Large Loads: Interconnection,Tariff Designs, and State Actions

Montana Legislature's Energy and Technology Interim Committee
March 26, 2026

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This work was funded by the U.S. Department of Energy under Contract No. DE-AC02-05CH11231

ENERGY TECHNOLOGIES AREA
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Agenda

- Load forecasting and large load interconnection
- Large load tariffs
- State actions to address large loads

Load forecasting and large load interconnection

How electricity demand forecasts are changing

- Electricity forecasters from many different types of organizations (utilities, RTO/ISOs) are starting to adapt their forecasting methods
- These efforts vary widely in terms of improvement techniques and the level of maturity of the effort
- Several utilities and RTO/ISO have made changes to their forecast approaches to incorporate new demand drivers, resulting in sometimes substantial changes in their load forecasts over the course of a few vintages
- Only a few entities include forecasts of these Type B drivers at the distribution level

INCORPORATION OF MAJOR DEMAND DRIVERS BY VARIOUS FORECASTING ENTITIES

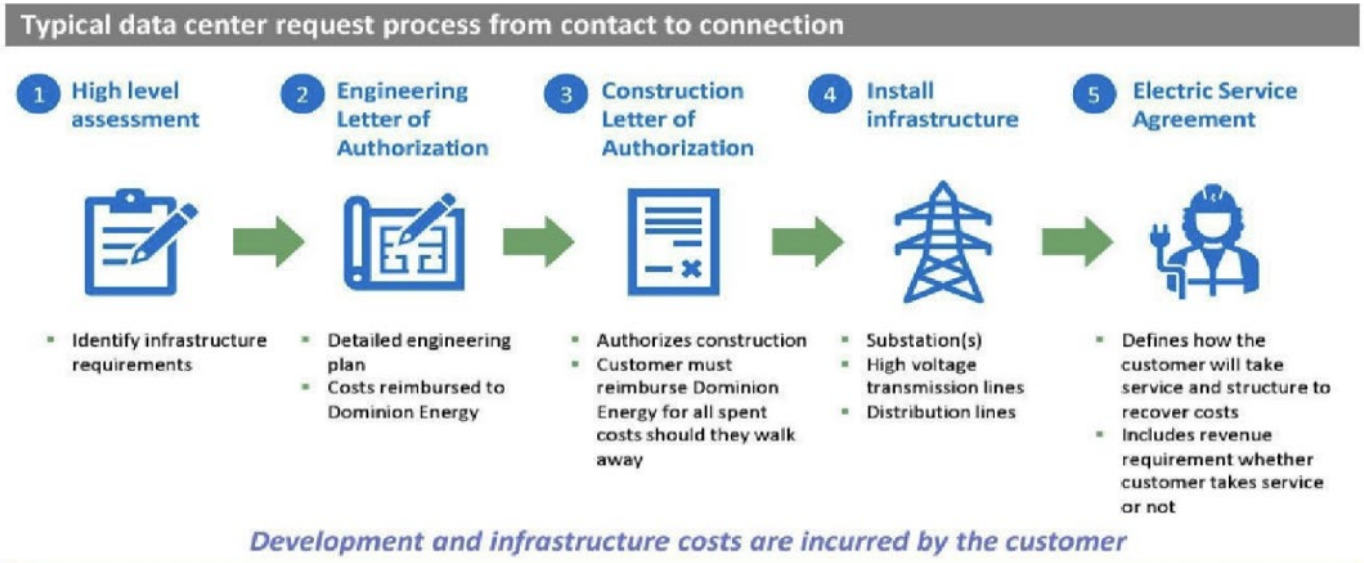
		Demand-Side Resources			Type B Load		Type A Load			
		EE	DR	DG	EVs	Electric Heating	Data Center	Indoor Agriculture	Electrolyzer	Industrial Onshoring
AZ	Arizona Public Service (APS)	✓	✓	✓	✓		✓			✓
AZ	Salt River Project (SRP)	✓	✓	✓	✓	✓	✓			
CA	City of Palo Alto	✓	✓	✓	✓	✓	✓			
CA	CleanPowerSF	✓	✓	✓	✓	✓				
CA	Los Angeles Department of Water and Power	✓	✓	✓	✓	✓				
CA	Pacific Gas & Electric (PG&E)	✓	✓	✓	✓	✓	✓		✓	
CA	Southern California Edison (SCE)	✓	✓	✓	✓	✓				
CA	San Diego Gas & Electric (SDG&E)	✓	✓	✓	✓	✓				
CA	Sacramento Municipal Utility District (SMUD)	✓	✓	✓	✓	✓	✓	✓*		
CO	Black Hills	✓	✓	✓	✓	✓	✓*			
CO	Colorado Springs Utilities (CSU)	✓	✓	✓	✓	✓				
CO	Public Service Company of Colorado (PSCO)	✓	✓		✓	✓				

Large load interconnection

- The number of large load interconnection requests is rapidly increasing.
- Interconnecting large loads can be complex, intersecting with distribution system planning, integrated resource planning and utility or RTO transmission planning.
- Often, there is not a publicly available description of a standardized process to interconnect a large load to a utility system. Information may be available, with varying degrees of specificity in a variety of proceedings (e.g., integrated resource plan, rulemaking, tariff).
- Speculative load interconnection requests have contributed to difficulties in developing load forecasts.
- Standardized and transparent processes can assist with incorporating large load service requests into load forecasts.

Dominion Energy (1)

Data center interconnection request process



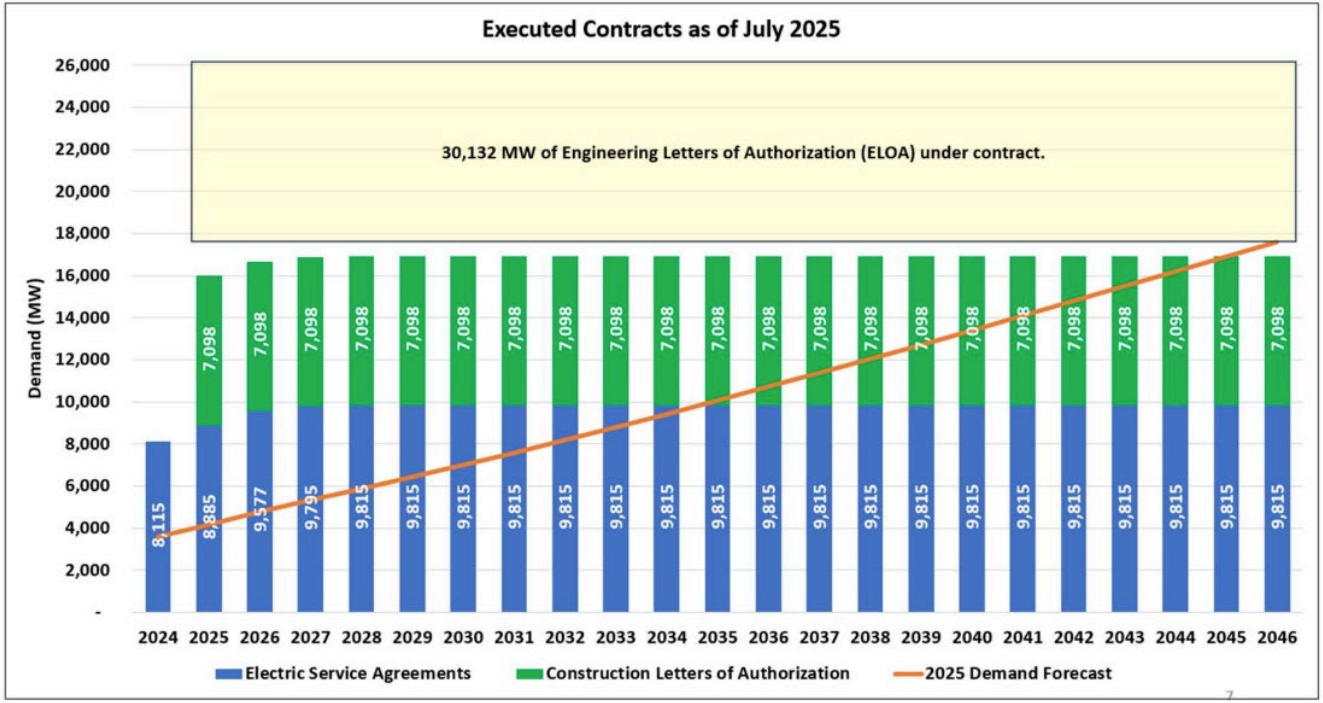
Source: Dominion Energy, Dominion Energy

Dominion Energy (2)

Dominion provides information on the quantity of load in different stages of interconnection in their IRP.

Construction Letter of Authorization are less certain (green bars)

Electric Service Agreements are certain (blue)



Source: Dominion

California energization process

California PUC decision expedites the process of connecting homes, businesses, electric vehicles and other loads to the grid.

- Provides transparency to process
- Adopts timelines
- Supports early engagement betweeen customers and utilities

Energization Process Steps & Responsibilities

Step #	Step Name	Description	Responsibility
1	Customer Intake	Customer submits energization request; IOU reviews and establishes "Application Final Submittal" date (AFS); energization clock starts when application is deemed complete and approved.	Shared: Customer initiates, IOU reviews/ approves
2	**Engineering & Design**	**IOU conducts field visits, engineering study, develops project design, determines project cost.**	**IOU**
3	Customer Dependencies	Customer obtains necessary permits, easements, signs contracts, pays fees, completes 3rd party approvals.	Customer
4	**Utility Dependencies**	**IOU obtains its own permits, easements, approvals from authorities having jurisdiction (AHJ).**	**IOU**
5	Customer Site Readiness	For non- Rule 29/45: Customer requests pre- construction meeting/ inspection and completes customer- side construction. For Rule 29/45: Customer requests pre- construction meeting.	Customer
6	**IOU Site Readiness**	**For non- Rule 29/45: IOU conducts pre- construction meeting and inspection. For Rule 29/45: IOU preforms site readiness work as required by the tariff.**	**IOU**
7	**Construction**	**IOU schedules and completes utility-side construction (including traffic control, outages, equipment install, etc.).**	**IOU**
8	**Service Energization Provided to Customer**	**Final inspections scheduled/ completed as required. IOU energizes service- project clock stops.**	**IOU**

Source: CPUC

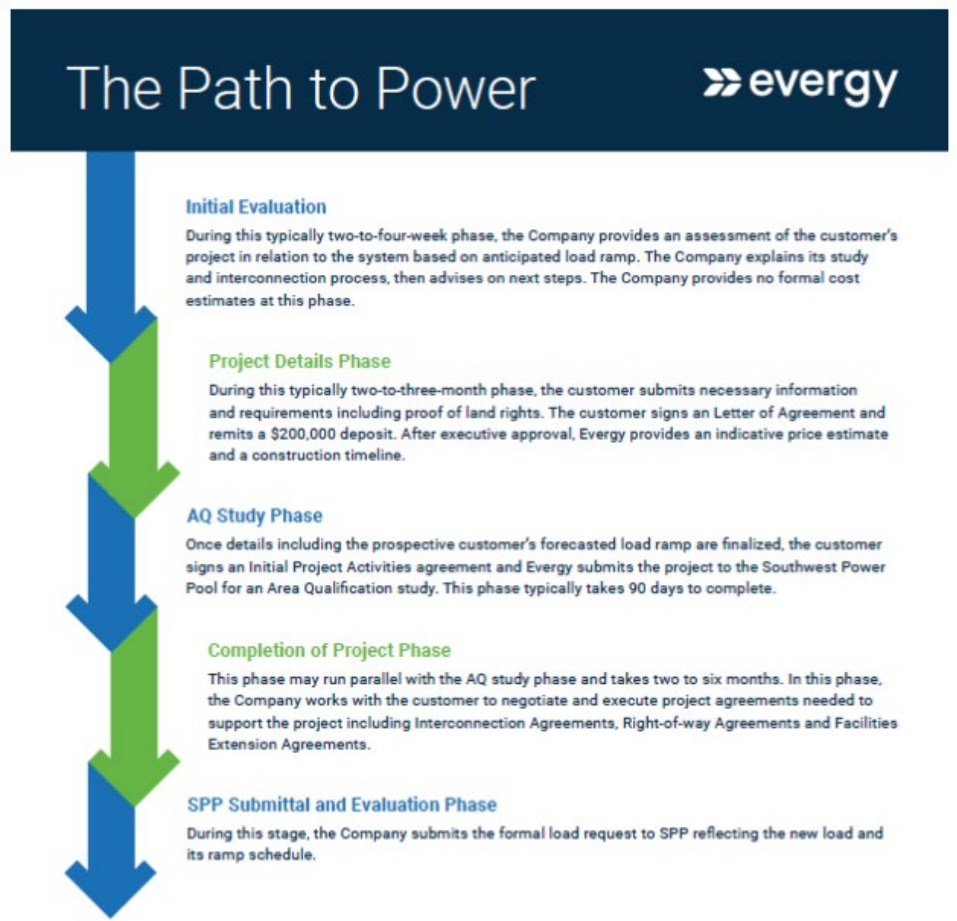
Idaho Power

Speculative High Density Load Interconnection Process

- Once a request for new Schedule 20 (Speculative High-Density Load) service is received, Idaho Power will perform a study or studies to determine what equipment or upgrades are necessary to interconnect the customer's load to Idaho Power's system.
- The customer pays the actual cost of all required interconnection studies.
- Any difference between the deposit and the actual cost of the study will be paid by or refunded to the customer. If a deposit of amount sufficient to pay for the completion of the study is not maintained, the Company may suspend work on the study.

Evergy Missouri

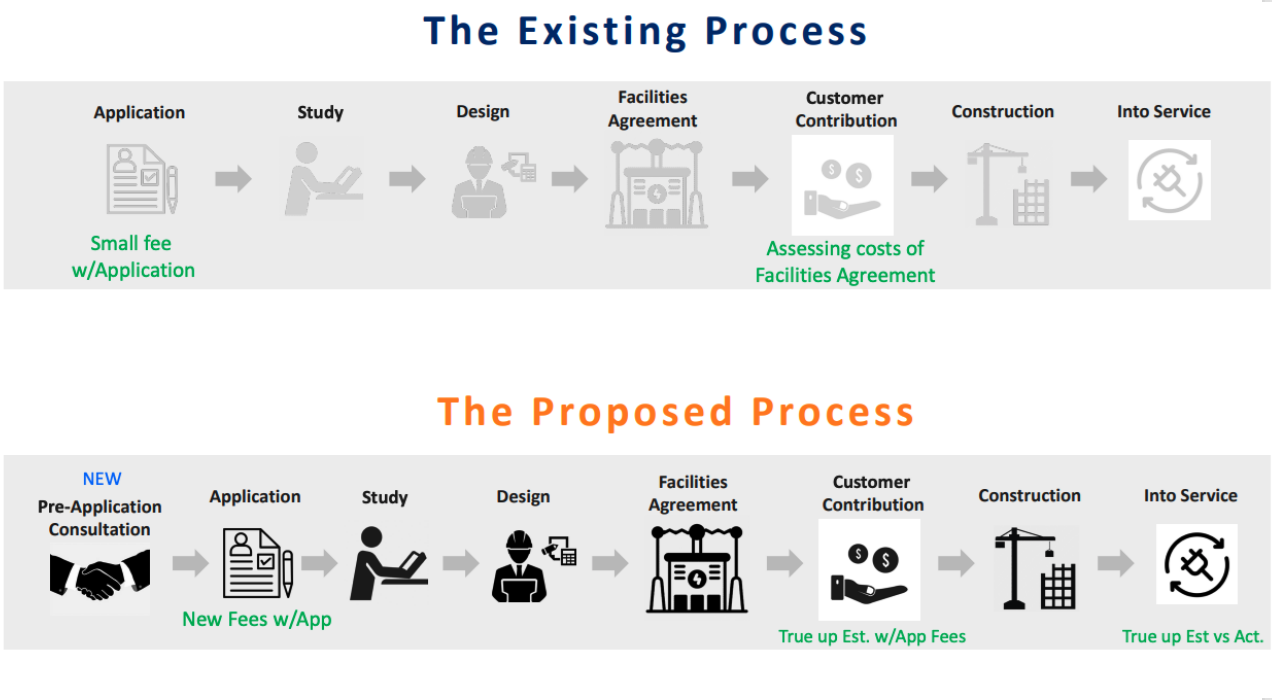
- Evergy's Large Load Power Service Rate Plan included a proposed interconnection timeline.
- Begins with initial assessment of the customer project and goes through final interconnection.
- The process is reflected in Evergy's General Rules and Regulations.



Grant Public Utility District

Proposed changes include:

- Applicants must submit load ramping plan
- Utility schedules pre-application meeting
- Revised application fees
- Added true-up



Source: Grant PUD

Large load tariffs

Reasons for introducing a large load tariff

Traditional Approaches to Large Customer Tariffs

- **Standard tariff**: Recover embedded costs through tariff-based prices, with some customer-specific assignment of T&D costs
- **Special contract**: Prices tailored to individual customers based primarily on recovering incremental costs, sometimes with a discount to promote economic development

Common Reasons for Introducing Large Load Tariff

- Mitigate **concerns about shifting costs** caused by very large new loads to other customers
- Reduce **risk of stranded assets**
- Provide large customers with improved options for **renewables procurement**
- Create a **standardized mechanism** to quicken and strengthen the process of signing up and interconnecting new loads

Other (less common) reasons

- Promote **economic development**
- Enhance **demand flexibility**

Timeline of select large load tariff proceedings

Pre-2023

Cheyenne Fuel Light & Power *(Aug 2016)*: WY commission approves CFLP's Large Load Tariff
NY Municipal Power Authority *(Jun 2018)*: NY commission approves NYMPA's Cryptocurrency Tariff
Entergy MS *(Dec 2018)*: MS commission approves new Large Load Tariff
Xcel MN/Northern States Power *(May 2019)*: MN commission approves proposed changes to Xcel MN's Competitive Response Rider
Dominion *(Mar 2020)*: VA commission approves market-based rate, an optional tariff available to large load customers

2023

Idaho Power *(May)*: ID commission approves Large Load Tariff
Entergy AR *(Dec)*: AR commission approves Large Load Tariff

2024

Entergy Louisiana *(Apr)*: LA commission approves revisions to Large Load, High Load Factor Power Service

PG&E *(Nov)*: Proposes Rule 30, requiring large loads to pay for electric grid upgrades in advance

Basin Electric (ND) *(Aug)*: FERC rejects Basin Electric data center & cryptocurrency tariff

2025

AEP/Indiana & Michigan *(Feb)*: IN commission approves Large Load Tariff
Salt River Project *(Feb)*: Board approves changes to E-67 rate
AEP/Appalachian Power and Wheeling Power *(Mar)*: WV commission approves new Large Load Tariff
NV Energy *(Mar)*: NV commission approves Clean Transition Tariff
Kentucky Power *(Mar)*: KY commission approves Industrial General Service
Georgia Power *(Apr)*: GA commission approves revised TOU-SC-15 tariff
AEP Ohio *(Jul)*: OH commission approves Data Center Power tariff
Dominion *(Sep)*: VA commission approves revised GS-5 rate
East Kentucky Power Cooperative *(Oct)*: KY commission approves new Data Center Power tariff
Evergy MO & KS *(Nov)*: Commissions approve separate LLPS tariffs
Consumers Energy *(Nov)*: MI commission approves amended General Primary Demand tariff
Ameren Missouri *(Dec)*: MO commission approves LPS tariff revisions

Florida Power & Light *(Feb)*: Proposes new large load contract service rates
Wisconsin Electric *(Mar)*: Files new Very Large Customer tariff
Rappahannock Electric Cooperative *(Mar)*: REC submits application for new Large Power Dedicated Facilities Rate Schedule
ComEd *(Jun)*: Files changes to General Terms & Conditions that raise the upfront costs for large load customer applications
APS *(Jun)*: Files proposed changes to its Extra High Load Factor rate
Xcel MN/Northern States Power *(Jul)*: OH commission approves Data Center Power tariff addressing data centers and crypto mining facilities
Duke Energy Florida *(Sept)*: Proposes new "Large Load Tariff" rate
Shenandoah Valley Electric Cooperative *(Oct)*: Submits application for new Large Power Dedicated Facilities Contract Service Rate
Delmarva Power & Light *(Dec)*: Proposes new General Service - Large Demand

Approved Applied Rejected

Short-term tactics to serve large customers

Short-Term Tactic	Example
1. Use an existing tariff for large customers	**Portland General Electric** relies on Schedule 90, Large Nonresidential Standard Service; **Xcel Energy** Northern States relies on existing Competitive Response Rider (CRR)
2. Introduce minor updates to existing tariffs to accommodate larger customers	**Ameren Missouri** embedded new requirements for large loads (≥100 MW) in its existing Large Primary Service rate (ongoing proceeding)
3. Rely on one-off energy service agreements (ESA) and contracts	**Duke Energy Indiana** and Meta (through "Blocke, LLC") entered into a special ESA with a PPA & market-based rates
4. Microgrid/on-site generation configurations to bring data centers online quickly, and optionally connect them to the grid later	**Entergy TX** partnered with Enchanted Rock, a microgrid developer, to deploy on-site backup generation for a large commercial customer. The generator will be run synchronously with the grid and can also operate in island mode.
5. Create more transmission headroom	**PG&E** relies on transmission line tap and remedial action scheme to create more headroom on the transmission system in the short-term

While short-term tactics can serve as stop-gap solutions, bringing an increasing number of large customers online efficiently will require durable solutions, **including changes/additions to tariff offerings**

Fundamental options for designing large load rates/tariffs

1	**Cost recovery approach**	**Direct assign:** Transparent demonstration of cost causation; customer-specific flexibility	**System average:** Reduced risk of disallowance if customer exits; consistent with philosophy of power system as a shared resource	
2	**Basis for recovered costs**	**Marginal/incremental costs:** Ensures no cost shift to other ratepayers; may attract load if marginal cost < embedded cost	**Embedded costs:** Consistent with pricing basis for most existing customers; benefits ratepayers if marginal cost < embedded costs	**Hybrid option:** Recover incremental cost for all demand above a threshold level
3	**New or existing tariff**	**Propose new tariff:** Provides more flexibility in rate design; avoids "baggage" associated with existing rates	**Leverage existing tariff:** Potentially less regulatory and administrative burden; less "fear of the unknown"	**Hybrid option:** Update existing rate and introduce new option
4	**Standardized or special contract**	**Special contract:** Provides customer-specific flexibility	**Standardized approach:** Streamlined negotiations and approval	**Hybrid option:** Default to standardized approach, with special contract option
5	**Available Customer Programs**	Optional customer programs include: **clean energy program** to help customers achieve their decarbonization goals, **load flexibility programs** and **behind-the-meter generation** to accelerate interconnection, support resource adequacy, and reduce power system costs		
6	**Risk Mitigation**	Tools to reduce stranded cost and cost shifting risks include: collateral requirements, minimum charges, exit fees, minimum term lengths, and "hold harmless" provisions		

Emerging trends in large load tariff design

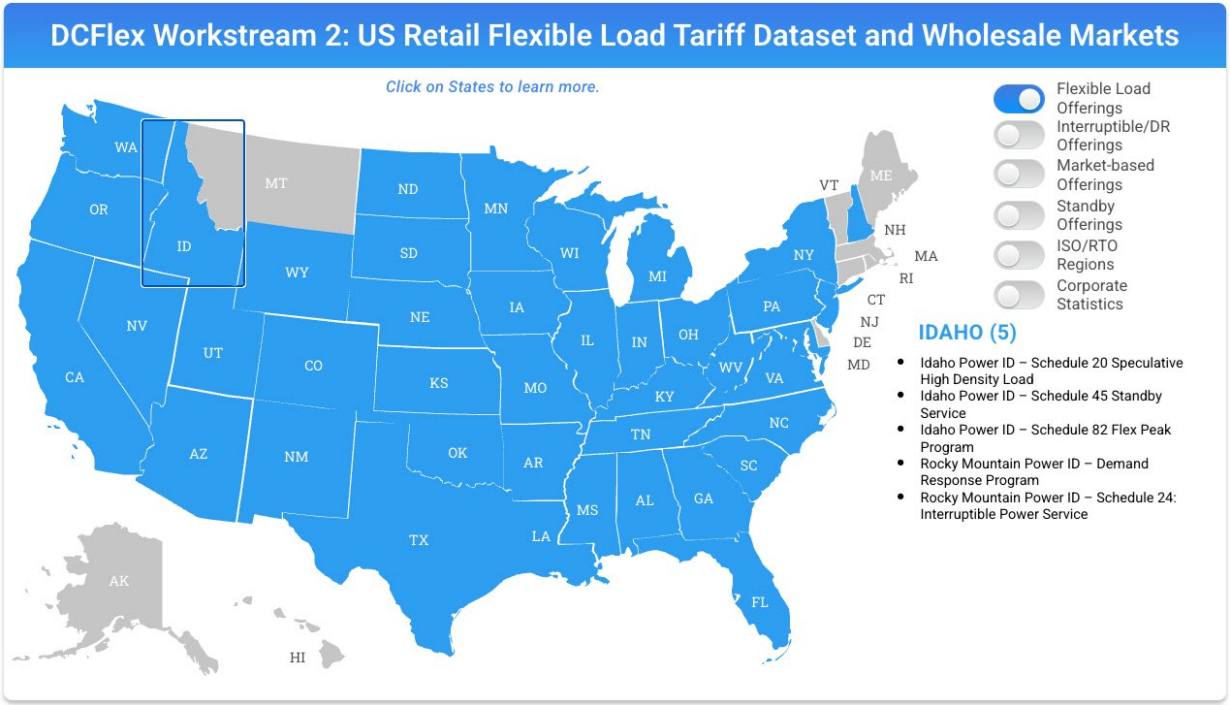
Non-Discriminatory Tariff Design	Utilities are mostly moving away from tariffs that single out data centers and instead establish eligibility criteria that focus on large customers, including data centers (e.g., using minimum load requirements)
Risk Mitigation Mechanisms	Utilities rely on a multi-prong approach to mitigate stranded cost risks: high credit ratings and collateral requirements, minimum (demand) charges, exit fees based on minimum charges, and longer contract terms (10-15 years). State legislation is beginning to impose these requirements as well
Premium	Some tariffs require customers to pay a premium to reflect the cost of accelerating new energy supply procurement. Customers can also pay a premium to be supplied by more expensive clean energy
Cost-Recovery	Generation charges reflect the market structure and how the energy resource is procured (e.g., from an organized market, utility-owned, customer-owned), while **transmission costs** are typically recovered in the same manner as in the "standard rate", with some customer-specific costs directly assigned
BTM Resources and Load Flexibility	Surveyed tariffs typically allow **BTM generation** as backup or to offset contract capacity, by incorporating elements of **standby rates** (e.g., customers contract for their remaining capacity needs). **Load flexibility** is typically addressed through demand response programs or BTM generation

Large load tariffs: Demand flexibility

Demand flexibility tariffs

The Electric Power Research Institute has identified flexible load tariffs in almost every state.

Many of the examples are interruptible service or load curtailment which are not focused on data centers but can apply to large loads.



Demand flexibility tariff examples (1)

- Idaho Power can call interruption events and remotely disconnect electric service to Speculative High Density Load customers up to 225 hours annually:
  - June 15- September 15
  - 1-11 pm; M-F
  - Max 10 hour interruption
  - 2 hour notification
- Entergy Arkansas requires Large Power High Load Density customers to enter into a customer service agreement for interruptible service as part of the tariff. Maximum interruptions range from 10-20 events per year depending on curtailment notice time.
- Montana Dakota Utilities' High Density Contracted Demand Response tariff allows the utility to interrupt the customer's service for up to 200 hours annually (or as included in electric service agreement).

Demand flexibility tariff examples (2)

- Ohio Power's Data Center Tariff requires customers with behind-the-meter generation to be capable of instantaneously curtail load equal to or greater than the behind-the-meter generation output.
- Texas passed a law in June that requires utilities to develop protocols to install equipment before loads are interconnected for remote disconnection during firm load shed event, starting in 2026.
    - It also requires ERCOT to develop a threshold at which a large load customer with an on-site backup generator may be called upon to curtail load in the event of an emergency.

Demand flexibility special contract examples

- Google and Indiana Michigan Power (I&M) filed a special contract with the Indiana Utility Regulatory Commission on July 30, 2025 that has two components
  - Clean Capacity Arrangement (CCA) – an agreement to transfer long-term generation capacity from Google to I&M
  - Demand response – Google will provide interruptible capacity to I&M
  - Much of the filed contract is redacted and it is not clear what the quantity or price is of the resources Google are offering to I&M.

Xcel Energy Minnesota

- Minnesota PUC required Xcel Energy to develop rate classes, sub rate classes or a tariff to address super-large loads.
  - Xcel Energy proposed the Large General Time of Day Service and Large Peak Controlled Time of Day Service (Docket 25-289)
  - Large General Time of Day Service
    - On peak (9am-9pm) and off peak electricity rates
  - Large Peak Controlled Time of Day Service
    - Reduced demand charge for providing interruptible load
    - Four groups of controllable demand, based on performance factor or notice time
    - No minimum interruptible threshold

EPRI – DC FLEX


Initial Demo Sites:
Cohort 1
ARIZONA, U.S.
Compute Flexibility
Artificial Intelligence
NORTH CAROLINA, U.S.
Compute Flexibility
Hyperscaler
PARIS, FRANCE
Grid Services
Co-Located
Cohort 2
VIRGINIA, U.S.
Compute Flexibility
AI & Geospatial Load Shifting
ILLINOIS, U.S.
Compute Flexibility
Artificial Intelligence
ARIZONA, U.S.
HVO Backup Solution
OKLAHOMA, U.S.
Compute Flexibility
DCFlex
demonstrations
ORACLE
Rte
COMPASS
GRDA
Dominion Energy
NVIDIA
Schneider Electric
SRP
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State actions

Informational proceedings

- New Mexico PUC opened an inquiry docket (2024) to evaluate grid readiness and economic development (Docket 24-00257-UT). Concurrently, a new law was passed to promote economic development in the state.
- Pennsylvania PUC requested responses (2025) to 14 questions on the design of a large load customer model tariff.
- Arizona Corporation Commission (ACC) opened a docket (2025) to review existing rate classifications and explore creating more transparent rates for data center customers and the public.
- North Carolina opened proceeding opened to receive information and develop recommendations as how to fairly and efficiently integrate large electric load additions (Docket E-100 Sub 208).

Request additional information

- Entergy Arkansas must file annual reports regarding their Large Power High Load Density Service.
- North Carolina required Duke Energy to file semiannual reports on large loads in Docket E-100 Sub 207, addressing changes to the proposed large electric load additions in the advanced stage of development.
- Georgia PSC required Georgia Power to continue providing quarterly large load economic development reports and include additional information.

Studies on the impact of large energy consumers

- North Dakota (2025) passed a law requiring the Legislative Management to study the impact of large energy consumers, including data centers, on the electricity grid.
  - It will evaluate grid reliability and infrastructure requirements, regulatory consistency throughout the state, economic impacts, costs and impacts of regulated and exempt utilities and regulatory and exemption criteria (among other topics).
- Virginia published the Joint Legislative Audit and Review Commission study reviewing the impacts of the data center industry in the state (2024).
  - Policy recommendations included to consider:
    - Requiring utilities to establish a demand response program and require data centers to participate in the program
    - If utilities have the authority to delay service (but not deny) to customers if load cannot be supported by the transmission or generation capacity.
  - The report included a review of rate impacts of data centers in Virginia by E3. See appendix for additional information.

New Trends

Moratoriums

- Legislation in Georgia, Maryland, Michigan, New Hampshire, New York, Oklahoma, Pennyslvania, South Carolina, South Dakota, Vermont, Virginia and Wisconsin proposes to temporarily ban data centers.

Rethinking Tax Incentives

- Legislation in Arizona, Georgia, Michigan, Oklahoma and Virginia are proposes to reduce or eliminate tax credits

Leveraging state resources and supporting economic development (1)

- Colorado (2025) allows transmission developers to co-locate within a state highway right-of way, and requires the state Department of Transportation to provide transmission developers “the best available information” on potential future state highway development plans that could impact (i.e., be suitable for) the placement of transmission lines in the state highway right-of-way.
- New Mexico (2025) authorizes the commission to approve utility applications for special rates to attract new customers and promote economic development and requires that special rates or tariffs must be designed to recover at least the incremental cost of providing services to the customer.
- West Virginia (2025) built on its Certified Microgrid Development program to attract data centers to the state, and requires the Department of Commerce to assist projects in developing or operating a certified microgrid.
  - Local governments can not slow the creation of a certified microgrid

Leverage state resources and support economic development (2)

- Pennsylvania – offers fast track permitting data centers program and plans for legislation to accelerate Department of Environmental Protection permitting for data centers
- Kansas created sales tax exemption on goods to build and equip data centers
- Kentucky and Arkansas expanded pre-existing data center tax exemptions
- Michigan created sales tax exemption with consumer protections
- Utah and Oklahoma made it easier for data center developers to procure their own power supply without going through grid
- South Carolina eased regulations to build power plants to meet demand for data centers

Resources for more information

- Large Load Literature Review - summaries of ~60 reports and large load resources, grouped into 11 categories (Load forecasting, Reliability and resource adequacy, Large load interconnection, Demand flexibility, Generation, Co-location, Data center location/infrastructure, Large load tariffs, Policy options, Maps and tools, Design and operations)
- Electricity Rate Design for Large Load: Evolving Practices and Opportunities
- Center of Expertise in Data Centers – datacenters.lbl.gov

Presented By

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Dr. Long Lam is an expert in tariff and rate design, including advanced rate structures and designs for large load customers.

His work for regulated utilities, market operators, regulators, and market participants focuses on several areas, including:

- Economic analysis of load flexibility, distributed energy resources, advanced metering infrastructure system planning, and emerging technologies;
- Emissions reduction strategies and implementation program development for entities pursuing large-scale decarbonization, including granular accounting of Scope 2 emissions and clean energy procurement

Dr. Lam has led projects to develop greenhouse gas abatement cost curves and abatement measure prioritization, analyze programs to effectively integrate clean energy resources, and evaluate the economic benefits of grid modernization and transportation electrification programs.

Thank you

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Appendix

Texas

- Texas SB6 requires the PUC to establish standards for large load electricity users in ERCOT on interconnection and cost recovery (among other topics). Examples include:
- Disclose information about back-up generation that can provide 50% of customer load, and may be required to use back-up generation or curtail load during energy emergencies
- Requires large load interconnections that occur after 2025 allow load to be curtailed during firm load shed
- Requires creation of long-lead demand response program, compensating large loads that reduce demand with 24 hours' notice during grid emergencies.
- Evaluate whether the current methodology, including the Four Coincident Peaks (4CP) methodology, for allocating transmission costs by transmission and distribution utilities in the ERCOT power region results in a just and reasonable cost allocation.

Informational proceedings – New Mexico

- New Mexico PUC opened an inquiry docket (2024) to evaluate grid readiness and economic development (Docket 24-00257-UT). Concurrently, a new law was passed to promote economic development in the state.
- The Commission has issued three requests for information:
  - Required the utilities to respond to 13 questions to examine their ability to meet new load from customers larger than 500kW.
  - Required responses to 17 follow-up questions focused on the utility's readiness to serve new demand and potential barriers to serving new demand, broken into three areas:
    - Integrated resource planning
    - Certificates of Public Convenience and Necessity (CPCN) and
    - Other commission rules
  - The number of new resource applications the utility anticipates it will file in CY2025 (updated in October) and Q1 CY2026.

Source: NM PUC Staff. Docket 24-00257-UT

Informational proceedings (2)

- Pennsylvania PUC requested responses (2025) to 14 questions on the design of a large load customer model tariff (responses were due June 6).
  - The questions posed to consumer advocates include:
    - What safeguards do you believe are essential to prevent cost-shifting from speculative or short-lived data center investments onto existing ratepayers?
    - How can we ensure tariff structures are transparent enough to allow meaningful public input on what constitutes fair cost allocation, especially when commercial contracts are confidential?

Informational proceedings (3)

- Arizona Corporation Commission (ACC) opened a docket (2025) to review existing rate classifications and explore creating more transparent rates for data center customers and the public.
- The ACC identified other topics that may be discussed in the docket including:
  - “Review of utility mechanisms being implemented with data center customers,
  - behind-the-meter and in-front-of-the-meter solutions,
  - User-funded utility scale generation to help large customers such as data centers meet their power needs”

Informational proceedings (4)

- North Carolina opened proceeding opened to receive information and develop recommendations as how to fairly and efficiently integrate large electric load additions (Docket E-100 Sub 208).
- Utilities responded to questions posed by the commission in July 2025 on topics related to large loads including:
  - **Generation**: Types of back up generation, co-location
  - **Cost allocation**: issues associated with cost allocation, stranded cost issues
  - **Interconnection**: Potential modifications for generation interconnection procedures
  - **Tariff design**: Need for new tariffs, minimim demand for tariff, terms and conditions for tariff, value of allowing self supply in tariff, whether tariff shoud address voltage ride-thorugh, sensitivity to transient disturbations, and ramp rate limitates for large load reconnection
- The commission will hold a technical conference in October 2025.

Required filings for additional information (1)

- Entergy Arkansas must file annual reports regarding their Large Power High Load Density Service. Information includes:
  - Number of utility-called curtailments
  - Number of MISO-called curtailments
  - Compliance and performance of the Large Power High Load Density Service (LPHLDS) customers during each curtailment period
  - Contribution of all current LPHLDS customers, in the aggregate, to the utility's system peak in megawatts and as a percentage (if the utility continues to file its annual report under seal)
- North Carolina required Duke Energy to file semiannual reports on large loads in Docket E-100 Sub 207, addressing changes to the proposed large electric load additions in the advanced stage of development.

Required filings for additional information (2)

- Georgia PSC required Georgia Power to continue providing quarterly large load economic development reports and include additional information:
  - Date in which a new project entered the large load pipeline,
  - Announced load of the project when it first entered the large load pipeline,
  - New large load projects that have entered into a Contract for Electric Service
- Staff recommended additional information be included in the quarterly filings, but the Commission did not agree.
  - Whether the customer is considering sites outside of Georgia, and
  - A description and quantification of financial commitments provided by each large load customer.

Virginia rate impacts study

The Virginia Joint Legislative and Audit and Review Committee commissioned a study examining “electricity system infrastructure and associated investments costs, under a wide range of potential data center-driven load growth scenarios” to “determine if current rate and fee structures lead to equitable distribution of costs between data centers and other customers.”

Approach to Assessing Rate Impacts

Utility tariffs and cost-of-service studies informed how cost shifting may occur with escalating forecasts of costs and load

1. **Relevant tariffs for each utility were reviewed to determine current methods of revenue collection**
2. **Cost-of-service studies were examined to determine basis of volumetric and fixed costs**
3. **Compare volumetric revenue and cost components against each other and across rate classes**
4. **Calculate total cost and revenue by rate class using load forecast data**
   - Determine where total cost/revenue values do not align within classes
5. **Compare and highlight specific impacts for Residential customers served by Dominion Virginia under various cost recovery scenarios**
   - Extension of existing cost allocations
   - Updated cost allocations using current methodology to adapt to anticipated load growth

Revenues	
Values	**Description**
$ / kW	Demand charges (if applicable)
$ / kWh	Delivery + supply + other volumetric adders
Fixed charges	Customer or minimum monthly charges
Data Sources	Utility Tariffs

Costs	
Values	**Description**
$ / kW	Capacity-driven investment / Coincident demand
$ / kWh	Consumption-driven costs (e.g., generation)
Fixed costs	Utility billing, overhead, etc.
Data Sources	Project forecasts, cost of service studies, etc.

Key elements of large load tariffs

1. Eligibility Requirements
2. Cost Recovery and Rate Design
3. Risk Mitigation Provisions
4. Customer Programs
5. Flexibility Provisions
6. Backup and Behind-the-Meter Generation

Key elements of large load tariffs

1. Eligibility Requirements
2. **Cost Recovery and Rate Design**
   - **a) Generation Charges**
   - b) Transmission & Distribution Charges
   - c) Customer Tolerance for Premiums

Generation charge is typically designed to reflect the market structure and how the generation resource is procured (e.g., from an organized market, utility-owned, customer-owned, etc.). Cost recovery approaches range from using the existing standard rate to recover embedded costs from all customers to creating a bespoke special contract that recovers incremental costs specific to each customer.

Options

- **Market-based** energy price and capacity price based on RTO/ISO zone (*Ex: Dominion's Market-Based Rate)*
- **Tariff-based price** (i.e., energy and demand charges) to recover systemwide embedded costs (*Ex: Dominion's proposed GS-5 Rate)*
- **Hybrid recovery** of marginal cost for portion of the contracted demand and embedded capacity costs for the remainder (*Ex: NV Energy)*
- **Special contract to recover incremental cost** of supplying new customer from new resources (*Ex: Northern States/Xcel MN)*
- In some retail choice states, utilities rely on requests for proposals and/or auctions to determine energy price and capacity prices (*Ex: AEP/Ohio Power)*

Key elements of large load tariffs

1. Eligibility Requirements
2. **Cost Recovery and Rate Design**
   a) Generation Charges
   b) Transmission & Distribution Charges
   c) Customer Tolerance for Premiums

Unlike the varied approaches used for generation cost recovery, transmission cost recovery converges on one approach: Transmission costs are typically recovered through the "standard rate," which recovers embedded costs through demand and/or energy charges. Some "direct assignment" of customer-specific costs is common.

Options

- **Standard rate** to recover systemwide embedded delivery costs, with **direct assignment** of some project-specific incremental grid costs. Customers pay otherwise-applicable T&D rates *(Ex: NV Energy, Indiana Michigan, Georgia Power)*
- Transmission rate may be a **negotiable** part of the ESA, using the standard rate as a starting point (*Ex: Cheyenne)*

Key elements of large load tariffs

1. Eligibility Requirements
2. **Cost Recovery and Rate Design**
   a) Generation Charges
   b) Transmission & Distribution Charges
   c) **Customer Tolerance for Premiums**

Tariffs may include premiums for contracted clean energy, co-location with resources, or reflect the cost of accelerating new energy supply procurement to serve large customers.

Options

- **Premium for renewable energy** *(Ex. NV Energy, Evergy, Ameren;* see slide 19 for other examples of clean energy premiums)
- Some customers are willing to pay a **premium for co-located energy** for securing quick grid access & carbon-free energy (e.g., Amazon was willing to pay a premium for BTM co-location with Talen's Susquehanna nuclear plant)
- Evergy's system support rider is a $/kW adder that collects **costs associated with the acceleration of resource investment** required to serve large loads.

Conversely, some utilities may offer discounts akin to those in economic development rates. For example, Xcel MN's Competitive Rate Response Rider permits a temporary **discounted supply rate** when facing competition from other suppliers.

Key elements of large load tariffs reviewed

1. Eligibility Requirements
2. Cost Recovery and Rate Design
3. **Risk Mitigation Provisions**
   - a) **Collateral Requirements**
   - b) Minimum Charge
   - c) Exit Fee
   - d) Minimum Term Commitment
   - e) "Hold Harmless" Provisions

Increasingly, new tariffs for large customers share the same set of features: a combination of high credit ratings from credit rating agencies, evidence of liquidity, and collateral requirements. Recent proposed tariffs have incorporated potential discounts to requirements for customers that meet certain financial prerequisites.

Options

- Nearly every utility that we surveyed requires large customers to either (a) demonstrate very **high credit ratings** or (b) post **collateral**. Collateral forms include cash equivalents or a guarantee (*Ex: Evergy, Dominion)*
- **Collateral amount** is usually equivalent to a percentage of the total minimum charges over the full term of the contract *(Ex: Ameren)* or as a $/MW of contracted capacity *(Ex: Dominion)*
- Tariffs may include clauses to reduce collateral requirements if customer displays special financial capabilities:
  - Significant liquidity (*Ex: Evergy*)
  - Yearly decreases with on-time payments (*Ex: AEP Ohio*)

Key elements of large load tariffs reviewed

1. Eligibility Requirements
2. Cost Recovery and Rate Design
3. **Risk Mitigation Provisions**
   a) Collateral Requirements
   b) Minimum Charge
   c) Exit Fee
   d) Minimum Term Commitment
   e) "Hold Harmless" Provisions

There is a trend towards implementing minimum charges to prevent stranded costs, mostly in proportion to contracted capacity.

Options

- Nearly all proposals include **minimum charges that are based on high percentages of the contracted capacity** (*Ex: Ameren – 70%, Indiana Michigan – 80%)*
- Recent proposals have included minimum charges with **unbundled service structures.** For example, Dominion's proposed GS-5 rate has an 85% minimum demand for transmission and distribution costs, but a 60% minimum demand for generation costs.
- AEP Ohio has different minimums for differently-sized customers.

Key elements of large load tariffs reviewed

1. Eligibility Requirements
2. Cost Recovery and Rate Design
3. **Risk Mitigation Provisions**
   a) Collateral Requirements
   b) Minimum Charge
   c) **Exit Fee**
   d) Minimum Term Commitment
   e) "Hold Harmless" Provisions

An exit fee is often included to prevent stranded asset costs. There is a trend to establish exit fees based on the minimum charges for a certain part of the contract duration ("take-or-pay").

Options

- Termination fees are widely incorporated as the **minimum charge for a certain period of time**. Among utilities surveyed, this period ranges from 1 year (*Ex: Northern States*) to 5 years (*Ex: Ameren Missouri*)*
- Among surveyed utilities, Dominion and Evergy have some of the strictest exit terms: **minimum charges for the remainder of the full contract term****
- In special arrangements where a resource with higher incremental costs was supported by the tariff or ESA, the termination fee may be **based on the price differential** (*Ex: NV Energy*)

*Tariffs reviewed typically include language that shortens this period if the term length would expire first.
**Evergy's tariff is even stricter—the exit fee cannot be less than 12 months of minimum charges, even if less time remains in the contract term

Key elements of large load tariffs reviewed

1. Eligibility Requirements
2. Cost Recovery and Rate Design
3. **Risk Mitigation Provisions**
   a) Collateral Requirements
   b) Minimum Charge
   c) Exit Fee
   d) **Minimum Term Commitment**
   e) "Hold Harmless" Provisions

There is a trend towards longer (e.g., 10-15 years) contract durations to allow sufficient time to recover investment costs. A minimum term, ranging from 1 (Xcel MN) to 15 (NV Energy) years, was defined in all of the tariffs surveyed.

Options

- Term lengths are often **standardized in the tariff** (*Ex: AEP Ohio)*. Among utilities we surveyed, several also have **different term lengths for** new **and existing customers** (*Ex: Xcel MN*, AEP Ohio**)*
- However, they **may also be customer-specific** and outlined in an ESA (*Ex: Arizona Public Service, Duke Indiana).*

Note: If a customer exits a contract before its expiration, some tariffs allow the service level – and a portion of the remaining contracted cost – to be assumed by another off-taker.

*Minimum term length is longer for existing customers (10 years) than for existing customers (7 years).
**Maximum term length is longer for new customers than for existing customers.

Key elements of large load tariffs reviewed

1. Eligibility Requirements
2. Cost Recovery and Rate Design
3. **Risk Mitigation Provisions**
   a) Collateral Requirements
   b) Minimum Charge
   c) Exit Fee
   d) Minimum Term Commitment
   e) **"Hold Harmless" Provisions**

Some utilities are pursuing "hold harmless" provisions aimed to ensure no costs are shifted to existing customers.

Options

- **"Ratepayer Impact Measure**" analysis conducted by utility for each customer to ensure (1) the tariff recovers the costs to serve the customer and (2) the ratepayer impact remains identical to that under the otherwise-applicable rate *(Ex: Georgia Power)*
- **"No-harm analysis"** by utility to demonstrate the contract does not negatively impact other customers *(Ex: Xcel MN)*
- **Formulaic "backstop"** designed to prevent incremental costs from shifting to current customers *(Ex: NV Energy)*