Memorandum

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Subject:	Data Center Energy Efficiency Opportunities
Date:	January 21, 2026

Introduction

Historically, data centers have not had a large footprint in Wisconsin's electric grid. However, as of the time of this memorandum, four new hyperscale facilities are either under contract or under construction. Hyperscale facilities are the largest class of data centers and are often used to host large-scale information technology (IT) services, such as artificial Intelligence (AI) platforms. Together, the four planned hyperscale facilities are expected to add approximately 4 GW of demand to Wisconsin's electric grid by 2030.[1] With these hyperscale facilities as a backdrop, Cadmus and Apex Analytics (the evaluation team) conducted research to help Focus on Energy and the Wisconsin Public Service Commission better understand hyperscale energy efficiency options while also exploring the opportunities for energy efficiency at smaller data centers.

This memo brings together findings from a review of secondary data center research, as well as interviews with three energy efficiency implementers and one Regional Transmission Organization (RTO) to provide insight into how Focus on Energy might approach data center energy efficiency. Findings are broken into four main areas:

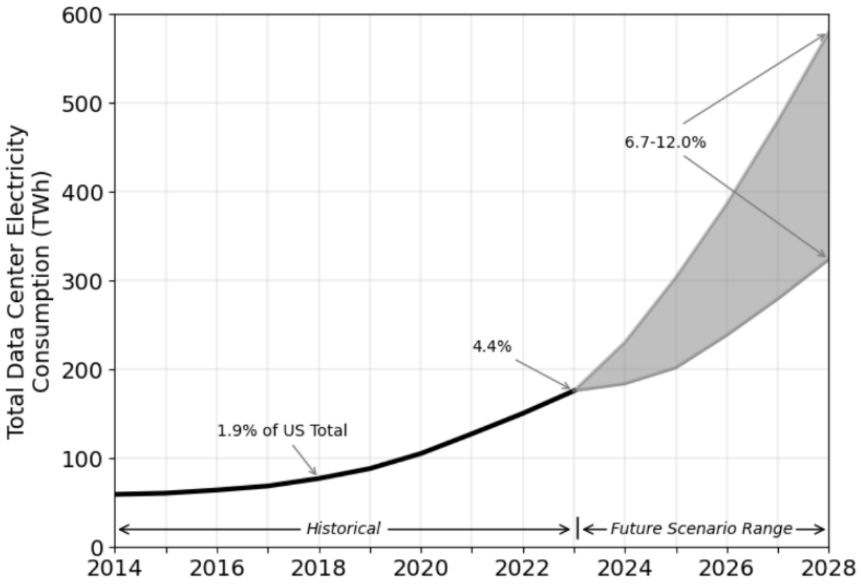
- **Data Center Overview:** Provides an overview of data center market trends, types of facilities, key players, energy usage, and facility siting priorities.
- **Wisconsin Data Centers:** Covers existing Wisconsin data centers, data centers under construction or contract, and codes and policies that shape Wisconsin's data center landscape.
- **Data Center Programs:** Reviews data center energy efficiency and load flexibility programs within the U.S.
- **Engaging Data Centers:** Recommends strategies for engaging data centers based on implementer experiences and secondary research findings.

[1] Calculated using publicly reported facility load and construction timelines. See Table 4 for additional details.

Data Center Overview

Between 2014 and 2023, data center energy consumption as a percentage of total U.S. electricity usage increased roughly two percentage points.[2] Over this period, efficiency gains allowed total computing power to increase dramatically with only moderate increases in total energy consumption. However, with the emergence of AI, data center energy demand is expected to increase exponentially in the short term: increasing from 4.4% of U.S. energy usage in 2023 to between 6.7% and 12.0% in 2028.[3] Figure 1 shows data center energy use as a proportion of total U.S. energy consumption.

Figure 1. Data Center Share of U.S. Energy Use



Data Center Types

The anticipated growth of data center energy consumption is primarily driven by growth in colocation and hyperscale data center facilities. Table 1 lists the different types of data centers and their average facility size.[4]

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[2] Lawrence Berkley Lab. Shehabi, Arman, Sarah J. Smith, and Alex Hubbard, et al. December 2024. 2024 *United States Data Center Energy Usage Report.* https://escholarship.org/uc/item/32d6m0d1

[3] ibid.

[4] Ibid.

Table 1. Data Center Types

Facility Type	Average Size of Data Center Space
Telco Edge	< 150 sq ft
Commercial Edge	< 150 sq ft
Small Business	< 150 sq ft
Enterprise Branch	< 150 sq ft
Internal	< 2,700 sq ft
Communication Service Providers	6,900 sq ft
Colocation	**11,000 sq ft**
Hyperscale	**30,000 sq ft**

A description of the largest facility types is as follows:

- **Colocation facilities** provide space and power access for customers to run their own computing hardware. These facilities may have 20-plus tenants operating at any one time. Colocation facility owners often experience a coordination issue relating to energy efficiency, where tenants' energy consumption costs are set at a fixed rate in their contract with the facility. Consequently, under these conditions, tenants do not benefit from energy efficiency.[5]
- **Hyperscale facilities** are primarily owned by large technology companies and are used to run large-scale IT services such as AI workloads. Approximately 50% of these facilities are owned by Amazon, Microsoft, and Google. Hyperscale facilities are particularly important when it comes to grid management, as they are expected to be the source of 70% of data center growth by 2030.[6]

Data Center Efficiency and Energy Usage

Data center energy efficiency is most commonly benchmarked using the Power Usage Effectiveness (PUE) calculation. PUE is calculated by dividing the total data center facility energy usage by the computing equipment energy usage (servers, storage, and networking). The more efficient a site is, the larger the percentage of its IT power to total power will be, and the lower the PUE will be. The primary non-IT data center power uses, in order of largest to smallest, are cooling, electric losses, and lighting. Facilities primarily reduce their PUE by increasing the efficiency of their cooling systems. Large colocation and

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5 Chi, Ce. March 2021. *Improving Energy Efficiency in Colocation Data Centers for Demand Response*. https://www.sciencedirect.com/science/article/abs/pii/S2210537920301992

6 McKinsey & Company. August 8, 2025. "The Data Center Balance: How US States Can Navigate the Opportunities and Challenges." https://www.mckinsey.com/industries/public-sector/our-insights/the-data-center-balance-how-us-states-can-navigate-the-opportunities-and-challenges

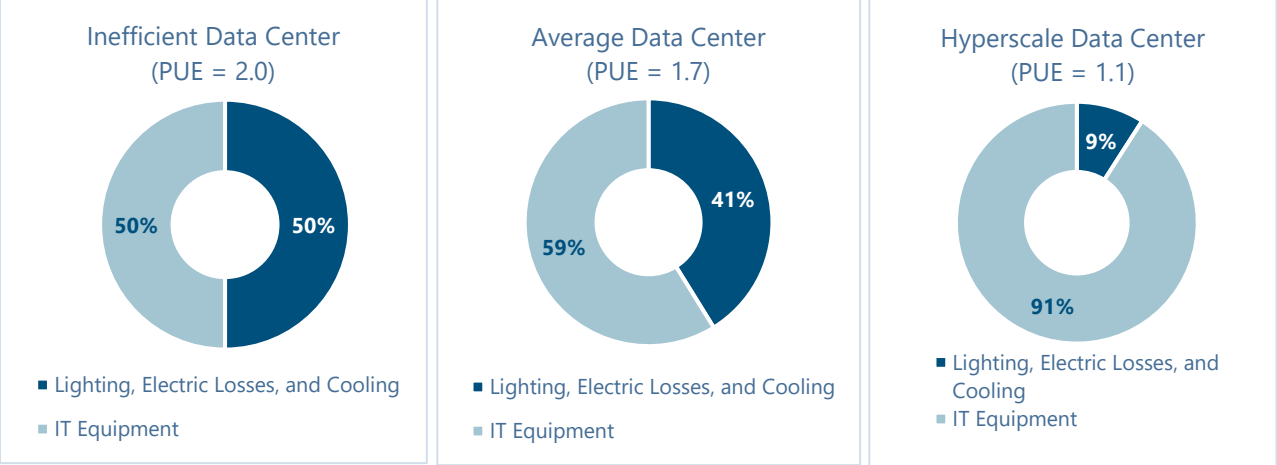
hyperscale facilities are the most efficient data center types, with PUEs around 1.1 or 1.2. Table 2 shows the average PUE for four of the largest hyperscale companies.[7]

Table 2. Hyperscale Average PUE

Company	PUE (avg)	Global Data Centers
Microsoft	1.18	~300+
Amazon Web Services	1.14	~125+
Google	1.10	37
Meta	1.09	24

Inefficient data centers, such as older enterprise facilities, have PUEs of approximately 2. For these facilities, as shown in Figure 2, their total load is split between IT and other sources. Average PUE for non-hyperscale data centers, including many colocation facilities, is approximately 1.7.[8] For these facilities, IT equipment comprises the majority of the load, but lighting, electric losses, and cooling are still significant. As shown in Figure 2, for hyperscale facilities, non-IT power is approximately 9% of total facility power usage.

Figure 2. Data Center End Use by PUE



7 Berger, Adam. May 2025. *Artificial Intelligence Data Centers and United States Based Hyperscalers: Impacts and Solutions*. https://jscholarship.library.jhu.edu/server/api/core/bitstreams/18baa7b6-0e0f-4473-9b5c-eab214ea8176/content

8 National Renewable Energy Lab. Accessed October 2025. "High-Performance Computing Data Center Power Usage Effectiveness." https://www.nrel.gov/computational-science/measuring-efficiency-pue

Determinants of Data Center Siting

As shown below in Table 3, companies consider a complex set of factors when determining where to site a large data center.[9] Regulatory considerations, especially the interconnection process, have become increasingly important as AI has rapidly increased the demand for data center capacity. Currently, many regions have extensive interconnection queues that include many proposed data center projects. However, the rush to add data center capacity has led to many companies submitting more data center applications than they will ever build in a bid to increase their likelihood of having an application approved. This surge of speculative applications has created uncertainty for both grid and utility planning.[10]

Table 3. Data Center Siting Considerations

Factor	Description
Power Availability and Reliability	Proximity to robust power grids and substations minimizes costs
Connectivity and Network Infrastructure	Proximity to network infrastructure ensures low latency and reliable data transfer
Natural Disaster Resilience and Climate	Earthquakes, floods, and hurricanes (amongst others) threaten reliability, while colder climates lower cooling costs
Regulatory Environment and Incentives	Policies, tax incentives, streamlined permitting process, and renewable generation
Water Accessibility	Similar to power availability - a 50 MW site might need ~200 million gallons of water per year
Fuel Supply for Backup Generation	Abundant natural gas or other alternative fuels reduce the cost of backup power
Buildable Land and Workforce Considerations	Adequate land and qualified labor needed for construction and maintenance

Wisconsin Data Centers

Wisconsin's data center landscape is evolving rapidly. Data presented in this section represents information publicly available as of November 2025. Wisconsin has between approximately 30 and 50

[9] Ahrabi, R.R., A. Mousavi, E. Mohammadi, R. Wu and A. K. Chen. April 2025. *AI-Driven Data Center Energy Profile, Power Quality, Sustainable Sitting, and Energy Management: A Comprehensive Survey,* 2025 IEEE Conference on Technologies for Sustainability (SusTech), Los Angeles, CA, USA. https://ieeexplore.ieee.org/document/11025802

[10] Giacobone, Bianca. March 26, 2025. *Phantom Data Centers are Flooding the Load Que*. https://www.latitudemedia.com/news/phantom-data-centers-are-flooding-the-load-queue/

data centers.[11] Smaller facilities have power access of less than 1 MW, while the largest facilities have power access of around 50 MW.[12] As shown in Table 4, each of the four hyperscale facilities planned for Wisconsin has a much higher demand than any of the facilities currently operating in the state. The largest hyperscale facility (owned by Vantage Data Centers) is expected to have 3.5 GW of demand. Together, these four hyperscale facilities could add at least 4 GW of load to Wisconsin's grid by 2030. Analysis of U.S. Energy Information Administration generation data shows that this added demand is approximately 20% of Wisconsin's 2024 nameplate peak generation capacity and that it exceeds the approximately 3 GW of proposed peak generation as of 2024.[13] Consequently, as shown in Figure 4, We Energies and Invenergy are both proposing to build gas power plants to meet the demand of these new facilities. These four hyperscale facilities, as well as the colocation facilities discussed above, are all concentrated in southeastern Wisconsin.

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[11] Estimates vary by source. Wisconsin Public Radio reports there are 45 data centers in the state, the Wisconsin Bar reports there are 32, and datacenters.com there are 25 colocation facilities in the state.

Wisconsin Public Radio. Accessed October 2025. "Report Says Growing Demand from Data Centers, Industry Could Stress Great Lakes Water." https://www.wpr.org/news/report-growing-demand-data-centers-industry-great-lakes-water.

Wisconsin Bar. November 19, 2025. "Thirsty Data Centers: Does Wisconsin Have Enough Water?" InsideTrack, vol. 17, no. 41. https://www.wisbar.org/NewsPublications/InsideTrack/

[12] DATACENTERS.com. Accessed October 2025. "States with Data Centers." https://www.datacenters.com/locations/united-states/Wisconsin

[13] Department of Energy Office of Electricity. Accessed October 2025. "EIA-860 Data." https://openenergyhub.ornl.gov/explore/dataset/eia-860-data/information/

Table 4. Wisconsin Hyperscale Facilities

Owner	Location	Cost	Size	Demand	Status	Details
Microsoft[14]	Mount Pleasant	Pledged to invest $3.3 billion in WI by 2026	1.1 million sq ft	450 MW[15]	Under Construction	Phase 1 to be completed in early 2026. Taking advantage of infrastructure from failed Foxconn LCD factory. **We Energies proposed a $2 billion gas plant to meet demand.**
	Kenosha		1 million sq ft[16]	Unclear	Construction yet to begin	Land purchased in early 2025. Construction timeline TBD. **1.2 GW natural gas power plant proposed in September 2025 by Invenergy for 2030 completion.**
Vantage Data Centers, Open AI, and Oracle	Port Washington	$15 billion	83 million sq ft	3.5 GW[17]	Construction yet to begin	Construction started in fall 2025. One of the largest data center complexes in the country. Joint venture between Oracle and OpenAI: 11 data center buildings, five substations, and three office buildings planned. **We Energies to bring a 1.3 GW natural gas power plant online by 2027 to support project.**
Meta	Beaver Dam	$1 billion	0.7 million sq ft[18]	Unclear	Construction yet to begin	Timeline TBD

[14] In October 2025, Microsoft canceled plans for a third data center in Caledonia, Wisconsin after community opposition to the facility emerged. Microsoft stated that it plans to work on identifying another site in Wisconsin for this facility.

Data Center Dynamics.com. Butler, Georgia. October 10, 2025. *Microsoft cancels plans for data center in Caledonia, Wisconsin.* https://www.datacenterdynamics.com/en/news/microsoft-cancels-plans-for-data-center-caledonia-wisconsin/

[15] Wisconsin Public Radio. May 13, 2025. "Power-hungry data centers are promoting new gas plant proposals. Critics say that would lock in pollution and higher costs for decades." https://www.wpr.org/news/power-wisconsin-data-centers-gas-plants-pollution-higher-costs

Wisconsin Data Center Policies and Regulations

Data Center Sales Tax

Since 2023, Act 19 has incentivized data center companies to build in Wisconsin through a sales tax exemption that excludes the company from being taxed on certain purchases if they invest the following:[19]

- $150 million in counties with over 100,000 residents
- $100 million in counties with 50,000 to 100,000 residents
- $50 million in counties with fewer than 50,000 residents

Many equipment types that data center energy efficiency programs often target are covered by this tax exemption. The list of equipment includes chillers, cooling systems, air handling units, fans, and universal power supplies. Wisconsin is one of approximately 20 states (highlighted **green** in Figure 3) that offer data center tax incentives.[20]

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16 Kenosha Area Business Alliance (summary from *Milwaukee Business Journal*). January 27, 2025. "Microsoft plans 1 million-square-foot data center in Kenosha." https://www.kaba.org/news-item/microsoft-plans-1-million-square-foot-data-center-in-kenosha/

17 $8 billion for phase 1 and $15 billion overall.

ENR Midwest. November 3, 2025. "Construction Team Chosen for First Phase of $15B Wisconsin Data Center Campus." https://www.enr.com/articles/61793-construction-team-chosen-for-first-phase-of-15b-wisconsin-data-center-campus

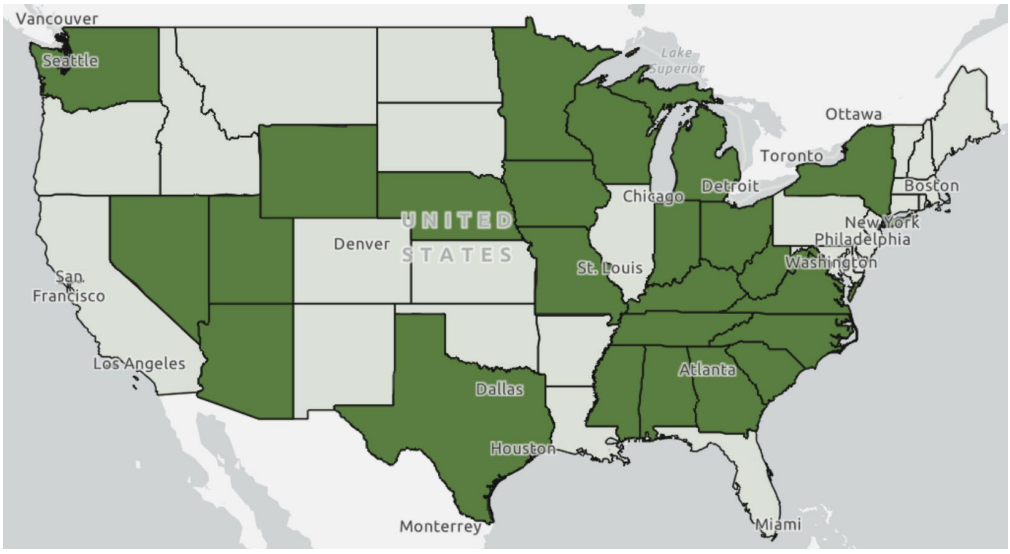
18 Meta. November 12, 2025. "Hello, Beaver Damn." https://datacenters.atmeta.com/2025/11/hello-beaver-dam/

19 Wisconsin Department of Revenue. July 31, 2024. "Sales and Use Tax Exemption for Qualified Data Centers." https://www.revenue.wi.gov/DOR%20Publications/2114QualifiedDataCenter.pdf

20 Note that it was outside the scope of work for this project to compare the tax incentive levels. Tax incentive data come primarily from the following source, with additional data added on an *ad hoc* basis.

SDIA. Accessed October 2025. "US tax incentives for data centers by state." https://knowledge.sdialliance.org/8d367baa340046029912b1e04cc89ec2

Figure 3. States with Data Center Tax Incentives



Data Center Efficiency Standards

In September 2025, Wisconsin adopted the International Energy Conservation Code (IECC) 2021, which includes the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) standard 90.4 covering data center energy efficiency.[21] Specifically, IECC 2021 covers ASHRAE 90.4 mechanical and electric sections. With the adoption of 90.4, there is less potential for data centers to achieve efficiency levels that are above code. However, IECC brings with it compliance to ASHRAE 90.4 2016 and not ASHRAE 90.4 2022, which requires data centers to meet even higher efficiency standards.

We Energies Data Center Rate

Utilities across the country are grappling with how to accommodate large data center facilities while not burdening other ratepayers with the cost of connecting or serving these customers. We Energies' proposed rate requires customers over 500 MW to pay for the new generation resources, distribution infrastructure, and transmission infrastructure required to meet their demand. Additionally, the rate would give We Energies the power to curtail energy to customers over 500 MW in times of grid strain.[22]

Similar rates have been proposed across the country. Other rates attempt to ensure that the utility will be able to cover the costs of bringing energy to a data center by requiring the data center to pay, at a

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[21] Wisconsin Department of Safety and Professional Services. Accessed October 2025. "Updates to the WI Commercial Building Code (CBC)." https://dsps.wi.gov/Pages/Programs/CommercialBuildings/Default.aspx

[22] Wisconsin Public Service Commission. Received October 10, 2025. *Direct Testimony of Richard Stasik on Behalf of Wisconsin Electric Power Company*. Docket No. 6630-TE-113. https://apps.psc.wi.gov/ERF/ERFview/viewdoc.aspx?docid=564348

minimum, a certain percentage of the power that the facility says it will need each month, regardless of whether it actually uses that much power. For example, in Ohio, data centers are required to pay for at least 85% of the power that they say they will need each month (referred to as "take or pay").

Data Center Programs

The evaluation team reviewed utility filings and materials from across the Midwest and nationally to understand how Focus on Energy's peers are addressing data center energy efficiency. Many large Midwest utilities cover data centers under their existing custom, prescriptive, and new construction business programs (Table 5). At this time, Xcel Energy Minnesota is the only Midwest utility that offers a dedicated data center program. The following section presents insights from Xcel Energy, ComEd, and Consumers Energy's efficiency efforts.

Table 5. Midwest Utility Data Center Energy Efficiency Programs

Utility and State	Data Center Offerings?	Dedicated Program(s)	Program Offerings
MN - Xcel Energy	Yes	Yes	• Standalone prescriptive program and new construction design/siting assistance program • Public reporting and planning available
IL - ComEd	Yes	--	• Data centers covered under the custom program • Public reporting available
MI - Consumers	Yes	--	• Covered by business prescriptive and custom offerings • Public testimony available
IL & IL - MidAmerican	Yes	--	• Data centers covered under the new construction program—equipment incentives and energy savings modeling
IA - Alliant	Yes	--	• Data centers covered under new construction program—equipment incentives and energy savings modeling
MI - DTE Energy	Yes	--	• Some data center equipment included in the prescriptive program
KS & MO - Evergy	Yes	--	• Some data center equipment included in the prescriptive program
IL & MO - Ameren	Yes	--	• Some data center equipment included in the prescriptive program

Xcel Energy Minnesota

Xcel Energy provides prescriptive and custom data center measures and incentives for data center siting and design studies. Xcel Energy has run a data center energy efficiency program since at least 2012.[23] In

[23] Xcel Energy. June 1, 2012. *Minnesota Electric and Natural Gas Conservation Improvement Program.* Docket No. E,G002/CIP-12-447. https://www.xcelenergy.com/staticfiles/xe/Regulatory/Regulatory%20PDFs/MN-DSM/MN-DSM-2013-2015-CIP-Triennial-Plan.pdf

its 2024-2026 DSM plan, Xcel expanded the program to target 10-15 GWh of savings annually, instead of the 6 GWh of annual savings targeted in its previous plan, and to include incentives for load flexibility. Load flexibility incentives were added with the explicit goal of "optimizing customers' usage to produce bill savings and reduce electric system costs."[24] The program primarily serves enterprise and colocation facilities and makes up roughly 2% of the utility's business DSM budget. In 2024, the program significantly underperformed relative to its goals, achieving only 2% of its participation goal and only 1% of its energy savings goal while spending 9% of the program's budget (Table 6).[25]

Table 6. Xcel Energy Minnesota 2024 Data Center Program Performance

2024	Participants	Budget	Gen Demand Savings (kW)	Gen Energy Savings (GWh)
Target	91	$1,236,777	922	15
Actual	2	$112,896	15	0.16
% of Goal	2%	9%	2%	1%

Xcel Energy's 2024 evaluation report explained that "Staff turnover, long sales cycles, the AI boom, along with continued supply chain and economic challenges have impacted the ability of customers to implement improvements and gain business justifications within defined financial timelines."[26]

Xcel Energy's planning data shows that the utility expected most of its savings and participation to come from prescriptive or implementation measures (measures recommended based on data center design studies) from motor or cooling projects (Figure 4). Xcel Energy also expected new construction measures shown as EDA (Early Design Assistance) in the figure to make up only a small portion of program savings and participation, budgeting $50,000 for data center load shifting and anticipating two participants between 2024 and 2026. However, this measure is largely theoretical and meant to incentivize technologies that might emerge during the 2024-2026 cycle.

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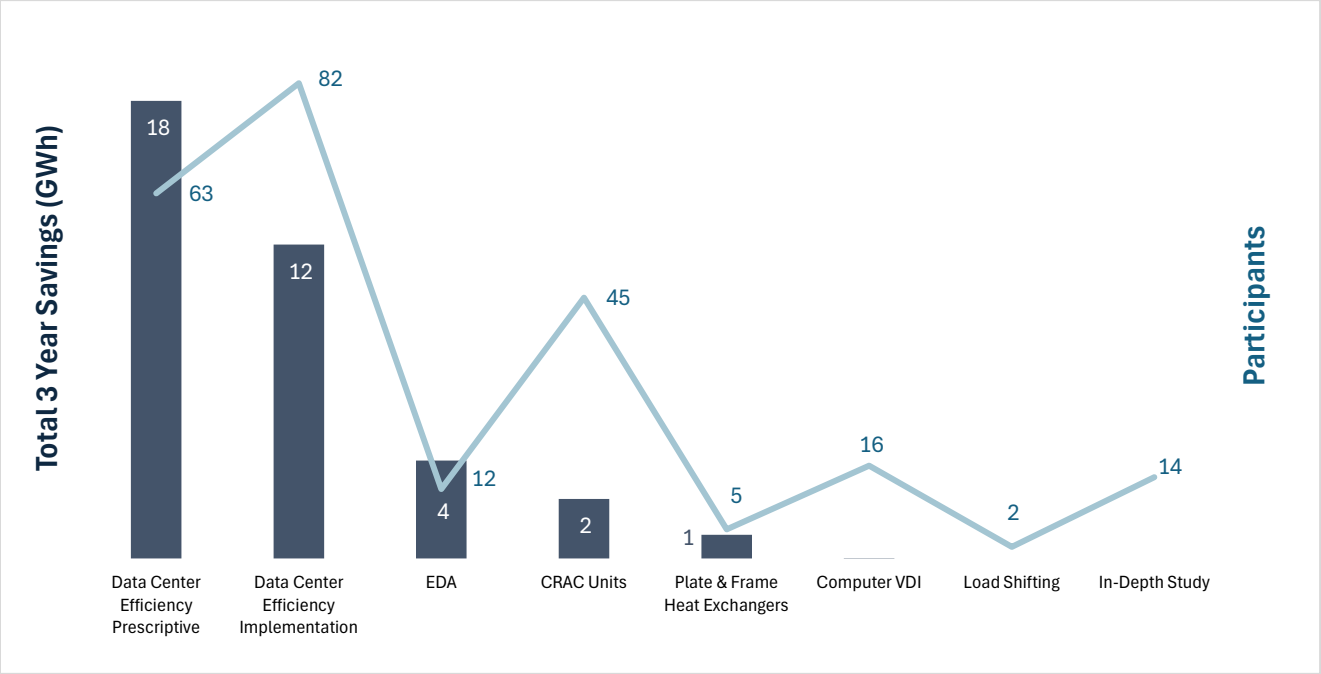
[24] Xcel Energy. June 29, 2024. *Minnesota Electric and Natural Gas Energy Conservation and Optimization Program.* Docket #E,G002/CIP-23-92. https://www.xcelenergy.com/staticfiles/xe-responsive/Company/Rates%20&%20Regulations/23-92%20-%202024-2026%20MN%20Triennial%20Plan%20062923.pdf

[25] Xcel Energy. April 1, 2025. *Letter from Jessica Peterson to Deputy Commissioner Wyckoff and Mr. Seuffert: Re 2024 Energy Conservation and Optimization Consolidated Filing.* Docket Nos. E, G002/CIP-23-92, E002/M-25-50, and G002/M25-47. https://xcelnew.my.salesforce.com/sfc/p/#1U0000011ttV/a/R3000005SWoa/i3UeIgvecEiRLArSFuoyRf8.Y0PhSYrhgX9vSVIqxHc

[26] Ibid.

Figure 4. Xcel Energy 2024-2026 Project Savings and Participation



Xcel Energy's focus on cooling projects is largely in line with anecdotal and reported evidence from other utilities where cooling and electricity loss reduction measures have comprised the majority of savings. While IT load is the majority of load at large facilities, especially hyperscale, companies are highly risk-averse and may be less willing to adapt their IT systems to prioritize energy efficiency for fear that doing so may compromise system performance or reliability.

Xcel Energy Minnesota assumes a net-to-gross (NTG) of one for all data center measures.

ComEd

ComEd offers small to medium and colocation data center energy efficiency incentives through its Business Custom Program. ComEd's 2024 NTG evaluation showed very high freeridership (0.94) for the one large new construction data center in the portfolio and found that freeridership was higher for other data center projects (0.51) compared to non-data center custom projects (0.37) (Table 7).[27] For both data center groups, spillover was determined to be negligible. While ComEd's data center new construction freeridership was particularly high in 2024, freeridership values for both new construction and other data center projects in past years appear to be lower on average than non-data center custom projects.

[27] Guidehouse. Buege, Amy and Kumar Chittory (Verdant). September 16, 2024. *Net-to-Gross Research Results for the ComEd Custom Program and Data Center Subprogram – Final.* https://www.ilsag.info/wp-content/uploads/ComEd-Custom-NTG-2024-Memo-2024-09-16-FINAL.pdf

Table 7 ComEd 2024 NTG Findings

Measure Type	Freeridership	NTG Ratio
Data Center New Construction	.94	.06
Data Center Other	.51	.49
Non-Data Center Custom Project	.37	.63

Consumers Energy

Like ComEd, Consumers Energy has offered custom incentives for new and existing data centers (focusing mainly on variable frequency drives and cooling units).[28] However, Consumers Energy is proposing to exclude data centers from its new Energy Waste Reduction plan.[29] Consumers Energy claims that the company will not be able to achieve its mandated 2% savings goal cost-effectively if data centers are included in the customer pool from which the company is required to achieve these savings. Like Wisconsin, Michigan is switching to IECC 2021, and data centers are required to comply with green building standards if they want to receive Michigan's data center tax incentives. Consumers Energy claims that both standards make it harder for the company to achieve higher than baseline efficiency. Additionally, Consumers Energy claims that data centers are already often designed for energy efficiency before engaging with the utility.[30]

> "Data centers are often optimized for energy efficiency from the outset. These facilities are often designed to incorporate advanced energy management technologies prior to engaging with the utility." – *Direct testimony from Consumers Energy, August 1, 2025*

National Perspectives on Data Center Energy Efficiency

Within the Midwest, the efficacy of data center energy efficiency measures appears mixed. In the southwest, both Rocky Mountain Power Utah and Arizona Public Service (APS) have achieved 30 GWh and 40 GWh of annual savings, respectively, from their data center programs as reported in the Southwest Energy Efficiency Project's (SWEEP) 2025 data center report.[31] Savings for both utilities have come almost

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28 Consumers Energy. Accessed October 2025. *2026 Incentive Application: Consumers Energy Business Energy Efficiency Programs*. https://www.clearesult.com/partner-hub/program-resources/consumers-energy-business/Incentive-Application

29 Consumers Energy. August 1, 2025. *Application for Approval of Consumers Energy Company's 2026-2029 Energy Waste Reduction Plan*. Case No. U-21680. https://mi-psc.my.site.com/sfc/servlet.shepherd/version/download/068cs000012xvwmAAA

30 Ibid.

31 Southwest Energy Efficient Project. Kolwey, Neil and Howard Geller. March 2025. *Data Centers: Power Needs and Clean Energy Challenges.* https://www.swenergy.org/wp-content/uploads/SWEEP-data-center-report-2025_3_27.pdf

exclusively from cooling and uninterruptible power supply (UPS) measures. Rocky Mountain Power's program targets "off-brand" new data centers (not Google, Microsoft, or Amazon Web Services), some of which are on the scale of 100 to 200 MW in size. SWEEP's report does not detail the facilities targeted by APS, but in APS territory, 90% of the facilities are colocation, and there are no hyperscale or data centers run by large tech companies. APS uses an NTG value of one for all data center energy efficiency projects.

SWEEP concludes in its report that utilities should offer incentives for large data centers. Given that none of the efficiency programs discussed in the report include hyperscale data centers, SWEEP is likely referring to "off-brand" data centers run by colocation companies as opposed to data centers owned by the large tech companies, such as those being built in Wisconsin, that are generally much larger and less cash-constrained. Additionally, SWEEP's advice may not generalize to utilities subject to NTG adjustments.

> "Utilities should offer energy efficiency programs for large data centers. We recommend offering design assistance to new data centers and custom incentives for retrofits to existing data centers, focusing on cooling systems and uninterruptible power supply (UPS) systems."
> *– 2025 SWEEP Data Center Report*

On the other hand, the American Council for an Energy-Efficient Economy (ACEEE) recommends that utilities use incentives sparingly.[32] ACEEE takes a very similar position to Consumers Energy, arguing that facilities already have both the incentives and the resources to invest in energy efficiency themselves.

> "The data center industry is well capitalized and has incentives to invest in energy efficiency to better assure power availability, reduce costs, and improve its image. Thus, incentives should probably be used sparingly."*– 2025 ACEEE report*

Other utilities outside of the Midwest offer data center energy efficiency measures (Table A-1). Most utilities offer these incentives as a subprogram of their business programs, instead of as a standalone program, such as Xcel Energy Minnesota.

Lastly, while cooling, electrical losses, and lighting measures have been the focus of data center energy efficiency programs, factors outside of what utilities might incentivize are also expected to impact data center energy efficiency. In particular, improvements in AI model efficiency are expected to create significant improvements in data center energy efficiency.[33]

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[32] American Council for an Energy Efficient Economy (ACEEE). October 7, 2025. "Data Center Efficiency and Load Flexibility Can Reduce Power Grid Strain and Costs." https://www.aceee.org/blog-post/2025/10/data-center-efficiency-and-load-flexibility-can-reduce-power-grid-strain-and

[33] According to ACEEE's 2025 report, the energy efficiency potential from improving AI model efficiency (such as DeepSeek) is on the same magnitude as efficiency gains from hardware improvements.

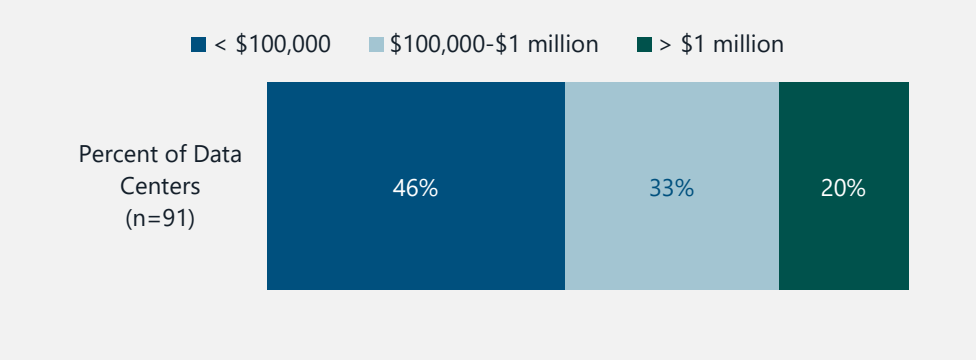
Data Center Load Flexibility

The evaluation team did not identify any utility-run data center load-flexibility programs. Data centers have extremely high uptime requirements and, unlike many manufacturing and other industrial customers, they are largely expected to run nonstop 24/7 for 365 days/year. Consequently, facilities are averse to taking servers offline for any period. This issue can be further complicated in colocation facilities where the facility owner has a legal obligation to their tenants to ensure that their servers are running a certain percentage of the time.

Large data centers have backup generation, mostly diesel, that meets at least 100% of their load (backup generation is often oversized). Utilities could have data centers switch to backup power; however, as one RTO staff member put it, "We simply can't put enough money in front of them to make it worth it, and most facilities have very strict limits (100 hours or less) on how often they can run their backup power." As a result of this yearly cap, data centers are extremely reticent to use their backup generation unless it is necessary. Consequently, instead of incentivizing data center load flexibility, some utilities, such as We Energies, are incorporating requirements for load flexibility into data center rates.

A recent survey of data center owners (Figure 5)[34] showed that for 20% of data centers, an outage will cost at least $1 million.

Figure 5. Data Center Outage Costs



However, there are a few ways in which data center load flexibility may be facilitated:

- **Virtual redundancy:** Data centers are increasingly adopting virtual redundancy, where processes can be shifted from one site to another if needed. Virtualization may be leveraged during times of grid strain if the data center providing virtual redundancy is located outside of the region under strain.

[34] Uptime Intelligence. July 2024. *Uptime Institute Global Data Center Survey 2024*. https://datacenter.uptimeinstitute.com/rs/711-RIA-145/images/2024.GlobalDataCenterSurvey.Report.pdf?version=0

- **Data centers dedicated to non-time-sensitive tasks:** Data centers dedicated to AI training (which makes up approximately 20% of total AI load) do not provide services to external customers and may be willing to delay non-critical jobs to provide grid flexibility.
- **Technical improvements:** Data center technology is progressing rapidly, and interviewees expressed optimism that new technologies, namely processor chips that can curtail their energy usage for a certain period of time, will help to facilitate flexibility.

During the drafting of this memorandum, Axios released an article on Nvidia and Emerald AI's deployment of the first commercial load shifting software for data centers at a 96 MW facility in Virginia.[35]

Energy Efficiency's Impact on Data Center Demand

While in some contexts energy efficiency creates sustained demand reductions, it is unlikely to do so in the context of large data centers. For new construction facilities, capacity freed up by efficiency gains in the initial design phase will likely simply be used to accommodate additional computing equipment.[36] For existing facilities, efficiency gains might not immediately be used to accommodate additional computing equipment, but in time, they are likely to be used to accommodate additional computing resources. A number of articles point to AI being an example of Jevons Paradox,[37] where efficiency improvements can lead to increased overall consumption of a resource, rather than conservation (i.e., as AI gets more efficient and cheaper, demand for it will explode).

> "Energy efficiency in general is an important goal for the data center industry, but efficiency improvements are unlikely to reduce the industry's overall energy demand."
>
> As one company representative noted "At the end of the day, a 200 MW data center is going to be a 200 MW data center." – *Report to the Governor and General Assembly of Virginia*

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35 Harder, Amy. October 29, 2025. "1 Big Thing: Exclusive - New Data Center Tech Aims to Temper Energy Strain." https://www.axios.com/newsletters/axios-future-of-energy-dcfe6510-b3fe-11f0-a4d4-79238329ed14.html?chunk=1&utm_term=emshare#story1

36 Virginia Joint Legislative Audit and Review Commission. December 9, 2024. *Report to the Governor and the General Assembly of Virginia: Data Centers in Virginia 2024*. https://jlarc.virginia.gov/pdfs/reports/Rpt598.pdf

37 New York Times. Smith, Talmon Joseph. Last modified March 10, 2025. *DeepSeek Doesn't Scare OpenAI, Thanks to the 'Jevons Paradox. '*https://www.nytimes.com/2025/02/14/business/deepseek-openai-jevons-paradox.html, https://arxiv.org/pdf/2501.16548

Engaging Data Centers

Timing

For new construction projects, especially, it is essential for utilities to get involved as early as possible. The rush to market is so intense that delaying a data center is a nonstarter. As one implementer emphasized, "They don't care about a $200,000 incentive when they have a customer who needs the data center online by a certain date."

Getting involved early allows for logistical hurdles to be cleared and for the implementer to work with the design team to incorporate efficiency measures. This is important not only at the start of facility construction, but also as subsequent phases of the data center are built out, as is often the case with larger facilities. In the case of colocation facilities, the timing of expansion phases is determined by the amount of capacity that tenants contract for the facility. As this contracted capacity begins to approach the initial built capacity, the colocation owner will look to expand the facility's server space.

Messaging

Interviews, as well as past research, emphasize that reliability is of the highest concern to data centers.[38] Data center operators in APS territory reported that reliability and upholding service level agreements were their most important operating objectives.[39] In a recent survey of data center operators, respondents rated energy efficiency as the least important of the five organizational priorities they were asked about (Figure 6).

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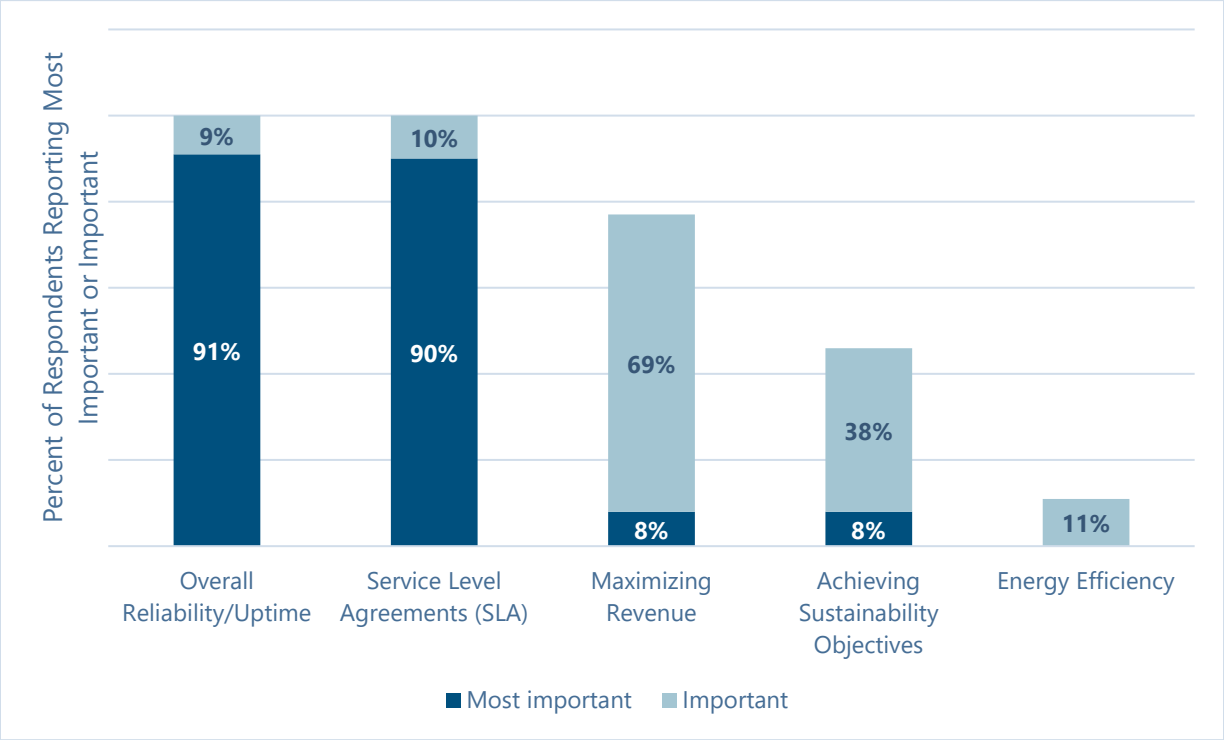
[38] Newkirk, A.C., Hanus, N. & Payne, C.T. April 17, 2024. "Expert and operator perspectives on barriers to energy efficiency in data centers." *Energy Efficiency* 17, 63. https://doi.org/10.1007/s12053-024-10244-7

[39] Service level agreements dictate the terms under which a facility provides power to its tenants. Such agreements specify uptime, temperature, and network performance levels amongst other criteria.

Figure 6. Data Center Organizational Priorities (n=19)[40]



Consequently, messaging should emphasize how energy efficiency upgrades will not negatively impact reliability and uptime.

> "We have found that it is important to make our proposals as simple as possible and to show that it won't impact reliability in order to build customer confidence in the project."
> *– Implementer*

Coordination

Data center facilities are highly complex, and energy efficiency projects are likely to require buy-in from multiple groups, such as IT, engineering, design, and contractors. As noted above, getting involved early in new construction projects can help to make sure that all the required parties can engage early enough to avoid project delays.

[40] Chart is adapted from a forthcoming report from Tierra Consulting and Guidehouse on behalf of APS.

"HVAC is 50% to 60% of energy, which is influenced by server load. Getting the HVAC and facility designers together with the IT team early on will reduce a lot of development costs and speed up the timeline." – *Implementer*

Additionally, data centers often have preferred vendors that they trust to make equipment recommendations. Often, these vendor relationships are built on personal relationships and have a strong influence on a data center's purchasing decisions.[41] By working with the data center's existing vendor to make energy efficiency recommendations, utilities can increase data centers' trust in their recommendations.

"Vendors are the key determinant of product specification, vendor choice is durable, and vendor selection is built on personal relationships." – *Newkirk, Hanus, and Payne 2024*

Recommendations

The evaluation team offers the following recommendations for Focus on Energy to expand its data center efforts:

1. **Start with Conservative Savings Goals**
    a. Data center program performance appears to be a "mixed bag." Prominent Midwest programs have underperformed in recent years due to low NTG (ComEd) and low participation levels (Xcel Energy Minnesota).
    b. Conservative savings goals will help to mitigate the risk that lower-than-expected data center savings affect the larger portfolio. In other words, if data center savings targets remain modest, then underperformance in this area will have minimal impact on whether or not Focus on Energy's ability to meet its overall portfolio goals.
2. **Target Smaller Enterprise and Colocation Facilities**
    a. While the size of these facilities does not grab headlines, they are likely to have more room for efficiency improvements. Financial incentives may be more impactful to their owners.
    b. Hyperscale facilities risk high freeridership due to their high baseline efficiency and lack of financial or technical barriers.
3. **Provide Support for Retrofit/Retro-Commissioning and New Construction Studies**
    a. As emphasized by one implementer, the program's technical influence may be more important than its financial influence when working with cash-rich data centers.

[41] Newkirk, A.C., Hanus, N. & Payne, C.T. 2024. Expert and operator perspectives on barriers to energy efficiency in data centers. *Energy Efficiency*. vol. 17: 63. https://doi.org/10.1007/s12053-024-10244-7

> "There is always financial influence, but we emphasize our technical influence and our ability to show data centers how they can reach a higher efficiency more quickly than they thought."
>
> *– Implementer*

   b. Emphasizing Focus on Energy's role in this area may mitigate evaluation risk.

4. **Create a Program Structure That Meets Data Center Development and Technology Speeds**
   a. Pre-approval can be particularly important for fast-moving data center projects.
   b. Data center technology is changing quickly, and incentive offerings should be flexible enough to accommodate this - both within a project and over time.
      i. Focus may explore partnering with data center equipment vendors (e.g., HVAC, uninterruptible power supplies, and IT equipment) to make sure that their product recommendations include the newest efficiency technologies.

> "At the beginning of the project they expected rack capacity to be 40 kW but between 2023 and now they have gone through four redesigns and expect to be at 200 kW per rack by the end of the year." – *Implementer*

Ultimately, the AI boom has caused data center energy management to rapidly become a pressing issue for utilities across the U.S. Our research shows that to date, utilities have a mixed track record of incentivizing data center energy efficiency. In the Midwest, some utilities have struggled to find cost-effective savings that bring new data centers above code, and others have struggled with lower participation and higher freeridership. In other areas of the country, where utilities claim gross savings, such as Arizona and Oregon, utilities have been able to claim significant savings from data centers in energy efficiency. Given Wisconsin's commercial building codes and NTG evaluation requirements, it is more likely that Focus on Energy would achieve modest savings from targeting data center energy efficiency as opposed to the higher savings seen outside the Midwest for utilities that have different commercial building codes or evaluation requirements. Incentivizing energy efficiency at hyperscale facilities, which are driving data center demand growth in Wisconsin, may be particularly difficult given the technical expertise and resources of the companies building these facilities and their scale. Savings opportunities are likely greatest for projects at smaller facilities that focus on cooling system efficiency or reducing electrical losses. Note that this market is rapidly evolving with new technologies (e.g., the load management chips and software referenced above), and new energy efficiency and load management opportunities may become available in the future.

Appendix A. Additional Supporting Data

Figure A-1 shows the location of the Wisconsin hyperscale data center facilities, all of which are in the southeast portion of the state.

Figure A-1. Wisconsin Hyperscale Locations

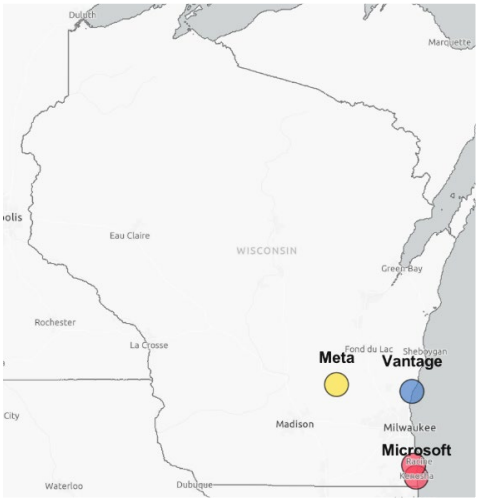


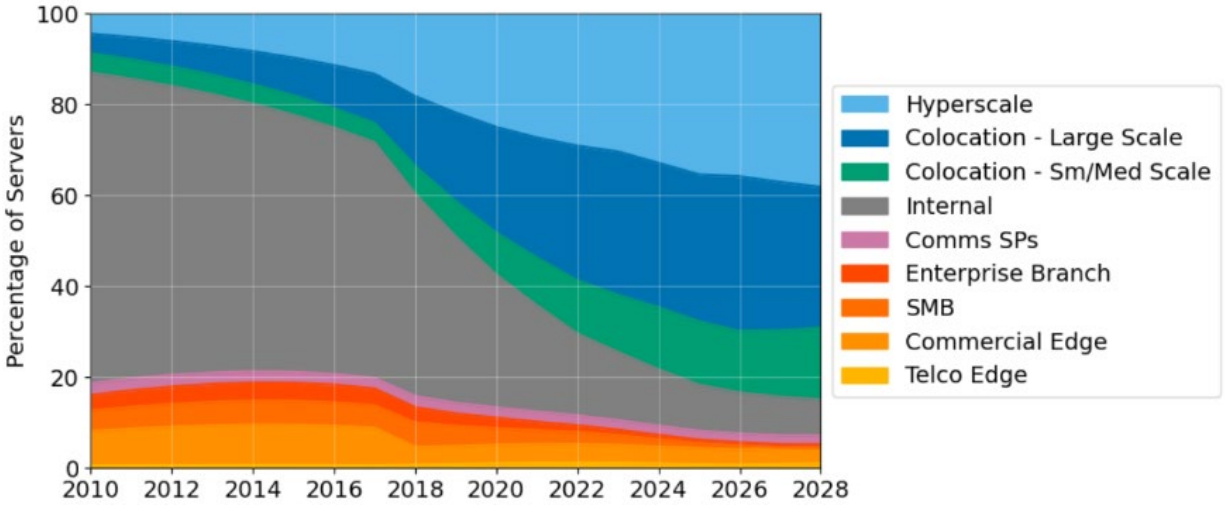
Table A-1 provides additional information about utility programs outside of the Midwest.

Table A-1. Utility Programs Outside of the Midwest

Utility	Program Name(s)	Program Description & Savings
Rocky Mountain Power - UT	Design Assistance Program	30 GWh annually Primarily targets cooling and UPS systems
APS - AZ	Design Assistance for New Data Centers and Custom Rebates + Retrofits	40 GWh annually (18% of business program) Primarily targets cooling and UPS systems
Xcel – CO	Data Center Efficiency & Data Center Design Assistance	Similar measures to Xcel MN <1% of Business Savings in 2024 | achieved 2% of DC target 1 participant in 2024
Energy Trust – OR	N/A – within commercial program	Prescriptive rebates for data center cooling equipment 2.6 GWh of savings (6% of 2021-2022 NC program)
Dominion - VA	Data Center Server Rooms	Launched a new "one-stop-shop" program similar to Xcel Energy's program Included in the update to the 2024 DSM plan Data center savings are not publicly reported
PGE – CA	N/A – within business program	High tech energy efficiency subprogram offering within the business program Data center savings are not publicly reported
SCE – CA	N/A – within business program	Three custom data center HVAC measures within the business program; data center savings are not publicly reported

Figure A-2 shows the national share of servers by data center type and shows the expected growth of hyperscale and colocation.

Figure A-2. National Share of Servers by Data Center Type[42]



[42] Lawrence Berkley Lab. Shehabi, Arman, Sarah J. Smith, and Alex Hubbard, et al. December 2024. 2024 *United States Data Center Energy Usage Report.* https://escholarship.org/uc/item/32d6m0d1