



## Legislative Council Staff

*Nonpartisan Services for Colorado's Legislature*

# Memorandum

February 26, 2026

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**SUBJECT:** Data Center Impacts on Public Health and Environment

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## Summary

Data centers are growing rapidly across the United States. They require large amounts of electricity for computational power and water to cool the computer systems. This memorandum explores the impacts of data centers on electricity, water, public health, and energy costs. It also covers recent federal and state legislation.

## Data Center Classifications

Data centers are physical facilities that house and run large computer systems. Data centers typically contain multiple computer servers, data storage devices, and network equipment that can provide IT infrastructure service for organizations to store, manage, process, and transmit large amounts of data. There are approximately [4,000 data centers in the U.S.](#), located primarily in Virginia, Texas, and California. Approximately [57 data centers are located in Colorado.](#)

There are several types of data centers, generally based on ownership or intended purpose. For example:

- **Enterprise data centers.** Private, on-premises data centers generally run by a large company. All IT infrastructure and data is hosted on-premises.
- **Managed data centers.** Also known as colocation data centers, these third-party facilities provide a shared rented space for organizations who may lack the space, staff, or IT resources to own and operate their own data centers.
- **Cloud (computing) data centers.** Data center resources are hosted by a cloud services provider (e.g., Amazon Web Services (AWS), Google Cloud Platform (GCP), Microsoft Azure, IBM Cloud). These types of online service providers operate geographically distributed and interconnected data centers, and allow multiple users to remotely access computing resources hosted by these data centers.
- **Edge data centers.** Smaller data centers operated and maintained by cloud computing service providers physically closer to users for a number of benefits, including reduced network latency and data communication delay, faster content distribution, optimized workloads, and improved application performance and user experience.
- **Hyperscale data centers.** Massive data centers that are designed to support very large-scale IT infrastructure, and so provide extreme scalability capabilities for purposes that include AI development, automation, and big data computing tasks. These facilities were developed in large part to address increasing demand for data storage and processing capacity.



The majority of computer servers nationwide (74 percent in 2024) were present in hyperscale and colocation data centers.

## Environmental Impacts of Data Centers

Data center servers require substantial energy to perform their computations, and this computing process can generate significant amounts of heat within the servers. They require extensive cooling systems to keep computer hardware from overheating and to maximize the systems' performance, stability, and life expectancy. There is significant uncertainty about the total environmental impact of data center development due both to the rapid and recent growth of the industry, as well as a lack of reporting around electricity and water usage. The environmental impacts of data centers are discussed below, within the scope of energy usage, greenhouse gas (GHG) emissions, and water consumption.

### Data Center Energy Usage

U.S. data center annual energy usage increased significantly in 2017 with the introduction of graphic processing unit (GPU)-accelerated servers<sup>1</sup> for artificial intelligence (AI) development. According to the [Grid Strategies 2025 load growth report](#), data centers are the largest driver of U.S. electricity demand growth. Other factors include electric vehicle adoption, onshoring of manufacturing, and the electrification of industry and buildings. The report notes that, when operating, an individual data center can consume over a gigawatt (GW) of power, which is equivalent to powering approximately 750,000 homes. While data centers tend to require energy steadily throughout the day, they can experience sudden, rapid changes in load that present unique challenges for grid planning.

A 2024 [report](#) from Lawrence Berkeley National Laboratory (LBNL) estimates historical data center electricity consumption back to 2014 and projects future demand out to 2028. From 2018 to 2023, data center energy consumption increased by approximately 100 terawatt-hours (TWh), representing a jump from 1.9 percent of total annual U.S. electricity consumption in 2018 to 4.4 percent in 2023. The report predicts that data centers would represent between 6.7 percent and 12 percent of total annual U.S. electricity consumption by 2028, depicted in Figure 1.

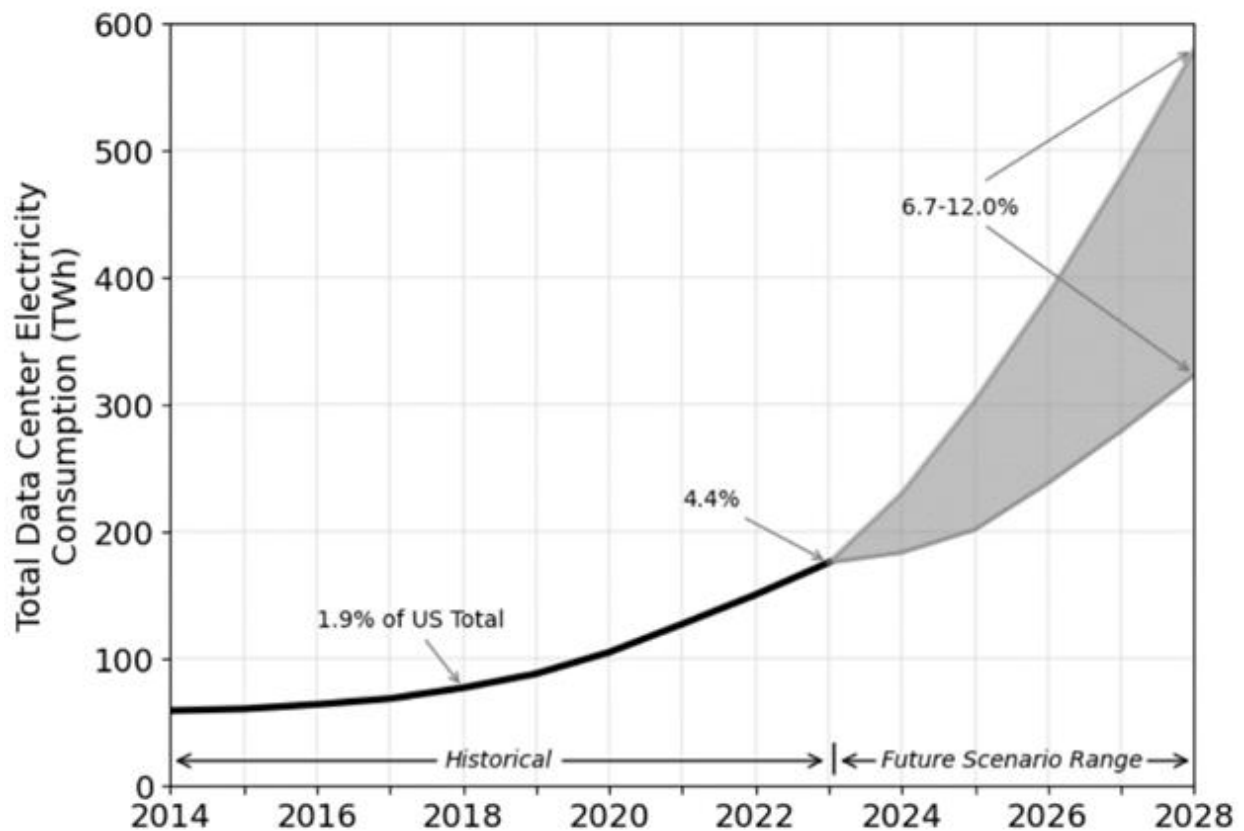
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<sup>1</sup> While central processing units (CPUs) - generally thought of as the "brains" of a computer - can perform the same types of functions, GPUs are divided into many more processing units (called cores) that can do many different complex computations in parallel. While GPUs were initially created to handle graphics rendering tasks in gaming and animation that CPUs could not handle, they are now used for use cases like deep learning and high-performance computing - tasks for which technology companies rely on data centers.



**Figure 1**

**Historical and Projected Energy Consumption by Data Centers**



Source: [LBNL 2024 United States Data Center Energy Usage Report](#)

Newer hyperscale data centers tend to consume more energy than older data centers due to their larger size and increased computational load. However, these newer facilities devote proportionally less energy to upkeep necessities like cooling, lighting, and power distribution, and proportionally more energy to useful computational tasks. This pattern of energy usage is more efficient, expressed by a better (lower) power usage effectiveness value (PUE).

### Data Center Water Use

IT equipment in data centers generates high heat, which can cause the equipment to malfunction or fail. To keep the equipment at optimal temperatures, data centers use cooling technologies, such as:

- **Refrigeration cooling.** Hot air is cooled in a compressor unit using air or water and circulated throughout the building. Examples include air-cooled chillers and water-cooled



chillers. Water-cooled chillers use cooling towers, which collect heat and then release this heat through evaporation. Cooling towers cause a large loss of consumptive, non-recyclable water to the atmosphere and leaving the immediate water system.

- **Free cooling.** This method takes advantage of outdoor ambient air or water to cool throughout the building. Examples include air-side economizers and water-side economizers. Air-side economizers only work in favorable climates that are dry and cold. Water-side economizers use a nearby river, lake, or ocean to cool air that is then circulated through the data center.
- **Liquid cooling.** Instead of cooling air around the equipment, the system directly absorbs heat from the equipment by piping the water directly next to or inside the equipment.
- **Adiabatic assist.** This method uses water to cool air or water in a closed circuit. When outdoor temperature is low, the dry coolers can reject heat using ambient air alone, without the need for water. When temperatures are not ideal, water is sprayed or circulated to pre-cool air prior to reaching heat exchanger coils and cooling towers are not used.

Just as data centers use PUE to measure electricity efficiency, they also use Water Use Efficiency (WUE) to measure water use efficiency per electrical demand of the IT equipment. High WUEs indicate lower efficiency in the system. [LBNL's 2024 Data Center Energy Usage Report](#) found that unlike PUE, WUE has remained relatively constant and is projected to increase in the future. The same report estimated both PUE and WUE for the different systems mentioned above:

- air-cooled chillers have high PUEs, but use no water and thus have WUEs of zero;
- water-cooled chillers have moderate PUEs and high WUEs;
- air-side economizers have moderate PUEs, but use no water;
- water-side economizers have low PUEs, but high WUEs; and
- liquid cooling systems that also use adiabatic assist have both low PUEs and WUEs.

Measuring the exact amounts of water data centers in the U.S. consume is challenging due to proprietary nature of the information. Data centers often opt for cooling with water, since water has a higher heat capacity (the amount of heat absorbed before increasing in temperature) compared to air and is relatively inexpensive compared to the electricity necessary for other types of cooling. [LBNL's 2024 Data Center Energy Usage Report](#) estimated that data centers consumed 21.2 billion liters of water in 2014. By 2023 the DOE estimated that that number grew to 66 billion liters of water, or over 500,000 acre-feet of water per year.

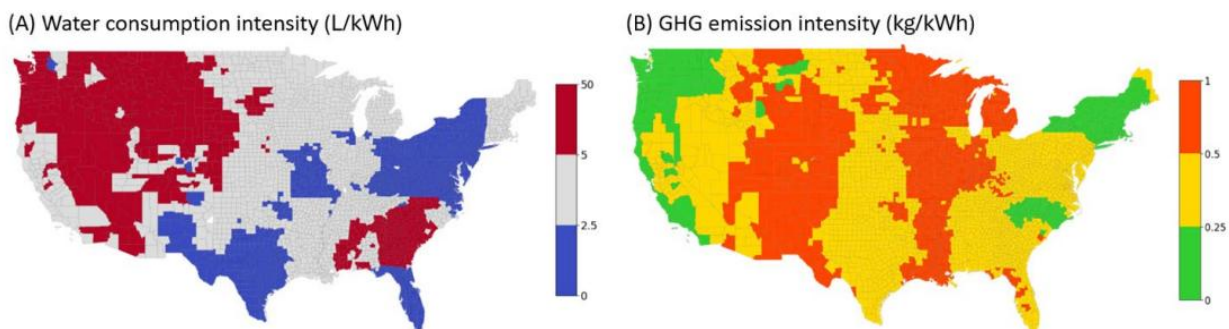


## Regional Dependence of Water and Greenhouse Gas Emissions Impacts

Water consumed upstream for electricity generation is not included in the estimates above. [Electricity generation technologies differ](#) in their water consumption. For example, wind and solar generation use no water once installed, fossil fuel-based thermoelectric plants require water for cooling, and hydroelectric reservoirs lose water through open surface evaporation (a consumptive loss of water). Electricity generators that rely on the fossil-fuel-based (coal, natural gas, and petroleum) combustion also generate greenhouse gas emissions as a byproduct of the combustion process. The water and GHG emissions associated with electricity use can be quantified using water consumption intensity, which measures the volume of water consumed per unit of electricity used, and GHG emission intensity, which measures the mass of GHG emitted per unit of electricity used. The annual average water consumption intensity and GHG emission intensity for electricity generation varies significantly across U.S. counties, as shown in Figure 2.

**Figure 2**

**The annual average water consumption intensity (a) and the GHG emission intensity for electricity generation (b) across U.S. counties.**



Source: [LBNL 2024 United States Data Center Energy Usage Report](#)

The specific water consumption and GHG emissions impacts of a data center vary depending on location because water availability and the mixture of generation sources supplying the electrical grid differs by region (Xiao et al., 2025). According to [LBNL's 2024 Data Center Energy Usage Report](#), the total indirect water footprint of U.S. data centers in 2023 was nearly 800 billion liters, attributed to water consumed indirectly through electricity use, based on the regional electricity grid mix for U.S. data center locations. Concurrently, total GHG emissions for that same electricity grid mix would be 61 billion kilograms of CO<sub>2</sub> equivalent.



In addition to using energy supplied by the grid, data centers often use onsite generators for back-up or supplemental power. In 2025, [the EPA determined](#) that these generators can operate for up to 50 hours per year in non-emergency conditions as part of a financial arrangement with another entity.

## Public Health Impacts

While more research is needed into long-term health outcomes in communities hosting data centers, the primary public health implications include air pollution, noise pollution, and potable water consumption.

### Air Pollution

Data centers relying on fossil fuels for power and diesel backup generators emit localized air pollution (e.g., fine particulate matter, nitrogen oxides, ammonia, carbon dioxide). Exposure to air pollution increases rates of respiratory diseases, cardiovascular conditions, and premature death in impacted communities ([Tao and Gao, 2025](#); [Han et al., 2025](#)). It also increases the risk of certain types of cancers ([Pritchett et al., 2022](#); [Kim et al., 2018](#)).

Initial economic modelling of lifecycle pollutant emissions for data centers and computing tasks revealed that pollutants from data centers in the U.S. could cause approximately 600,000 asthma symptom cases and 1,300 premature deaths ([Han et al., 2025](#)). Additionally, the scientists from University of California Riverside and Caltech who conducted that modelling found that “growing demand for AI is projected to push the total annual public health burden of U.S. data centers up to more than \$20 billion in 2028, rivaling that of on-road emissions of California. Further, the public health costs are more felt in disadvantaged communities, where the per-household health burden could be 200x more than that in less-impacted communities.”

To mitigate emission-related impacts while waiting on longer-term research, scientists have discussed powering data centers with renewable sources, using battery storage or fuel cells instead of diesel generators, mandating public reporting of data center pollution, and building new data centers in low-density areas to reduce human exposure ([Tao and Gao, 2025](#); [Han et al., 2025](#)).

### Noise Pollution

Researchers found that average afternoon noise levels in part of Virginia known as “Data Center Alley” were 5.7 decibels higher in neighborhoods 200 feet away from data centers than neighborhoods two miles away (28.0 decibels versus 22.3 decibels, respectively) ([Ngata et al.,](#)



2025). While noise exposure at these volumes does not contribute to hearing loss, the researchers noted that, “This low-frequency hum may affect local well-being and adds to the datacenters’ environmental footprint.” [Residential noise complaints](#) filed with one of the counties in this area corroborate the human impact of the noise pollution. Extended exposure to low-frequency noises (characterized by sound waves below 200 hertz) can negatively affect human health, wellbeing, and cognition, including “higher-order cognitive functions, such as logical reasoning, mathematical calculation, and data processing,” ([Liang et al., 2024](#)). Industrial enterprise noise is a common source of low-frequency artificial noises.

### **Potable Water Consumption**

A lack of transparency by data center operators can make it challenging to measure their water consumption. CoreSite, the company building a data center campus in north Denver, shared [projections with the Denver Post](#) that the facility may use up to 805,000 gallons of water a day to cool its computer systems.<sup>2</sup> However, it is unclear if this water consumption (equivalent to 16,100 Denverites' average daily indoor water use) relies on potable (drinkable) and/or non-potable water.

Non-potable water can be used for evaporative cooling, but it requires filtration to avoid contamination by minerals that might damage sensitive equipment. For this reason, data centers tend to rely on potable water. Some data centers source over half of their water from potable water sources ([Mytton 2021](#)). The type of water used for data center cooling (i.e., potable water versus non-potable water) can impact public health through water insecurity. Using non-potable or recycled water conserves limited potable water for communities.

Water insecurity is an issue in the United States, even in states perceived to be water-rich, like Oregon ([Schimpf and Cude 2020](#)). Inadequate or inequitable access to clean, safe, and affordable water impacts drinking, cooking, sanitation, and hygiene. Although scientific research has not yet examined water insecurity by households and communities where data centers are planned or operating, concerns with data center impacts on water security appear in public reporting and legal filings ([Shah 2026](#)). [Reports by the New York Times](#), [Environmental and Energy Study Institute](#), and others found that communities may experience water scarcity and other water-related challenges following the arrival of data centers. These challenges may be compounded in areas with pre-existing water scarcity.

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<sup>2</sup> The Denver Post journalist confirmed that this figure came directly from CoreSite’s spokesperson who verified the figure was accurate as of Friday, February 20, 2026.



## Impacts on Energy Costs

According to the U.S. Energy Information Administration, national retail electricity prices have [increased faster than inflation](#) since 2022. Retail electricity prices reflect a [complex mixture of costs](#) associated with building, financing, maintaining, and operating the infrastructure to generate, transmit, and deliver electricity to customers, as well as taxes and other fees. Some for-profit utilities also include a financial return for owners and shareholders in their electricity prices. Electricity prices vary significantly by [region](#) and by type of customer, with many utilities splitting customers into residential, commercial, industrial, or transportation sub-groups.

The increased demand of data centers has resulted in larger energy loads, which can have downstream impacts on the electricity rates paid by residential customers. A recent [report](#) by the independent external market monitor for PJM Interconnection concludes that “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” within PJM’s mid-Atlantic and Midwestern service region, which has the nation’s highest concentration of data centers.

In order to meet new large load demands, utilities often must add or upgrade transmission and generation infrastructure. According to the [Federal Energy Regulatory Commission’s 2024 State of the Markets Report](#), transmission projects driven by load growth represented the second-largest category of projects entering service in 2024 after reliability-focused projects. Depending on how rates are structured, these infrastructure costs can impact rates paid by other customers in the region.

Data centers development can be highly uncertain and developers can submit proposals with multiple utilities at the same time to optimize costs, potentially causing utilities to [over-estimate needs for new generation and transmission resources](#). If a utility expands its transmission or generation system for this potential growth and then the data center either does not materialize, leaves after a short period, or uses less energy than expected, then those infrastructure investments may increase electricity costs for other customers. Rate contracts between data centers and utilities are often confidential and may not capture the cost of serving power to the data center. States are increasingly exploring more public and standardized large-load tariffs as opposed to special contracts.

In Colorado, the Public Utilities Commission (PUC) has the full authority to regulate the rates charged and the services provided by investor-owned utilities (IOUs), Xcel Energy and Blackhills Energy, in order to ensure fair pricing and reliable delivery of service. IOUs are required to file all



rate changes with the PUC for approval. The PUC also reviews IOUs' infrastructure improvement plans and the effect of those plans on consumer electricity rates.

[Xcel Energy has proposed Just Transition Solicitation \(JTS\)](#), a form of electric resource plan, that may result in the acquisition of over 6,000 MW of new generation, a level that would make it the largest acquisition ever approved by the PUC. The JTS proposal reflects a significant increase in electricity demand that is a departure from decades of nearly flat growth. Data centers are one driver of this increase, in addition to home electrification, growth in electric vehicles, and electrification of oil and gas fields.

## Legislation

The increased demand for data centers has resulted in a variety of legislation from federal, state, and local government entities. Legislation concerning land use and construction, water use, artificial intelligence, protecting residential customers, and studies and impact assessments have been passed throughout the country.

### Federal Legislation

[Executive Order 14179, Removing Barriers to American Leadership in Artificial Intelligence](#), is intended to promote the advancement of AI in the United States. The order revokes certain existing policies that the administration views as barriers to innovation. Regardless, there are a variety of regulations and permitting around data centers, primarily through the Clean Air Act. The Environmental Protection Agency created the [Clean Air Act Resources for Data Centers webpage](#) that provides support and a centralized location for regulatory resources, air permitting resources, and modeling guidance. The website states this effort to provide easy and comprehensible access to these resources will align with the executive order and promote efficiency in building data centers.

Additionally, through the [Federal Data Center Enhancement Act of 2023](#), the Office of Management and Budget was directed to set requirements for data centers to meet standards for cybersecurity, resiliency, and availability. This resulted in [Memorandum M-25-03](#), which provides federal agencies guidance on existing policies, risk management frameworks, and standards for the effective acquisition, design, and management of data centers. This is set to sunset on September 30, 2026.



## State Legislation

States have enacted a variety of legislation and executive orders around data centers. The following table, current as of February 2026, summarizes state-level actions known as of the date of publication, but may be incomplete.

**Table 1. State Legislation and Executive Orders Related to Data Centers**

State	Bill Number	Brief Description
California	<a href="#">Senate Bill 57</a>	The bill authorizes Public Utilities Commission to assess the financial impact of large data centers on electrical corporations and customers and identify opportunities to prevent or mitigate cost shifts.
Colorado	<a href="#">House Bill 25-1177</a>	The bill modifies the requirements of economic development rates to: increase the maximum location load allowable, without approval; increase the maximum duration of a reduced rate to 25 years; and adjust considerations for existing clean energy programs.
Idaho	<a href="#">Executive Order 2025-02</a>	The Strategic Permitting, Efficiency, and Economic Development (SPEED) Act creates the SPEED Council, comprised of several state agency directors, in an effort to expedite permitting processes for large scale projects.
Illinois	<a href="#">Senate Bill 25</a>	Also known as the Cooperative Electric Utility Transparent Planning Act, the bill requires Clean Air permits for data center construction.
Indiana	<a href="#">House Bill 1007</a>	The bill establishes expedited regulatory review for large-load customer projects. In order to qualify for the expedited review, large-load customers must make a capital investment of \$500 million, create at least 50 full-time jobs, and provide financial assurances, including reimbursement of project costs.
Maryland	<a href="#">Senate Bill 937</a>	Investor-owned utilities will be required to submit a specific rate schedule for large load customers to prevent residential customers from facing costs associated with the large-load customers interconnected to the grid.
Maryland	<a href="#">House Bill 270</a>	The bill requires an analysis to be completed on the environmental, energy, and economic impacts of data center development in the state.
Minnesota	<a href="#">House File 16</a>	The bill modifies environmental and energy regulatory requirements that govern data centers, authorizes a clean energy and capacity tariff, and modifies sales and use tax exemptions.



New Jersey	<a href="#">Assembly Bill 5466</a>	The Board of Public Utilities must conduct a study regarding the impact of data centers on electricity costs, determine if ratepayers incur unreasonable rate increases due to data centers, and estimate the current portion of the average residential electricity rate that is attributed to data center demand.
Oklahoma	<a href="#">House Bill 2845</a>	Rate tariffs are required for large-load facilities, ensuring recovery of service extension and costs without impacting other customers.
Oregon	<a href="#">House Bill 3546</a>	The Public Utilities Commission must provide a classification and tariff schedule for large energy use facilities. The tariff must mitigate the cost shifting onto other classes of energy customers.
South Carolina	<a href="#">House 3309</a>	The South Carolina Energy Security Act adjusts the net metering cap, allows utilities to offer large-load customers contracts with below-marginal-cost rates, and expedites agreements for co-located generation. Additionally, utilities may bypass certification requirements and shorten timelines, streamlining the process for certifying major large-load projects.
Texas	<a href="#">Senate Bill 6</a>	The bill establishes a regulatory framework for large-load consumers.
Utah	<a href="#">Senate Bill 132</a>	The bill allows large-load customers to enter private generation contracts or request large-scale service from the local utility, which may be denied.
Virginia	<a href="#">House Bill 2084</a>	The State Corporation Commission is directed to review the existing classifications for utility customers and determine if they are reasonable.
Washington	<a href="#">Senate Bill 5431-2025-26</a>	The bill encourages data center businesses that receive certain tax incentives to adopt water-efficient and conservation practices.
West Virginia	<a href="#">House Bill 2014</a>	The Certified Microgrid Development Program is created, allowing for two microgrids for new electricity loads, including data centers. The microgrids are exempt from public utility connections and are isolated from other customers.
Wyoming	<a href="#">Senate File SF0022</a>	Public utilities are enabled to enter individualized energy contracts with large commercial and industrial customers.

Source: Legislative Council Staff.

# Getting Clean Energy Requirements Right Is a Critical Foundation for Data Center Policy



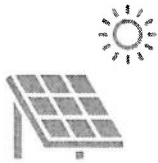
## Colorado has ambitious clean energy goals.

Colorado's largest electric utilities are on a path to reduce their emissions by at least 80% by 2030, and they are building solar, wind, and battery storage to meet these goals. With the right guardrails, data centers can help advance these goals. Without sufficient protections, data center energy loads will make our climate goals impossible to achieve.



## Data centers demand energy around the clock.

Simply requiring data centers to acquire renewable energy, like additional solar or wind, means that data centers could rely on methane gas in the hours when solar or wind power is not generating. To avoid this, data centers must be required to bring clean, dispatchable resources like battery storage to meet their around-the-clock energy demand.



## Colorado utilities have — or will soon have — very high levels of renewable energy on their systems.

Renewable resources are cheaper than generators powered by methane or coal, and utilities are successfully integrating them at high levels. But if large loads like data centers are only required to bring new renewable resources without storage, this could dramatically increase curtailment, leading to higher electricity costs for other customers.

Today, Xcel Energy projects that it will curtail almost 8.2 million MWh of clean energy in 2031 — roughly 12% of its total generation, or enough energy to meet the needs of 1,000,000 Colorado homes for a year. Those curtailments occur year-round, and the utility expects curtailment to grow to 28% of generation — over 40 million MWh — in 2050. Battery storage and resources such as geothermal can help reduce this.

## What is curtailment?

When solar or wind generation exceeds demand, renewable energy is curtailed, meaning it is generated but not used. Some curtailments are normal and cost-effective, but dramatic increases can mean higher costs for ratepayers.

## Leading data centers are already showing how clean resources can meet around-the-clock energy demands

In Minnesota, Google just announced a plan to bring on 1,600 MW of solar and wind, and 300 MW of long-duration (100-hour) battery storage. In New Mexico, Meta and XGS Energy plan to develop 150 MW of geothermal to power data centers. This resource is expected to come online by 2030. And in Nevada, Google partnered with Fervo Energy to add 115 MW of geothermal to NV Energy's grid. This will be used to power Google's data centers in the northern region of the state.

# Why Does This Matter?

If data center energy demands are met with mostly fossil fuels, the result will be increased pollution and negative impacts on communities. And if data centers just bring more solar or wind to the system, the result will likely be higher amounts of curtailed generation.

## Data centers are placing extraordinary and unprecedented demands on our energy grid.

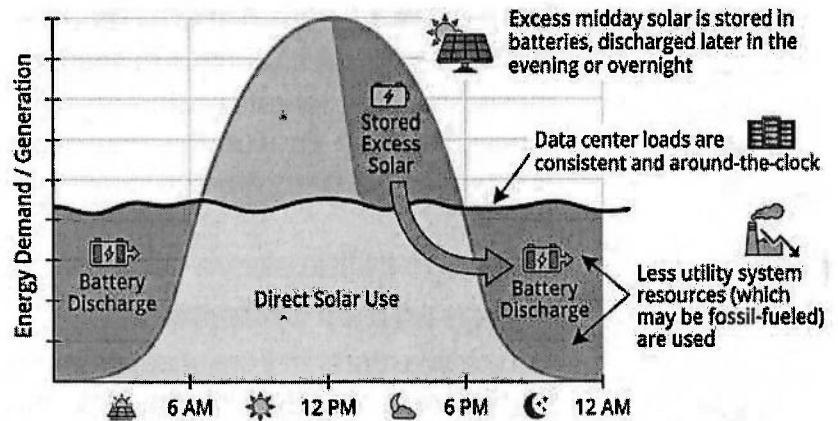
They must be part of the solution. That means bringing valuable, dispatchable clean capacity to the system to ensure they are contributing to the modern, clean energy grid we need.

## SB26-102 meets these bottom lines.

It requires data centers to bring new clean energy resources that can meet a high portion of data centers' electricity needs on a day-to-day basis and reduces the likelihood that data centers will rely on methane gas. SB26-102 will drive investment in newer technologies like long-duration storage or geothermal, and is simple for utilities and data centers to implement.



## Meeting Energy Needs Throughout the Day with Clean Energy



## The Bottom Line

From a clean energy perspective, any data center policy must ensure the majority of their energy demands are met with clean energy, and create incentives for data centers to bring valuable, clean, dispatchable technologies to Colorado.

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NEWS: ENERGY

# It's up to Colorado to shield consumers from the price shock of Xcel Energy's data center-related building boom

Colorado utilities regulators have a tall order: cut pollution, promote electrification and economic development while slowing rise of electric bills



Mark Jaffe

4:20 AM MDT on Mar 12, 2026 Updated 12:42 PM MDT on Mar 13, 2026



Construction continues on the Denver-based CoreSite three-building data center and technology campus at 5050 N. Race St north of downtown Denver near the National Western Complex on Aug. 7, 2025. (Kathryn Scott, Special to The Colorado Sun)

**F**acing a massive building boom to meet new electricity demand, Xcel Energy's Colorado profits could triple to \$1.9 billion by 2031, while electricity rates rise as much as 55%, according to an analysis by state regulators.

A Colorado Public Utilities Commission report on ways to manage and limit those potential impacts is part of a mandate by Gov. Jared Polis to cut pollution, promote economic development and electrification while avoiding customer rate shock.

In an **October 2024 letter** to the PUC and four other state agencies, Polis urged interagency coordination. "This effort is important to maintaining affordable energy costs for Colorado residents," Polis wrote.

"Other states that have not carefully managed the electrification transition are seeing large increases in utility rates."

The PUC staff report delivered to the commission Wednesday outlines challenges the state is facing to meet new electricity demand and possible ways of limiting the impact on customer bills.

The report is focused on Xcel Energy — the largest electricity provider in the state with 1.6 million customers — and is based on data submitted by the utility in its pending electric resource plan.

In 2010, when Colorado began to close coal-fired plants and promote the build-out of renewable energy, the economic wind was at the back of those policies. Interest rates and natural gas prices were low and the costs of wind and solar were falling each year.

Closing coal-fired plants provided "quantifiable fuel and other cost savings" that led to corporate profits and stable electricity rates while cutting greenhouse emissions, according to the PUC report.

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However, beginning in 2020 the financial terrain got rocky. The start of the war in Ukraine in February 2022 led to volatile natural gas prices, and inflation and interest rates began to rise. Supply chains were disrupted by the COVID pandemic resulting in price increases for some equipment.

Meanwhile, after 2030 there will be no more cost savings from coal-fired plants, which have helped offset clean energy costs. As more wind and solar energy is added to the grid, the incremental contribution they make to the electric system also declines.

Complicating the calculation is the prospect of big demands for electricity in the next five years from data centers and industry and building heating, switching to electricity, so-called beneficial electrification, and electric vehicles.

In the PUC analysis, peak load — the highest demand on the grid — is driven by data centers, EVs and beneficial electrification. The peak is important because although the system may only see it for a few days or even a few hours a year, the system must be designed to meet it.

The problem is that it is not clear how big the demand will be, especially from data centers.

The forecasts in Xcel Energy's resource plan for large loads, like those demanded by data centers, range from 3 terawatt-hours of annual load to 20 TWh — a growth rate 10 to 25 times higher than historic averages.

The risk is that if Xcel Energy builds too little capacity the grid will be stressed, but if it overbuilds customers will be stuck paying for the unused capacity.

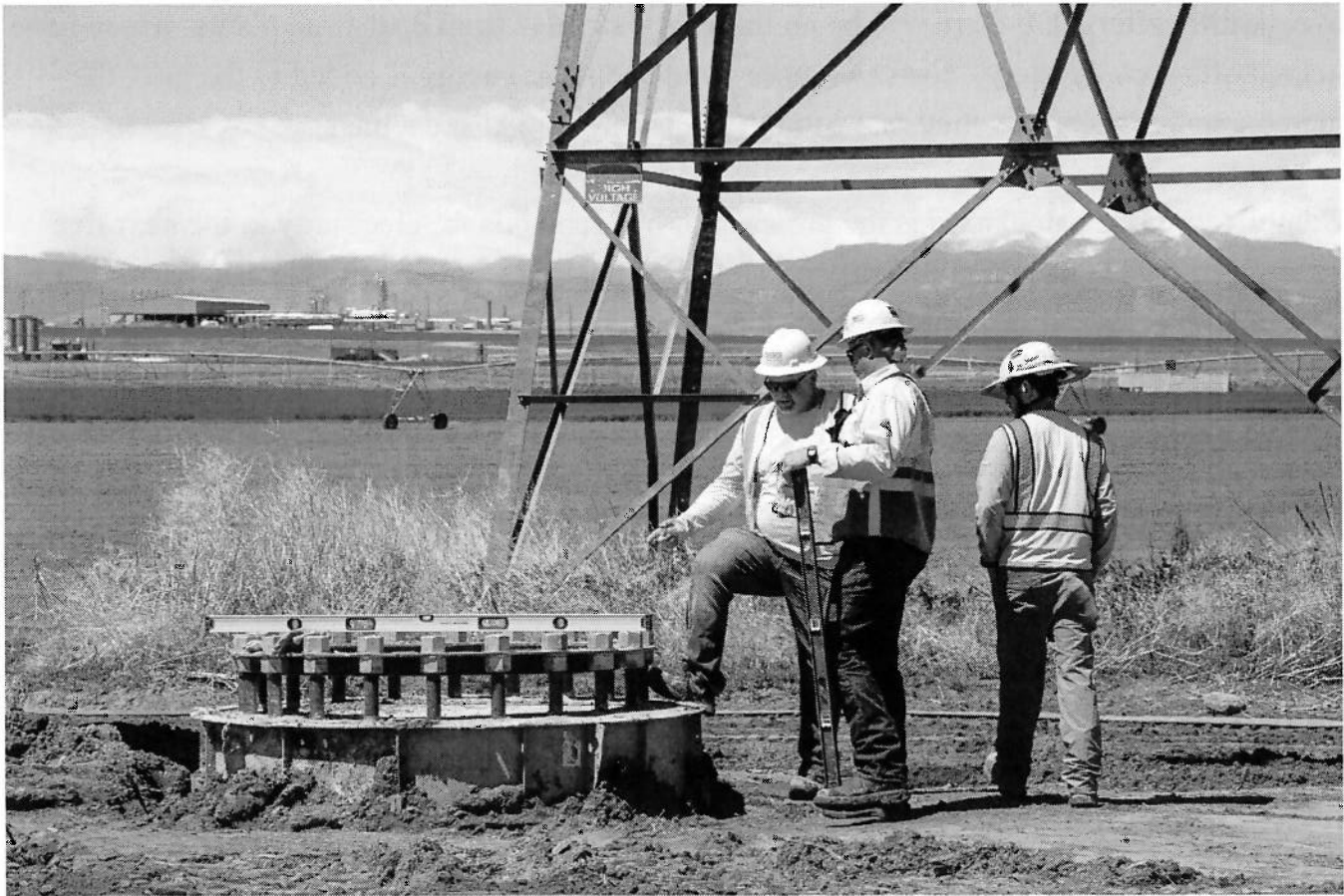
In the low-load scenario the residential price of a kilowatt-hour of electricity would rise to about 25 cents in 2040 from a little more than 15 cents in 2024.

If the system was built out to Xcel Energy's proposed size and the additional electric sales didn't materialize, residential customers would be paying about 40 cents a kilowatt-hour, according to the PUC report.

In approving Xcel Energy's resource plan, the commission chose the low-load scenario, with the understanding additional capacity could be added. Still, even that plan will need 7 gigawatts of new generating capacity — an almost 50% increase over the current capacity.

It will also require more than **\$12 billion in new transmission** projects.

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Xcel workers contracted from Vivid Engineering Group set and examine concrete base structures for electric transmission lines near Platteville on May 15. (Jeremy Sparig, Special to The Colorado Sun)

In all, even under the low-load plan Xcel Energy is projected to spend \$37 billion through 2031, the company's current plant and infrastructure are valued at \$12.5 billion.

Xcel Energy makes **its money** not from selling electricity but from building new plants and transmission and getting repaid plus a return through rates. All these new investments will go into rates.

In 2025, Xcel Energy's subsidiary Public Service Company of Colorado **posted a net profit of \$678 million**. By 2031 with all these new investments, profit is projected to rise to \$1.9 billion, according to the report.

Residential customers could see rates increase 20% to 30% by 2027 and a 55% increase by 2029 compared with 2024 levels, the report said.

"The commission may want to consider if this relationship might raise concerns about the general alignment between customer and utility interests," Alexandra Rozen, a PUC research analyst, said in presenting the report.

## Deposits, contracts, exit fees could protect existing customers

New large-load customers, however, could offer a cushion to rate impacts for the rest of Xcel Energy's customers.

“Our analysis suggests that new customer demands and revenues may provide an opportunity to create value for the electric system if they could be flexibly and thoughtfully integrated into the grid by time of day and location,” Rozen said. “But if these demands are not planned strategically, they might pose a risk of increasing existing customer rates.”

The staff report offered some approaches to limiting rate impact. It calculated that a 12% reduction in spending could keep electricity rates rising at about the same rate as inflation.

Another suggestion was that programs that fulfill policy goals but don't generate revenue, such as wildfire mitigation, gas pipeline safety and replacing aging infrastructure, get a lower capital return.

Requiring firm commitments from data center developers would also help reduce the uncertainties over the need for new generation.

For data centers and other large-load customers, the commission in conjunction with Xcel Energy is **already requiring** nonrefundable deposits, 15-year contracts and early exit fees.

The commission required Xcel Energy to file a large-load tariff, a separate rate for large loads. It is due in April. **A bill** pending in the legislature would also require upfront payments and long-term contracts for data centers.

Performance metrics to assess the value of projects and performance incentives to encourage efficient project development were also raised as potential tools.

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The report also suggested the commission look at initiatives in other states, such as **Ohio, where large customers must pay for 85% of their request demand** regardless of how much power they use, and **New Jersey, which has capped electric rate increases**.

“This provides more insights into ensuring that we can really manage that peak system growth, and therefore manage those investments,” Commissioner Megan Gilman said.

PUC Chairman Eric Blank, however, said that the commission may not have the regulatory tools it needs.

“I just think the concern is that this evolving — call it clean energy 2.0 — plan may not be the one that optimizes the company’s capital spending and earnings,” Blank said, “so it may be challenging to achieve under existing regulatory approaches.”