in its spinning turbine and generator mass to adjust to sudden changes in load, with some assistance from the energy stored in spinning industrial motors. This rotational energy is only sufficient for 5-10 seconds of load variation.[55] The move to inverter-based generation (wind and solar) is reducing the total amount of energy stored in spinning parts. As Jennifer Granholm noted in her LinkedIn post (quoted earlier), this calls for advanced inverter systems.

[54] Harriet Weber, "AI Data Center Turbines, Backlogged For Years, Are Suffering Early Deaths. Here's Why." Investor's Business Daily, July 29, 2026. Accessed on 8/4/26 at: https://www.investors.com/news/turbine-generator-ai-data-center-power-threat/#:~:text=8%2F1%2F2026-,AI%20Data%20Center%20Turbines%2C%20Backlogged%20For%20Years%2C%20Are%20Suffering%20Early,Here's%20Why.&text=AI%20data%20centers'%20thirst%20for,intelligence%20boom%20%E2%80%94%20thermal%20turbine%20generators.

[55] "Inertial Response", Grokipedia, fact-checked 7 months prior. Accessed on 7/26/26 at: https://grokipedia.com/page/inertial_response

Over longer periods of time, utilities adjust the production of their generators. Simple gas-fired turbine generators ("peaker plants") can ramp up to peak output in five minutes.[56] Combined cycle gas-fired plants rely on the production of steam for about a third of their output and can take over 30 minutes to ramp to full power.[57]

Semi Analysis explains that the problem that data centers pose is the ability to ramp generation up or down by hundreds of MW in *seconds*, compared with the ability of fossil-fueled generators ramp rates of 5-50 MW/*minute*.[58] The mismatch in timing is severe.

Q. What solution is there to data center load volatility causing power outages?

A. Both Semi Analysis and Jennifer Granholm recommend battery storage, which can adjust output at the sub-second speeds necessary.

[56] Rob Rapier, "The load following power plant: the new peaker," *GE Vernova,* (c) 2026. Accessed on 7/26/26 at: https://www.gevernova.com/gas-power/resources/articles/2017/load-following-power-plant

[57] Michael Welch and Andrew Pyn, "Improving the Flexibility and Efficiency of Gas Turbine-Based Distributed Power Plants," September 14, 2015. Accessed on 7/26/26 at: https://www.power-eng.com/gas/turbines/improving-the-flexibility-and-efficiency-of-gas-turbine-based-distributed-power-plants/

[58] Jeremie Elliahou Ontiveros, Dylan Patel, and Ajey Pandey, "AI Training Load Fluctuations at the Gigawatt-scale – Risk of Power Grid Blackout?" *Semi Analysis*, June 25, 2025. Accessed on 7/26/26 at: https://newsletter.semianalysis.com/p/ai-training-load-fluctuations-at-gigawatt-scale-risk-of-power-grid-blackout

Q How have other jurisdictions addressed data center load volatility?

A. The Southwest Power Pool (SPP) regional transmission operator (RTO) created a "High Impact Large Load" (HILL) framework, which was approved by FERC in January this year:

> "SPP's High Impact Large Load (HILL) framework provides the first RTO-specific pathway designed from the outset for expedited data center interconnection. The SPP framework took a fundamentally different approach from PJM's. Where PJM focused on the generator side (regulating how existing and new generators can serve co-located load), SPP focused on the load itself… SPP also imposed ongoing operational requirements on HILLs: hourly load forecast data provided in real time, remote disconnect capability for the transmission operator, *ramp rate limitations not exceeding 20 MW per minute, and ride-through requirements.* These operational constraints reflect reliability concerns about sudden large-load changes and may prove challenging for data center operators accustomed to flexible operations, though they may also signal the kind of operational requirements FERC could adopt more broadly." (emphasis added)

I will address the issue of "ride-through" requirements later in my testimony.

SPP's HILL framework offers data centers a simplified, faster interconnect process:

> Most recently, FERC approved Southwest Power Pool's High Impact Large Load (HILL) framework—the most concrete regulatory development to date. The defining feature of the HILL framework is its integrated treatment of load and generation. *Rather than forcing customers to navigate separate transmission service, load interconnection, and generator interconnection processes, the framework combines them into a single expedited study and approval process.* In return for the benefits associated with registering as a HILL, a customer must comply with

enhanced operational requirements, including detailed load forecasting and real-time telemetry, to support system reliability. The framework also establishes distinct tracks for large loads paired with existing or planned generation and for loads that bring new supporting generation as part of the interconnection request. In both cases, network upgrades are directly assigned to the relevant customer, reinforcing traditional cost-causation principles and reducing the risk that upgrade costs are shifted to existing ratepayers. FERC emphasized that this integrated approach preserves reliability while accelerating interconnection timelines. The effort provides greater certainty for data center developers and offers a potential template for addressing large load growth in other regions.

Taken together, these developments reinforce that data center powering and interconnection have become a central federal energy policy issue, not merely a state-level matter. These developments also offer hyperscalers and developers important strategies to consider when selecting data center sites and planning how to supply power to data centers.

Conclusion

The convergence of federal policy initiatives and recent FERC actions reflects a clear shift in federal regulatory posture. *Data centers are no longer viewed as incremental load that can be absorbed through legacy state level interconnection processes.* Instead, they are increasingly recognized as interstate infrastructure with system-level implications for transmission planning, reliability, and wholesale market design. How far that shift extends—and how it is reconciled with state authority—will define the next phase of large load regulation and determine the circumstances in which large loads can connect directly to power generation."[59] (emphasis added)

[59] Stephen J. Humes, Alicia M. McKnight, Andrew H. Jacobs, "The Emerging Regulatory Framework to Power Data Centers," January 27, 2026. Accessed on 7/26/26 at: https://www.pillsburylaw.com/en/news-and-insights/ferc-regulation-data-centers.html

Q What should the Commission do to remedy the risk posed by data center load volatility?

A. The Commission should order that the tariff, or mandatory other agreements include limits to customer load ramp rates, both ramp-up and ramp-down. In U-22058, MEI/CEO witness Shaver proposed an operational ramp limit of 30 MW per minute.[60] Even more importantly, the interconnect with any large load customer should include monitoring equipment (at customer expense) to ensure that the customer adheres to the limit.

2. Simultaneous Uninterruptable Power Supply (UPS) Trips

Q. What is a UPS, and what is a UPS "trip"?

A. A UPS is a system that provides electrical power (often to computer equipment) whether the grid is operating, or in a state of power failure. The key feature for computing equipment is that the switchover from grid power to backup power is nearly instantaneous, so the computers don't crash. These systems usually employ batteries for short-term energy storage, and backup generators to provide lasting power during prolonged outages. UPS systems are a nearly ubiquitous feature of data centers.

In addition to providing power during outages, a UPS can protect electronic equipment from damage due to voltage variations. When a UPS system detects a power failure, or that grid voltage has fallen outside set

[60] U-22058, direct testimony of Lee Shaver, 3 TR 759

parameters, it disconnects the data center from the grid, and provides backup power. This is called a "trip" or "transfer."

Q. Is the risk of simultaneous UPS trips a recognized issue?

A. Yes. As a result of a very brief voltage variation, sixty data centers in Virginia, using 1,500 MW power, dropped off the grid simultaneously, and did not return to the grid for hours on July 10, 2024. According to the National Energy Reliability Council (NERC) incident report:

> " 'A lightning arrestor failed on a 230 kV transmission line in the eastern interconnection, resulting in a permanent fault that eventually 'locked out' the transmission line,' the NERC report said. A lightning arrestor is a piece of equipment designed to protect against power surges.
>
> This led to a series of short supply disturbances, *lasting a matter of milliseconds before the system corrected itself*, but it was enough to cause data centers in the area to automatically switch to their backup UPS systems as a precautionary measure because 'data center loads are sensitive to voltage disturbances,' the report said." (emphasis added) [61]

[61] Matthew Gooding, "Virginia narrowly avoided power cuts when 60 data centers dropped off the grid at once," *Data Center Dynamics*, March 20, 2025. Accessed on 8/1/26 at: https://www.datacenterdynamics.com/en/news/virginia-narrowly-avoided-power-cuts-when-60-data-centers-dropped-off-the-grid-at-once/

Q. Was this event in Virginia an isolated case?

A. No. Reuters reviewed disclosure filings in Texas (ERCOT) and identified "more than 30 near-miss incidents since 2020, triggered by big energy users like data centers and crypto miners switching offline."[62] On July 22, 2026, a transmission line in Virgina faulted. A series of data centers, sensing the instability tripped onto UPS power, dropping 3.1GW of load in 30 seconds. Lights flickered, and voltage dropped across the PJM region from Virginia to Chicago. No serious problems were reported – this time.[63]

Q. Could this kind of event really cause a major power outage?

A. Yes, according to Alison Silverstein, a former senior adviser to the chairman of the US Federal Energy Regulatory Commission, who said: "What it tells us is that the behavior of data centers has the potential to cause cascading power outages for an entire region."[64]

[62] Tim McLaughlin, "Big Tech's data center boom poses new risk to US grid operators," *Reuters*, March 19, 2025. Accessed on 6/2/26 at: https://www.reuters.com/technology/big-techs-data-center-boom-poses-new-risk-us-grid-operators-2025-03-19/

[63] Tim DeChant, "One fallen power line exposed a growing AI data center problem — here's how to fix it," *Tech Crunch*, July 25, 2026. Accessed on 7/27/26 at: https://techcrunch.com/2026/07/25/one-fallen-power-line-exposed-a-growing-ai-data-center-problem-heres-how-to-fix-it/

[64] Ibid

Q. Why would data centers configure their uninterruptable power System (UPS) to trip due to a voltage fluctuation that lasted only milliseconds, and how could the data centers prevent this behavior?

A. Reuters explains that the settings on the UPSs could be changed, but data centers are concerned with protecting their equipment from voltage variations:

> "Many data centers are engineered by their operators to switch to local generators at the smallest hint of a problem on the grid to minimize the risk of an interruption to services like Google search or crypto mining, according to NERC.
>
> Some grid operators have proposed requiring data centers to "ride through" routine voltage dips without disconnecting. But data center operators are opposed because of the risk of damaging electronic equipment and cooling systems.
>
> ERCOT last year withdrew a proposal that would have imposed ride-through restrictions on data centers and crypto miners after facing pushback from an industry group, the Data Center Coalition.
>
> The group, whose members include Amazon, Google, and Meta, cited costs and the risk of damaging computer chips and cooling systems exposed to fluctuating voltage levels.[65]

[65] Ibid

Q. Isn't it better to risk damage to some equipment than to risk a blackout?

A. It is easy to understand the data center operator's concern if you understand the cost of the equipment at risk. Oracle's co-CEO Clay Magouyrk recently visited the construction site for the Oracle data center in Saline Twp., where he announced that the electronics they will install in that data center will cost $30-40 *billion*.[66] Obviously, they want to protect that huge investment.

Q. Is the problem of simultaneous UPS trips similar to the problem of data center load volatility?

A. While the causes are different, the impact on the grid is similar to a rapid load ramp-down; a large amount of load suddenly drops off the grid. But it is different in two ways: data center load volatility goes both directions – increases as well as decreases in load, and simultaneous UPS trips can be far more massive than volatility in the load of a single data center, because it can involve many data centers dropping off the grid simultaneously. In the Virginia example cited earlier, 60 data centers went off-grid simultaneously. In that case, it involved 1,500 MW of load. A handful of hyperscale data centers today drop several times that much load due to UPS trips.

[66] Dustin Blitchok, "Data center news: Altman visits Saline data center, says it's 'huge bet' on AI," *Planet Detroit*, June 1, 2026. Accessed on 6/2/26 at: https://planetdetroit.org/2026/06/michigan-data-center-news-altman-saline/

Q. Do Michigan's current interconnect standards protect the grid from the risk of data center transient load causing cascading breaker trips?

A. I don't know. In U-21859, the Commission cited "Service Quality and Reliability Standards for Electric Distribution Systems, Mich Admin Code, R 460.701 et seq., and the Technical Standards for Electric Service, Mich Admin Code, R 460.3101et seq.," and noted that they were "recently amended" and became effective in April, 2023.[67] Based on my online research, this problem was not widely known at that time; an update may be needed to address the risk of transient loads.

Q. Has any other jurisdiction addressed the problem of AI data center transient loads?

A. Yes. ERCOT (in Texas) has data center proposals totaling 450 GW of load. The board of directors of the Electric Reliability Council of Texas recently approved rules that "would require data centers and crypto-mining facilities to stay online and 'ride through' brief power interruptions on the grid. If a data center were unable to weather those disruptions under the new plan, it would be ordered to disconnect from the grid until it came into compliance with the new rules." Data center supporters have opposed the rules arguing that compliance will be costly and take years to implement.[68] The Texas

[67] U-21589, Commission order dated November 6, 2025, p 122

[68] Shelby Webb, "Texas advances major grid rules for data centers," *E&E News*, June 3, 2026. Accessed on 6/4/26 at: https://www.eenews.net/articles/texas-advances-major-grid-rules-for-data-centers/

PUC approved the proposal and reported that ERCOT "has experienced 28 events involving LCL [large computing load] trips of at least 100 MW due to voltage and frequency excursions since the beginning of 2023. This risk will increase exponentially with the significant growth of LCLs expected in the ERCOT region."[69] The California ISO has proposed rules for large loads, including, "ride-through capability, post-fault power recovery, ramp rates, monitoring and telemetry."[70]

[69] Diana DiGangi, "Texas PUC approves 'ride-through' rules for data centers," *Utility Dive*, July 13, 2026. Accessed on 8/3/26 at: https://www.utilitydive.com/news/texas-puc-approves-ride-through-rules-data-centers/825051/

[70] "Large Loads Initiative: Technical requirements straw proposal posted," *CASIO*, June 16, 2026. Accessed on 7/27/26 at: https://www.caiso.com/notices/large-loads-initiative-technical-requirements-straw-proposal-posted

Q. Have any industry standards been established to address simultaneous UPS trips?

A. Not that I'm aware of. However, the problem is very similar to the problem of inverter-based generation (i.e., wind and solar) tripping off-grid in response to transient variations in grid voltage. In that case, *generation* suddenly drops off the grid rather than load. But the two are operationally similar. IEEE 2800 was designed to address this issue.[71] MISO has *proposed* adoption of IEEE 2800 as well as the related NERC PRC-028 standard.[72]

Q. What do you recommend the Commission do to mitigate the risk of simultaneous UPS trips?

A. I recommend that the Commission direct Staff to set up a study group to look at the ERCOT interconnect requirements, and the proposed MISO requirements, and make a recommendation – urgently! It would be imprudent to allow gigawatt data centers to interconnect to DTEE without protections in place. The stakes are high; no one wants cascading power failures.

[71] "IEEE 2800-2022, IEEE Standard for Interconnection and Interoperability of Inverter-Based Resources (IBRs) Interconnecting with Associated Transmission Electric Power Systems," *IEEE*, April 22, 2022. Accessed on 7/26/26 at: https://standards.ieee.org/ieee/2800/10453/

[72] "Inverter-Based Resource Performance Requirements (IEEE 2800) (PAC-2024-2)," *MISO*, October 16, 2024. Accessed on 7/26/26 at: https://cdn.misoenergy.org/20241016%20PAC%20Item%2006c%20IBR%20Performance%20Requirements%20IEEE%202800%20(PAC-2024-2)653146.pdf

3. Data Center Induced Harmonics

Q. What are harmonics on the electric grid?

A. The grid operates on a 60 Hertz sine wave. That means that the voltage cycle repeats 60 times each second, or every 16.7 milliseconds. Because data center load can vary widely in much less time than a full cycle, it can distort the shape of that sine wave; not just in the data center, but out into the surrounding area through the data center's interconnection. The President of Embedded and Critical Power explains what harmonics are with an illustration:

> "Generally, voltage follows a rolling wave characterized by the smooth, periodic oscillations — a sine wave, as depicted by the green line in Figure 1. International standards for steady state loads established in the mid-1990s governing harmonic currents, voltage flicker and other factors have served data center operators well. Some have even established additional, more stringent standards for their own facilities.
>
> But AI models cause massive, sudden surges in power usage, making "white space" within a data center — the room housing IT equipment such as servers, storage, and networking gear — the source of distortion. Drawing power in rapid, uneven bursts generates harmonics that distort the voltage wave (the blue and yellow lines)."[73]

[73] Christopher Butler, "Power quality: The unseen phenomenon behind some of the biggest data center challenges," *Flex.com*, September 22, 2025. Accessed on 6/2/26 at: https://flex.com/resources/power-quality-the-unseen-phenomenon-behind-some-of-the-biggest-data-center-challenges

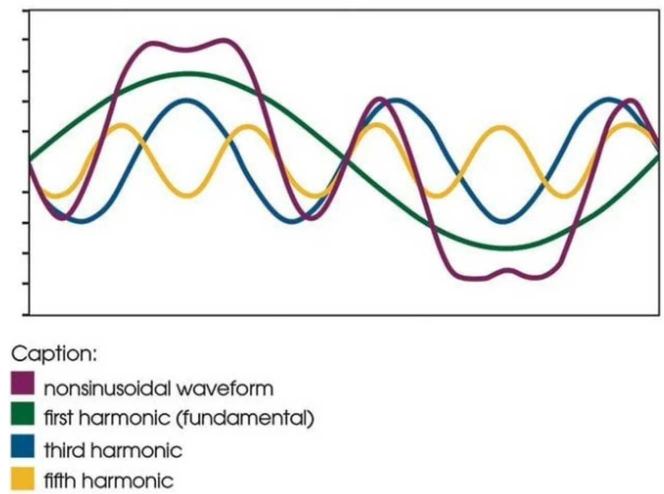

Figure 1. Harmonic distortion.

He recommends, "Adhering to utility interconnection standards such as IEEE 519 (U.S.)."

Q. **Is there any empirical evidence that data centers are commonly pushing harmonics out into the grid today?**

A. Yes. Ting Labs (formerly Whisker Labs) has installed more than a million power quality monitors in American homes, including mine. Bloomberg did a study of the data from about one million Whisker monitors, and found a compelling correlation between homes with dirty power and areas of large-scale data center operation. "The report contends that harmonic issues will likely worsen without *significant investment in grid infrastructure*."[74] (emphasis added)

[74] Zachary Skidmore, "AI data centers causing 'distortions' in US power grid – Bloomberg," *Data Center Dynamics*, January 6, 2025. Accessed on 6/2/26 at:

Q. **Are harmonics fed back into the grid by large energy customers a new problem?**

A. No, this is a common problem with certain industrial equipment, but data centers create more complex, rapidly changing harmonics at a huge power scale.

Q. How are harmonics generated by data centers different than harmonics generated by industrial customers?

A. Harmonics from industrial customers are usually the result of variable-frequency drives (VFDs) on large motors. VFDs create highly predictable harmonics. Data centers also use VFDs on their HVAC systems, but they generate highly irregular harmonics from their switch-mode power supplies on their electronics and (previously discussed) volatile load:

> "Data centers today deal with some pretty tricky harmonic problems because of all the non-linear IT gear they run. Think about those server racks, UPS systems, and those switch mode power supplies everyone loves. What happens is these devices pull electricity in weird little bursts instead of smooth flows, which creates this nasty harmonic distortion. Sometimes it gets really bad too – we've seen cases where total harmonic distortion hits over 15% on important parts of the electrical system according to IEEE standards from 2022."[75]

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https://www.datacenterdynamics.com/en/news/ai-data-centers-causing-distortions-in-us-power-grid-bloomberg/

[75] "What Load Types Require Dynamic Harmonic Filters Most Urgently," *Ampersure*, August 6, 2025. Accessed on 7/26/26 at: https://www.ampersure.com/blog/what-load-types-require-dynamic-harmonic-filters-most-urgently

Q. What kinds of problems do harmonics cause?

A. For the electric utility, high levels of harmonics accelerate the degradation of transformers:

> "Power transformers experience accelerated insulation degradation, increased heating, and reduced operational lifespan when subjected to sustained harmonic distortion.
>
> Harmonic-induced circulating currents in parallel windings create hot spots that compromise structural integrity. This thermal stress compounds over time, causing insulation systems to become brittle and fail prematurely.
>
> Transformer oil degrades more rapidly under these conditions, while internal components experience mechanical stress from the abnormal harmonic vibrations that can loosen connections and damage internal structures. Equipment designed to operate reliably for decades now requires premature replacement, driving up maintenance costs and creating unpredictable failure points throughout the system."[76]

But the impacts are not limited to the utility, the harmonics feed through the grid to other customers:

> "When transformers operate beyond their harmonic tolerance limits, they begin delivering distorted voltage waveforms to downstream customers. This distorted power causes sensitive electronic equipment to malfunction, motors to run hot and inefficiently, and lighting systems to flicker or fail prematurely.

[76] "Managing Harmonic Distortion from Data Centers," *Dynamic Ratings*, October 6, 2025. Accessed on 7/26/26 at: https://www.dynamicratings.com/managing-harmonic-distortion-from-data-centers/

> Customers experience unexpected equipment failures, reduced appliance lifespans, and increased energy consumption as their devices struggle to operate efficiently with distorted power supply. These impacts create customer complaints, service reliability issues, and additional maintenance burdens for utility crews already stretched thin by increasing infrastructure demands."[77]

Q. How are harmonics quantified, and is there a standard for how much is too much?

A. Harmonics are quantified by "Total Harmonic Distortion," or THD. This is the same measure used to rate the inaccuracies in sound quality induced in music by amplifiers. For the grid, the standard is IEEE 519.[78] The IEEE 519 standard sets limits for THD that vary, depending on the service voltage. As shown in the table below, higher voltages are restricted to lower THD levels.[79]

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[77] Ibid.

[78] "519-2022 - IEEE Standard for Harmonic Control in Electric Power Systems," *IEEE*, 2022. Accessed on 7/26/26 at: https://ieeexplore.ieee.org/document/9848440

[79] "Power Quality – IEEE 519-2022," *Power Quality Blog*, 2026. Accessed on 7/27/26 at: https://powerquality.blog/2023/06/01/power-quality-ieee-519-2022/

Table 1. (IEEE 519-2022, pg.17) voltage distortion limits

Bus voltage V at PCC	Individual harmonic (%)	Total harmonic distortion THD (%)
V ≤ 1.0 kV	5.0	8.0
1 kV < V ≤ 69 kV	3.0	5.0
69 kV < V ≤ 161 kV	1.5	2.5
161 kV < V	1.0	1.5*

Q. Can data centers be designed to avoid inducing harmonic into the grid?

A. Yes, but it involves costly equipment:

> "As with most challenges in today's data center industry, it ultimately comes down to cost. The barrier isn't a lack of technology – it's the balance between upfront investment and long-term payback. While harmonic migration components have become far more affordable and advanced in recent years, the initial expenditure can still deter operators focused on short-term budgets."[80]

Q. Does the IEEE 519 standard specify enforcement measures?

A. No, IEEE 519 is a set of *guidelines*. In practice, the impacts of harmonics are only addressed when other customers are experiencing problems:

> "First thing is that this is a recommended practice. So the intent is that it's supposed to guide you. It's not supposed to be very, very, very strict rules. And you'll notice that if you talk to utility companies, a lot of times they're typically not enforced unless required by neighboring customers and things that cause problems.[81]

[80] Farah Johnson-May, "The hidden disruptor of data center harmony: Vol 1," *Data Center Dynamics*, December 11, 2025. Accessed on 7/26/26 at: https://www.datacenterdynamics.com/en/marketwatch/the-hidden-disruptor-of-data-center-harmony-vol-1/

[81] "IEEE 519 Standard – what do I need to know? Where do I start?" *Eaton Corp*, 2026. Accessed on 7/27/26 at: https://www.eaton.com/us/en-us/products/controls-drives-automation-sensors/harmonics/harmonics-faq-video-library/ieee-519-standard-what-do-i-need-to-know.html

Q. Does the proposed tariff address harmonics?

A. I found nothing in the tariff that addresses harmonics, or any power quality issues other than power factor. The tariff limits the power factor of the customer load. A power factor below 85% triggers a penalty, and a power factor less than 70% is not permitted. The power factor measures the ratio of true power to apparent power. A power factor of less than one indicates that the voltage and current are out of phase. Power factor is different than harmonic waveform distortion, though harmonics will also tend to pull the power factor down; this is called the distortion power factor.[82]

Importantly, a low power factor is often corrected with capacitor banks,[83] which can't be used to correct harmonics; specialized filters are required to manage harmonics.[84]

Q. What do you recommend the Commission do to mitigate the risk of data center induced harmonics?

A. I recommend that the Commission order the Company to install power

[82] Colin, "Capacitor Bank: The Complete Guide To Power Factor Correction," Giantele. Accessed on 8/3/26 at: https://www.giant-electric.com/capacitor-bank-the-complete-guide-to-power-factor-correction.html

[83] "Total Harmonic Distortion (THD) and Power Factor Calculation," YT Electric, October 28, 2024. Accessed on 8/3/2026 at: https://www.ytelect.com/blog/total-harmonic-distortion-thd-and-power-factor-calculation_b279

[84] Colin, "Capacitor Bank: The Complete Guide To Power Factor Correction," Giantele. Accessed on 8/3/26 at: https://www.giant-electric.com/capacitor-bank-the-complete-guide-to-power-factor-correction.html

quality monitoring equipment (at customer expense) to measure power quality issues caused by the data center. The data center should bear the cost of the monitoring equipment. Other neighboring customers should not bear the burden of detecting and reporting power quality issues caused by the data center.

B. Impact on Resource Adequacy

1. The PJM Experience

Q. Have other parts of the US already experienced dramatically higher loads as a result of new data centers?

A. Yes, Northern Virginia has been called "data center alley" due to the high concentration of new data centers there. In 2025, Virginia had 12GW of data centers, consuming 40% of the state's electricity.[85] The entire PJM region has seen explosive growth in power demand. Monitoring Analytics, the independent market monitor for the Eastern grid operator PJM Interconnection reported that "PJM attributed almost all of this increase in the summer peak load forecast to the anticipated additions in data center demand."[86]

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[85] "AI Data Center Statistics in US 2026," in table: "US Data Center Energy by State 2026," *Global Statistics*. Accessed on 6/3/26 at: https://www.theglobalstatistics.com/ai-data-center-statistics-in-us/

[86] "Analysis of the 2026/2027 RPM Base Residual Auction Part A," *Monitoring Analytics*, October 1, 2025, p 8. Accessed on 5/29/26 at: https://www.monitoringanalytics.com/reports/Reports/2025/IMM_Analysis_of_the_20262027_RPM_Base_Residual_Auction_Part_A_20251001.pdf

Morning Analytics report shows that peak-hour demand was fairly constant from 2014 – 2023, varying between 138GW and 144 GW, but rose to 149 GW in 2024 (+3.2%) and 156 GW in 2025 (+4.9%), as shown in the table below. These are substantial increases in load for a huge region. PJM's forecasts of peak load are getting revised upwards every year, projecting a peak load of 164 GW in 2027:[87]

Table 1 PJM Peak Load between 2009 and 2025[8]

	Date	Hour Ending (EPT)	PJM Load (MWh)
2009	Mon, August 10	17	123,900
2010	Tue, July 06	17	133,297
2011	Thu, July 21	17	154,095
2012	Tue, July 17	17	150,879
2013	Thu, July 18	17	153,790
2014	Tue, June 17	18	138,448
2015	Tue, July 28	17	140,266
2016	Thu, August 11	16	148,577
2017	Wed, July 19	18	142,387
2018	Tue, August 28	17	147,042
2019	Fri, July 19	18	148,228
2020	Mon, July 20	17	141,449
2021	Tue, August 24	17	145,563
2022	Wed, July 20	18	144,356
2023	Thu, July 27	18	144,215
2024	Tue, July 16	18	148,890
2025	Mon, June 23	18	156,256

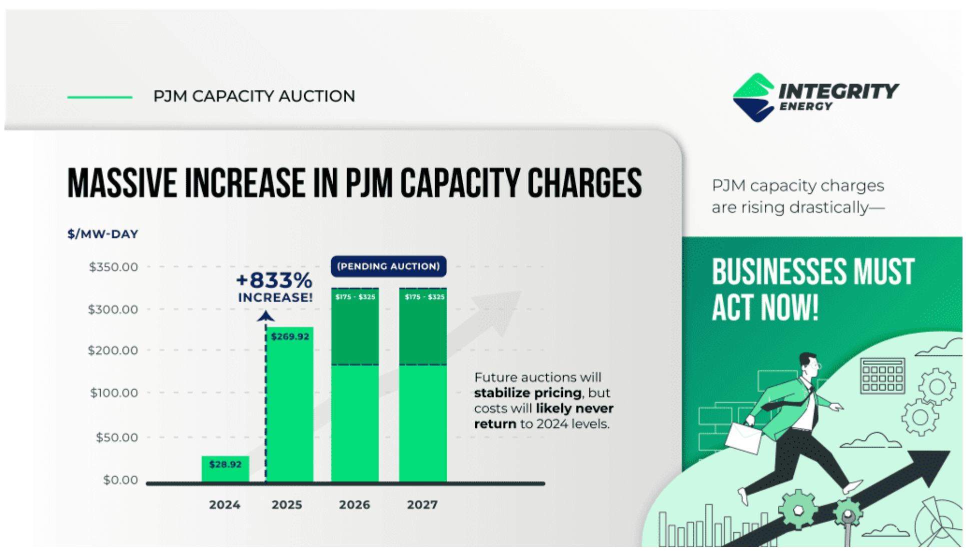
[87] Ibid, p 7, Table 1 & 2

Table 2 Forecasted Summer Peak Load for 2022 through 2026 as reported in the recent load forecast reports[9]

	Forecasted Summer Peak Load (MW)					
Report	2022	2023	2024	2025	2026	2027
2022 Load Forecast	148,938	149,351	150,309	151,165	152,259	152,322
2023 Load Forecast		149,059	149,737	150,924	152,736	154,275
2024 Load Forecast			151,247	153,493	156,803	159,859
2025 Load Forecast				154,144	158,937	164,186

Q. How have PJM capacity auction prices been affected by increasing load?

A. PJM capacity prices have skyrocketed, increasing from $28.92/MW-day in 2024 to $269.92/MW-day in 2025, an 833% increase! The capacity price increased an additional 22% in the 2026/27 auction, but would have gone higher if not for an artificial price cap:[88]



[88] Renee Sanders, "How the Latest PJM Auction Impacts 2026–2027 Energy Costs," *Integrity Energy*, July 24, 2025. Accessed on 5/29/26 at: https://www.integrityenergy.com/resources/about-us/news-media/pjm-announces-expensive-energy-changes-in-2026/

A report from Monitoring Analytics put the responsibility for this increased load squarely on data centers:

> "There are clear warning signs for the capacity market and for PJM reliability. The capacity market was short of reaching its reliability objective in the most recent capacity auctions… PJ was also short of meeting its reliability target as of June 1, 2025… *Data center load growth is the primary reason* for recent and expected capacity market conditions, including total forecast load growth, the tight supply and demand balance, and high prices. *But for data center growth*, both actual and forecast, the capacity market would not have seen the same tight supply demand conditions, the same high prices observed in the 2025/2026 BRA, the 2026/2027 BRA, and the 2027/2028 BRA, and the currently expected tight supply conditions and high prices for subsequent capacity auctions." [89] (emphasis added)

Q. Did the market monitor make any recommendations to address the steep increase in data center load's impact on the PJM capacity market?

A. Yes, Morning Analytics recommended that data centers be required to bring their own new generation, or have their load treated as curtailable:

> "*It is clear that continuing to simply accept the interconnection of large data center loads that cannot be served reliably because there is not adequate dispatchable capacity, is not a reasonable path forward…* There is not enough capacity currently to meet the data center load. The solution is not to create reliability issues and wealth transfer issues by clearing the capacity market at the maximum price and at a quantity less than the reliability requirement by allowing the ongoing interconnection of large data center loads without adequate generation to serve them… The market solution is *to require data centers to bring their own new generation.* This would include an expedited fast track load and

[89] "State of the Market Report for PJM, 2025," *Morning Analytics*, March 12, 2026, p 1. Accessed on 5/29/26 at: https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2025/2025-som-pjm-vol1.pdf

> generation interconnection process for large new data center loads that bring their own new generation with locational and temporal characteristics reasonably matched to their load profile. *The preferred solution would include creating a queue* for the addition of large new data center loads, which would not be interconnected until there is adequate capacity to serve them. Another solution would require data centers that do not bring their own new generation to be *curtailable prior to current demand side customers but without the pretense that the data centers are providing "demand response" for which they should be paid.* Given the level of data center load growth, this curtailability solution would provide a strong incentive to bring new generation, if enforced on a specific data center basis. This broad bring your own new generation solution to the issues created by the addition of unprecedented amounts of large data center load does not require a continued massive wealth transfer."[90] (emphasis added)

Q. Have the high PJM capacity auction prices attracted enough new generation to ensure resource adequacy?

A. No. In the 2028/2029 auction, secured capacity (generation + demand response) fell 6.8GW short of the reserve requirement. The prior auction also fell short, by 6.5 GW.[91] This is reflected in Morning Analytics declaration (above) that continuing to connect large data center loads that can't be served reliably is unreasonable.

Q. Should Michigan follow the PJM model?

A. No. I agree with Morning Analytics, it is unreasonable to connect loads that will compromise resource adequacy and grid reliability. No one wants rolling blackouts. We need to ensure resource adequacy for new large loads.

[90] Ibid, p 2
[91] Paul Gerke, "PJM capacity auction easily hits price cap… Again," *Renewable Energy World*, July 16, 2026. Accessed on 7/26/26 at: https://www.renewableenergyworld.com/news/pjm-capacity-auction-easily-hits-price-cap-again/

2. Special Contracts – Bring Your Own Capacity

Q. How have the MPSC and DTEE managed capacity adequacy for data center customers so far?

A. For both the Oracle data center in Saline Twp. and the Google data center in Van Buren Twp., DTEE has negotiated contracts with the data centers that fund significant amounts of capacity. Oracle funded 1.4 GW of battery capacity, a value equal to its load (whether the accredited capacity will be that high is questionable).[92] Google funded a mix of batteries, renewable generation facilities, Zonal Resource Credits (ZRCs), and demand response to provide sufficient capacity until 2033, at which time DTEE will need to add new capacity of some kind.[93] DTEE will still acquire, own, and operate the capacity assets.

As far as I know, the inclusion of capacity resources in the two data center's contracts was at DTEE's discretion, and not the result of any rule or Commission order. It is critical for resource adequacy that new data centers continue to provide their own capacity in some way. But there are other options besides special contracts.

3. Onsite Generation

Q. Besides special contracts, how else have data centers provided the capacity needed to serve their load, in other States?

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[92] U-21990, Commission order dated December 18, 2025, p 17 – citing CEO's motion, p 9

[93] U-22058, ABATE witness James Dauphinais direct, 3 TR 547

A. There have been calls for data centers to build on-site power plants to supply most of all of their needs, and many data center developers are doing so.

Q. Besides Morning Analytics (quoted earlier), have others called for data centers to supply their own generating capacity?

A. Yes. President Trump has said that data centers "would be expected to secure or develop dedicated power supply for their own loads rather than rely solely on the existing grid."[94] Later, Trump announced that he would fast-track requests to build power plants next to data centers, granting approval "in a matter of weeks."[95] FERC issued an order to RTOs and ISOs to "defend or revise" their large load interconnect tariffs. Part of the order was to "accommodate co-location agreements and behind-the-meter generation." Another section called for "providing new transmission services for flexible large loads."[96]

[94] Kevin Clark, "Trump urges tech companies to build their own power plants for data centers," *Power Engineering*, February 25, 2026. Accessed on 7/27/26 at: https://www.power-eng.com/news/trump-urges-tech-companies-to-build-their-own-power-plants-for-data-centers/
[95] Arcelia Martin, "Trump Says He'll Fast-Track Private Gas Plants to Power AI Data Centers," *Mother Jones*, July 8, 2026. Accessed on 7/27/26 at: https://www.motherjones.com/politics/2026/07/donald-trump-epa-lee-zeldin-fast-track-private-gas-fired-power-plants-ai-data-centers/
[96] Paul Gerke, "FERC takes historic action, orders US grid operators to 'defend or revise' large load interconnection tariffs," *Renewable Energy World*, June 18, 2026. Accessed on 7/27/26 at: https://www.renewableenergyworld.com/news/ferc-takes-historic-action-orders-us-grid-operators-to-defend-or-revise-large-load-interconnection-tariffs/

Q. What are the benefits of data center on-site power?

A. According to The Rocky Mountain Institute, there are benefits for all parties. The customer gets speed-to-power, and a choice of technologies. Other ratepayers are insulated from the costs of new generation and the risk of the customer's load failing to materialize. Utilities get planning certainty and increased resource adequacy.[97]

Q. Are data centers already building on-site, behind the meter (BTM) generation?

A. Many are, and the practice is increasing *rapidly*. A company called Clearview did a comprehensive study of data centers building on-site generation. It identified 59 data centers, totaling 82 GW that are planning onsite power since 2025; about 25% of all planned data center capacity in the US. The trend includes nearly every hyperscaler, and a broad variety of generation equipment including gas turbines of various kinds and reciprocating engines.[98] Bloom Energy reports that "over one-third of data centers are expected to use 100% onsite power by 2030 and developers increasingly expect permanent onsite generation to emerge as a preferred long-term approach. Their report includes a graph illustrating how rapidly

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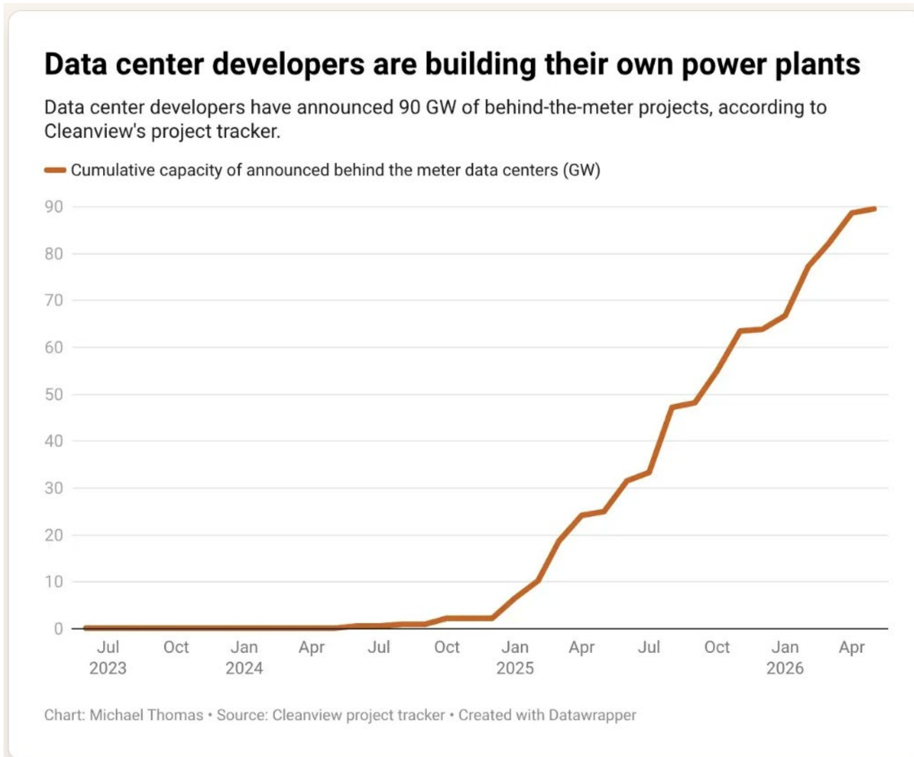
[97] Alyssa Perez, Sarah Wang, and Charles Cannon, "New Ways to Power Data Centers and Other Large Energy Users," *Rocky Mountain Institute*, February 6, 2026. Accessed on 8/1/26, at: https://rmi.org/resources/new-ways-to-power-data-centers-and-other-large-energy-users/

[98] Michael Thomas, "Bypassing the Grid: How Data Center Developers Are Building Their Own Power Plants," *Clearview*, 2026. Accessed on 7/27/26 at: https://cleanview.co/reports/behind-the-meter-data-centers

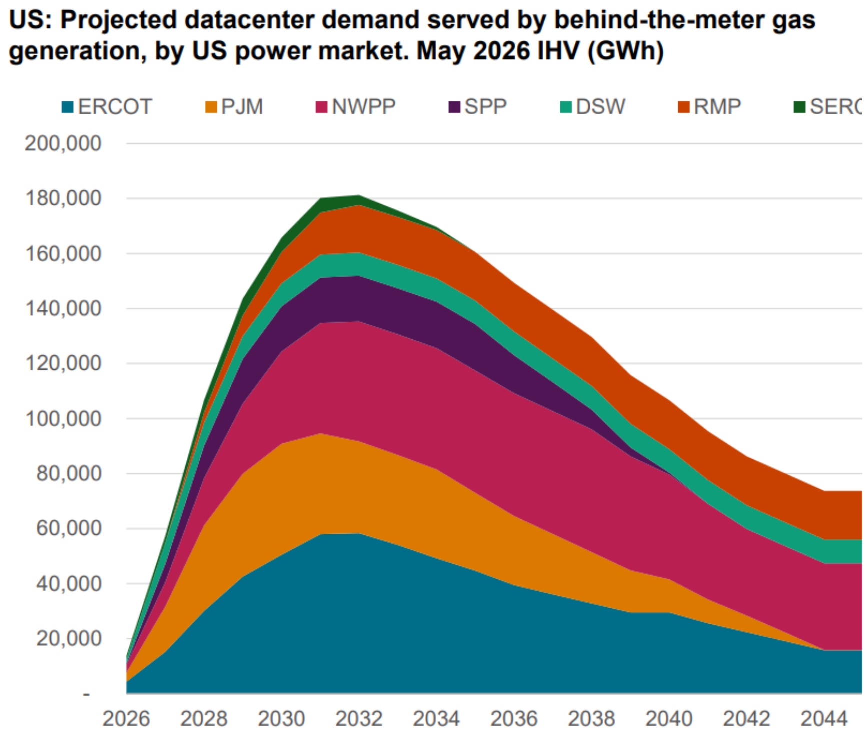
data centers have switched to on-site power:[99]



S&P Global also reported on data center's move to on-site power, projecting rapid increases across the next four to six years:[100]

[99] "2026 Data Center Power Report," *Bloom Energy*, January, 2026, p 3. Accessed on 7/27/26 at: https://www.bloomenergy.com/wp-content/uploads/2026-power-report.pdf

[100] "AI infrastructure growing pains: Ensuring energy resilience amid grid constraints and public demands," *S&P Global*, June 11, 2026, slide 22. Accessed on 8/1/2026 at: https://on24static.akamaized.net/event/53/56/76/9/rt/1/documents/resourceList1781194546520/aiinfrastructuregrowingpainswebinardeckfinalversion1781194546520.pdf



Q. Does Michigan law allow data centers to generate on-site power?

A. Yes. The law creating tax incentives specifically names on-site generation as an option, see MCL 205.54.(10)e(ix)(A).

Q. Are DTE customers on the D.11 industrial rate able to use onsite generation?

A. Yes. DTEE's rider 3 for standby power is available for customers on the D.11 rate sheet. It provides grid power during any periods when the customer is unable to provide their own electricity, and has a variety of charges based on capacity.[101] The process for interconnection under this

[101] DTE Electric Rate Book, *MPSC*, "Standard Contract Rider No. 3 Parallel Operation and Standby Service and station power standby service," p D-67.00

service is defined by the Interconnection and Distributed Generation Standards, Mich Admin Code R 460.901a – 460.1026.[102] Alternatively, if the customer is confident in the redundancy of their onsite generation, they could forego grid connection entirely and operate entirely off-grid.

Q. Are data center developers actually designing for 100% island power (off-grid)?

A. Some are. A data center in West Virgina is being designed with 2 GW of gas generators, potentially scaling to 8 GW, in a huge microgrid. A Meta data center In Louisianna is planning 7+ GW of dedicated onsite generation – a $200 billion project, with no grid dependency in the design. xAI Colossus complex in Memphis plans 2 GW of onsite capacity. Per Avanza Energy, for all three of these examples: "These are not backup strategies. They are primary power strategies - a parallel private power infrastructure built from scratch over 18 months."[103]

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[102] Interconnection and Distributed Generation Standards, *MPSC*, January 31, 2023. Accessed on 7/27/26 at: https://www.michigan.gov/mpsc/-/media/Project/Websites/mpsc/workgroups/interconnection-std/MIXDG-Updated-Rules.pdf?rev=e0aba826a2414cea810b29a27ae9c814&hash=FCD2FD051E0ABE7C4E8A504C4F6BB31E

[103] Christopher Johnson, "The $150 Billion Private Grid: How Data Centers Built the Largest Private Power Program in US History," *Avanza Energy*, June 2, 2026. Accessed on 7/27/26 at: https://avanzaenergy.substack.com/p/the-150-billion-private-grid-how

Q. If a data center was constructed in DTE Electric's territory and operated 100% off-grid, how would that affect the Company?

A. It wouldn't. Nothing would change for DTEE. But DTEE might view that as a lost opportunity to supply capacity and energy, and earn a profit on the capital invested in equipment necessary to do so. I would not expect the Company to favor data centers providing their own energy.

Q. If a data center was constructed in DTE Electric's territory and generated most of its own power, but signed up for standby service, how would that affect the Company?

A. The Company would gain revenue from the standby power agreement. It would also need to plan capacity to meet the customer load on the occasions when the customer switches to grid power

Q. Do Data Centers prefer building on-site power plants to getting their energy from the grid?

A. No. Data Centers much prefer grid power, *if* the grid can provide capacity quickly. The long delays to install and interconnect new grid generation facilities have forced data centers into building on-site power.[104] As ClearView put it,

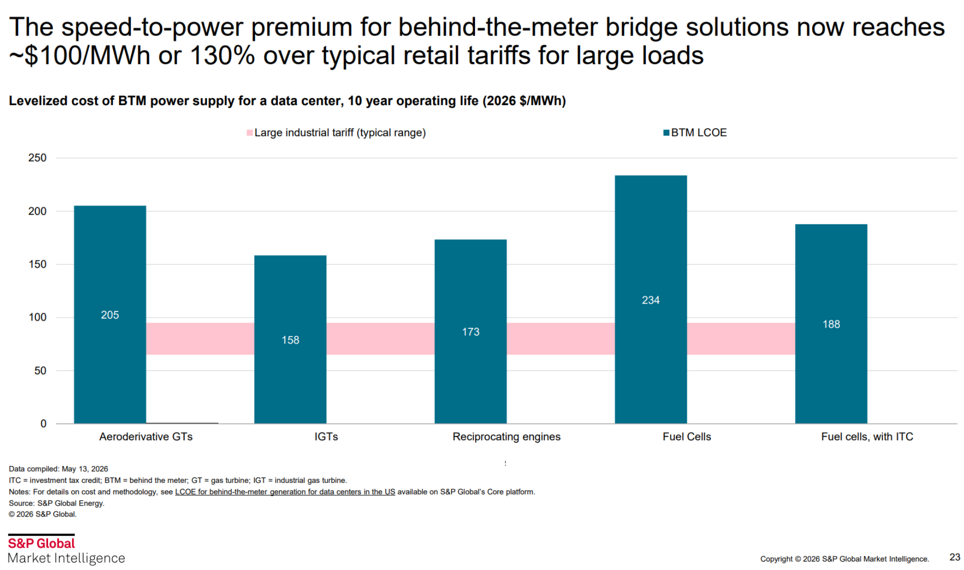
[104] Shaun Walsh, "Hyperscalers didn't set out to be power companies. The grid left them no choice." *Utility Dive*, May 28, 2026. Accessed on 8/1/26 at: https://www.utilitydive.com/news/hyperscaler-data-center-power-companies-grid-utilities/820568/

> "Power generation efficiency is out. *Speed to power is all that developers care about*. AI data centers can generate $10–12 million per MW annually, or $10–12 billion per GW. Bringing a data center online even a few years early could result in tens of billions in revenue that would otherwise be forgone.[105] (emphasis added)

Another report put it this way: "Hyperscalers are increasingly giving up on the grid for AI training capacity."[106]

Q. Why do data centers prefer grid power?

A. S&P Global did a study showing that the cost of on-site power is more than twice as expensive as utility energy under large load tariffs:[107]



[105] Michael Thomas, "Bypassing the Grid: How Data Center Developers Are Building Their Own Power Plants," *Clearview*, 2026. Accessed on 7/27/26 at: https://cleanview.co/reports/behind-the-meter-data-centers

[106] Olivia Wang, "Data center outlook: half of 2026 pipeline may not materialize," *Concurrence*, February 24, 2026. Accessed on 8/1/26 at https://www.currence.ai/blog/data-center-outlook

[107] "AI infrastructure growing pains: Ensuring energy resilience amid grid constraints and public demands," *S&P Global*, June 11, 2026, slide 23. Accessed on 8/1/2026 at: https://on24static.akamaized.net/event/53/56/76/9/rt/1/documents/resourceList1781194546520/aiinfrastructuregrowingpainswebinardeckfinalversion1781194546520.pdf

Q. What should the Commission do regarding data center options for self-power?

A. When negotiating a power supply agreement with a potential data center customer, the Company's self-interest is not well aligned with the potential customer's interests. DTEE would make more profit if it can supply all the capacity and energy that the customer needs, rather than if the customer provides capacity via DR or on-site batteries, or if the customer meets most or all of their needs with on-site generation. Some data center developers are very knowledgeable about energy supplies, but many are not. Bloomberg reports that "the majority of new projects are sponsored by first-time developers rather than more experienced firms."[108] When negotiating the power supply agreements, DTEE has an informational advantage.

The Commission should ensure that the customer is aware of their options. This could be done with a directive that Staff hold discussions with prospective data center customers to ensure the customer is aware of their alternatives. Alternatively, the Commission could have DTEE include language about large load's options for DR, onsite generation with grid standby power (rider 3), or onsite generation with no interconnection to the grid.

[108] Catherine Boudreau, "BNEF nearly doubled its forecast for US data center power demand," Latitude Media, July 21, 2026. Accessed on 7/28/26 at: https://www.latitudemedia.com/news/bnef-nearly-doubled-its-forecast-for-us-data-center-power-demand/

4. Demand Response

Q. Can Demand Response (DR) programs support resource adequacy for new data center loads?

A. Yes. According to an often-cited study from Duke University, if all US data centers cut back their usage by 1-2% during peak hours, NGCC (natural gas combined cycle) construction would be reduced by 10-15%.[109]

Q. Have data centers voluntarily signed up for DR programs elsewhere?

A. Yes. Google has declared that their data centers (across the country) are providing one GW of flexible load via DR programs.[110] Google's proposed data center in Van Buren Twp. has agreed to provide 650 MW of DR for six years.[111] Data center enrollment in DR in the PJM region makes up about 5% of the program.[112] The "Flex" data center project proposed by developer Verras for South Lyon Twp. is planning to have sufficient battery storage onsite to power the data center for four hours, and plans to participate in

[109] M.T. Ross and Jackson Ewing, "Data Centers and Generation Capacity over the Next Decade: Potential Benefits of Flexibility," *Nicholas Institute for Energy, Environment & Sustainability*, 2026. Accessed on 8/1/26 at: https://nicholasinstitute.duke.edu/sites/default/files/publications/data-centers-generation-capacity-over-next-decade.pdf

[110] Michael Terrell, "A new milestone for smart, affordable electricity growth," *Google*, March 19, 2026. Accessed on 7/27/26 at: https://blog.google/innovation-and-ai/infrastructure-and-cloud/global-network/demand-response-data-center-milestone/

[111] U-22058, direct testimony of N.T. Foley, 3 TR 90

[112] Jack Newsham, "Dark smoke rose above a Virginia data center as a heat wave pushed the power grid close to its limits," *Business Insider*, July 11, 2026. Accessed on 7/26/27 at: https://www.businessinsider.com/virginia-data-center-diesel-backup-generator-heat-wave-pjm-2026-7

DTE's DR programs.[113]

Q. How do demand response programs provide resource adequacy?

A. In MISO's resource adequacy process, demand response capacity is included in the calculation of resource adequacy for the utility (Load Serving Entity, or LSE).

5. Shedding Data Center Load First

Q. How has MPSC managed capacity adequacy for data center customers so far?

A. The MPSC took a major step beyond the customer contracts that DTEE has negotiated with the customers. In U-21990, the Commission ordered DTE Energy to "within 90 days of the date of this order, to file an application to update its Emergency Electric Procedures outlined in Section C3 of its Rate Book… the company will shed firm load from the Customer prior to shedding firm load of any of DTE Electric's other customers…"[114] DTEE has proposed such changes in U-22059. But, as far as I know, there has been no similar order issued to Consumers Energy.

[113] Verras, "Project Flex Study Meeting," *Lyon Township*, January 2026, slides 15, 19-20. Accessed on 7/27/26 at: https://cms2.revize.com/revize/lyontownship/Project%20Flex%20Presentation%20-%2001-22-26.pdf

[114] U-21990, Commission order dated December 18, 2025, p 41

Q. Has PJM implemented the recommendations made by Morning Analytics to address the capacity shortfall caused by data centers?

A. PJM has only implemented the recommendation to shed large loads that have backup power first. PJM got approval from the US Department of Energy to curtail service to large loads that have backup power as a last resort before instituting rolling blackouts.[115]

Q. Have other jurisdictions gotten authorization to curtail service to large loads before instituting rolling blackouts?

A. Yes. The DOE issued emergency orders for data center curtailment to Duke Energy Carolinas, Duke Energy Progress, and the Electric Reliability Council of Texas.[116] In Texas, all large loads (> 75 MW) interconnected after the passage of SB 6, are subject to mandatory curtailment before load-shed of other customers.[117]

[115] Ethan Howland, "PJM gets emergency approval to curtail data centers, large loads during hot weather," *Utility Dive*, May 19, 2026. Accessed on 7/27/26 at: https://www.utilitydive.com/news/pjm-doe-emergency-order-curtail-data-centers/820571/
[116] Zachary Skidmore, "PJM granted emergency approval to curtail data centers due to hot weather concerns," *Data Center Dynamics*, May 20, 2026. Accessed on 7/27/26 at: https://www.datacenterdynamics.com/en/news/pjm-granted-emergency-approval-to-curtail-data-centers-due-to-hot-weather-concerns/
[117] Christopher Johnton, "Why Data Centers Are Breaking Up with Traditional Power Utilities," *Avanza Energy*, September 19, 2025. Accessed on 7/27/26 at: https://avanzaenergy.substack.com/p/why-data-centers-are-breaking-up

Q. What is your view of the Commission's "first load to shed" directive in U-21990?

A. I think it was an essential, quick-to-implement measure to protect grid reliability. While the directive protects grid *reliability* from excess large load demand, it does not help the Company to meet the *resource adequacy* requirements of MISO. I think there is a better way to simultaneously address the related issues of grid reliability and resource adequacy.

6. Proposal: Two-Tiered Demand Response

Q. How could the Commission protect grid reliability while helping the Company meet resource adequacy requirements?

A. The Commission could direct the Company to create an *option* in the proposed large load tariff, or in a separate tariff, to specify that the service is not firm; putting the large load customer into a two-tiered demand response (DR) program. Large loads in this second tier (which I will call "tier-2") would only be called upon after existing DR customers (tier-1) have been called upon, but would not receive any reduction in their electric rates. To the large load customer, this would function much like the current "first load to shed" directive in U-21990; the large load customer would have their service curtailed only when necessary to prevent the firm load shed of other customers. But it would have the huge advantage that DTE Electric could register the customer's load flexibility as demand response in the MISO resource adequacy process. Therefore, DTE Electric would not have to acquire nearly as much additional capacity to meet the large customer's load. This would reduce the Company's cost of service, putting downward pressure on customer rates.

Q. Is there any downside for the large load customer in "last demand response" option?

A. There is only one that I can think of. MISO recently changed their demand response rules to require an annual test, showing at least an 80% load reduction.[118] Under the tier-2 DR option, the large load customer would be required to switch to backup power once a year. With sufficient advanced notice, this should not be a major burden to the customer; they are likely doing occasional tests of their backup power systems already.

Q. How would offering large load customers in a two-tiered demand response program affect DTE Energy?

A. Because the Company would not (necessarily) need to sign PPAs or acquire generation or storage assets to supply the customer's load under the MISO resource adequacy process, the Company's opportunity to earn a profit may be reduced. I would not expect the Company to favor this option.

[118] Ben Duwve and Jill Drum, "FERC Accepts MISO's Revised Demand Resource Real Power Testing Requirements," *Troutman Pepper Locke*, December 11, 2025. Accessed on 7/27/26 at: https://www.troutmanenergyreport.com/2025/12/ferc-accepts-misos-revised-demand-resource-real-power-testing-requirements/

7. Capacity Adequacy Summary

Q. Can you summarize your proposed options to ensure resource adequacy as new large load customers are interconnected?

A. Yes. I propose that new large load customers be presented with four options (which are not mutually exclusive) to provide the capacity needed to support their load:

1. A special contracts approach in which the customer provides funding for sufficient capacity to support their load, for the duration of the primary supply agreement (PSA). They will still be subject to the "first load shed" provision.
2. The customer can build their own on-site power system. The customer may either be entirely off-grid, with no DTEE interconnect, or interconnect on standby power. Because standby power still imposes a major load on the grid (on occasion), the customer, when pulling power from the grid, would still be subject to the "first load shed" provision.
3. The customer can sign up for a traditional demand response program. Unless the customer agrees to 100% load reduction during declared events, the customer would still be subject to the "first load shed" provision.

4. The customer can sign up for a new program, as a tier-2 demand response participant, at 100% of their load. The customer would only be called upon to drop off the grid after all standard (tier-1) DR customers had been called upon, and if there was still a shortfall of capacity. The customer would need to participate in a DR test once per year. The "first load to shed" provision would have no impact on this customer, since their load will already be off-grid before any load shedding occurs. Compared to the special contracts or on-site power options, this option allows the data center customer to interconnect without the delays of power plant or battery construction. Compared to the traditional DR program, this option will call upon the customer to reduce their load less frequently.

V. DATA CENTER LOADS ARE UNIQUE

Q. Why is it important for the Commission to consider data centers as a unique load?

A. Multiple aspects of data centers make them a unique load, including the risk that a data center's load will not materialize – causing stranded assets, the 24-hour/day and 365 day per year (24x365) load profile, and the rate at which new data centers are being proposed. UPS systems may simultaneously trip the data center off-grid in response to transient grid fluctuations, potentially resulting in cascading blackouts. Additionally, data centers doing AI training have loads that vary wildly in less than a second which can cause frequency deviations.[119] I will discuss each of these characteristics in sequence.

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[119] Chuck Ross, "It's Not Just the Load: A.I. data center grid impacts," *Electrical Contractor*, January 15, 2026. Accessed on 5/27/26 at: https://www.ecmag.com/magazine/articles/article-detail/it-s-not-just-the-load--a.i.-data-center-grid-impacts

Q. Why do large computing loads (i.e., data centers) present a greater risk of stranded grid assets than typical large industrial loads?

A. According to Consumers Energy:

> "…data center hardware needs to be refreshed more often than other typical manufacturing equipment, and data centers have the ability to easily transfer their functions to locations outside of Michigan. She states that other differences from typical large industrial customers are that data centers do not develop local supply chains and do not create significant local commercial activity or employment. Ms. Connolly opines that these differences present a greater risk for stranded assets."[120]

ABATE has made similar observations:

> "[b]eyond their size, it is the relatively new and immediate scale of their proliferation, their specific operating characteristics, and their limited operational ties to their localities that make them unique. As such they present specific stranded cost concerns which are not present with other types of large customers, such as industrial or manufacturing entities.... While a sizable manufacturing facility entails a local workforce and supply chain commitments which ground it in its location, data center customers have none of these locational attachments."[121]

I agree with their assessments. These characteristics, along with the huge size of their loads, are why tariff terms such as long contract duration, minimum payments, and exit fees are essential. But these are not the only characteristics that make data center loads unique.

[120] U-21859, Commission order dated November 6 2025, p 13

[121] Ibid, p 60

Q. How does planning and forecasting of large computing loads differ from typical large industrial loads?

A. New data centers differ in both scale and speed from new industrial facilities. Load can materialize in 18-36 months, faster than new industrial facilities and faster than an electric utility can get a new gas-fired plant approved, permitted, built, and interconnected.[122] Load planning for data centers requires a different process.[123] This has led to data center developers' willingness to work with electric utilities in ways large industrial customers have not.

Q. How do Data Center developers work with electric utilities differently from typical large industrial customers?

A. Data center developers have repeatedly declared that they are willing to pay the full costs of their impact to the grid.[124,125] In U-21859 and U-21990, Oracle and Google each provided substantial funding for network assets to be owned and operated by the utility. This is not behavior we normally see in other customers. One analyst put it this way:

[122] "How Should Utilities Prepare for Rapid Data Center Load Growth?" *Ascend Analytics*, March 16, 2026. Accessed on 8/3/26 at: https://www.ascendanalytics.com/blog/best-practices-utilities-managing-data-center-demand

[123] Emeka Obikwelu, "The New Large-Load Compact," *Power Magazine*, July 14, 2026. Accessed on 8/3/26 at: https://www.powermag.com/the-new-large-load-compact/

[124] Sonal Patel, "White House Expands Data Center Ratepayer Pledge as Congress Moves to Codify Protections," *Power Magazine*, July 23, 2026. Accessed on 8/3/26 at: https://www.powermag.com/white-house-expands-data-center-ratepayer-pledge-as-congress-moves-to-codify-protections/

[125] Kinsey Grant Baker, "Anthropic to cover 100% of grid upgrade costs, demand-driven price hikes from data centers," *Energy Central*, February 12, 2026. Accessed on 8/3/26 at: https://www.energycentral.com/customer-engagement-experience/post/news-anthropic-to-cover-100-of-grid-upgrade-costs-demand-driven-price-qbmOHOLAdave6KO

> "…data centers have more strategic options than many earlier industrial loads. They can sign long-term power purchase agreements, co-locate with generation, install backup generation and batteries, build private substations, participate in demand response pilots, or shift some workloads across time and geography. These options do not eliminate the need for reliable grid service, but they change the bargaining relationship between customer and utility."[126]

Q. How does the response of data center loads to brief grid disturbances differ from typical industrial loads?

A. As I discussed earlier in this testimony, data centers are concerned with protecting their extremely expensive electronic equipment from power quality issues; their UPS settings can cause their load to trip off the grid (to run on backup power) during minor grid disturbances. As I discussed, there have been numerous documented cases of this behavior, some involving dozens of data centers dropping off-grid simultaneously. National Energy Reliability Corporation's (NERC's) Large Load Working Group report went into extensive discussion of the negative impacts that data center's tendency to trip off can have on the grid. UPS trips can negatively affect frequency stability, rotor angle stability, and voltage stability.[127]

Q. How does the load profile of data centers differ from typical industrial loads?

A. The load profile of a data center is unusual because these facilities typically run 24x7x365; most industrial facilities have downtime at night, and/or weekends, and/or

[126] Morgan Bazilioan, "How Artificial Intelligence Data Centers Are Reshaping the Regulatory Architecture of U.S. Electricity," *AI Energy*, 2026. Accessed on 8/3/26 at: https://www.aixenergy.io/how-artificial-intelligence-data-centers-are-reshaping-the-regulatory-architecture-of-u-s-electricity/

[127] "Characteristics and Risks of Emerging Large Loads: Large Load Task Force White Paper," *NERC*, July 2025, p 22-8. Accessed on 8/3/26 at: https://www.nerc.com/globalassets/who-we-are/standing-committees/rstc/whitepaper-characteristics-and-risks-of-emerging-large-loads.pdf

holidays.

As I discussed earlier in this testimony, the load profile of data centers is unique because their load can rise to contracted capacity and plunge to a small fraction of contracted capacity in sub-second time intervals, repeatedly, over minutes and hours. Quoting former Secretary of Energy Granholm again:

> "One of the least understood aspects of the AI-data-center boom is not the size of the load … it's the *volatility of the load*.
>
> Utilities have historically treated data centers as large but relatively flat demand sources — closer to steady industrial load than to highly dynamic systems… And unlike traditional utility planning assumptions, these changes may occur in seconds — or subseconds — rather than over hours.
>
> This matters because the grid was largely designed around gradual load ramps, predictable industrial demand and hourly planning models…
>
> AI infrastructure may require a different architecture…"
>
> AI changes that."[128]

In addition to the contract conditions needed to prevent stranded assets, a tariff for data centers needs to include limitations about ramp rates, for both ramp-up and ramp-down speeds (MW/minute). On May 4 of this year, the National Energy Reliability Corporation (NERC), issued a level-3 alert, escalating its prior level 2 alert because it

> "…found that entities generally did not have sufficient processes, procedures, or methods to address risks associated with computational loads. This contrasts with the robust historical experience with traditional non-power electronic non-computational load. As seen in the public report, NERC found specific deficiencies with the treatment of computational loads."[129]

[128] Jennifer Granholm, *LinkedIn*, 2026. Accessed on 7/26/26 at: https://www.linkedin.com/posts/jennifergranholm_one-of-the-least-understood-aspects-of-the-activity-7458242574542327808-bZoX/

[129] "Essential Action to Industry Computational Load Modeling, Studies, Instrumentation, Commissioning, Operations, Protection, and Control," *NERC*, May 4, 2026. Accessed on 8/3/26 at: https://www.nerc.com/globalassets/programs/bpsa/alerts/level-3-computational-load-alert.pdf

The alert requires transmission entities to acknowledge the alert by August 3, 2026. The alert requires transmission entities to collect a variety of data about data centers, including "electrical size and power factor," "dynamic characteristics" (UPS ride-through), "expected ramp rate (MW/min) in down-ramp and up-ramp," "protective devices," "on-site generation," and other information.[130] NERC has also modified its organization registration manual to require every "Computational Load Entity (CLE)" to register with NERC.[131] NERC had previously issued a white paper on large loads, which described how AI training can create rapid load ramps, both up and down. Using a "high-speed recorder" on a 50 MW block of a Google data center, ramp speed was measured and recorded, with approximately 40% of load ramping up or down in 250 milliseconds:[132]

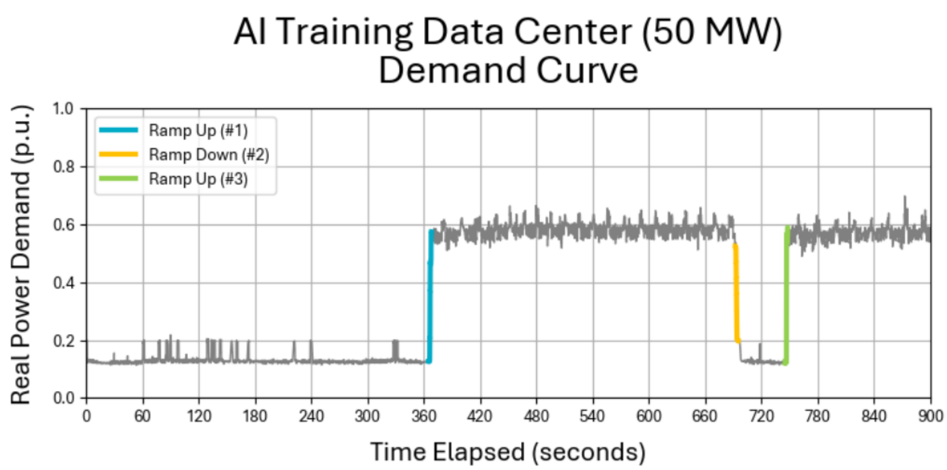

Figure 2.2: An AI Training Data Center Begins a Training Run (EdgeTunePower)

[130] Ibid, "Essential Action #1," p 3-5

[131] "Appendix 5A Organization Registration and Certification Manual," *NERC*, p 1. Accessed on 8/3/26 at: https://www.nerc.com/globalassets/who-we-are/rules-of-procedure/proposed/appendix-5a-redline-to-last-approved---april-2026-posting.pdf

[132] "Characteristics and Risks of Emerging Large Loads: Large Load Task Force White Paper," *NERC*, July 2025, p 6-7. Accessed on 8/3/26 at: https://www.nerc.com/globalassets/who-we-are/standing-committees/rstc/whitepaper-characteristics-and-risks-of-emerging-large-loads.pdf

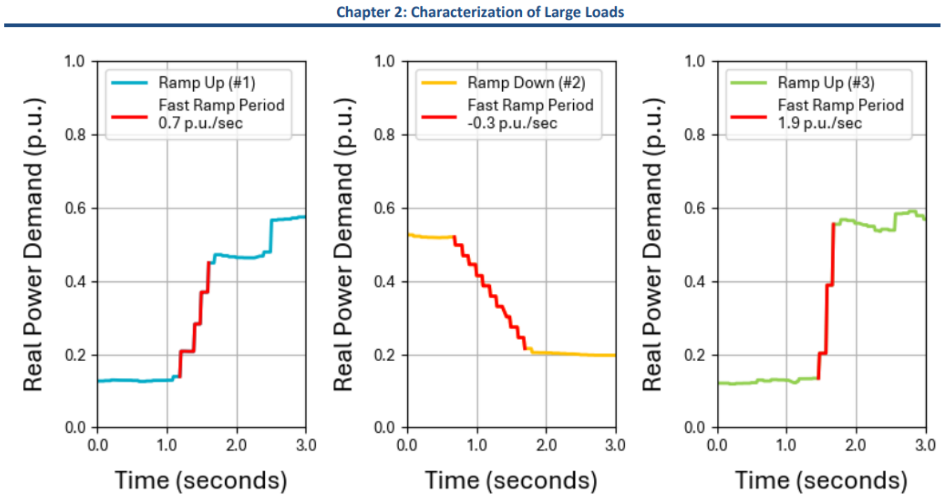

Figure 2.3: Zoomed-In Views of AI Training Data Center Ramping Up and Down Due to Transitioning Between Training and Saving Checkpoint Progress

NERC's large load working group recommended that:

> "Several other factors, such as *load ramp rates*, real-time behavior and flexibility, protection systems, and backup power schemes, *should be considered if a large load definition is developed for regulatory procedures or policies.* Some of the additional factors for consideration are described below."[133] (emphasis added)

Q. What risks to the reliable operation of the grid has NERC attributed to high load ramp-rates?

A. NERC says that these rapid swings in load can cause issues with frequency regulation, and trigger outages:

[133] Ibid, p 11

> "Large load ramp rates may cause issues with frequency regulation by outstripping the reserves held to regulate frequency. These reserves are provided by on-line spinning resources with headroom to manage a decrease in frequency and units that can further lower their output to manage an increase in frequency. With larger ramp rates, more regulation services will be needed to handle larger swings… If the system operator fails to procure adequate regulation to manage frequency, then load shed or rapid generation curtailment may take place and result in unplanned outages, reducing system security/reliability. In addition to the loss of load, the sudden restoration of a large load could exhaust available balancing reserves, ultimately leading to decreased system frequency and potential frequency instability. Large rapid changes in demand will also rapidly alter the flow of reactive power in the system, potentially exceeding the ability of existing voltage controls to respond and lead to over- and undervoltage conditions. This could lead to the unplanned outages of generation plants initiated by voltage-ride through protection, load loss related to undervoltage load shedding, or even more widespread outages caused by voltage instability and collapse."[134]

Q Do data centers have statutory obligations, which other industrial customers do not?

A. Yes. Michigan statute restricts data centers from using tariffs available to some other industrial customers, and requires that data centers not use "A rate that causes residential customers to subsidize the costs incurred to provide electric service to the facility."[135]

Although the ratemaking process normally assigns costs to the customer *class* that causes them, the legislature has given the Commission a specific legal obligation to ensure that residential customers do not subsidize *any particular data center facility*. This regulatory treatment of data centers is mandated by Michigan law.

[134] Ibid, p 20

[135] MCL 205.54ee(10)(e)(x)(C)

Q Have other jurisdictions recognized that data centers require special regulatory treatment?

A. Yes. Oregon enacted a law that has special rules for data centers. It defines data centers using code 518210 of the 2022 North American Industry Classification System ("Computing Infrastructure Providers and Web Hosting."[136] It requires the PUC to create a separate tariff for these customers, with specific terms and conditions. The Georgia PSC has issued a series of orders on data centers, including a provision to ensure that data center revenue reduces residential bills.[137]

Q Has the Commission recognized that data centers are a unique industry?

A. Yes. In U-21859, the Commission stated, "As Consumers makes clear in its application, data centers are a unique industry with characteristics that differ significantly from other commercial and industrial enterprises.[138]

Q. What characteristics of data centers has the Commission recognized as unique?

A. The Commission has recognized several characteristics that make data centers unique:

1. The load "presents unique and significant cost implications."[139]

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[136] Kevin Hardy, "With electricity bills rising, some states consider new data center laws", Stateline, February 5, 2026. At: https://stateline.org/2026/02/05/with-electricity-bills-rising-some-states-consider-new-data-center-laws/ linked to: "House Bill 3546", *Oregon Legislative Assembly*, 2025. Accessed on 8/3/26 at: https://olis.oregonlegislature.gov/liz/2025R1/Downloads/MeasureDocument/HB3546/Enrolled

[137] "Data Center Fact Sheet," Georia Public Service Commission, March, 2026. Accessed on 8/3/26 at: https://psc.ga.gov/site/downloads/datacenterfactsheet.pdf

[138] U-21859, Commission order dated November 6, 2025, p 10 and p 103

[139] U-21859, Commission order dated March 13, 2025, p 3

2. The magnitude of the potential stranded costs.[140]

3. The risk of cross-subsidization.[141]

4. "… unprecedented character, including the high load factor, 24/7/365 demand profile, and the fact that the vast majority of new generation and transmission investments will be driven by such a small number of discrete loads.[142]

Q. What has the Commission said about the data center and the large load tariff?

A. In U-21859, the Commission ordered that the large load tariff should be end-use neutral, explaining:

> "…eligibility should be end-use neutral, rather than applied only to data center customers. The Commission agrees with the Staff that the end-use at issue here does not involve a unique type of service such as that required for metal melting or electric vehicle charging, but that the size itself is the unique feature that must be addressed."[143]

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[140] [140] U-21859, Commission order dated November 6, 2025, p 10

[141] Ibid, p 103-4

[142] Ibid, p 116

[143] Ibid, p 106

Q. Do you agree with that Commission finding that the large load tariff should be end-use neutral?

A. No. In the NERC Large Load report, under the section on "Power Quality" and the sub-section "Voltage Fluctuations," the report discussed how electric arc furnaces (metal melting) induce voltage fluctuations into the bulk power system. The next two sentences are: "Some new large electric loads, such as cryptocurrency miners and AI data centers, also have the potential to introduce significant voltage fluctuations to the supply system. This can be attributed to the significant variation in the load profile of these loads"[144] Data centers as an end-use do involve issues similar to metal melting.

For all of the reasons described above, and perhaps additional reasons that other intervenors in the instant case will identify, data centers require different tariff terms and conditions and power quality monitoring equipment, and methods & procedures than other end-uses.

[144] "Characteristics and Risks of Emerging Large Loads: Large Load Task Force White Paper," *NERC*, July 2025, p 32-6. Accessed on 8/3/26 at: https://www.nerc.com/globalassets/who-we-are/standing-committees/rstc/whitepaper-characteristics-and-risks-of-emerging-large-loads.pdf

Q. What action should the Commission take, due to the unique qualities of data center developers and data center loads?

A. The Commission should order that the new tariff should be created that only applies only to enterprise data centers, as defined in MCL 205.54ee(10)(e) - (i) through (iii). Terms and conditions added to D11 for large loads in the Company's proposal should instead be applied to the new tariff, which would copy the rates in D11, until they may be changed in a rate case.

VI. RECOMMENDATIONS

Q. What actions should the Commission take in this case?

1. The Commission should order that a new tariff should be created that applies only to enterprise data centers, as defined in MCL 205.54ee(10) (e)(i) through (iii). Terms and conditions added to D11 for large loads in the Company's proposal should instead be applied to the new tariff, which would copy the rates in D11, until they may be changed in a rate case.

2. The Commission should order that any tariff approved in this case (D11 revisions or a new tariff) should limit the customer's reduction in their capacity commitment to a one-time 10% reduction, or get special approval via an ex parte filing per U-21859.

3. The Commission should order that any tariff approved in this case (D11 revisions or a new tariff) address collateral requirements consistent with prior cases. The Commission may reasonably order:

    a. Grant the Company control over the amount and type of collateral accepted and assign the Company full liability if the collateral is insufficient, as it did in U-21990.

    Or

    b. Require 100% of the exit fee as collateral, in either cash or an irrevocable letter of credit, following the precedent in U-21859, but with a 100% requirement (vs. 50% in U-21859)

    Or

    c. Require 50% of the exit fee as collateral, in either cash or an irrevocable letter of credit, following the precedent in U-21859, but including a credit rating clause to demand more collateral, if the customer's credit rating declines.

4. The Commission should order that in any tariff approved in this case (D11 revisions or a new tariff) that the Company remove the provision allowing the customer to exceed their contracted capacity. Alternatively, if the Commission favors giving large load customers some latitude, the provision should be re-written. The cap should be the lessor of: 5% of the customer's contracted capacity, or 50 MW, and be restricted to the nine non-summer months, as defined in MISO capacity auctions.

5. The Commission should order that any tariff approved in this case (D11 revisions or a new tariff) include a clear statement in the tariff that all new large load customers must sign a power supply agreement, subject to review by the Commission, in a contested case.
6. The Commission should order that any tariff approved in this case (D11 revisions or a new tariff) include language about customer's options for demand response (DR), onsite generation with grid standby power (rider 3), or onsite generation with no interconnection to the grid.
7. The Commission should order that any tariff approved in this case (D11 revisions or a new tariff) include limits to customer load ramp rates, both ramp-up and ramp-down (MW/min).
8. The Commission should order that any tariff approved in this case (D11 revisions or a new tariff) require that the interconnect with any large load customer shall include monitoring equipment to ensure that the customer adheres to ramp limits and other power quality requirements, at the customer's expense.
9. The Commission should order that any tariff approved in this case (D11 revisions or a new tariff) include a customer *option* which specifies that the service is not firm; putting the large load customer into a two-tiered demand response (DR) program, as described in my testimony.
10. The Commission should order Staff to set up a study group to look at the UPS trip issue, including ERCOT interconnect requirements, and the proposed MISO requirements, and make a recommendation – urgently!

Q. Does that conclude your testimony?

A. Yes.

John Richter

EDUCATION

Murdoch University, Perth, Australia – January 2009
M.S. in Renewable Energy

Oakland Community College, Rochester Hills, Michigan – 1991
Alternative Energy Technologies (Solar, Wind, Biomass)

Oakland University**,** Rochester, Michigan
B.S. Engineering, minor in Economics - 1982

RENEWABLE ENERGY EXPERIENCE

Adjunct Instructor, Macomb Community College (2009 – 2010)
Online / classroom hybrid course including labs.
Grant-funded curriculum development and classroom instruction in solar energy.

President, Great Lakes Renewable Energy Association (2002 – 2003)
Non-profit administration focused on financial planning, fundraising & recruitment.
Staffing, budget, and strategic planning.

Policy Analyst, Great Lakes Renewable Energy Association
Developed position papers on policy initiatives. One of three invited presenters to the Northeast and Midwest Caucus meeting on a national RPS. Presented: *Wind Power and Distributed Generation* to U.S. Congressional Staffers at the U.S. Capitol Building. Member of the MPSC collaborative on renewable energy and the Michigan Wind Working Group of the DOE's *Wind Powering America* program.

Renewable Energy Consultant

American Green Careers
Project management and meeting facilitation for a team of independent contractors for the start-up of a proprietary school green jobs training program.

Great Lakes Renewable Energy Association
Researched, developed, and presented policy recommendations: *Opportunities for Renewable Energy Deployment* to Michigan legislators and staff.

Midwest Education Connection Network (MECNet) / Urban Options
Developed K-12 educational materials: *Michigan's Renewable Energy and Efficiency Success Stories*. This complemented materials from NEED.

American Council for an Energy Efficient Economy (ACEEE)
Researched and authored *Michigan's Current Energy Situation* section of an energy efficiency white paper for the State Governor.

Speaker
Scores of speaking engagements at conferences, community colleges, and community groups for two decades, including:

- American Solar Energy Society; *Making the Benefits of RE Real,* and *World Oil Depletion and Its Implications for U.S. Energy Policy*
- Pierce Cedar Creek RE Conference - Keynote speaker: *RE Cornucopia*
- PBS Documentary: *Michigan's Green Energy Economy*

Contributing Writer
Home Power Magazine, The Rock River Times, ReNews, Energy Paths,
Energy Times

TELECOM EXPERIENCE

Century Link Communications *(formerly Level-3, Global Crossing, Frontier, and Allnet),* Southeastern Michigan – September 1987 to March 2002, December 2002 – May 2018

Sr. Software Architect

Design and specify software changes to meet program objectives.

- Define project scope, deliverables, schedule and budget.
- Develop software specifications.

Sr. Product Development Manager

Plan, direct, and coordinate all work activities to build new services on-time and within budget.

- Create cross-functional project teams with members from various departments; build team commitment to project objectives.
- Define project scope, deliverables, schedule and budget.
- Create or update business processes to support new products.
- Develop software specifications.

Director, Product Platform Development

Responsible for the selection, purchase, project management, installation, integration, and operation of multi-million dollar real-time call processing systems.

- Performed vendor/product evaluation, purchase negotiations and installation project management.
- Managed staff of 23 Software Engineers developing real-time call processing software and integrating purchased systems.

Senior Manager of Hardware Integration

Responsible for evaluation, selection, engineering, purchase, and installation of all switching equipment and Digital Cross-connect Systems (DCS).

- Planned and managed annual capital budget in excess of $25M.
- Negotiated pricing and payment terms, installation schedules, and acceptance testing procedures.
- Created network traffic forecasting model for budgetary and capacity planning. Selected sites to close for economic efficiency.
- Provided Project Management of equipment purchases, moves, and installs to facilitate consolidation of four acquired carrier switching networks into one fully integrated network.

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the application of
DTE ELECTRIC COMPANY
for approval of Amendments to Rate D11 and related relief ______/

Case No. **U-22061**

PROOF OF SERVICE

Carol A. Dane says that on August 4, 2026, she served a copy of Direct Testimony and Exhibit of John Richter upon the following parties via email:

Name/Party	E-mail Address
ADMINISTRATIVE LAW JUDGE Honorable Katherine E. Talbot	talbotk@michigan.gov
DTE ELECTRIC COMPANY Andrea E. Hayden John Janiszewski	mpscfilings@dteenergy.com andrea.hayden@dteenergy.com john.janiszewski@dteenergy.com
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The statements above are true to the best of my knowledge, information and belief.

PUBLIC LAW RESOURCE CENTER PLLC

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Dated: August 4, 2026