ENERGY FUTURES GROUP

Review of Large Load Tariffs to Identify Safeguards and Protections for Existing Ratepayers

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Introduction

Cloud computing, artificial intelligence ("AI"), and cryptomining have resulted in an unprecedented projected growth in power demand throughout the nation, and many forecasts find that such demand will continue to grow significantly over the next decade. In its February 2024 analysis, EIA estimated that cryptocurrency mining in the U.S. may represent up to 2.3% of the annual total U.S. electricity demand.[1] Between May and August of 2024, there were predictions that data centers alone could reach as much as 7.5-9% of the United States' total electricity consumption by 2030.[2] [3] Due to the size and frequency of requests, forecasted load related to data centers and cryptomining are ever changing evolving and can change every few months.

The increase in power demand for data centers and other large consumption activities can negatively impact existing customers on the electric system and limit or eliminate progress on renewable energy and greenhouse gas emissions goals.[4] Negative impacts can include increased electricity demand that cannot be met with current capacity and increased congestion, a new customer's operations ceasing after a utility's significant investment in distribution and/or transmission infrastructure and procurement of new capacity. These translate into increased and abandoned costs left to be recovered from existing ratepayers.

For data centers, the full operating capacity does not typically occur for the first few years of a utility service contract, which impacts the timing of cost recovery and cash flow from servicing the load for the utility. Therefore, it's pertinent to include safeguard provisions in tariffs and special contracts to protect ratepayers and environmental goals, such as ensuring the facility is paying its fair share of transmission and distribution costs associated with service, requiring a certain number of jobs for economic development rates, and meeting decarbonization plans and goals of both the host jurisdiction and the host utility.

This report consists of four sections. The first section briefly considers why technology giants, such as Microsoft and Amazon, have an interest in designing their own contracts related to data centers and clean energy procurement. Second, this report summarizes a review of high-density tariffs and special contracts established for large load customers. Through this review, common provisions were identified, as well as details on how certain provisions can serve as

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[1] *Tracking Electricity Consumption from U.S. Cryptocurrency Mining Operations*, U.S. Energy Information Administration, Feb. 1, 2024, https://www.eia.gov/todayinenergy/detail.php?id=61364.

[2] *How Data Centers Can Set the Stage for Larger Loads to Come*, Alexandra Gorin, Roberto Zanchi, and Mark Dyson, May 3, 2024, https://rmi.org/how-data-centers-can-set-the-stage-for-larger-loads-to-come/, accessed October 18, 2024.

[3] *Clean energy Resources to Meet Data Center Electricity Demand,* U.S. Department of Energy, August 12, 2024, https://www.energy.gov/policy/articles/clean-energy-resources-meet-data-center-electricity-demand#:~:text=Data%20center%20deployment%2C%20partly%20driven,of%20total%20load%20in%202023, accessed October 18, 2024.

[4] Although some may use the terms data center and cryptomining facility interchangeably, there is a distinction between the two, particularly when it comes to operation. Cryptomining facilities operate depending on the price signal from the crypto markets, with facilities operating up to 24 hours a day depending on the financials. Data centers have high load factors and operate on a 24/7 basis.

safeguards for ratepayers and/or environmental goals. The third section identifies ongoing proceedings and efforts to monitor as they could have a significant impact on the structure of high-density tariffs in the future. The final section of this report discusses certain safeguards more in-depth and identifies specific language for consideration in future tariffs and special contracts to serve as safeguards for ratepayers.

With the evolving market surrounding the electric service of data centers and large loads, it should be noted that this report was drafted based upon the information available throughout the latter half of 2024. The cases summarized in the third section of this report are based upon the information available at the time and will not include all details of the case, such as settlement proposals and commission orders. For clarity, in this document, a reference to a data center or cryptocurrency mining customer that the tariff would be applicable to will be identified as "customer," the utility will be referred to either as "utility" or "company," and those already on the power system will be referred to as "ratepayers."

Tech Giants' Interest

Technology giants, such as Amazon, Google, Microsoft, and Meta, all have significant stakes in locating and developing their data centers to support cloud computing and artificial intelligence. In addition to trying to develop a competitive edge in the data center world, each organization has corporate goals related to clean energy. Additionally, the technology giants may also have policies related to the implementation of their data centers. For example, requirements for onsite backup power. Price signals in the market help the companies determine which types of onsite power back up is procured (storage versus fossil fuel generators).

Corporations pursuing data centers may be proactively working with utilities on tariff development to find ways to reduce costs around onsite generation back up, energy costs, and achieving renewable energy goals. If a corporation is working with a utility to develop a tariff, the corporation can ensure the tariff supports its efforts to develop a competitive edge, while achieving corporate goals and requirements for siting data centers.

Review of Existing Tariffs and Special Contracts

A multitude of tariffs and special contracts were reviewed, from which a total of ten tariffs, each from a different state, were identified as being models for consideration based upon the safeguards included in the tariff language.[5] Regardless of the location, there are common rate structure elements, including:

- Contract length, requirements for investment by the new customer, and cost assignment.
- Demand, load factor, and power factor.
- Requirements to shed load and/or participate in demand response.

[5] A detailed summary of the reviewed tariffs and special contracts are provided in Appendix A of this report.

- Resource adequacy and requirements related to renewable or clean energy.

There is not one perfect tariff design that can adequately address the potential concerns related to large loads, and it is likely that large load tariffs will have to evolve over time, as loads and customers' requirements continue to change. However, there are elements of a rate structure that can serve as safeguards for existing ratepayers, ensure new customers pay their fair share of system costs, promote more efficient electricity usage, and minimize adverse impacts to clean energy and climate goals.

Figure 1 below provides the prevalence of safeguard provisions throughout the ten tariffs examined. A more detailed review of each of the requirements is provided in Appendix A, along with a link to the tariff or special contract. A green circle indicates that a safeguard is included as part of the tariff, while a red circle indicates that it is not a tariff requirement. If the circle is white, then it is considered not applicable, either because it was not mentioned, or in the case of demand response, it is not offered by the utility. As noted below, not one of the tariffs includes all the safeguard provisions discussed in this report. That is because safeguards are dependent upon a service territory's needs, which could pertain to ensuring the customer base does not suffer from stranded asset costs or to capacity and transmission constraints. For example, if there is excess capacity in a service territory, stakeholders may not be as concerned with having a robust demand response program or interruptible tariff.

Figure 8 Safeguards Included in Data Center and Cryptocurrency Tariffs

State	Utility	Document Type	Contract Length	Minimum Demand	Minimum Load Factors	Range for Power Factor	Requirements for Investment	Cost Assignment	Requirement to Shed Load	Load Subject to Interruptible Service	Maximum Hours of Interruptible Per Year	Demand Response
WY	Cheyenne Light, Fuel and Power Company d/b/a Black Hills Energy	SC	●	●	○	○	●	●	●	●	●	●
AR	Entergy Arkansas LLC	T	○	○	○	○	●	●	●	●	●	○
ID	Idaho Power Company	T	●	●	○	●	●	○	●	●	●	●
NY	New York Municipal Power Agency	T	○	●	○	○	●	●	●	○	○	○
SD	Montana-Dakota Utilities Company	T	●	●	●	●	●	●	●	●	●	●
WA	Grant County Public Utility District	T	●	●	○	○	●	●	●	○	○	●
IN	Indiana Michigan Power	T	●	●	○	○	●	○	●	○	○	●
KY	Kentucky Power	SC	●	●	○	○	○	○	●	●	●	●
MO	Evergy Missouri Metro	T	●	●	○	○	○	●	●	○	○	●
ND	Montana-Dakota Utilities Company	T	●	●	●	●	●	●	●	●	●	●

Note: For document type, “T” indicates a tariff and “SC” indicates a special contract.

Below is a more in-depth discussion of the safeguards in existing contracts and how they could be applied to future contracts for large loads.

Contract and Minimum Demand

The most prevalent safeguards include establishing a contract term length and minimum monthly demand to qualify for the tariff. The latter is a typical element of a commercial or industrial rate structure. This allows for targeting certain, or significant, energy loads. By establishing a monthly demand minimum for participation, the tariff can allow smaller load customers to receive service through another tariff, where the associated risks are not as significant. Minimum demand should be determined:

- in relation to the overall demand from the commercial and industrial customers and sector,
- in relation to the overall service territory's demand; and,
- through consideration of the available capacity in the system and the need for additional capacity builds.

Caution: The tariff should indicate if the minimum demand is based upon the location, service point, or customer. There is potential for customers to find ways to avoid paying the tariff by structuring the demand in a manner that stays below the minimum demand threshold, such has having multiple meter points for a single customer

Not only can demand serve as a minimum requirement for a tariff, but there can also be a demand threshold that requires customers above a certain level of demand to have a special contract. This can be useful in large load scenarios as it will allow for the utility to ensure safeguards are in place for existing ratepayers, the Company, and the customer. Idaho Power Company's Speculative High-Density Load tariff is offered to those with metered usage exceeding 2,000 kilowatt hours ("kWh") for at least three billing periods and requires customers with a minimum demand threshold of 1,000 kilowatts ("kW") to be served under this tariff. The tariff specifies that a special contract is required for loads over 20,000 kW.[6] The tariff language is provided below.

SCHEDULE 20
SPECULATIVE HIGH-DENSITY LOAD

If the aggregate power requirement of a Customer who receives service at one or more Points of Delivery on the same Premises exceeds 20,000 kW, the Customer is ineligible for service under this schedule and is required to make special contract arrangements with the Company.

Service under this schedule is applicable to electric service supplied to a Customer at one Point of Delivery and measured through one meter delivered at the primary or transmission service level. This schedule is applicable to Customers whose metered energy usage exceeds 2,000 kWh per Billing Period for a minimum of three Billing Periods during the most recent 12 consecutive Billing Periods. Where the

[6] Idaho Power Schedule 20 Speculative High-Density Load: https://docs.idahopower.com/pdfs/AboutUs/RatesRegulatory/Tariffs/20.pdf.

The contract term length is not related to the offering of the tariff; rather, this is a feature of the special customer service agreement. There are various lengths used by utilities and are likely dependent upon risk associated with the customer's service load. Of the arrangements reviewed, contract terms varied from two to ten years. In addition to the overall contract, some utilities required terms for renegotiation and/or pricing terms. Longer-term contracts, such as contracts of ten years or more, may have a shorter term related to pricing, as that is harder to accurately forecast over an extended period. Most of the contracts had contract length options within the three- to five-year span. This allows for limited forecasting on price and can accommodate ramp up in load, while also allowing for cost recovery of improvements to the system.

Some large load tariffs, such as those for facilities with a load greater than 50 MW, are proposing longer contract terms, such as 20-year minimums, with termination of the contract only if the facility ceases operation along with a penalty payment.[7] Large loads, like those more than 100 MW, will require significant investment in the electric system, both in capacity and the transmission system. Investments of that size are riskier given the level of cost recovery, depreciation of assets, the need for large capacity resource builds, and the fact that the significant load increased will be limited to one customer class rather than spread across multiple customer segments. The benefit of a longer contract term for this size of customer is that the cost recovery of the investment can be spread over the contract term. This will also allow for cost allocation that enables these customers to pay for their share of the utility investment needed to provide them with electric service. A negative of a long contract term, particularly if there is not much diversity in the customer class, is that an economic downturn or changes in the industry could significantly impact the load and need for service. For example, if the industrial customer class primarily consists of cryptocurrency mining customers, then a decrease in proof-of-work cryptocurrency value could limit the utility's revenue from that class. Therefore, it is important to develop a guardrail to alleviate the risk throughout the years of the contract. As noted in the Investment Requirement and Cost Assignment subsection below, the requirements for deposits throughout the life of the contract can offset some of this risk. A deposit can offset stranded costs if usage is below a minimum threshold or if the customer shuts down.

The contract itself can outline cost allocations to the customer, deposit terms, and credits to be returned to the customer for continued electric service and initial infrastructure investment to support the customer's load. Any known increases in load throughout the contract period can be addressed at the time of the contract being drafted, or through contract amendments, particularly if there is additional investment required to bring that load onto the system.

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[7] Examples of these proposed tariffs include Kentucky Power Company's New Tarif Industrial General Service: https://psc.ky.gov/pscscf/2024%20cases/2024-00305/20240830_Kentucky%20Power%20Tariff%20Filing.pdf and Appalachian Power Company and Wheeling Power Company's Application for Approval of Revisions of Schedules LCP and IP https://www.psc.state.wv.us/scripts/WebDocket/ViewDocument.cfm?CaseActivityID=625853&NotType=WebDocket.

Load and Power Factors

In addition to contract and minimum demand levels, tariffs and special contracts also may establish a minimum load factor or a range for power factor to encourage consistent monthly energy usage. Encouraging consistent energy usage will ensure that utilities can cover the fixed cost to serve the load. Demand ratchets, discussed below, are another method of ensuring fixed costs are covered.

Load factor is the average power usage compared to peak power usage during the same period, measured as a percentage. The higher the percentage indicates the more efficient use of electricity. The desired effect of a minimum load factor is to smooth out demand peaks to lower the strain on the power infrastructure and increase reliability.

Power factor, also measured as a percentage, indicates the effectiveness of the use of incoming power by a specific load or equipment. The higher the power factor, the more efficient performance of the load/equipment. More efficient usage of power can reduce energy costs and system losses, which translates into savings for all customers.

Load factors are dependent upon the customer's usage. For example, an office building, which has low usage on weekends, can experience a load factor of 40-60%, whereas a cryptomining facility that is dependent on the value of the currency may have a lower load factor due to spikey monthly usage. A large load data center, since it is constantly active, will have a high load factor of 90-100%. Ultimately, the load factor is dependent on the type of customer/industry. The utility can include a load factor charge to penalize those customers that do not maintain a certain load factor, based on the type of customers being served under that tariff.

Demand Ratchet

While residential customers are billed on energy usage, commercial and industrial tariffs also include a demand charge component. A demand charge, which is used to cover fixed costs associated with a customer's load, is based upon the peak demand during the billing period.[8] The demand charge typically reflects a per kilowatt hour charge based upon the highest level of demand during a billing period. This charge allows the utility to recover the cost of providing a reliable service during those high peaks. Utilities must provide reliable service at those maximum demand levels; however, a customer may have significant shifts in demand by hour, day, or month.

[8] Peak demand is based on the level of demand over a 15-minute period.

Demand Ratchet Tariff Example

Here is an example of an 80% demand ratchet over an 11-month period. In this example, the demand charge is based upon the greater of the actual peak demand in the billing month or 80% of the highest peak demand recognized in the prior 11-month period.

Ex. In September, a facility's maximum peak demand was 400 kW and in the prior 11-months, the facility recognized its highest demand peak of 560 kW in July. The demand ratchet dictates that the demand charge for the month of September would be based on the greater of the 400 kW of actual usage or 448 kW (80% of 560 kW). Therefore, the facility would be charged a peak demand of 448 kW, since that is greater, resulting in the customer paying for 48 kW of demand it did not actually use.

One way that utilities reduce risks of serving customers that have large swings in demand is to assess demand charges using a demand ratchet.[9] The demand ratchet establishes the level of the demand charge based upon the actual peak demand, or a percentage of the highest demand recorded during the previous certain number of months, whichever is greater. The percentage of demand typically ranges from 80-85% of the previous period's demand, and the previous period can range from 9 to 11 months. Utilizing a demand ratchet encourages the customer to maintain a level of demand that is consistent as the customer would have to pay for demand not utilized if it does not.

Demand Shedding

Another safeguard that is often included or available is the opportunity to shed load, either through an interruptible tariff or through a demand response program. The availability of an interruptible tariff or a formal demand response program appears to be dependent upon the size of the service territory and utility type (investor-owned / cooperative / municipality). Even without a formal avenue to shed load, such as an interruptible tariff or demand response program, some tariffs included language for the utility to be able to enter into demand shedding agreements directly with customers. The highlighted language below identifies Black Hills Energy's Blockchain Interruptible Service requirements for interruptible service that is detailed in individual service contracts.[10]

[9] For more information on demand, please visit; https://www.santeecooper.com/rates/understanding-your-demand/#:~:text=Ratchet%20%E2%80%93%20A%20ratchet%20charge%20is,work%20and%20is%20being%20lost..

[10] Cheyenne Light Fuel and Power Company d/b/a Black Hills Energy, Electric Rates Blockchain Interruptible Service: https://ir.blackhillscorp.com/static-files/5c33d769-2d19-43f8-8898-a37af25481ef#:~:text=This%20tariff%20is%20applicable%20to,Agreement")%20with%20the%20Company.

ELECTRIC RATES

BLOCKCHAIN INTERRUPTIBLE SERVICE ("BCIS")

The Agreement shall be in accordance with the provisions of this BCIS tariff and at a minimum shall include:

1. Electric service is for new interruptible load expected to be 10,000 kW or greater;
2. A term of at least two (2) years;
3. Specific pricing for all electricity purchased, with the pricing terms being subject to renegotiation at least every three (3) years;
4. Identification of Customer and Company costs for any required new electric infrastructure;
5. Details specifying how service will be interrupted by the Company;
6. Negotiated service interruption provisions (size of interruptible load, notice of planned interruption, duration of interruption, and maximum hours of interruption per year) ;
7. BCIS customers that fail to interrupt service as required by the Agreement shall be responsible for all costs incurred by the Company due to such failure;
8. A release of liability of the Company for any losses or damages, including consequential damages, caused by or resulting from any interruption of service;

With the level of some proposed data centers' load being equivalent to 50% or more of an entire system's load, utilities and their systems would benefit from having a tariff that allows for interruptible service, either through a formalized tariff or on a case-by-case basis, which can be negotiated with or without a special contract. As these loads are large and unique compared to past loads, having a flexible interruptible tariff will likely allow a utility to accommodate customers while accounting for risk and available system capacity. Not one of the tariffs reviewed identified the maximum or minimum level of load that can be interruptible, rather the tariffs required the service agreement to identify the level of firm load, or the amount of demand that cannot be interrupted. Some contracts did include a maximum number of hours or interruption events; however, it is not necessary to establish a maximum number of hours or event durations within the tariff. This can be negotiated based upon the load and customer. For transparency and fairness purposes, the utilities may want to disclose in the tariff the compensation for interruptible service.

Commercial and industrial ("C&I") demand response and interruptible load programs are typically more cost-effective than residential demand response programs. Depending on program saturation, C&I can provide a more significant shed load than a residential program due to a higher level of load per customer.

It is important that pricing of interruptible and demand response efforts be done in moderation, with enough incentive to the ratepayer to offset the inconvenience of shedding load and reducing activity, but not too high as to incentivize high profitability from shedding load as it can be costly to other ratepayers. Pricing structure, limitations on overall hours of interruption, and having the utility determine when an interruptible or demand response event occurs can eliminate concerns related to profitability. Compensation for demand response efforts should be considered based upon the level of load that can be shed and how quickly the load can respond to a request. Commercial and industrial customers, depending

on their industry, can typically shed higher amounts of load and in a short period of time (within 30 minutes to an hour). The ability to provide large amounts of load shedding quickly should be compensated appropriately to encourage customers to do so when necessary. Demand response or interruptible tariff compensation for load shedding should be compared among similar rate classes and rate design elements, such as number of hours and events and duration of the event. These factors, along with the need for capacity in a service territory, can influence the level of compensation offered for demand shedding.

Interruptible tariffs can have several elements to establish safeguards for the grid and to ensure that load reductions do occur. In Texas, there have been capacity issues when an interruptible service client does not respond to the request to reduce load. Some provisions that can be included in an interruptible service agreement include:

- Number of annual events and total hours. The number of events and overall hours for interruption per year should not be detrimental to the business.
- Event duration and seasonal requirements. There may be periods of time when demand reduction is more valuable than others, depending on the utility's peak season. This can influence the length of events, typically around two to four hours, and the timing of the events.
- Details of compensation that could be based on the level of demand or energy reduction, such as the dollar per megawatt, or could be offered through a discounted energy price throughout the year for participating.
- Penalty for not responding to an interruption event. The utility is relying on the reduction in load; however, if a customer does not respond, it can increase energy costs for others. Therefore, a penalty should be assessed to offset that increase in cost for not responding to the event and to encourage customer participation.

Investment Requirements and Cost Assignment

One way to limit risk to existing ratepayers from the addition of the customer's load is to assign costs to the customer, require contributions in aid of construction for system upgrades, and require surety bonds or minimum bills equivalent to a portion of the annual bill. These safeguards can lessen the risk to ratepayers by requiring the customer to be invested in the location. Assignment of costs for new or expanded electric service is not a new concept. Customers, both residential and commercial, can be responsible for line

extensions and other identified costs to receive service. Cost assignments should be designated in the tariff, including guidelines on how to calculate the minimum bill.[11]

Depending on the size and characteristics of the load, there is potential for other customers throughout the service territory subsidizing the cost of service for a large load customer, particularly when discounted rates are provided to the large load customer. One way to avoid subsidization for a particular customer is to evaluate if the revenues received from the large load customer exceed the cost to serve the customer. An example of this is Evergy Missouri Metro's Special High-Load Factor Market Rate ("Schedule MKT"), noted in Table 1 below, which requires the utility to track all costs to serve each customer under this tariff and verify that the revenue collected is higher.[12] This provision is designed to ensure that non-Schedule MKT customers are not held liable for any deficiencies in revenues or from stranded investment or costs from serving the customer over the length of the contract. To track the costs and revenues associated with this, the tariff outlines the following:

- Utility must identify costs and revenues with each customer on the Schedule MKT in its books and records.
- During a rate proceeding, the portion of the revenue requirement associated with the costs to serve the customer shall be assigned to the customer and not the overall customer base.
- If the customer's rate revenues do not exceed the cost to serve the customer in the customer's revenue requirement, there must be an additional revenue adjustment to cover the shortfall in a true-up period.
- The customer served by Schedule MKT can argue whether a specific quantifiable societal or other benefit (e.g., added jobs or tax revenue) should be considered to offset the deficiency.

One example of a cost assigned could be for a feasibility study. As large new loads are requested on an electric system, a feasibility study is usually conducted to understand what system upgrades may be needed to accommodate the load safely, depending on size thresholds, including transmission and distribution upgrades.[13] Sometimes, the tariff includes

Concern: The cost assignment concerns are not only limited within a service territory but also across state lines for transmission infrastructure. In April, the Federal Energy Regulatory Commission ("FERC") approved a regional cost assignment for the PJM. The transmission upgrades are being implemented to support a cluster of data centers in northern Virginia. While the location of the data centers is in Virginia, ratepayers in Maryland have been assigned 10%

[11] Source for orange box: *Utilities poised for datacenter earnings boost, want clarity on cost recovery,* Allison Good, April 18, 2024, https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/utilities-poised-for-datacenter-earnings-boost-want-clarity-on-cost-recovery-81249390, accessed October 18, 2024.

[12] Evergy Missouri Metro's Special High-Load Factor Market Rate Schedule MKT can be found here: https://www.evergy.com/-/media/documents/billing/missouri/detailed_tariffs_mo/special-high-load-factor-market-rate.pdf

[13] Requirements for a feasibility study is dependent upon the service territory and the jurisdiction.

a provision that assigns the cost of the feasibility study on the customer, like in New York, which is shown below.[14]

RIDER A

RATES AND CHARGES FOR CUSTOMERS REQUESTING HIGH DENSITY LOAD ("HDL") SERVICE

B. APPLICATION FOR SERVICE:

b. Upon payment of security acceptable to the Utility, the Utility shall conduct, or cause to be conducted a feasibility study to evaluate whether the requested load can be safely served by the Utility.

a. The feasibility study will identify what, if any, upgrades to the Utility's facilities are required to serve the customer.

B. CUSTOMER COST CONTRIBUTION

A Customer requesting service under this Rider will be responsible for:

a. reasonable costs of conducting the feasibility study; and

If the system can accommodate the load with minimal system upgrades, the risk associated with the customer's electric service is likely limited. However, if significant upgrades are required, then those costs serve as potential risks to existing ratepayers. The cost for the feasibility study should be assessed to the customer seeking interconnection; sometimes this is done through a flat fee. Furthermore, the charges associated with upgrades, including the proportional cost of acquiring or building new generation to serve the customer, should be required to be funded by the customer and tied to a deposit or contribution in aid of construction, to limit risk exposure of stranded assets to the existing customer base.

Historically, a large load facility, like an Amazon warehouse or industrial process, is more permanent and will contribute towards cost recovery immediately, as the plant ramps up in its first year of operation and then will remain on the system for the foreseeable future. On the contrary, cryptocurrency mining facilities are seen as volatile as they are price sensitive and can be operated in non-permanent facilities, and traditional data centers can take years

[14] See Leaf 95-96 of Rider A Rates and Charges for Customers Requesting High Density Load ("HDL") Service, https://ets.dps.ny.gov/ets_web/search/showPDF.cfm?%3B%3AIS%20%3B%2A%29LOUNWD%5CJ%5E8%2B"%2B5%2F0MD%2F0%28%231V%28S<WX%0A, accessed November 11, 2024.

to get to full capacity, which can delay cost recovery and place the burden on existing ratepayers.

A definition and summary of how each requirement serves as a safeguard is provided in Table 1 below. In addition, each requirement has an example and is linked to one of the tariffs discussed in Appendix A.

Table 1 Common Tariffs Requirements

Requirement	Definition	Serves as a Safeguard?	Example
Contract Term Length	Length of the service agreement. It can be limited to a minimum and/or maximum number of years. In addition to a contract term, there could be a term length for pricing terms.	Yes. A limited term could limit potential risk to customers, as well as ensure that system upgrades or investment in new generation are paid for by the new customer rather than existing ratepayers.	Evergy Missouri Metro limits contract lengths to 10 years, with pricing terms no more than 5 years
Minimum Demand	Level of demand needed to qualify for the tariff	Yes. Provides a threshold for customers to qualify for the tariff and can be designed to target high demand users	Contracts varied significantly between 500 kW and 100,000 kWh per month. This will be dependent on the service territory's load compared to the new customer load.
Minimum Load Factor	Average power usage compared to peak power usage during the same period. The higher the percentage, the more efficiently the electricity is being used.	Yes. Establishing a penalty for not achieving a minimum load factor will encourage the customer to have energy usage consistent with its maximum peak. Smoothing out peaks can lower the strain on power infrastructure and reliability.	If required, the minimum load factor required was 85%. The reduces the opportunity for significant fluctuations in load and thus the reliability of service is more easily predictable by the utility.

Requirement	Definition	Serves as a Safeguard?	Example
Range for Power Factor	Effectiveness of incoming power by a specific load (or equipment) at a given time. The higher the power factor, the more efficient the load's performance.	Yes. Inefficient power usage can result in additional costs on the system. Establishing a power factor range can reduce energy costs, reduce system losses, and improve voltage regulation, which can limit outages and allow for additional loads to be added to the system from that customer.	If required, this would be 90% or greater. The Montana-Dakota Utilities Company requires a power actor between 97% lagging and 97% leading.
Requirements for Investment	Designated cost elements that are funded directly by the new customer, sometime viewed as a deposit in the form of Contributions in Aid of Construction ("CIAC"), bonds, or actual payments. This investment may be returned to the customer overtime.	Yes. Delineating expenses for the customer to pay or cover with a deposit eliminates concerns about discriminatory rates. Additionally, it encourages investment by the new customers, thus removing the risk from existing ratepayers, and ensures a term commitment to the service territory.	This requirement varied by utility, but could include new electric infrastructure, line extension or system upgrades, and feasibility studies. Other utilities require bonds for Value of Lost Load dependent upon the RTO requirements or a bond for the average bill for a time period.
Cost Assignment	Designation of which expenses related to providing service to the customer is the responsibility of the customer and not socialized to other ratepayers.	Yes. Eliminates the risk of a customer not paying their fair share of the investment in providing electric service. Some commissions have required utilities to track all costs related to the customer to ensure during rate cases that the revenues from the customer offset expenses to provide service to the customer.	Evergy Missouri Metro has a requirement to track all costs to serve the customer and verify that revenue collected is higher. The New York Municipal Power Agency requires costs associated with the purchased power adjustment and rate statement to be allocated to the customer.

Requirement	Definition	Serves as a Safeguard?	Example
Requirement to Shed Load	Utility requires the customer to drop a portion of its load during events with notice.	Yes. Increases system reliability and reduces capacity costs, depending on the type of event requiring load shedding. This could be done through an interruptible service rider, service agreement, or a formal demand response program.	Approximately half of the tariffs have a load shed requirement. The majority vary by contract. If there is an interruptible schedule, the customer is typically not subject to a demand response program. If there is not an interruptible program, then demand response programs were often, but not always available. Grant County Public Utility District does not offer an interruptible tariff or a demand response program through tariffs but does do arrangements on a customer-by-customer basis.
Load Subject to Interruptible	Can be a determined capacity subject to interruptible service (such as non-firm demand) or the amount of time when an interruption event may be announced.	Yes. While the tariff language can indicate a cap on the level of interruptible load to be included or excluded, it is recommended that the level of load be negotiated on a per customer basis.	For those requiring interruptible load, the amount of load subject is established in the contract with the customer. It is often limited to non-firm demand.
Maximum Hours of Interruptible per Year	A defined limitation on the number of hours that load can be interrupted per year. This is typically accompanied by penalty language in the event the customer does not respond to the interruptible load request.	Yes. Designating a maximum number of events or hours, or even length of events, can encourage participation from customers in an interruptible schedule.	There is a significant range in the number of hours, if any were specified in the tariff. Entergy Arkansas limits the maximum number of hours to 40 or 80 hours, depending on notice time, while other utilities such as Idaho Power Company set limits of 225 hours per year.

2024 Proposed Large Load Tariffs

Ohio

In Ohio, there are opposing opinions between the utility, AEP Ohio, and the technology giants like Amazon, Google, Meta, as well as the Data Center Coalition on the structure of large load tariffs. In July 2024, AEP Ohio, in its role as a distribution utility, proposed two new tariff designs as a result of an influx of data center load requests in its service territory in May 2024.[15] The initially-proposed tariff included two components, a Data Center Power designed for customers with a monthly demand of 25 MW or more, and a second Mobile Data Center component for cryptomining facilities with a monthly demand of 1 MW or greater.[16]

As of January 2025, there were two competing settlements that diverged substantially from the initial proposal, and the case is still pending before the Ohio Public Utilities Commission, with hearing dates in December 2024 and January 2025.[17] Depending on the decision in the case, it could set precedent and baseline safeguards throughout the nation as the filing's proposed terms have not been collectively included in any other utility tariffs for data centers.

The primary components of the initial proposal were changes to an existing rider, known as the Basic Transmission Cost Rider ("BTCR").[18] Currently the BTCR sets the minimum demand charge for a customer at 60% of the contracted capacity. AEP Ohio's initial proposal indicated that the amount was too low and sought to increase the minimum demand charge to 90-95% of the contracted demand. This is due to the significant difference for large load customers between the minimum and actual bill if all contracted load is utilized. In addition, AEP Ohio initially requested that data centers enter into 10-year service contracts to ensure funding for the significant investment that the utility will need to make over the next decade to accommodate the data center load interconnection requests. An exit fee was proposed for customers in the 10-year contract to pay to leave the contract after 5 years. As noted in the safeguard above, AEP Ohio is implementing elements to provide safeguards not only for ratepayers but also for the utility itself as it endeavors to grow the system. If the data centers are not located in the service territory after AEP Ohio builds out the transmission system, the unneeded capacity costs will be passed along to ratepayers located throughout PJM.

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[15] Application for approval of New Tariffs By Ohio Power Company, *In the Matter of the Application of Ohio Power Company for New Tariffs Related to Data Centers and Mobile Data Centers,* Case No. 24-508-EL-ATA, https://dis.puc.state.oh.us/ViewImage.aspx?CMID=A1001001A24E13B42822J00948.

[16] Direct testimony of Matthew S McKenzie on behalf of Ohio Power Company, *In the Matter of the Application of Ohio Power Company for New Tariffs Related to Data Centers and Mobile Data Centers,* Case no. 24-508-EL-ATA, tariff pages begin on page 32, https://dis.puc.state.oh.us/ViewImage.aspx?CMID=A1001001A24E13B43247C00950.

[17] Full docket available at: https://dis.puc.state.oh.us/CaseRecord.aspx?CaseNo=24-0508

[18] Direct testimony of Matthew S McKenzie on behalf of Ohio Power Company, *In the Matter of the Application of Ohio Power Company for New Tariffs Related to Data Centers and Mobile Data Centers,* Case no. 24-508-EL-ATA, tariff pages begin on pages 15-16, https://dis.puc.state.oh.us/ViewImage.aspx?CMID=A1001001A24E13B43247C00950.

Provisions within the initially-proposed tariff that can serve as safeguards for ratepayers are summarized below:

- Minimum Load Eligibility
  - Tariff is applicable to customers requesting a minimum demand of 25 MW of service at a single location. The tariff would also be applicable to a parent company with multiple data centers that have an aggregate monthly maximum demand greater than 25 MW within a 24-month period.
    - By establishing aggregate demand for parent companies, this ensures that data centers locating around the service territory are not circumventing the eligibility requirements for the tariff.
- Minimum Billing Demand
  - Load ramp period which establishes monthly peak load requirements as the facility comes online and requires that the overall requested load of the facility commence service within three years. During the ramp up period, billing demand shall not be less than 90% of the customer's load ramp contract capacity.
    - This ensures that the fixed costs associated with serving this customer's level of load are paid for by the customer. Even if the customer has not reached that level of demand, the utility is already incurring the cost to provide services at the contracted demand levels.
  - Monthly billing demand once a customer is beyond the load ramp period shall not be less than 90% of the greater of (a) customer's contracted capacity or (b) customer highest previously established monthly billing demand during the past 11 months.
    - The inclusion of a demand ratchet ensures the customer is paying the fixed charges associated with this customer's demand.
- Range for Power Factor
  - Includes an excess reactive demand charge, assessed for each kVAR of reactive demand, leading or lagging, in excess of 50% of the metered demand.
    - This ensures that the customer is paying its fair share of the fixed charges to provide service, as it is based on the level of capacity contracted and not used.
- Retail Supplier Notice
  - If a customer wants to switch from standard offer service to a competitive supplier, then the customer must provide the utility with notice 60 days prior to the end of the supply period covered by the auction. The customer must remain on standard offer service for the six month period in which the customer has been receiving standard offer service.
    - This ensures that the utility does not over procure energy through the supply auctions.
- Contract Period
  - The initial contract period cannot be less than 10 years, including the load ramp period. There is an exit fee, equal to the minimum charges for 36 months after the notice of the termination, if the customer elects to leave after the completion of the 5th year of the contract.

        - The contract term is the average contract length and has an exit fee schedule that is designed to avoid stranded asset costs.
- Collateral Requirements
    - Customers must meet a credit and cash collateral requirement relative to 50% of the total minimum charges for the full contract term. The amount of collateral is reduced by one year's minimum charges for each year the customer is energized and makes on-time electric service payments. If the financial position of the customer changes over the term of the contract, the Company may ask for updated information and re-evaluate the collateral requirements.
        - This provision is unique compared to others reviewed, as the collateral is for the full contract term and the reduction of the collateral is based upon timely payments. Furthermore, the collateral provisions are typically calculated ahead of the contract signing and do not have re-evaluation requirements. This last provision would be useful as the industries related to cryptomining and data centers are ever evolving and dependent on a number of factors, such as contracts and price signals.
- Demand response
    - The initially proposed contract lacks a provision related to interruption outside of a requirement for the customer to reduce its demand during an RTO- or company-declared emergency event. There is a lack of detail related to the emergency events and no mention of voluntary interruptible events. While it is important to be able to react to emergency events, given the size of the loads anticipated, the ability to interrupt load for reliability purposes, particularly to address local reliability issues, would be of significant benefit to the system. While it may not be a standard provision, this tariff should have a special contract provision to determine interruptible load levels from large load facilities.

As noted above, as of this publication date, the case was ongoing with a multi-day hearing held on many of the issues covered above.

Indiana

On November 22, 2024, Indiana Michigan Power Company (I&M) introduced a settlement, involving all parties to the case including tech giants Amazon and Google and the Indiana Office of Utility Consumer Counselor, to amend their industrial power tariff.[19] This tariff is applicable to new or expanded facilities seeking to contract capacity of 70 MW or more or 150 MW of aggregated load across a company. Loads meeting this requirement are required to

[19] Before the Indiana Utility Regulatory Commission, *In the Matter of Verified Petition of Indiana Michigan Power Company for Approval of Modifications to its Industrial Power Tariff – Tariff I.P.*, Cause No. 46097, filed November 22, 2024, https://iurc.portal.in.gov/_entity/sharepointdocumentlocation/4aae5d78-18a9-ef11-8a6a-001dd80bd98a/bb9c6bba-fd52-45ad-8e64-a444aef13c39?file=46097_IndMich_Submission%20of%20Unopposed%20Settlement%20Agreement%20and%20Unopposed%20Motion%20for%20Acceptance%20of%20Out%20of%20Time%20Filing_112224.pdf.

have initial contracts of at least 12 years. The contract for the full load can start after a five-year ramp up period. Additionally, without incurring any fees, after the first five years of the contract, a customer can reduce its contract capacity by up to 20 percent, as long as the customer notifies I&M through written notice 42 months prior to the start of a PJM Interconnection delivery year. Contracts can be terminated, or contract capacity can be reduced beyond 20%, if an exit fee is paid and done so under the conditions listed above for reduced capacity.

In addition to these contract terms, the I&M settlement put forth several provisions related to I&M's integrated resource planning ("IRP"), interconnection, demand response, and clean tariffs. As part of its IRP, I&M has agreed to study grid enhancing technologies and tools to maximize the transmission grid efficiency and to relay the study's result in the next IRP. I&M also agreed to discuss any changes to its interconnection process with stakeholders, including large load entry requirements to the utility's queue, interconnection requirements, and load ramping requirements. To address emergency load reduction plans, I&M will meet with the parties to the settlement to discuss emergency response procedures and demand response opportunities for customers under this tariff. Finally, I&M agreed to collaborate with settling parties to develop a clean transition tariff proposal that will allow participants to support investment in carbon-free resources and ensure that all program costs are covered by participants and remain consistent with the five pillars in Indiana Code §8-1-2-0.6.

As part of the agreement, beginning six months after approval, I&M would provide semi-confidential reports to the Indiana Utility Regulatory Commission on new and pending large load customers. The settlement, which as of the publication of this report, has not been approved yet by the Commission,[20] also requires Amazon Web Services, Microsoft, and Google to each give $500,000 annually, for five years, to the Indiana Community Action Association, which supports low-income individuals in Indiana.

North and South Carolina

In North and South Carolina, Duke Energy has several initiatives they have proposed or adopted to address the growing demand from high energy users, including from data centers.

New rates for Data Centers and Industrial Customers

Duke Energy conducted a study which evaluated ways that high-volume users could pay their fair share into the system. The reason behind the focus has to do with the constrained power supply on their system compared to a few years ago. Duke is anticipating 18,000 gigawatt hours of additional load from new customers by 2028, with 25% of that load coming from data centers.[21] As a result of the study, Duke is adding electric supply contract terms for data centers and factories which require a minimum-take clause and upfront payments for infrastructure investments. The minimum-take clause requires qualifying customers to pay

[20] Full docket at https://iurc.portal.in.gov/docketed-case-details/?id=b8cd5780-0546-ef11-8409-001dd803817e

[21] *Duke Energy seeks take or pay power contracts for data centers,* Laila Kearney, May 7, 2024, https://www.reuters.com/business/energy/duke-energy-seeks-take-or-pay-power-contracts-data-centers-2024-05-07/ , accessed October 18, 2024.

for a certain amount of power regardless of actual use and requires upfront contributions for investment in system upgrades.

Clean Energy Tariff Options

In May 2024, Duke Energy signed memorandums of understanding with Amazon, Google, Microsoft, and Nucor to explore carbon-free energy generation and clean tariff options, called the Accelerating Clean Energy ("ACE") tariffs. The ACE framework includes a Clean Transition Tariff where Duke Energy would be able to provide commercial and industrial customers with new carbon-free energy options, while providing protection for non-participating customers and potentially lowering the long-term costs of investing in clean energy technologies.[22] The framework being proposed will occur in phases, with the purpose of helping customers meet their clean energy goals through tariff design and financing options.

One of those items that occurred outside of the framework included a green tariff proposal called the Green Source Advantage Choice Program, which was approved by the North Carolina Utilities Commission in July 2024. [23] The rider is offered to non-residential customers "who elect to direct the Company to procure renewable energy on behalf of the Customer's behalf" and who have a minimum maximum annual peak demand of 1 MW or an aggregated annual peak demand of 5 MW.[24] The tariff allows for large customers to increase Duke Energy's investment in solar energy by 150 MW per year, through a resource acceleration option in which customers can sponsor projects not selected in the company's annul competitive bidding process. The program limits procurement of renewables by the Duke Energy companies in North Carolina as follows:

- 4,000 MW of renewable energy from Duke Energy Carolinas ("DEC") and Duke Energy Progress ("DEP")
- DEP and DEC can only collectively own 2,200 MW of the capacity under this tariff
- The remaining 1,800 MW of renewable energy facilities must be developed by third parties that have entered into PPA's with one of the Companies or an eligible Green Source Advantage Choice customer.
- Annually, the Company must reserve 10% of the capacity for subscription by qualifying economic development customers. At the end of the third quarter each year, any unsubscribed economic development capacity can be released to all other qualified customers.

Some of the projections in place for the service territories customers include:

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[22] *Responding to growing demand, Duke Energy, Amazon, Google, Microsoft, and Nucor execute agreements to accelerate clean energy options,* Duke Energy News Center, May 29, 2024, https://news.duke-energy.com/releases/responding-to-growing-demand-duke-energy-amazon-google-microsoft-and-nucor-execute-agreements-to-accelerate-clean-energy-options, accessed October 18, 2024.

[23] Docket Nos. E-2, SUB 1314 and E-7, SUB 1289, Before the North Carolina Utilities Commission, *In the Matter of Petition of Duke Energy Progress, LLC, and Duke Energy Carolinas, LLC, Requesting Approval of Green Source Advantage Choice Program and Rider GSAC,* Commission Order dated July 31, 2024, *https://starw1.ncuc.gov/NCUC/ViewFile.aspx?Id=acd1a9a3-9b00-4a3a-9700-4dae3a293cc2.*.

[24] Compliance tariff currently under review by the North Carolina Utilities Commission, Rider GSAC Green Source Advantage Choice, dated August 14, 2024, https://starw1.ncuc.gov/NCUC/ViewFile.aspx?Id=0d45934a-06ea-478d-8301-7a3b4377415a.

- Customers can pay for their portion of clean energy costs either through an up-front contribution in aid of construction payment or on their bill over time through a levelized demand charge payment.
- If a customer elects battery storage, the charging cost will be assessed as a charge to the customer and the discharging value will be assessed as a credit to the customer, effectively netting the amounts on the customer bill.

The docket for this item is ongoing and the tariff has not yet been approved by the Commission. Additionally, the overall ACE framework is an ongoing process that should continue to be monitored.

West Virginia and Kentucky

On July 18, 2024, Appalachian Power Company and Wheeling Power Company filed proposed revisions to its Schedules LCP and IP to include tariff terms related to the addition of customers with loads of 200 MW or greater in West Virginia.[25] On August 30, 2024, Kentucky Power Company filed revisions to its Tariff Industrial General Service ("Tariff I.G.S.") to address customers with loads of 150 MW or greater in Kentucky.[26] The initially-proposed changes to the tariffs were the same and include the following:

- Initial contract period of 20 years
- Either the customer or utility must provide at least five years' written notice to discontinue service of the terms of the schedule; however, this shall not reduce the 20-year initial contract term.
- If a permanent closure by the customers occurs in the first five years of the contract, the customer must pay a one-time exit fee equal to five years of minimum billing.
- A customer must provide written notice five years in advance to reduce the contract capacity by up to 20 percent of the contract capacity; however, mutual agreement can result in reduce contract capacity in less than five years.
- Demand ratchet requirement of no less than 90 percent of the greater of (a) the customer's on-peak contract capacity, or (b) the customer's highest previously established monthly billing demand during the past 11 months, or (c) the customer's maximum demand created during the billing month.
- Collateral is based upon creditworthiness of the customer. The collateral shall be equal to 24 times the customer's previous maximum monthly non-fuel bill.

[25] Before the West Virginia Public Service Commission, *In the Matter of Appalachian Power Company and Wheeling Power Company Application for Approval of Revisions to Schedules LCP and IP,* Case No. 24-0611-E-T-PW, https://www.psc.state.wv.us/scripts/WebDocket/ViewDocument.cfm?CaseActivityID=625853&NotType=WebDocket.

[26] Before the Kentucky Public Service Commission, *In the Matter of Kentucky Power Company's First Revised Tariff Sheet 1-1 (Index), First Revised Tariff Sheet 8-2 (Tariff I.G.S.), and Original Tariff Sheet 8-3 (Tariff I.G.S.),* Case No.2024-0830, https://psc.ky.gov/pscscf/2024%20cases/2024-00305//20240830_Kentucky%20Power%20Tariff%20Filing.pdf.

As of January 2025, this case is still pending before respective Commissions.[27] Notably, on January 22, 2025, the parties in the West Virginia proceeding filed a joint stipulation and settlement agreement signed by all parties. Under the terms of the settlement agreement, which is still pending approval, the large load tariff will apply to customers seeking to contract capacity of 100 MW or more or 150 MW of aggregated load across a company. Many of the settlement's terms mirror the terms of the Indiana settlement discussed above: for example, terms pertaining to minimum contract length, monthly billing demand, and reducing capacity during the contract period. The settlement also requires the utilities to track revenue and capital investments related to new large load customers, with the customers having the ability to seek confidentiality protections. The utilities, with input from the settling parties, must also conduct or utilize analyses to minimize transmission needs, but the cost of such analysis cannot exceed $50,000 pending further agreement.

Additional Considerations

Powering large loads from cryptocurrency mining and data centers is still evolving, which means there are changes announced monthly. In addition to reviewing the tariffs, several proceedings before public service commissions were reviewed to assess the fairness, reasonableness, and non-discriminatory elements of various contracts considered by public service commissions, in order to to better understand which safeguards have legal standing or precedent. Using the information from those proceedings and the tariffs discussed in the second section, there are additional rate provisions that should be considered when designing a large load tariff. These provisions will not only safeguard existing ratepayers, but also the efforts to achieve clean and renewable energy goals.

Avoid Discriminatory Rate Structures

As established by the Robinson-Patman Act, the Federal Trade Commission prohibits public service commissions from allowing unduly discriminatory rates. Public service commissions require approved rate structures to be just, reasonable, and non-preferential. While some commissions have approved tariffs that explicitly identify cryptomining and data centers, concerns regarding discriminatory rates and tariffs have been rising up throughout the states, as well at the federal level.

To avoid discriminating against certain industries, tariffs can include definitions and categories of service that can be related to the volatile and non-permanent nature of cryptomining and data centers.

Rather than explicitly naming cryptomining or data centers, utility tariffs have used the following definitions for high density tariffs:

- "Load that is portable and distributable"
- "High energy use density"
- "High variable load growth or load reduction"
- "permanency of service cannot be reasonable assured"
- "Evolving Industry"

[27] Joint Stipulation and Agreement for Settlement, Case No. 24-0611-E-T-PW, filed Jan. 22, 2025, https://www.psc.state.wv.us/scripts/WebDocket/ViewDocument.cfm?CaseActivityID=634939&NotType=WebDocket.

Black Hills Energy in Colorado offers a service tariff for "Indeterminate Service," which is defined below.[28]

BLACK HILLS COLORADO ELECTRIC, LLC
d/b/a BLACK HILLS ENERGY

K. Indeterminate Service: Service that is of an indefinite or indeterminate nature where the amount and permanency of service cannot be reasonably assured in order to predict the revenue stream from applicant. For purposes of uniform application, "Indeterminate Service" may include such service as may be required for the speculative development of property, mobile buildings, mines, quarries, oil or gas wells, sand pits and other ventures that may reasonably be deemed to be speculative in nature.

In the Grant County Public Utility District ("PUD") service territory, in Washington, rather than adopting a tariff explicitly for cryptomining facilities and volatile users, the PUD adopted a new rate class, known as "evolving industries." Rather than explicitly call out specific users, it defined characteristics that those industries are known for. The definition of Evolving Industries rate class is based on three risk factors as shown below.[29] This rate class is charged a different rate than other C&I customers.

To decide if an industry falls into the evolving industries class, the district used a test focused on certain risk factors presented by the industry in question. These risks are:

- Regulatory risk — risk of detrimental changes to regulation with the potential to render the industry inviable within a foreseeable time horizon;
- Business risk — potential for cessation or significant reduction of service due to a concentration of business risk in an evolving or unproven industry or in the value of the customer's primary output; and
- Concentration risk — potential for significant load concentration within the district's service territory resulting in a meaningful aggregate impact and corresponding future risk to the district's revenue stream. Evaluation would begin to occur when industry concentration of existing and service request queue customer loads exceeds 5% of the district's total load.

[28] Black Hills Colorado Electric LLC d/b/a/ Black Hills Energy tariffs: https://www.blackhillsenergy.com/sites/blackhillsenergy.com/files/coe-rates-tariff.pdf, see PDF page 220.
[29] *A Blow to Crypto Miners Disputing Local Energy Rates,* James Gatto and Andrew Mina, April 10, 2020, https://www.sheppardmullin.com/media/publication/1859_A%20Blow%20To%20Crypto%20Miners%20Disputing%20Local%20Energy%20Rates.pdf, accessed October 18, 2024.

Renewable Energy Requirements

To date, most tariffs related to cryptomining and data centers do not have renewable energy or clean energy procurement requirements. Most efforts to have clean energy used to power these services are achieved through renewable energy credits pushed by a corporate goal rather than from a utility. Of the tariffs and proceedings reviewed, only one had an explicit renewable energy provision. Renewable energy requirements or clean energy tariffs should be designed in accordance with the "three pillars" of clean energy:

1. **Incremental – energy is from a clean energy source that incremental to existing generation.**
2. **Temporality or being time-matched – power is generated in the same hour it is consumed.**
3. **Deliverable – power is deliverable in the same grid region.**

In the Evergy Missouri Metro service territory, customers are subject to the Renewable Energy Standard Rate Adjustment Mechanism ("RESRAM") charge, which is an adjustable rate to allow for the utility to recover prudently-incurred costs related to procurement of renewable energy standard costs that are above and beyond the renewable energy costs already included in base rates. The provision included below states that a customer on Schedule MKT must pay future RESRAM charges unless they have renewable attributes that support its load which are greater than or equal to the existing Renewable Energy Standard.[30] As written, the provision rewards customers under this tariff if they are procuring renewable attributes on their own. Please note that the provision does not require actual investment in renewable energy resources to directly serve the load.

Special High-Load Factor Market Rate
Schedule MKT

6. A Schedule MKT Customer shall be subject to any future RESRAM charges imposed by Evergy Metro unless a Schedule MKT customer does have renewable attributes supporting its load greater than or equal to the then existing Renewable Energy Standard including any solar portfolio requirements. For Schedule MKT customers with renewable attributes supporting its load greater than or equal to the then existing Renewable Energy Standard, including any solar portfolio requirements, the MKT Customer's entire load will be subtracted from the calculation of total retail electric sales in in 20 CSR 4240-20.100. Renewable attributes means Renewable Energy Credits and solar Renewable Energy Credits that the MKT Customer has retired, or had retired on its behalf, documented annually from an established renewable registry.

While renewable energy credits are a step in the right direction, it is essential to include provisions to require data centers to invest in renewable energy in the surrounding community, either through investment in community solar, wind, roof top solar, and storage. Adding significant levels of load in communities, particularly those with clean energy targets,

[30] Evergy Missouri Metro Special High-Load Factor Market Rate Schedule MKT, https://www.evergy.com/-/media/documents/billing/missouri/detailed_tariffs_mo/special-high-load-factor-market-rate.pdf.

can derail clean energy achievements to date and could potentially result in increased environmental and health impacts due to increased generation needs. One of the three pillars of clean energy is incrementality. To achieve this, data centers must work to accelerate achievement of clean energy goals and/or offset any additional load powered by fossil fuel power plants. Utilities should work with potential customers to identify avenues to support the growth of renewable energy generation. For example, Meta worked with the Tennessee Valley Authority ("TVA") to develop a green tariff that supports the development of solar energy across the service territory to support Meta's corporate energy goals.[31] Depending on the economic development provisions, the green tariff is likely driving investment in the nearby community.

The clean transition tariff proposed by NV Energy in Nevada and Google and currently before the Public Utilities Commission of Nevada is another example of having clean energy serving large loads. The proposed tariff would allow for Google to power one of its data centers by purchasing power that NV Energy buys from the 115 MW Corsac Station Enhanced Geothermal Project at a price slightly higher than that paid by NV Energy. The tariff design prevents impacts to other ratepayers and allows Google to operate towards its 24/7 carbon free energy goal by 2030.

Power Purchase Agreements

Data center and cryptomining facilities are working with power plant operators and markets to establish power purchase agreements ("PPAs") to procure low-cost power options.[32] A power purchase agreement is between the buyer and seller, where a buyer commits to purchase an agreed amount of electricity over an established period. PPAs require approval from a utility commission if they involve a regulated utility.[33] There are two types of PPAs, physical and prepaid. A physical PPA is when the buyer takes physical delivery of the electricity generated either onsite in a behind-the-meter arrangement or offsite at a pre-determined point on the grid. A prepaid PPA is when the buyer pays the discounted cost of the PPA upfront. There is also something known as a virtual PPA, which is not a PPA but rather a financial instrument for a contract for difference.[34] Ultimately, state and local regulations on retail choice and electricity franchises establish the type of PPAs that are available by state.

As noted in Texas and by a case being considered by FERC, PPAs could have negative implications for other ratepayers. In Texas, a cryptocurrency company purchased low-cost electricity behind-the-meter through a PPA, which means that the energy utilized by the

[31] More information on the green tariff is provided here: *Meta Partners with Silicon Rand for Seven New Solar Projects in Georgia and Tennessee,* December 15, 2022, https://www.siliconranch.com/stories/meta-partners-silicon-ranch-walton-emc-tva, accessed October 18, 2024.
[32] For more information on power purchase agreements, please see: *Customer Power Purchase Agreements,* United States Environmental Protection Agency, https://www.epa.gov/statelocalenergy/customer-power-purchase-agreements, accessed October 18, 2024.
[33] Wholesale power sales, which do not involve an end user, are within the purview of the Federal Energy Regulatory Commission.
[34] Virtual PPAs are considered a financial instrument and are regulated by the Securities and Exchange Commission.

PPA customer is not offered in the ERCOT market. During a heat wave in summer 2023, ERCOT issued a request for curtailment of power. In response, the cryptomining company, through its wholesale agreements, sold its power into ERCOT, making over $24 million on energy savings, more than three times the revenue it made from cryptomining the prior month.[35] Due to the load flexibility and price sensitivity of cryptomining, the facilities are able to game the system to create additional profits at a significant cost to ratepayers, who are less flexible to respond to demand pressures and are not compensated for doing so, as ERCOT does not currently offer residential demand response programs.

Another case where ratepayers may not benefit is for the interconnection service agreement ("ISAs") change for a facility to provide power to a co-located data center or mine. Currently, the 2,228-MW Susquehanna nuclear facility in Pennsylvania provides power to PJM as a baseload resource.[36] However, in March, Talen Energy, which owns the nuclear plant and had a cryptomining facility and data center on site, sold the data center to Amazon and planned to sell up to 980 MW of nuclear power to Amazon through a behind-the-meter power purchase agreement. In late November 2024, FERC denied the application.[37]

Economic Development

The potential for economic development through increased tax revenues and potential jobs from large load projects is intriguing and viewed as a positive element of potential load growth by politicians and utilities. However, the opportunities of increased tax revenue are often offset by state and local government tax credits used to entice certain industries or large loads to locate in a specific area. Additionally, utilities often offer discounted rates to large loads, which means that there is potential for existing ratepayers subsidizing that customer and lower potential tax revenue from the electric service. These discounts do not have to come from an economic development tariff, rather they can be supported by existing laws and incentives which provide these to new loads and entities building in certain areas.

The issue with economic development for cryptomining facilities and data centers is that they typically do not produce a substantial number of full-time equivalent jobs compared to the level of load added to the system. Furthermore, with the tax credits, there is limited net tax revenue being provided to the area.[38] As a result, the economic development discounts provided to customers result in limited to no benefits to the area and can expose those living in the area to added risks and increased bills, as previously identified.

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[35] "Texas Leaders worry that Bitcoin mines threaten to crash the state power grid," Keaton Peters, The Texas Tribune, July 10, 2024, https://www.texastribune.org/2024/07/10/texas-bitcoin-mine-noise-power-grid-cryptocurrency/, accessed October 18, 2024.

[36] *Talen-Amazon interconnection agreement needs extended FERC review: PJM Market Monitor,* Ethan Howland, July 11, 2024, https://www.utilitydive.com/news/talen-amazon-interconnection-agreement-ferc-constellation-vistra/721066/, accessed October 18, 2024.

[37] https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20241101-3061&optimized=false; https://www.utilitydive.com/news/ferc-interconnection-isa-talen-amazon-data-center-susquehanna-exelon/731841/

[38] Reference for the orange box text: *Protect SC Consumers From Data Center Costs,* Frank Knapp, South Carolina Daily Gazette, September 12, 2024, https://scdailygazette.com/2024/09/12/protect-sc-consumers-from-data-center-costs/, accessed October 18, 2024.

With the focus from politicians on attracting new industries, utilities may want to consider reviewing and revising their economic development riders that allow for discounted rates. One AEP utility, Indiana Michigan Power in Indiana, sunset its Economic Development Rider tariff and adopted its Economic Development Rider 2 tariff, which increased the level of minimum demand and the minimum number of full-time equivalent jobs and capital investment guidelines. A summary of the differences to qualify for a discounted rate through the Economic Development Rider 2 is provided below.[39]

INDIANA
Economic Development Rider 2 (EDR 2)

To qualify, a new or expanding business must meet the following minimum criteria:

New Customer Criteria

- Add 500 kW or greater to one metered account
- Create at least 20 full-time equivalent (FTE) jobs or make a capital investment of $2,000,000 or more at the service location.

Existing Customer Criteria

- Increase billing demand by 250 kW or more above the Average Billing Demand during the 12 months prior to the date of application on one metered account
- Achieve a score of 100 or greater using the following calculations:
    - Base Score = New FTEs created X 10 + Capital Investment / 10,000
    - Load Multiplier = Estimated Load Increase (kW) / Base Average Billing Demand (Maximum of 1.0)
    - Final Score = Base Score X Load Multiplier.

Customer Account Status	Final Score	Discount Percentage on Total Non-Fuel Bill				
		Years 1 - 4	Year 5	Year 6	Year 7	Year 8
New	--	12.0%	9.0%	6.0%	3.0%	0.0%
Existing – Higher	> 200	6.0%	4.5%	3.0%	1.5%	0.0%
Existing – Lower	100 - 200	4.0%	3.0%	2.0%	1.0%	0.0%

Siting with Generation

As part of large load facilities procuring low energy costs, some are locating themselves near the power sources to ensure availability of low-cost energy. Not only are consuming companies looking to site near low-cost generation, but so are utilities. Several coal power plants have been revived or experienced increased run time in order to support new large loads.

[39]Indiana Michigan Power, Indiana Economic Development Rider 2, https://www.aep.com/assets/docs/economic-development/IN-EDR-2023-App.pdf.

While there is an option to build new generation, co-locating the data center or cryptocurrency facility with an existing coal or gas plant slated for retirement or transition to a gas-fired plant can be an attractive energy source for larger users. This can result in increased greenhouse gas emissions and local air and water pollution due to smaller, less efficient plants being built or from the proliferation of coal-fired plants that may have difficulty with emission compliance. Additionally, while some large loads are considering nuclear power sources, there are concerns about capacity limitations and increased wholesale market prices if such power plants dedicate power directly to a customer rather than to the open market.

Including Projected Loads in Forecasts

Prospective data load centers and cryptomining facilities are seeking the best electricity rates and terms. This can result in utilities over-forecasting new load additions and capacity needs. Inclusion of the loads into utility forecasting needs a level of certainty as to whether a project will move forward or not, and sensitivity analyses need to properly account for the level of load that may not come to fruition. A utility's capacity planning cycles will likely never match up with discussions of potential customers' loads. Therefore, utilities should assess the likelihood of the load addition using elements such as where the new load is in the interconnection process, whether a feasibility study has been conducted, and whether the location has been procured, such as through a land sale/lease contract or local zoning approval.

Providing reasonable estimates of large new loads is extremely important, as it can require investment in not only new generating capacity, but also the transmission and distribution systems. If utilities utilize their planning processes, such as integrated resource planning ("IRP"), or a regional transmission operator does long-term planning of new transmission infrastructure, those entities could invest in capacity and grid system upgrades that end up not being needed if the large loads do not come to fruition. This results in existing customers footing a bill for stranded assets and less load and fewer customers to share those stranded assets costs across.

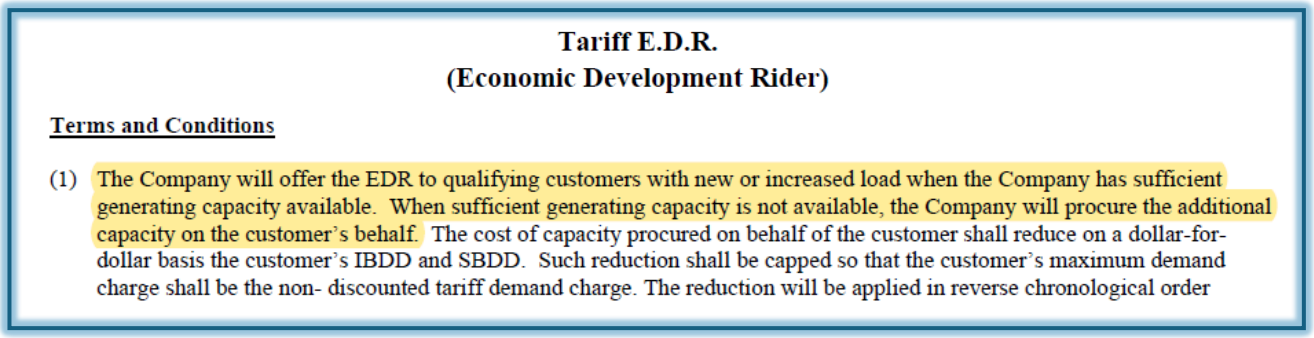
Mitigating over- and under-building of assets ultimately resides with the utilities and their planning models.[40] The planning models themselves need to not only account for customer load growth requirements over a long-term, but they also need to assess transmission and distribution opportunities and investments in distributed energy resources, such as energy efficiency, demand response, renewable energy, and storage. With all that said, there does not seem to be a utility or transmission operator that has established a process that can properly account for large load additions. For example, in 2023, Georgia Power submitted a one-year update to its 2022 IRP filing, indicating that the utility's demand increased by 20% by 2030 compared to the prior year's filing. There was significant uncertainty among the added load, particularly as to where this projected increase in demand was in the process of

[40] *Demand Better: How growing demand for electricity can drive a cleaner grid*, Jeremy Fisher, Laurie Williams, Dori Jaffe, Megan Wachspress, Sierra Club, September 2024, https://www.sierraclub.org/sites/default/files/2024-09/demandingbetterreportfinal_sept2024.pdf, p. 24, accessed October 18, 2024.

being interconnected. Transparency regarding potential new loads in the planning process—including the timing of the interconnection process and feasibility studies and ramp up of load over time—can be beneficial in ensuring sufficient investment in capacity.

Adequate Available Capacity

Kentucky Power's Economic Development Rider ("EDR") tariff requires there to be sufficient capacity to accommodate the increased or new load proposed by the customer. If sufficient capacity is not available, the cost of capacity to serve the new load must be passed on to the customer, by decreasing the discounted rate received by the customer. This provision is made to ensure that if capacity is needed to serve the load, that those costs are not passed on to the existing ratepayers. Not limited to EDRs, tariffs can include limitations on the level of load served by a certain tariff, such as Idaho Power Company's Schedule 20 Speculative High-Density Load.[41]



Tariff E.D.R.
(Economic Development Rider)

Terms and Conditions

(1) The Company will offer the EDR to qualifying customers with new or increased load when the Company has sufficient generating capacity available. When sufficient generating capacity is not available, the Company will procure the additional capacity on the customer's behalf. The cost of capacity procured on behalf of the customer shall reduce on a dollar-for-dollar basis the customer's IBDD and SBDD. Such reduction shall be capped so that the customer's maximum demand charge shall be the non- discounted tariff demand charge. The reduction will be applied in reverse chronological order

Conclusion

An ideal tariff will limit risk based upon the load being added to the system. There are several ways to achieve this and therefore, there is not one uniform set of safeguards that should be established. However, at a minimum, tariffs or special contracts should include the following:

1. For large loads under 50 MW, contract terms are not longer than 10 years, and loads larger than 50 MW should consider longer contract terms such as 12-20 years. Either contract term should come with pricing and negotiation terms set intermittently throughout the overall contract term.
2. Minimum or tiered monthly load requirements to qualify for the tariff.
3. Penalties for not maintaining a good load factor (typically 85% or greater) or power factor (typically 90% or greater). Examples of this are provided in Table 1 above.
4. Establish minimum demand charges or a demand ratchet to ensure that a large customer's fixed charges for peak demand levels are recovered.
5. Identification of costs that should be assigned to the customer or the requirement for a bond or deposit to offset the cost risk to existing ratepayers. Requirement of

[41] Idaho Power Company Schedule 20 Speculative High-Density Load: https://docs.idahopower.com/pdfs/AboutUs/RatesRegulatory/Tariffs/20.pdf.

contributions in aid of construction for any grid upgrades related directly to providing service will offset potential for stranded assets costs.

6. To ensure that the large load customer is not being subsidized by the service territory's other customers, the utility should track costs and revenues from the large load customer and assess a true up mechanism if the revenues do not exceed the customer costs.
7. An interruptible service requirement that can be negotiated between the utility and the customer. An interruptible service agreement should include the number of events and total annual hours, length of events, load reduction requirement, and penalty payment for failure to respond. It should also have term limits to allow for renegotiation.
8. Adequate available system capacity, with a requirement for procuring new capacity to be backed by the customer or through the purchase of renewable energy.

While these elements can be considered as part of any tariff related to serving large loads that may be considered volatile or a significant impact to the system, these terms will vary based upon the service territory's characteristics and current ratepayers.

In addition to establishing safeguards in tariffs, utilities need to put forward reasonable forecasts which consider whether large loads will move forward to interconnection. As part of those forecasts, utilities and IRPs should take into consideration how large loads can be served by a variety of services including transmission and distribution upgrades and investments in distributed energy resources. Using distributed energy resources such as solar, storage, and energy efficiency can also assist utilities and states to meet their environmental goals.

State	Utility	Document Type	Link	Contract Length	Minimum Demand	Minimum Load Factors	Range for Power Factor	Requirements for Investment
Wyoming	Cheyenne Light, Fuel and Power Company d/b/a Black Hills Energy	Special Contract	https://ir.blackhillscorp.com/static-files/5c33d769-2d19-43f8-8898-a37af25481ef#:~:text=This%20tariff%20is%20applicable%20to,Agreement")%20with%20the%20Company.	Min 2 years; renogotiation at least every 3 years	10,000 kW	N/A	N/A	New electric infrastructure, line extension or system upgrades
Arkansas	Entergy Arkansas LLC	Tariff	https://cdn.entergy-arkansas.com/userfiles/content/price/tariffs/eal_lphlds.pdf	N/A	N/A	N/A	N/A	Security deposit equal to 3 months of average estimated bill. Contributions in Aid of Construction for all network upgrades. Security Bond equal to Value of Lost Load Per MISO Schedule 28
Idaho	Idaho Power Company	Tariff	https://docs.idahopower.com/pdfs/AboutUs/RatesRegulatory/Tariffs/20.pdf	Special Contract required for over 20,000 kW	1,000 kW	N/A	90% or greater	Upgrades for interconnection facilities
New York	New York Municipal Power Agency	Tariff	https://ets.dps.ny.gov/ets_web/search/showPDF.cfm?%3B%3AIS%20%3B%2A%29LOUNWD%5CJ%5E8%2B"%2B5%2F0MD%2F0%28%231V%28S<WX%0A	N/A	>300 kW or load density exceeds 250/kWh/ft^2/year	N/A	N/A	Feasibility study, entire cost of new facilities necessary to supply requested service, cash deposit or Letter of Credit
South Dakota	Montana-Dakota Utilities Company	Tariff	https://puc.sd.gov/commission/Tariffs/Electric/mdu/Section3/20.pdf	3-5 years	10,000 kW	85%	Between 97% lagging and 97% leading	No
Washington	Grant County Public Utility District	Tariff	https://www.grantpud.org/templates/galaxy/images/Rate_Schedule_No_17.pdf	N/A	No minimum- separatedby greater or less than 200 kW	N/A	N/A	No
Indiana	Indiana Michigan Power	Tariff	https://www.aep.com/assets/docs/economic-development/IN-EDR-2023-App.pdf	N/A	500 kW	N/A	N/A	Create at least 20 full-time equivalent jobs or make a capital investment of $2 million or more at the service location, must apply and receive economic development assitance from the state, local government, or other public agency
Kentucky	Kentucky Power	Special Contract	https://psc.ky.gov/tariffs/Electric/Kentucky%20Power%20Company/Tariff.pdf	10 years	500 kW	N/A	N/A	N/A
Missouri	Evergy Missouri Metro	Tariff	https://www.evergy.com/-/media/documents/billing/missouri/detailed_tariffs_mo/special-high-load-factor-market-rate.pdf	No more than 10 years, with pricing terms no more than 5 years	100,000 kW/month or projected to be 150,000 kW within 5 years of being a new customer	85% or greater	N/A	N/A
North Dakota	Montana-Dakota Utilities Company	Tariff	https://www.montana-dakota.com/wp-content/uploads/PDFs/Rates-Tariffs/NorthDakota/Electric/NDElectric38.pdf	3-5 years	10,000 kW	85%	Between 97% lagging and 97% leading	N/A

State	Utility	Cost Assignment	Requirement to Shed Load	Load Subject to Interruptible Service	Maximum Hours of Interruptible Per Year	Demand Response	Requirement for Renewables or Traditional Generation	Requires Adquate Available Capacity	Notes
Wyoming	Cheyenne Light, Fuel and Power Company d/b/a Black Hills Energy	N/A	As defined in contract	As specified in contract	As specified in contract	No	No	N/A	
Arkansas	Entergy Arkansas LLC	N/A	Yes	Non-firm demand	40 or 80 hours	N/A	N/A	N/A	
Idaho	Idaho Power Company	N/A	Yes	Unclear	225 hours	N/A	N/A	Yes	
New York	New York Municipal Power Agency	Purchased Power Adjustment and Rate Statement	No	N/A	N/A	Not Offered	N/A	N/A	
South Dakota	Montana-Dakota Utilities Company	No	Yes	Specified in electric service agreement	200 hours	N/A	N/A	N/A	
Washington	Grant County Public Utility District	No	No	N/A	N/A	Customer by Customer Basis	N/A	N/A	Classified as an "Evolving Industry"
Indiana	Indiana Michigan Power	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Economic Development Rider. Requires that the customer provide to the Company's satisfaction that absent the availabity of the ridre, the new or increased demand would be located out of the Company's service territory or not place into service.
Kentucky	Kentucky Power	N/A	Yes	Specified in electric service agreement	N/A	N/A	N/A	N/A	Economic Development Rider
Missouri	Evergy Missouri Metro	Revenues must exceed costs	No	N/A	N/A	Special Interruptible Contract	A Schedule MKT Customer shall be subject to any future RESRAM charges imposed by Evergy Metro unless a Schedule MKT customer does have renewable attributes supporting its load greater than or equal to the then existing Renewable Energy Standard including any solar portfolio requirements.	N/A	
North Dakota	Montana-Dakota Utilities Company	N/A	Yes	Specified in electric service agreement	200 hours	N/A	N/A	N/A	