Load Growth from Data Centers—Issues, Challenges, and Potential Solutions

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I. INTRODUCTION[*]

Today's energy news is full of reports projecting dramatic increases in electricity demand driven by data centers, particularly those supporting artificial intelligence.[1] It should be no surprise that data centers, utilities, public utility commissions, and the public are scrambling to address the unprecedented electricity load growth attributable to these facilities. This surge in demand only exacerbates existing challenges for utilities across the United States: updating an aging electric grid, meeting increased demand from widespread adoption of electric vehicles and industrial electrification, investing in infrastructure to ensure system reliability, and hardening the grid against natural disasters.[2] Data centers routinely push for rapid development timelines, a practice at odds with the slow, measured approach utilities traditionally take to protect existing customers. Their growing needs have captured the attention of local, state, and federal governments, as well as renewable energy advocates, consumer and environmental groups, and electric generation developers. This heightened focus and potential load growth create an opportunity for these stakeholders to work collaboratively to meet increased electricity demand while moderniz-

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[1] *See, e.g.*, "AI to Drive 165% Increase in Data Center Power Demand by 2030," *Goldman Sachs Insights* (Feb. 4, 2025); Robert Walton, "Five-Year US Load Growth Forecast Surges 456%, to 128 GW: Grid Strategies," *Util. Dive* (Dec. 6, 2024); Spencer Kimball, "Data Centers Powering Artificial Intelligence Could Use More Electricity than Entire Cities," *CNBC* (Nov. 23, 2024).

[2] *See* U.S. Dep't of Energy, "What Does It Take to Modernize the U.S. Electric Grid?," *Grid Deployment Office Blog* (Oct. 19, 2023).

ing the grid through new legislation and creative tariffs that enable data center development while limiting impacts on existing customers. This chapter examines traditional utility resource processes—including resource planning and load forecasting—the challenges posed by data centers, and innovative approaches some states are adopting to address these issues.

II. UTILITIES 101 AND UTILITY RESOURCE PLANNING

A. *Utility Models*

The following is a summary of the public utility model, which provides important context for this discussion. Data centers and other large-load customers seeking to be served by a public utility must contend with the regulated model under which a public utility operates.[3]

The term "public utility" encompasses "a diverse group of businesses that have been subjected over several decades to detailed local, state, and federal regulation of rates and service,"[4] including those that provide electric utility service: (1) investor-owned utilities; (2) municipal utilities/tribal utilities; and (3) cooperative utilities. These enterprises supply continuous service of electricity through permanent physical connections between the plant of the supplier and the premises of the customer.[5] Known as *integrated public utilities*, these entities generate or purchase electricity, transport the electricity from its own transmission system, and distribute the electricity over its own distribution and transmission systems to customers.[6] This integration is built on the assumption that one business entity can perform each function—generation, transmission, and distribution—more affordably than many competing companies could.[7]

Because of the integrated nature of public utility service and the resulting lack of competition, public utilities are considered a natural monopoly and are regulated by state public utility commissions (PUC).[8] A state's constitution and legislature delegates regulatory authority to a PUC. Wholesale rates, including the allocation of wholesale power, are exclusively regulated by the Federal En-

[3] For a more in-depth explanation of the public utility model and the utility resource planning process, see Dana S. Hardy & Zoë E. Lees, "Resource Planning: The Utility Perspective," *Commercial Renewable Energy Project Development* 5-1 (Found. for Nat. Resources & Energy L. 2022).

[4] Charles F. Phillips, Jr., *The Regulation of Public Utilities* 118–20 (3d ed. 1993) (stating that public utilities have four major obligations and four major rights. The obligations: (1) to serve everyone who requests service; (2) to provide safe and adequate service; (3) to serve all customers on equal terms; and (4) to charge only "just and reasonable" price for services rendered. The rights: (1) the legal protection of private property; (2) to collect a reasonable price for services; (3) the protection from competition from an enterprise offering the same service in the same service area; and (4) eminent domain.).

[5] *See id.*

[6] *See* Leonard S. Hyman et al., *America's Electric Utilities: Past, Present & Future* 92 (8th ed. 2005).

[7] *See id.*

[8] Scott Hempling, *Regulating Public Utility Performance*: *The Law of Market Structure, Pricing and Jurisdiction* 3–4 (2013).

ergy Regulatory Commission (FERC).[9] The local PUC and FERC work together to ensure that utilities provide fair and reliable service, set reasonable rates, and oversee the siting of major infrastructure projects. PUCs oversee investor-owned utilities (privately owned utilities operated by a publicly traded company or corporation), constrain rates through general rate cases, and, in some states, oversee infrastructure projects through integrated resource plans—plans that determine how much investment and infrastructure improvements are needed to maintain the system and for expected growth.[10]

Investor-owned utilities earn a return on their investment, usually referred to as the return on equity (ROE). ROEs vary from state-to-state as they are set by the respective PUCs through a utilities' general rate cases. In the first half of 2024, the average authorized ROE for electric utilities was 9.68% with an overall range of approximately 9–11%.[11] Under traditional rate making principles and the "used and useful" doctrine, these utilities must build and place infrastructure into service before they can charge for that infrastructure.

Publicly owned utilities and tribal utilities are typically exempt from the jurisdiction of PUCs as they are owned and operated by federal, state, county, municipal, or tribal governments overseen by elected officials. Publicly owned utilities are subject to public financing and public purchasing laws. In many instances, publicly owned utilities use the issuance of municipal bonds for the financing of large infrastructure projects. These entities are nonprofits by their very nature and do not earn a regulator-approved ROE on their infrastructure. A publicly owned utility will routinely have robust operation and maintenance programs to keep its system running as long as possible to avoid large projects, as financing can be difficult to obtain. Publicly owned utility rates are set by their elected officials, and their rates will routinely include projects that are still being built on their rate base. These entities do not have to comply with the traditional used and useful rate base requirements that an investor-owned utility would be required to follow. Like publicly owned utilities, tribal utilities operate as the utility company providing electricity, natural gas, water, wastewater, and other essential services to their sovereign tribal nations. Many tribal utilities are self-sustaining, not-for-profit, tribally owned enterprises. Tribal utilities rates are set by their tribal governing body. One example of a tribal utility is the Navajo Tribal Utility Authority.

Cooperative utilities, like publicly owned utilities, are routinely exempt from public service commission regulation. Cooperatives are usually found in rural areas of the United States, due to the 1936 Rural Electrification Act.[12] Cooperatives are private, nonprofit entities owned by the customers or members of the cooperative. Cooperatives are run by an elected board of directors, based upon their incorporating documents. As cooperatives are also owned by their customers, they do not charge themselves a rate of return. Cooperative utilities,

[9] Miss. Power & Light Co. v. Miss. *ex rel.* Moore, 487 U.S. 354, 371–72 (1988).

[10] *See, e.g.*, N.M. Code R. § 17.7.3 (New Mexico rule on integrated resource plans).

[11] Regulatory Research Associates, S&P Global, "Major Energy Rate Case Decisions in the US January–June 2024" (July 29, 2024).

[12] *See* Brandon McBride, "Celebrating the 80th Anniversary of the Rural Electrification Administration," *USDA Blog* (May 20, 2016).

like publicly owned utilities, can include new projects in their rate base before they are used and useful and are able to set their own rates. Typical cooperatives will have one vote per customer, so even if they serve a large customer such as a data center, that data center will have only one vote.

B. Utility Resource Planning

Utility Resource Planning is the process by which a utility identifies generation resources to meet electricity reliability requirements and state and federal requirements at a reasonable cost.[13] The utility forecasts customer electrical demand and energy use and using this forecast determines the appropriate, diverse generation mix to meet customer requirements reliably and cost-effectively.[14] Thermal generation (including natural gas, coal, and nuclear), renewable resources (including wind and solar), energy storage, demand-side management (DSM) and load management (LM) resources all make up a utility's resource portfolio. Some states require integrated resource plans (IRP), a process that can be very time consuming.[15] In order to construct generation projects, a utility must obtain the permitting and regulatory approvals, which can also be very time intensive.[16] Regulatory approvals of new infrastructure, including new generation, are often referred to as certificates of public convenience and necessity (CCN or CPCN). Below is an illustrative timeline from New Mexico's current IRP and resource approval process, which requires a six-month facilitated stakeholder process before the utility files its IRP and a competitive procurement process to obtain necessary resources to address the utility's generation needs.

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[13] Fredrich Kahrl et al., "The Future of Electricity Resource Planning," at 3 (FEUR Report No. 6, Sept. 2016).

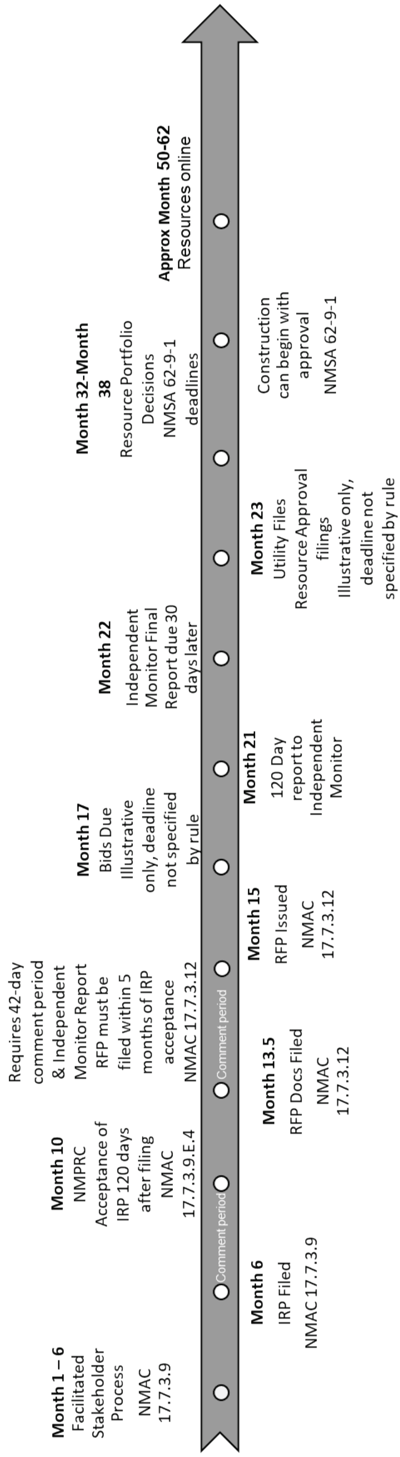
[14] The process of forecasting and determining a resource portfolio for the utility forecast is highly dependent on computer modeling. . . . On a high level, computer models are used to develop forecasts, load and resource (L&R) tables, and load duration curves for the system. Next, computer modeling is used by a resource planner to study how different resource technologies will integrate with a utility's existing resource fleet to meet the system needs. A range of assumptions are included in the modeling, such as fuel costs, forecasted capacity and energy needs, and existing generation resources. The model will simulate operation of the various combinations of resources with existing generation resources, while tracking all associated and fixed variable costs of the entire system. Modeling is necessary to keep track of calculations on costs, emissions, operational data, and the numerous other metrics for each possible resource portfolio.

Hardy & Lees, *supra* note 3, at 5-2 to 5-3.

[15] *See, e.g.*, Nev. Rev. Stat. §§ 704.736–.754.

[16] For example, N.M. Stat. Ann. § 62-9-1 requires the New Mexico Commission to decide an infrastructure approval application within nine to 15 months.

Figure 1. New Mexico's IRP and Resource Approval Process



The following objectives are usually considered by a utility and PUCs in the resource planning process: (1) safety and reliability—to provide electricity to all customers at all times; (2) affordability—to keep electric rates low; and (3) compliance—to comply with state and federal laws and regulations.[17] Other considerations include the desire to attract economic development opportunities for the state and to reduce greenhouse gas emissions.[18] Regulated utilities are obligated to provide safe and reliable electricity services to their customers and to propose rates that ensure recovery of reasonable costs and a reasonable return.

C. Utility Rates

In setting rates for customers, PUCs strive to approve rates that reflect the costs of the services provided—both fixed (property, infrastructure) and variable (fuel, labor and taxes) that the regulator finds are reasonable and prudent. Using data provided by the utility in a rate case, the regulator sets rates calculated to give the utility a reasonable opportunity to recover its prudent costs and to earn a fair return on invested capital.[19]

Utilities are prohibited from undue discrimination when designing rates; in other words, they must treat similar customers similarly and dissimilar customers dissimilarly.[20] The principle of cost-causation, which underlies the common method for allocating the costs among different customer classes, means customers who cause similar costs should face similar cost-based rates.[21]

Growing electricity demand from large-load customers—especially data centers—highlights the tension between protecting ratepayers from the financial and operational risks of serving these loads and enabling innovation and economic development. Rapid load growth can outpace grid capacity, requiring major upgrades. If large loads don't materialize as forecasted, utilities may be left with stranded assets. Without careful rate design, costs may be unfairly shifted to residential or small commercial customers. Depending on State policy, rate structures often must support clean energy goals and grid reliability.[22]

There is yet to be an industry standard for tariff design for large data center load and regulators, despite the fact that utilities have "considerable latitude to design tariffs applicable to large loads in ways that provide revenue sufficiency, do not unduly discriminate, do not lead to excessive cost shifts, and promote broader state policy objectives," such as resource adequacy, affordability, economic development, and clean energy objectives.[23]

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[17] Steven Sim, *Electric Utility Resource Planning* 16 (2012).

[18] *See* Andrew Satchwell et al., "Electricity Rate Designs for Large Loads: Evolving Practices and Opportunities," at 3 (Energy Markets & Pol'y Tech. Brief Jan. 2025).

[19] Hempling, *supra* note 8, at 217.

[20] *Id.* at 288.

[21] *Id.*

[22] *See* Satchwell et al., *supra* note 18, at 2.

[23] *See id.* at 3.

To address the challenges with serving large load customers like data centers, utilities and regulators may include eligibility requirements to ensure costs imposed by large-load customers are consistent with the utility's underlying cost allocation methodology and to prevent cost-shifting to other customer classes. Common eligibility requirements include:

- **Minimum Load Thresholds**: Customers must meet a baseline demand (e.g., 5 MW or more) to qualify.
- **Monthly Demand Charge**: Customers must pay a minimum specified percentage of their forecasted maximum demand, ensuring credible commitment by the customer to their forecasted capacity and minimizing utility financial and resource adequacy risks.
- **Tariffs Designed for Specific Customer Types**: Unique tariffs for specific large-load customer types.
- **Study Costs**: Customers must pay for studies analyzing whether the large-load customer can safely and reliably be added to the grid.
- **Customer Credit Rating**: Minimum credit ratings and/or collateral requirements for customers to mitigate utility financial risks and risks to ratepayers from nonpayment.[24]

Tariff defined contract size is also utilized by some utilities and regulators to achieve the objectives identified above. Contract size defines the energy or capacity a large-load customer is obligated to buy from the utilities, with conditions defined to adjust those quantities. Because large-load customers' actual capacity and energy requirements may differ from their forecasted demand for any number of reasons, and because utilities plan and invest in generation and other infrastructure assets based on forecasted demand, utilities may incur substantial financial or reliability risks.[25] Utilities and regulators may also require contract duration terms and exit fees that define a customer's ramp up period, operational commitment period, specific fees over a determined time, and sunset provisions. These terms assist the utility in managing its resource adequacy and cost recovery risks.[26]

Today, utilities across North America are experiencing exponential growth due to increasing demand, the need to replace the aging generation, and rising reliability requirements. Industrial-sized customers, like many data centers, often are in a utility queue to interconnect, awaiting new generation to be built for the utility to have enough capacity to serve new large load reliably. The traditional utility model for resource planning and resource approval no longer meets the development timelines for more modern customers, like data centers. As discussed later in the chapter, many state policy makers are looking for ways to modify this framework to meet today's economic development timelines.

[24] *See id.* at 4–5.
[25] *Id.* at 5.
[26] *See id.* at 7–9.

D. Conflicting Priorities

Due to the nature of their operations, utilities face multiple issues that affect their operations and limit their ability to focus resources on data center development. A few of these conflicting priorities include natural disaster protection, compliance with green legislation, and conflicting regulatory directives.

1. Natural Disasters

While the development and operation of data centers are some of the many priorities a utility will balance in order to adequately serve its customers, another priority that has received a lot of attention in the past few years is the hardening of aging systems to minimize both the risk of utility-created natural disasters and the impact of natural disasters on utilities. Specifically, the Camp Fire in California, caused by Pacific Gas and Electric infrastructure, ignited a focus on wildfire risk. The surge of wildlife or natural disaster programs, including excess wildfire liability insurance, is helping utilities pay for and upgrade their systems to meet stricter standards and reduce the overall risk that utility infrastructure will cause, or be impacted by, a natural disaster.[27]

2. Green Legislation

Many state and local governments have begun to prioritize making the electrical grid more environmentally friendly, both through renewable generation and electric vehicle requirements. Many utilities have implemented transportation electrification plans that require additional capacity and upgraded infrastructure to build out a charging network for the use of electric vehicles.[28] This infrastructure compounds the increased demand from data centers and general increased electrification.

In addition, 28 states and the District of Columbia have established renewable portfolio standards, and seven states have adopted renewable energy goals, that require electric utilities deliver a certain amount of electricity from renewable or other clean energy sources.[29] With these standards and goals, utilities are required to consider which resources they will bring on-line, how each resource fits into the utility's overall generation mix, and how it will ultimately be integrated into the utility's system.[30] Unfortunately, data centers are just one of many capital-intensive items in a growing stack of priorities for utilities.

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[27] Paul Ciampoli, "Utilities Adopt Various Strategies to Mitigate Against the Threat of Wildfires," *Am. Pub. Power Ass'n* (June 6, 2024).

[28] U.S. Dep't of Energy, "What Is Electrification?," https://www.energy.gov/electricity-insights/what-electrification.

[29] Galen L. Barbose, "U.S. State Renewables Portfolio & Clean Electricity Standards: 2024 Status Update" (Energy Markets & Pol'y Report Aug. 2024).

[30] Nat'l Conf. of State Legislatures, "State Renewable Portfolio Standards and Goals," https://www.ncsl.org/energy/state-renewable-portfolio-standards-and-goals.

3. Conflicting Regulatory Directives

The varying regulatory environments impact utilities that operate in more than one state. For example, PacifiCorp, which serves customers in Washington, Oregon, California, Idaho, Wyoming, and Utah, is faced with complying with Washington's,[31] Oregon's,[32] and California's[33] renewable energy requirements, while at the same being required to comply with Utah's requirements to keep coal generation facilities in operation.[34] These conflicting directives for each state make PacifiCorp's operation, financing, and cost recovery difficult. It also impacts how data centers evaluate PacifiCorp's territory for operation and growth.

III. WHAT IS A DATA CENTER?

The following is a summary of the data centers. At a basic level, "data center" is defined as "a facility that is equipped with or connected to one or more computers, used for processing or transmitting data."[35] Data centers range in size from small, medium, large to hyperscale. Smaller scale, boutique data centers are often specialized to provide service to specific clientele. Some boutique data centers specialize in specific industries or technologies, such as high-performance computing, financial services, or edge computing.[36] Hyperscale data centers are large facilities, typically owned and operated by technology companies such as Google, Amazon, Apple, Microsoft, and Meta. These hyperscale data centers are extremely large facilities that cover acres of land and need large amounts of water and electricity to operate. Hyperscale data centers are usually owned and operated by the same entity for their own operation; however, hyperscale data centers can also include data centers that lease space and equipment for individual customers. Data centers are currently located in all 50 states, across various types of communities, and are served by various types of utility structures.

Some states and local government welcome data centers,[37] while some communities seek bans or limitations on their continued development.[38] For

[31] The Climate Commitment Act was signed into law in May 2021, through Chapter 316, Laws of 2021 (Senate Bill 5126).

[32] HB 2021, passed in 2021, requires 80% carbon-free electricity by 2030, 90% by 2035, and 100% by 2040.

[33] In September 2024, SB 219 amended the California Climate Accountability Package, which consists of two laws: SB 253, Climate Corporate Data Accountability Act, and SB 261, the Climate-Related Financial Risk Act.

[34] In 2024 the Utah legislature adopted two bills, SB224 and HB191, with the intent of keeping Utah's largest electrical utility from shutting down the Hunter and Huntington coal-fired power plants by 2032—as Rocky Mountain Power announced last year.

[35] https://www.dictionary.com/browse/datacenter.

[36] Eleonora Kuznetsova, "What Are Boutique Data Centers?," *LinkedIn Pulse Blog* (Jan. 12, 2015).

[37] https://www.youtube.com/watch?v=grYhozCT-yo&list=PLgN8R2mAccnasTHcBxdr_Lx1Lh2lTXEMG&index=6&t=45080s (Mayor of Reno stating Reno is "open for business" during approval of the Oppidan Data Center).

example, the state of Nevada is actively enacting policy to attract data centers to locate in the state. The business-friendly tax structure in Nevada with no corporate income tax, a 75% abatement on personal property tax, and a sales tax reduction of 2% for qualified capital equipment purchases benefits data centers that locate within the state.[39]

Reno, Nevada, provides a case study on how different data centers can be developed in the same location. As mentioned above, Reno is "open to business" and Reno was recently named by Cushman & Wakefield as No. 4 among the emerging data center markets in the Americas and No. 5 among the emerging data center markets worldwide.[40] Reno is home to 24 data centers ranging from boutique to hyperscale.[41] The most recent addition to the Reno data center market is the Oppidan Data Center: a small boutique data center that received final approval from the Reno City Council on March 12, 2025.[42] The Oppidan Data Center will be a 61,554 square-foot building, sited on seven acres of land.[43] Oppidan has acquired and dedicated eight acre-feet of water per year to Truckee Meadows Water Authority, the local water utility.[44] Oppidan has also entered into an agreement with the local investor-owned utility, Sierra Pacific Power Company, d/b/a/ NV Energy (NV Energy), to purchase up to eight megawatts (MW) of electricity service for the data center through distribution level service.[45]

In contrast, the 107,000-acre industrial park, Tahoe Reno Industrial Center (TRIC), is located nine miles east of Reno.[46] TRIC was developed to serve as a master-planned industrial center and has become home to many data centers owned by companies such as Apple,[47] Google,[48] Switch,[49] Tesla,[50] and Tract.[51] One of these data centers, the Citadel Campus, was founded in 2000 and is

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[38] Zachary Hansen, "Second Atlanta Area Government Hits Pause on Data Centers," *Gov't Tech. Blog* (May 8, 2025) (Douglas County, Georgia, and Coweta County, Georgia, issued temporary moratoriums on data centers pending changes to their policies and zoning code).

[39] Nev. Gov'rs Office of Econ. Dev., "Business Incentives," https://goed.nv.gov/incentives/.

[40] Cushman & Wakefield, "Global Data Center Market Comparison" (2025).

[41] Data Ctr. Map, "Reno Data Centers," https://www.datacentermap.com/usa/nevada/reno/.

[42] *See* https://connectdatacenter.com/; *see also* Reno City Council and Redevelopment Agency, City Council Meeting, Item I.1, Staff Report and Appellant Presentation (Mar. 12, 2025), https://www.reno.gov/Home/Components/Calendar/Event/30689/67?toggle=allpast.

[43] Reno City Council and Redevelopment Agency, City Council Meeting, Item I.1, Staff Report and Appellant Presentation (Mar. 12, 2025), https://www.reno.gov/Home/Components/Calendar/Event/30689/67?toggle=allpast.

[44] *Id.* An acre-foot is a term commonly used in water supply planning to describe water volume in the western United States. An acre-foot is approximately 326,000 gallons, which is enough water to cover one acre of land about one-foot deep.

[45] *Id.*

[46] *See* https://tahoereno.com/.

[47] News Release, Nev. Gov'rs Office of Econ. Dev., "Apple to Expand Operations at Reno Technology Park in Washoe County" (Aug. 6, 2024).

[48] *See* https://datacenters.google/locations/storey-county-nevada/.

[49] *See* https://www.switch.com/tahoe-reno/.

[50] *See* https://www.tesla.com/giga-nevada.

[51] News Release, Tract, "Tract Announces Acquisition of 8,590 Acres Within Storey County to Secure Long-Term Growth in Northern Nevada" (June 18, 2024).

considered a pioneer in the data center industry. It was founded by Switch and is a 2,000-acre campus—designed to hold up to 7.2-million square feet of data center space and up to 650 MW of capacity. Citadel Campus is powered by 100% renewable energy through a combination of behind the meter generation, power purchased agreements, and renewable energy agreements with NV Energy. Citadel Campus is currently receiving water from TRI-GID, a local governmentally owned water utility.[52] The Citadel Campus provides services to various customers.

IV. EMERGING ISSUES WITH DATA CENTERS

Data centers, with their large electricity demands, water needs, potential environmental issues, and accelerated development timelines, are exacerbating already on-going issues with utilities and the regulatory environment they operate within. This chapter only addresses a small subset of those issues.

A. Timing and Financing of Infrastructure to Serve Data Centers

Timing and financing of the necessary infrastructure to serve data centers has become a prevalent issue impacting data centers, utilities, regulators and other interested parties. The cost to develop this infrastructure and the time it will take to build the infrastructure will depend heavily on the location of the data center, including the type of utility that will serve the data center. As mentioned above, some public utilities are subject to public service commission regulations that may require the utility to seek pre-approval of their large or overall grid plans before they can begin construction or allocate funding for data center related infrastructure.[53] This pre-approval can delay large scale projects that are necessary to serve a data center. For example, a new 150 MW data center may require additional generation resources to be built or contracted, or for new distribution infrastructure, substations, or even new transmission lines before they can be developed. If that infrastructure is required to be presented to a public service commission in a formal proceeding, the proceeding itself may take a year to two before a decision to approve the development and costs are approved. The costs to bring on this infrastructure can be significant due to the size and scope of these data center projects. The cost for the construction of this new infrastructure may be paid for by the data center customer itself, all customers of a utility, or some combination of both, depending on the applicable tariff or rate structure of the utility. Once approved, the utility may need additional time to procure the necessary materials to build the project. With tariffs and supply chain issues, this can further delay a data center project. A timeframe of five to 10 years for a data center to be able to interconnect and take power from an electric utility is not uncommon.

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[52] *See* Daniel Rothberg, "Tahoe-Reno Industrial Center Says Water Supply Solid as Pipeline Moves Forward, State Denies Extra Groundwater Permits," *Nev. Indep.* (Feb. 22, 2019).

[53] Bruce Biewald et al., Synapse Energy Economics, Inc. & Berkeley Lab, "Best Practices in Integrated Resource Planning: A Guide for Planners Developing the Electricity Resource Mix of the Future" (Nov. 2024).

Recently Dominion Energy issued a statement that it expects the time to connect large data centers (those over 100 MW) to increase by one to three years, bringing the total wait time to as long as seven years.[54]

B. Cost Allocation and Timing

As mentioned above, the cost to develop data centers may fall directly to the data center, on all customers or on both. Attempts to protect non-data center customers are becoming a bigger focus for utilities, data centers and their regulators. Various options will be discussed later in this chapter, but a few examples of methods utilities and regulators are exploring are line extension agreements or deposits that may require customers to pre-pay costs associated with that individual data center's customer's required infrastructure costs.[55] While many data centers are not opposed to paying for the associated costs, these entities may not be willing to pay for projects that will not become operational for five to ten years.

C. Transmission Constraints

Transmission constraints are one of the biggest hurdles facing data centers that want to interconnect quickly to the grid. Interconnection agreements have become more important than an off-taking power purchase agreement (PPA) for large scale generation projects. An executive for a geothermal company recently stated that: "It used to be if you had a PPA with a credit-worthy offtaker, then the investment community [of equity and] project finance was very interested and [consider it] a bankable project. Now, it's interconnection."[56]

The location of the data center impacts whether or not a data center will face an interconnection constraint and, if so, to what extent. For example, Rocky Mountain Power, a division of PacifiCorp, has been unable to meet the requested demands of data centers in Utah, due to the lack of adequate transmission capacity.[57] Like many investor-owned utilities, Rocky Mountain Power is regulated by the Utah Public Service Commission, which has historically taken a measured approach to utility development through the approval of integrated resource plans. Additionally, as a division of PacifiCorp, Rocky Mountain Power does not simply conduct an integrated resource plan for Utah. Rather, PacifiCorp conducts a comprehensive plan for all of its service territo-

[54] Josh Saul, "Data Centers Face Seven-Year Wait for Dominion Power Hookups," *Bloomberg* (Aug. 29, 2024).

[55] *E.g.*, Sierra Pacific Power Co. dba NV Energy, Rule 9 (effective Aug. 12, 2013), https://www.nvenergy.com/publish/content/dam/nvenergy/brochures_arch/about-nvenergy/rates-regulatory/electric-rules-north/Rule_09_Electric_North.pdf.

[56] Lisa Martine Jenkins, "The 'Clean Transition Tariff' Won Approval in Nevada. What's Next for Fervo?," *Latitude Media* (May 15, 2025) (alterations in original).

[57] Press Release, Pew Tr., "Pew Applauds Utah Bill to Promote the Adoption of Advanced Transmission Technologies" (Apr. 15, 2025).

ries.[58] In its 2025 integrated resource plan, Rocky Mountain Power seeks approval of permitting for the Energy Gateway transmission projects to serve a large data center load pocket.[59] However, merely seeking approval of permitting at this time continues to impact data center interconnection timelines. And, as a result of continued delays in service, the Utah legislature passed, and Governor Spencer Cox signed, Senate Bill 132, which will allow large hyperscale data centers (requiring over 100 MW of electric serve) to bypass Rocky Mountain Power. This is done by allowing the large customer to build their own generation or contract for generation on the market. Senate Bill 132 is discussed in more detail later in this chapter.

Rocky Mountain Power's sister company, NV Energy, is also facing transmission constraints throughout Nevada. In 2021, NV Energy obtained approval from the Public Utilities Commission of Nevada and the Nevada legislature to build two transmission projects, known as Greenlink West and Greenlink North.[60] Greenlink West is a 525-kV line from Las Vegas, Nevada, to Yerington, Nevada, and two 345-kV lines from Yerington, Nevada, into Reno/Sparks, Nevada. Greenlink North is a 525-KV line that spans approximately 235 miles from Ely, Nevada, to Yerington, Nevada.

Until the Greenlink projects are completely developed and operational, Nevada will continue to face transmission constraints impacting current and future interconnections and customers.[61]

Some data centers are attempting to circumvent transmission constraints by co-locating data center load with existing or new generation. These collocated data centers create an arrangement where the data center is provided energy directly from the co-located, dedicated resource, without having to rely on the traditional grid. While this arrangement may seem beneficial to the data center and the generation facility, it is creating issues with grid reliability and costs to customers. On February 20, 2025, FERC opened Docket No. EL25-49-000 et al. and ER24-2888-001 et al. to investigate whether the PJM Interconnection LLC (PJM) capacity market should establish rules to address the co-location of large loads, such as data centers, at generating facilities.[62] This inquiry is intended to address grid reliability and ensure that any rules that are implemented provide fair costs to consumers.

D. Load Forecasting

As each data center needs differ, requiring anywhere from 20 MW to over 500 MW, data centers often require that additional distribution, generation, and transmission facilities are built or acquired to obtain service from an electric

[58] PacifiCorp., "Integrated Resource Plan," https://www.pacificorp.com/energy/integrated-resource-plan.html.

[59] *See* https://psc.utah.gov/2025/03/31/docket-no-25-035-22/.

[60] Press Release, NV Energy, "PUCN Approves NV Energy's Greenlink Nevada Transmission and Renewable Energy Initiative" (Mar. 22, 2021).

[61] Order, *In re* Application of Nev. Power Co., Docket No. 25-05022 (Mar. 11, 2025).

[62] News Release, FERC, "FERC Orders Action on Co-Location Issues Related to Data Centers Running AI" (Feb. 20, 2025).

utility. Electric Utilities use load forecasting to determine what future electricity needs will be. Load forecasting is done with various models to determine or estimate the electricity needed to meet future electricity demand based upon current load, current resources, and expected load and resource growth.[63] Load forecasting can be classified as short-term (intraday and day-ahead), medium-term (one week to several months ahead), or long-term (one or more years).

Load forecasting is more of an art than a science, in that there is not one correct method or approach to determine how much electric growth will occur in a utility's service territory. Many utilities will use information directly from their current or prospective customers to determine how much electric demand will be needed for future development. This reliance on customer information is often inaccurate due to customer estimations or changing business plans and can lead to over or under estimation in load forecasts. In many states, the load forecast is used by the utility to justify the approval of generation, distribution, and transmission projects before their state regulators.[64] If a load forecast is underestimated, utilities will not have sufficient resources to serve customers on their desired development timelines. If the load forecast is overestimated, utilities will build, acquire, and contract for resources that they do not use or do not need, which will increase costs for all customers. State regulators, consumer advocates, and other interested parties routinely scrutinize load forecasts to ensure that each utility is building only what they need to avoid over or under-development.

This scrutiny is not unwarranted. In various states, data centers have overestimated their load, or the load has failed to show up at all. Additionally, many data centers, especially hyperscale data centers, will include redundancy needs in their load forecasting—data centers need consistent reliable energy 24 hours a day, seven days a week—which can increase the actual amount of load—or the amount of electrical power demanded—the data center will require. While this redundancy ensures that these data centers are served without disruption, these extra systems are not intended to be used consistently or to the level that warrants their inclusion in a load forecasting.

Poor load forecasting can also be attributed to poor planning or poor understanding of actual needs. Data centers—such as the Oppidan Data Center—are becoming attractive to many commercial and industrial developers, who do not have the operational knowledge or experience to evaluate how much energy a data center configuration will require. Additionally, more sophisticated data center developers with expert staff are aware of the intense competition for generation, distribution, and transmission capacity in many areas of the country, the various rules and tariffs in each market, and issues with utilities financing and ability to serve load. As such, these developers will prioritize timing of development to maximize the size of their facility and time to market. These developers will also work toward developing multiple sites at one time,

[63] Ella Zhou et al., "Best Practices in Electricity Load Modeling and Forecasting for Long-Term Power System Planning" (Apr. 2023).

[64] Regulatory Assistance Project, "Review of Integrated Resource Planning and Load Forecasting Techniques in India" (Feb. 2023).

in different markets, with different utilities. Many seek multiple projects in multiple markets simultaneously, seeking the location where the data center can be built the quickest and with the most favorable terms. This forum shopping is adding to the over-estimation of future load growth among utilities. Regulators, such as the Illinois Commerce Commission, have recently ordered specific reductions in the level of funding requested for utility construction of data center infrastructure, based in part, on forum shopping.[65]

In addition to poor forecasting, some data centers that have provided load forecasts and have entered the load queue do not always materialize.[66] Many data center developments will enter the queue with larger than necessary load forecasts, merely to obtain a spot in the queue. Many utilities queues are not based solely upon the date a project is ready, but rather based upon the date entered the queue for service. If these projects are being included in a utilities overall load forecast, but do not materialize, the utility runs the risk that they will over procure and over build, impacting other customers. As discussed further in this chapter, states such as Oregon are attempting to address this issue with various programs such as a capacity reservation charge.

Data centers also face an ever-evolving technology. Changes in the technology of services, switches, routers, cooling systems, etc. will impact load forecasting. So will advances in artificial intelligence, such as Faster, the breakthrough by Chinese artificial intelligence company DeepSeek, which has shown that the amount of energy needed to operate the new data centers may not be as large as expected.[67] This constant evolution of the technology used for and in the data center industry is creating uncertainty in the utility industry, leaving many regulators and utilities questioning the amount of energy that will ultimately be needed to operate a data center over its lifetime.

E. Environmental Issues

Data centers face increasing criticism over their impact to the environment. For example, Elon Musk's artificial intelligence company xAI has recently faced criticism over the impact to air quality by the development of the Digital Delta data center in Memphis, Tennessee.[68]

1. Greenhouse Gas Emissions

As data centers operate 24 hours a day, seven days a week, 365 days a year, with no natural cycling, they need a constant source of electricity. Additionally, due to the sensitive nature of the technology used in data centers, da-

[65] Press Release, State of Ill., "CORRECTED: ICC Approves Amended ComEd Grid Plan" (Dec. 20, 2024).

[66] Bianca Giacobone, "Phantom Data Centers Are Flooding the Load Queue," *Latitude Media* (Mar. 26, 2025).

[67] Kelly Ng et al., "DeepSeek: The Chinese AI App That Has the World Talking," *BBC* (Feb. 4, 2025); Dennis Normile, "Chinese Firm's Faster, Cheaper AI Language Model Makes a Splash," *Science* (Jan. 15, 2025).

[68] Laura Paddison & Rene Marsh, "Elon Musk Brought 'the World's Biggest Supercomputer' to Memphis. Residents Say They're Choking on Its Pollution," *CNN* (May 19, 2025).

ta centers need reliable energy free of any interruptions in service. Consequently, data centers often have load factors[69] that exceed 95%.[70] With this need for constant firm energy, many fossil fuel generation units that would be closed are remaining operational to serve data center load, and in some areas of the country new fossil fuel generation is being built for data centers.[71] This continued use of fossil fuel generation for data centers has also been endorsed by President Donald Trump.[72]

Due to their need for reliable, firm energy, most renewable energy generating units still cannot meet the needs that fossil fuel generation can provide, as solar and wind resources are variable. In other words, these renewable resources do not operate 24 hours a day, seven days a week; rather they operate when the sun is shining or when the wind is blowing. However, these resources can be tied to a Battery Energy Storage System, also known as BESS. A fully charged BESS can provide four to eight hours of energy. BESS systems are often used to help stabilize an unreliable grid or provide additional backup power to a data center. Other forms of renewable energy, such as geothermal and hydropower can better meet data center demands. But these renewable resources have not yet been widely adopted by utilities or states. Additionally, many data centers and their energy partners are acquiring nuclear power plants to serve their clean energy needs.[73]

Overall, the United States' net electric generation of utility scale power plants emits 69 billion short tons of carbon dioxide (CO_2) annually.[74] The largest emitters are coal and natural gas.

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[69] Load factor is the ratio of the actual kilowatt-hours used in a given period to the total possible kilowatt-hours that could have been used at the customer's peak kilowatt demand during the same period. *See* Energy Sentry, "Load Factor Calculations," https://energysentry.com/newsletters/load-factor-calculations.php.

[70] *See* Application for Approval of New Tariffs by Ohio Power Co., *In re* Application of Ohio Power Co. for New Tariffs Related to Data Ctrs. & Mobile Data Ctrs., No. 24-508-EL-ATA (Ohio PUC May 13, 2024); Sidney Elec., "Load Factor vs. Power Factor: Understanding Energy Efficiency in Commercial Buildings," https://sidneyelectric.com/news/load-factor-vs-power-factor-understanding-energy-efficiency-in-commercial-buildings/.

[71] Zachary Skidmore, "ExxonMobil Plots Natural Gas Power Plant to Exclusively Power Data Centers," *DCD* (Dec. 12, 2024).

[72] *See* Exec. Order No. 14,154, "Unleashing American Energy," 90 Fed. Reg. 8353 (Jan. 20, 2025); Exec. Order No. 14,179, "Removing Barriers to American Leadership in Artificial Intelligence," 90 Fed. Reg. 8741 (Jan. 23, 2025).

[73] C Mandler, "Three Mile Island Nuclear Plant Will Reopen to Power Microsoft Data Centers," *NPR* (Sept. 20, 2024).

[74] U.S. Energy Info. Admin. (EIA), "Frequently Asked Questions (FAQs)—How Much Carbon Dioxide Is Produced Per Kilowatthour of U.S. Electricity Generation?," https://www.eia.gov/tools/faqs/faq.php?id=74&t=11.

Table 1. U.S. Utility-Scale Net Electricity Generation and Resulting CO_2 Emissions by Fuel in 2023[75]

	Electricity generation	CO_2 emissions		
	million kWh	million metric tons	million short tons	pounds per kWh
Coal	675,115	709	781	2.31
Natural gas	1,806,063	790	871	0.96
Petroleum	16,233	18	20	2.46
All other energy sources	4,183,271	1,532	1,688	0.81

Unfortunately, the continued use of fossil fuel generation for data centers will contribute to carbon emissions either through continued emissions or increases in emissions when new fossil fuel plants are being built to meet the needs of data centers.

2. Noise

While some would argue that data centers may make great neighbors due to their lack of traffic or needs for community resources such as schools, the noise from data centers, or more accurately from the generators and cooling systems that run the data centers, are causing issues with neighbors. The 24 hours a day, seven days a week, 365-day operation that requires the continuous use of loud equipment to operate the facility and keep it cool is causing many data centers to receive noise complaints from their surrounding neighbors.[76] These noise complaints are causing many local entities to reconsider the locations that data centers will be built. For example, Manassas, Virginia, Prince William County, is imposing a noise ordinance on data centers after neighbors complained about constant noise emitted from an Amazon data center.[77]

F. Cyber and Physical Security Issues

On January 14, 2025, just days before President Trump took office, the Biden administration released implementation guidance for the Federal Data

[75] EIA, State Electricity Profiles, U.S. Profile, Table 5 (net generation) and Table 7 (emissions). Note: *All other energy sources* includes fossil fuels, some types of geothermal power plants, and other sources. Petroleum includes petroleum liquids (mainly distillates and residual fuel oil) and petroleum coke. Data are for utility-scale electric power plants, including combined heat and power plants. Actual CO_2 emissions per kWh from specific power plants may vary considerably from the factors in the table.

[76] Kelly Richardson, "Understanding the Impact of Data Center Noise Pollution," *TechTarget* (Dec. 3, 2024).

[77] Peter Cary, "Amazon Tones Down Its Data Center Noise After Residents Sound the Alarm," *Prince William Times* (Oct. 23, 2023); PowerPoint Presentation, Prince William Cnty. Bd. of Supervisors Meeting, "Prince William County Noise Ordinance Update" (Mar. 18, 2025).

Center Enhancement Act to the heads of federal executive departments and agencies, aiming to "enhance the reliability and resiliency of agency data centers" and build on existing data center security regulations.[78] The memorandum implemented Sen. Jacky Rosen's (D-Nev.) Federal Data Center Enhancement Act that Congress passed as a part of the National Defense Authorization Act for Fiscal Year 2024, which identified cybersecurity as a top priority for data center security.[79] The purpose of the Act was to "prioritize and, to the greatest extent possible, leverage commercial data center solutions, including hybrid cloud, multi-cloud, co-location, interconnection, or cloud computing . . . rather than acquiring, overseeing, or managing [federal government] data center infrastructure."[80] The memorandum opined that "[d]ata centers must be able to meet the reliability and resiliency needs of their hosted information and information systems through implementation of the appropriate information security and physical security protections."[81] Although this Act and directive is specific to federal agencies, all data centers face an increased risk of cybersecurity and physical security attacks due to the large amount of information that they maintain. A breach of a single data center can compromise the private information of individuals and businesses.

Having data centers interconnected into the grid also causes security issues for the utilities themselves. Utilities must follow the North American Electric Reliability Corporation Critical Infrastructure Protection (NERC CIP) standards, a set of mandatory cybersecurity requirements designed to protect the Bulk Electric System (BES) in North America. These standards are federally mandated and enforced by NERC under the oversight of the FERC. NERC CIP can be implicated by data center interconnection in a number of ways. For example, if the data center is directly connected to BES infrastructure or indirectly affects BES Cyber systems NERC CIP requirements may be triggered.[82] Additionally, the data center may utilize a third party vendor which requires additional vetting and security under NERC CIP standards.[83] The utility must ensure that data center interconnection does not impact their cyber security needs or impact the physical attributes of the grid. As data center technology changes, that technology may impact the overall grid if interconnected improperly. Also, if data center demand suddenly drops off, utilities must be able to react quickly to avoid impacting the entire system. Utilities, like data centers, already face a higher risk of cyber and physical security breaches.[84] The ability for a foreign hacker to take over a utility is not only a local, but a national security issue.

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[78] Memorandum for the Heads of Exec. Dep'ts & Agencies, "Implementation Guidance for the Federal Data Center Enhancement Act" (Jan. 14, 2025).

[79] Pub. L. No. 118-31, div. E, tit. LIII, 137 Stat. 940 (2023).

[80] 44 U.S.C. § 3601 note.

[81] Memorandum, *supra* note 78, at 6.

[82] May trigger obligations under CIP-002 through CIP-011.

[83] CIP-013 requires utilities to vet vendors for cybersecurity practices, software integrity and authenticity, and control and monitoring of access.

[84] Nat'l Ass'n of Regul. Util. Comm'rs, "Cybersecurity for Utility Regulators," https://www.naruc.org/core-sectors/critical-infrastructure-and-cybersecurity/cybersecurity-for-utility-regulators/.

F. Water Use

Data centers need water, and their impact on water resources has become a significant issue.[85] Data centers use significant amounts of water for their cooling systems, which can include cooling towers, chillers, pumps, pipes, and other necessary equipment. Collectively, data centers rank in the top 10 of "water-consuming industrial or commercial industries" in the United States and data centers "directly or indirectly draw water from 90% of United States watersheds."[86] Moreover, it is estimated that 20% of those data centers "draw water from moderately to highly stressed watersheds in the western United States."[87]

Like electricity, data centers may also face difficulties in obtaining adequate water supply for their operations. Some states and utilities are able to serve data centers directly from the available supply, while others may require dedication of water for each data center that is being developed. Like energy, water utilities and water law and regulations are unique to each state. Similarly, water utilities, like electric utilities, can range from private utilities that are subject to rules and regulations of a state commission, public utilities, cooperatives or tribal utilities. However, unlike electricity, which can be generated and transmitted thousands of miles away through transmission lines, water can only be economically piped so far.

As an example of how water may impact data centers, data center development in Nevada needs to deal with the robust water laws and regulations of the driest state in the nation.[88] Like many other western states, Nevada is a prior appropriation state.[89] Prior appropriation is based upon the premise that the first person who uses water for a beneficial purpose has a superior right to that water—"first in time, first in right."[90] These water users obtain water rights through vested claims, permitted water rights and certificated water rights. When a developer, such as a data center developer, requires a large amount of water, the water utilities in Nevada will routinely require that developer to obtain water rights and dedicate that water to that utility for use for that project. While these utilities may have small amounts of water rights for sale, many do not have the quantities available that are needed to serve data centers. Depending on the type of water right, the priority date, and the amount of water being purchased, water rights in Nevada may cost from $1,000 an acre foot, to over $50,000 an acre foot. Nevada, and more specifically the projects at TRIC,

[85] Md Abu Bakar Siddik et al., "The Environmental Footprint of Data Centers in the United States," *Environ. Res. Lett.* 16 (2021).

[86] *Id.*

[87] *Id.*

[88] *See* Nev. State Climate Office, "About Nevada's Climate," https://www.unr.edu/nevada-climate-office/about-our-climate.

[89] Fred W. Weldon, Research Div., Nev. Legis. Counsel Bureau, "History of Water Law in Nevada and the Western States" (Jan. 2003).

[90] *Id.*

have been working toward the use of effluent (treated sewer water); however, recent litigation has postponed that transition.[91]

Data centers also indirectly consume additional water through the power plants that generate the electricity supplied to data centers. The electric power sector uses a large amount of water in the production of electricity and is credited with using "10 percent of all global freshwater withdrawals."[92] Thermoelectric power plants (including natural gas, nuclear, and coal plants) boil water to create steam, which spins a turbine to generate electricity. In 2021, 73% of the utility-scale electricity generated in the United States came from thermoelectric power plants.[93]

To complicate matters, the exact amount of water consumed by individual data centers is often difficult to determine. There is very little, if any, publicly available data on individual customers' use. However, in 2021, The Dalles, Oregon released the water use for a Google data center after a lengthy legal battle. That data center reported water consumption of over 1,000 acre-feet in 2021, representing more than one-quarter of the Oregon town's annual water consumption.[94] After the lawsuit, Google and the City of Dalles entered into an agreement for Google to invest $28.5 million in water infrastructure upgrades, to ensure there was adequate water to meet future water needs.[95]

V. POTENTIAL SOLUTIONS: EMERGING STATUTES AND TARIFFS

Data center development is increasingly challenging with lack of transmission capacity, load forecasting issues, and environmental concerns. But because data centers are crucial to the modern technological era, various states and utilities are attempting to address these issues through legislation and tariffs. This section explores some examples of solutions that have been proposed or passed across the country to hopefully remedy these concerns and increase the responsible development of data centers.

A. Large Customer Options

1. Utah

Utah, by passing Senate Bill 132 (SB 132), is trying to address its utility's lack of transmission and other infrastructure to interconnect large customers—including data centers—in a timely fashion.[96] SB 132 was signed into law by Governor Spencer Cox on March 25, 2025, and creates an alternative pro-

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[91] *See* Tahoe Reno Indus. Ctr. v. TRI Gen. Imp. Dist., No. 24-02167 (Nev. 2d Jud. Dist. Ct. filed Sept. 20, 2024).

[92] IEA, "Energy and Water," https://www.iea.org/topics/energy-and-water.

[93] EIA, "U.S. Electric Power Sector Continues Water Efficiency Gains," *Today in Energy* (June 14, 2023).

[94] Mike Rogoway, "Google's Water Use Is Soaring in The Dalles, Records Show, with Two More Data Centers to Come," *Oregon Live* (Dec. 17, 2022).

[95] Mike Rogoway, "The Dalles OKs Contentious Water Deal to Cool Google's Data Centers," *Oregon Live* (Nov. 8, 2021).

[96] 2025 Utah Senate Bill No. 132, 66th Leg., Gen. Sess. (Utah 2025).

cess for customers with large loads by allowing the customers and their electric providers to meet growing demands outside of normal regulatory processes, while ensuring that these customers bear the full costs to serve their load.

SB 132 is applicable to customers who have a new load of 100 MW or more, or will have an expansion of more than 100 MW, within five years of the service date.[97] For customers that are interested in either a contract for a large-scale service with a utility or a large-scale generation provider, the customer must first file a large-scale service request filing with the utility, essentially giving the utility a right of first refusal. SB 132 provides timelines for processing large-scale service requests.[98] As part of the process, the customer must provide customer identifying information, location, requested demand, service commencement date, load profile, financial capability proof, and confirmation that the service is not for resale. SB 132 requires that the utility evaluate the customer's request and provide a written service request proposal that includes:

> (a) whether the qualified electric utility can provide the requested service within the time frame required by the customer;
>
> (b) the estimated large load incremental costs that will be allocated to the customer, based on the information provided by the customer;
>
> (c) any required:
>
> (i) system upgrades;
>
> (ii) improvements; or
>
> (iii) transmission service requests;
>
> (d) the estimated timeline for commencing the requested electric service; and
>
> (e) the proposed terms and conditions of service, including provisions for addressing long-term operation and maintenance costs for large load facilities.[99]

If the terms of the utility's proposal are accepted by the customer, the customer and the utility can then enter into a large load contract, which is filed with the Utah Public Service Commission (Commission) for review.[100] The Commission shall approve contracts if it finds by the preponderance of evidence that "(a) the contract complies with [SB 132]; (b) the large load customer bears all just and reasonable incremental costs attributable to receiving the requested electric service; and (c) existing ratepayers do not bear costs justly and reasonably attributable to providing electric service for the large load customer."[101]

However, if the utility's proposal is not accepted by the customer, the customer may enter into a contract with an alternative large-scale generation provider (or if necessary, multiple providers).[102] This process will allow customers to negotiate a contract directly with one or more large-scale generation providers to serve their load outside of the utility. The Commission will oversee

[97] Utah Code Ann. § 54-26-102.

[98] *Id.* § 54-26-202(2).

[99] *Id.* § 54-26-202(4).

[100] *Id.* § 54-26-302.

[101] *Id.*

[102] *Id.* § 54-26-402.

these contracts and is required to establish rules for allocating the costs for these contracts. SB 132 also requires a large-scale generation provider to register with the Commission. These generation providers are also required to file annual reports.

Unlike the contracts with a utility or a large-scale generation provider, customers interested in building their own, or contracting for, a closed private generation system are exempt from Commission approval and are exempt from filing a large-scale service request with the utility.[103] These customers are still subject to the 100 MW minimum for expanded or new load. However, these behind-the-meter systems must remain separate from utility facilities unless authorized by a Commission-approved contract.[104] Standby and other services may be allowed, however these services will be subject to FERC tariffs or Commission approval. The connected generation systems are also exempt from Commission oversight, however, like the large-scale generation provider they will be required to file annual reports.

Transmission service costs associated with large load service are to be paid by the large-scale generation provider or the large load customer. The Commission is required to establish rules for allocating these costs for these contracts which must include (1) generation resources; (2) distribution system upgrades; (3) to the extent permitted by federal law, and, as applicable, approved by FERC: (a) transmission system improvements, including network upgrades; and (b) interconnection facilities; (4) transmission service; and (5) other necessary infrastructure. All revenues and large load incremental costs associated with a large-scale service request shall be excluded from any rate determinations by the Commission as they should be paid for by the customer.[105]

In addition to overseeing large load contracts, SB 132 requires the Commission to investigate the feasibility of a large load flexible tariff.[106] A large load flexible tariff is defined as a tariff:

> (a) pursuant to which a large load customer:
>
> (i) will receive components of electric services from a large-scale service provider; or
>
> (ii) will reduce demand at periods specified by a large-scale service provider; and
>
> (b) under which a large load customer receives components of available electric services from a qualified electric utility to the extent:
>
> (i) the qualified electric utility's resources are reasonably expected to be available and sufficient; and
>
> (ii) as determined by:
>
> (A) agreement with the qualified electric utility; or
>
> (B) tariffs approved by the commission.[107]

[103] *Id.* §§ 54-26-201(1), -301(5).
[104] *Id.* § 54-26-505.
[105] *Id.* § 54-26-602(3).
[106] *Id.* § 54-26-701.
[107] *Id.* § 54-26-101(8).

As this legislation is new, the Commission has not opened a rulemaking docket to address SB 132.

2. New Mexico

New Mexico House Bill 93 (HB 93), signed into law by Governor Michelle Lujan-Grisham in 2025, provides a pathway for utilities and large customers to partner on building microgrids—permanent or temporary—to serve large customer load.[108] HB 93 allows customers to receive electricity from a qualified microgrid if they enter into an electric service agreement with the utility. The qualified microgrid must be designed to be islanded and may also be designed to connect to the utility's grid.

HB 93 defines "qualified microgrid" as a "permanent or temporary electrical system that: (a) incorporates a microgrid controller; (b) includes self-source generation that is capable of generating not less than [20 MW]; and (c) is capable of operating independently and disconnected from the grid."[109] "Self-source generation," is defined as permanent or temporary generation primarily serving a qualified microgrid.[110]

New Mexico has renewable portfolio standard (RPS) requirements for investor-owned utilities providing service in the state. Recognizing that large customers—including data centers—may want to utilize the microgrid option until the utility has sufficient system capacity, the legislature included a carve-out in the bill exempting self-source generation from counting against RPS compliance for a limited time. Energy generated and sold from a self-source generation resource wholly or partly owned by a qualified microgrid will not be considered retail sales or energy under existing RPS statutes until 2035, and thus will not factor into RPS compliance calculations until that year. By 2045, all energy generated and sold by a qualified microgrid must come from net-zero carbon resources, consistent with the state's 2045 zero-carbon RPS requirement.[111]

The Act also allows utilities, subject to approval from the New Mexico Public Regulation Commission, to acquire existing self-source generation resources for retail, wholesale, or self-generation services. However, Commission approval is not required for the microgrid itself—a customer and utility may enter into an energy supply agreement (ESA) for a microgrid without obtaining regulatory approval.

3. Nevada

Since 2001, Nevada had been attempting to address unique energy requirements for customers with extremely large loads. Nevada's first attempt at addressing a large load customer's need for rapid infrastructure that the utility was unable to meet was the enactment of Nev. Rev. Stat. ch. 704B. Chapter

[108] H.B. 93, 57th Leg., First Reg. Sess., § 6 (N.M. 2025).

[109] *Id.*

[110] *Id.*

[111] *Id.*

704B allows large customers, with an average annual load of one MW or more, to exit NV Energy's service and either build their own generation or acquire energy on the market through a provider of new electric resources. The first customers to take advantage of chapter 704B were gold mining operations who constructed a 215 MW coal plant near Carlin, Nevada, as well as various solar facilities.[112] After approval of the initial chapter 704B applications for these gold mining operations, various large customers took advantage of chapter 704B, including Switch. On December 28, 2016, Switch received approval to purchase energy, capacity, and ancillary services from a provider of new electric resources.[113] Switch has been and continues to be committed to use 100% renewable energy at its data centers.[114] By obtaining approval under chapter 704B, Switch has been able to purchase renewable energy and renewable energy credits through NV Energy's Green Rider Program.

Due to the success of chapter 704B, NV Energy introduced Senate Bill 547, which was adopted by the Nevada legislature to amend chapter 704B in 2019. Upon approval of Senate Bill 547, more stringent regulations were adopted by the Public Utilities Commission of Nevada in Docket No. 19-06028. Based upon these changes, chapter 704B exit applications for existing customers are limited to an annual limit that is set forth in NV Energy's triennial integrated resource plan under Nev. Rev. Stat. § 704.741 and is limited to no more than 50% of the projected large commercial and industrial load.[115] In NV Energy's most recent integrated resource plan, filed in 2024, the Public Utilities Commission of Nevada approved 29 MW to leave southern Nevada and 0 MW in northern Nevada due to transmission constraints.[116] New customers are not subject to these annual limits; however, since the adoption of Senate Bill 547 and the adoption of the new regulations, not a single customer, new or existing, has filed an application under chapter 704B.

NV Energy has also attempted to work with various data center clients through tariff filings. The Nevada Green Rider Tariff (NGR) allows the customer to enter into a special contract that provides for dedication of a new or existing renewable resource with power owned or procured by Nevada Power and dedicated to the customer.[117] NV Energy's NGR programs allow large customers to meet their individual goals to be 100% renewable through the purchase of renewable energy credits as a premium through either the rate set by the tariff or as part of a renewable energy agreement, where NV Energy contracts or

[112] *See* Pub. Utils. Comm'n of Nev., Docket Nos. 04-02006, 04-12036, 06-07026, and 08-03025.

[113] Docket No. 16-09023.

[114] Docket No. 25-04006, Annual compliance report of Switch, Ltd.

[115] Docket 19-06028, adopted on September 16, 2024. **Editor's Note:** Justina A. Caviglia represented Google during this docket.

[116] Docket No. 24-05041. **Editor's Note:** Justina A. Caviglia represented Google during this docket.

[117] Docket No. 19-11019; *see* https://www.nvenergy.com/publish/content/dam/nvenergy/brochures_arch/about-nvenergy/doing-business-with-us/energy-supply-rfps/ngr/NGR-Tariff-White-Paper.pdf.

builds a renewable generation facility. Tesla, Apple, and Switch have all taken advantage of this program.[118]

Another tariff option is the Large Customer Market Prices Tariff/Market Price Tariff (LCMPE/MPE) that was introduced in Nevada in 2019 as an alternative to chapter 704B. One of the first LCMPE/MPE customers in the state of Nevada was Lumen (Google).[119] The LCMPE/MPE tariff allows new customers who have a load of 10 MW or more, that are eligible to exit NV Energy's system under chapter 704B, to enter into an ESA with NV Energy to be served by a designated resource. LCMPE/MPE are not applicable to current customers and do not require customers to take energy from renewable resources. The tariff was recently modified in the 2024 integrated resource plan and now includes a pricing model.[120] Through the LCMPE the Lumen data center campus (Google) is served by a solar and battery storage project.[121]

The most recent tariff filing, the Clean Transition Tariff (CTT) allows large customers, both new and existing, such as data centers, the ability to enter into ESAs for the dedication of the full or partial energy and capacity of a new renewable energy resource.[122] The first approved ESA under the CTT is for Callisto Enterprises (Google).[123] The Public Utilities Commission of Nevada approval of the CTT ESA between NV Energy and Callisto, will allow Callisto's existing data center at the TRIC to receive energy and capacity from a Fervo geothermal project that is in development in Northern Nevada.[124] The CTT and the ESA were set up to allow the costs for both the generation and capacity of this product to be paid completely by Google. Google also pays for public program costs as well as an administrative fee to cover the cost for NV Energy.[125]

B. Minimum Billing Demand

Various states have attempted to address the large load issue through tariffs with minimum billing demands. Minimum billing demand, also known as minimum demand or contract demand, is the lowest demand (in kW) for which a customer is charged, regardless of their actual usage. However, each of these tariffs is slightly different.

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[118] *See* Pub. Utils. Comm'n of Nev., Docket Nos. 15-11025, 15-11026, 15-11028, 17-02008, 17-11002, 19-05006.

[119] Docket No. 19-12017. **Editor's Note:** Justina A. Caviglia represented NV Energy during this docket.

[120] Docket No. 24-05041. **Editor's Note:** Justina A. Caviglia represented Google in this matter.

[121] *See* "PUCN Approves NV Energy, Google Solar-Plus-Storage Agreement," *News Data* (Dec. 24, 2020).

[122] Docket Nos. 24-05022, 24-05023. **Editor's Note:** Justina A. Caviglia represented Callisto (Google) in this matter.

[123] Docket No. 24-06014. **Editor's Note:** Justina A. Caviglia represented Callisto (Google) in this matter.

[124] Docket No. 24-05041; Docket No. 24-06014.

[125] Docket No. 24-06014.

1. Ohio

On May 13, 2024, Ohio Power Company (AEP Ohio) filed an application with the Ohio Public Utilities Commission to adopt a new tariff related to data centers and mobile data centers (bitcoin operations).[126] This new tariff would apply to data centers that use a monthly maximum demand of 25 MW or greater at a single location, or mobile data centers with 1 MW of demand at a single location (bitcoin operations). To address the concern of properly planning the transmission and distribution network, the data center tariff was drafted to apply a minimum billing demand of no less than 90% of the greater of (1) the customer's contract capacity, or (2) the customer's highest previously established monthly transmission billing demand during the past 11 months. The application also sought a similar provision utilizing a 95% minimum demand charge for mobile data centers such as cryptocurrency miners. The minimum demand requirements were intended to ensure that the "investments in the system will be utilized and paid for by those that caused the need for such investments rather than placing the risk of paying for the associated incremental investment on other customers should the data center have lower usage."[127] The initial term in the application for these charges was for not less than 10 years and included an "exit fee" if the customer chose to leave early, which time period would commence upon energizing the customer. The contracted time period under the tariff could also include a three-year "load ramp" of increasing load if that is agreed to by AEP Ohio.[128]

As with any data center specific filing, various parties intervened in the matter. As the case progressed, two separate stipulations were drafted. One stipulation entered into by Ohio Public Utilities Commission Staff, the Ohio Consumers' Counsel, the Ohio Energy Group, Ohio Partners for Affordable Energy, and Walmart would have data centers larger than 25 MW pay an 85% minimum demand charge for the energy they expect to need each month, even if they use less, to cover the cost of infrastructure needed to bring electricity to the facilities.[129] The requirements would be in place for up to 12 years, including a four-year ramp-up period.

A competing stipulation, filed by a coalition of data centers led by Amazon, was entered into by Amazon Data Services, Constellation Energy Generation, Ohio Energy Leadership Council, Ohio Manufacturers Association Energy Group, Enchanted Rock, the Data Center Coalition, Retail Energy supply Association, Google, Meta, Ohio Blockchain Council, Microsoft, One Energy Enterprises, and Interstate Gas Supply.[130] The data center stipulation would apply to

[126] Application for Approval of New Tariffs by Ohio Power Co., *In re* Application of Ohio Power Co. for New Tariffs Related to Data Ctrs. & Mobile Data Ctrs., No. 24-508-EL-ATA (Ohio PUC May 13, 2024).

[127] *Id.*

[128] *Id.*

[129] Joint Stipulation and Recommendation, *In re* Application of Ohio Power Co. for New Tariffs Related to Data Ctrs. & Mobile Data Ctrs., No. 24-508-EL-ATA (Ohio PUC Oct. 23, 2024).

[130] Joint Stipulation and Recommendation, *In re* Application of Ohio Power Co. for New Tariffs Related to Data Ctrs. & Mobile Data Ctrs., No. 24-508-EL-ATA (Ohio PUC Oct. 10, 2024).

new agreements with monthly demands greater than 50 MW at a single location if AEP Ohio can prove that the location has insufficient transmission load capacity. That proposal would also include terms of up to 12 years, but with shorter options available, and require data center owners to pay for a minimum of 75% of monthly demand, or up to 85% under shorter contract terms. In July 2025 the Ohio Public Utilities Commission issued an opinion and order adopting the AEP Ohio stipulation.[131]

2. Indiana

In Indiana, the Indiana Michigan Power (I&M) company filed a petition to amend its industrial power in Cause No. 46097 to address data centers before the Indiana Utility Regulatory Commission. However, unlike Ohio, the Indiana case has been settled through an all-party stipulation with I&M, the Indiana Office of Utility Consumer Counselor, and all the intervenors in this cause, namely: Citizens Action Coalition of Indiana, Inc., Amazon, the Data Center Coalition, Google, and Microsoft.[132]

The approved tariff is applicable to customers taking service with a contract capacity greater than 70 MW or 150 MW on an aggregated basis. The tariff requires large load customers to enter into a minimum 12-year contract, with a load ramp of five years or less. The tariff also has a minimum monthly billing demand of 80% of the customer's contract capacity specified for the applicable time period in the contract or 80% of the customer's highest previously established monthly billing demand for 11 months. Large load customers are subject to a minimum monthly charge for each plant equal to the sum of: (1) the monthly service charge; (2) the product of the minimum demand charge and the monthly billing demand; (3) the product of the step 1 embedded capacity charge and the monthly billing demand; and (4) the sum of the product of each demand charge in all applicable demand-related riders in effect at the time and the monthly billing demand. The step 1 embedded capacity charge rate will be computed as follows: (Block 1 Energy Rate less Block 2 Energy Rate) multiplied by Block 1 Energy Hours less (Minimum Demand Charge less Demand Charge). The tariff also provides options for termination or reduction of the contract with or without an exit fee or any penalty, based upon the amount of reduction and timing of written notice prior to the termination of its contract or reduction of its contract capacity.[133]

3. Utah

PacifiCorp, through a settlement in its Utah Rocky Mountain Power general rate case, implemented minimum demand charges for large customers.[134] The

[131] *See* https://dis.puc.state.oh.us/CaseRecord.aspx?Caseno=24-0508&link=DIVA.

[132] *See* https://iurc.portal.in.gov/docketed-case-details/?id=b8cd5780-0546-ef11-8409-001dd803817e.

[133] *Id.*

[134] Docket No. 24-035-04. **Editor's Note:** Justina A. Caviglia represented Walmart in this matter.

phase 2 stipulation entered into by Rocky Mountain Power, the Division of Public Utilities, Office of Consumer Services, Utah Association of Energy Users, Federal Executive Agencies, Western Resource Advocates, the Utah Large Customer Group, Utah Clean Energy, Stadion LLC, The Kroger Co., and Nucor Steel-Utah made changes to the Electric Service Regulation 12 for large load customers to require a minimum demand charge for new and existing customers.[135]

Under the stipulation, new large load customers and existing large load customers with loads over 200 MW are required to enter into contracts with a minimum term of five years, in addition to the specified load ramp period and minimum monthly on-peak power charges. New and existing customers with loads between 50 MW and 200 MW will be billed the greater of: (1) their actual measured on-peak power usage for the month, or (2) 75% of their reserved capacity for the applicable month, for requests less than 200,000 kVA of reserved capacity.

C. Capacity Reservation Charges

1. Oregon

In contrast to its Utah division, PacifiCorp's Oregon utility, Pacific Power, chose and obtained approval to impose a capacity reservation charge and an excess demand charge to reduce speculative interconnection requests in PacifiCorp d/b/a Pacific Power's general rate case before the Oregon Public Utilities Commission.[136] In the docket, PacifiCorp proposed to assess additional charges to large load customers that either fall short of using their contracted-for reserved capacity through a "Capacity Reservation Charge," or use more than their reserved capacity through an "Excess Demand Charge." PacifiCorp proposed a charge of $4.81 per kW, billed monthly, for each kW of unused capacity reserved by a customer with a peak load of 25 MW or higher. PacifiCorp also proposed an Excess Demand Charge for each kW above capacity reserved by those same customers, requesting the rate be set at four times the Capacity Reservation Charge. This proposal was opposed by various parties in the docket.

The Public Utilities Commission approved the request with slight changes. The Commission approved both the Capacity Reservation Charge and an Excess Demand Charge for customers of 50 MW and greater. The Capacity Reservation Charge was set at $3.68/kW, with a buffer of 10%. The Excess Demand Charge was set at three times the Capacity Reservation Charge. The Commission determined that the peak load for these charges will be calculated as the largest load over the last 36 months for existing customers with existing contracts, and for 12 months for new customers.

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[135] Walmart Inc. was not a signatory to the stipulation, but did not oppose the stipulation on this issue.

[136] Order No. 24-477, *In re* PacifiCorp Request for a General Rate Revision, Docket No. UE 433 (Or. PUC Dec. 19, 2024). **Editor's Note:** Justina A. Caviglia represented Walmart in this matter.

D. Master-Planned Developments

1. Nevada

Nevada has also taken action to address overall planning for large scale facilities, including data centers in the TRIC, by providing approval for development master plans. As part of the development for TRIC, NV Energy obtained approval from the Public Utilities Commission for the Tracy Area Master Plan.[137] This pre-approval allowed NV Energy to build infrastructure necessary to provide services at the TRIC independently of NV Energy's traditional Rule 9 processes for electric service and Rules 9 and 16 for natural gas service for new developments and customers. The approved master plan allowed developments at TRIC to avoid delays and some initial costs to interconnect and take service from NV Energy's system.

However, the Tracy Area Master Plan has been controversial in NV Energy's recent rate cases, as the original load forecasting that was used to approve the plan overestimated the amount of load that has interconnected thus far due to delays in NV Energy's interconnection request/energy usage process in the area.[138] This has caused parties to argue that NV Energy should not be able to recover costs for these projects at this time because they are not completely used and useful. Regardless of these issues, the use and development of master planning can help utilities, regulators and data centers overcome the timing issues that they usually face in other situations.

E. Other Legislative Developments

Legislatures throughout the United States are grappling with different types of legislation to address the issues created by data centers.

1. Oregon—Additional Restrictions on Data Centers

Although PacifiCorp was able to get approval of its Capacity Reservation Charge and Excess Demand Charge, the Oregon legislature is still seeking additional changes for data center electric use and cost allocation. The Oregon Power Act, House Bill 3546, which became effective June 16, 2025, requires data centers to pay the true cost of electric service.[139] This legislation addresses how the Oregon Public Utilities Commission should handle large energy use facilities, defined as those using 20 MW or more and primarily engaged in data processing, hosting, or related services.[140] The legislation mandates that the Commission establish a separate classification of service for these facilities with its own tariff schedule that allocates costs to these users and mitigates risks to other electricity consumers.[141] Furthermore, it requires electric utilities to use a contract for service with these facilities, outlining specific

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[137] Docket No. 17-11003.

[138] Docket No. 24-02026.

[139] House Bill 3546, 83d Leg. Assemb., Reg. Sess. (Or. 2025).

[140] *Id.* § 2.

[141] *Id.*

conditions including a minimum duration of 10 years and payment obligations.[142]

2. Minnesota—Additional Restrictions on Data Centers' Water Use

Minnesota representative Peter Fischer introduced HF3007 in 2025, which would impose strict scrutiny on customers that would consume more than 100 million gallons of water per year or 250,000 gallons per day, such as data centers.[143] The bill is intended to protect aquifers, municipal water systems, and surface water supplies from being stressed from the negative ramifications of data centers.

3. Other Developments

One example is Texas Senate Bill 6, which is proposing a "kill switch" that would allow ERCOT to shut off power to data centers in times of grid emergencies.[144] Texas Senate Bill 6 was signed into law on June 20, 2025. Additionally, New York is proposing to impose renewable energy goals on data centers in Senate Bill S6394A.[145]

VI. CONCLUSION

While data centers offer tremendous opportunities for utilities, they also create unprecedented challenges that demand innovative responses. Legislative actions such as New Mexico's HB 93, enabling microgrids, and Utah's SB 132, offering alternative service options, demonstrate the kinds of forward-thinking solutions needed. As demand intensifies with the growth of artificial intelligence, overcoming these challenges will require utilities, regulators, data centers, and other stakeholders to move beyond traditional ratemaking and embrace creative policies and tariffs that protect existing customers while supporting responsible data center development.

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[142] *Id.* § 5.

[143] HF3007, 94th Leg., Reg. Sess. (Minn. introduced Apr. 1, 2025).

[144] *See* Meghan E. Griffiths et al., "Senate Bill 6 & Upcoming Changes to Texas Electric Regulations: What Data Centers and Large Power Users Need to Know," *JW News* (June 16, 2025).

[145] Senate Bill S6394A, 2025–26 Leg. Sess. (N.Y. 2025).