Large Load Growth: Tariff Structures, Rate Impacts and Risk Mitigation Tools

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September 2025

Energy+Environmental Economics

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Large Load Tariffs

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A Review Of Large Load Tariff Structures Across The US Reveals Various Approaches To Cost Allocation And Risk Mitigation

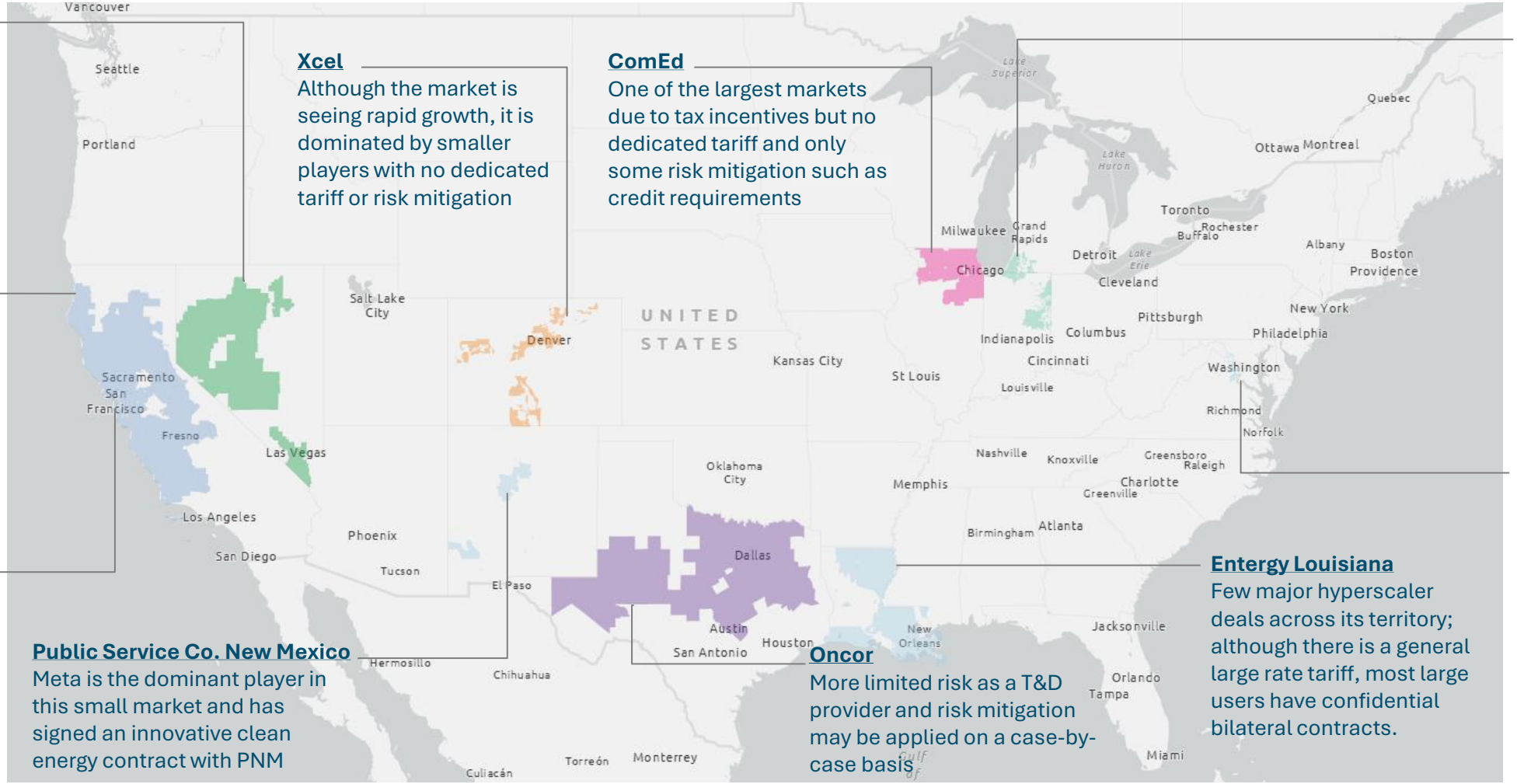
NV Energy
The Clean Transition Tariff is an innovative and flexible structure that provides cost savings and de-risks emerging clean technologies like geothermal

PG&E
Draft Rule 30 is a "best-in-class" cost allocation structure balancing cost shift concerns while being developer friendly, incorporating "pay to play" elements

Silicon Valley Power
Proximity to Silicon Valley & competitive rates led to a data center boom; SVP has struggled to keep up in addition to increasing local opposition

Xcel
Although the market is seeing rapid growth, it is dominated by smaller players with no dedicated tariff or risk mitigation

ComEd
One of the largest markets due to tax incentives but no dedicated tariff and only some risk mitigation such as credit requirements



Public Service Co. New Mexico
Meta is the dominant player in this small market and has signed an innovative clean energy contract with PNM

Oncor
More limited risk as a T&D provider and risk mitigation may be applied on a case-by-case basis

Entergy Louisiana
Few major hyperscaler deals across its territory; although there is a general large rate tariff, most large users have confidential bilateral contracts.

Indiana & Michigan Power
Recently amended Industrial Power tariff is a landmark agreement with risk mitigation, which is fitting given the small utility size to the load growth, while preserving some flexibility to be developer friendly

Northern Virginia Electric Coop (NOVEC)
Relatively small co-op in the largest global data center market and has a dedicated rate class employing direct and indirect cost allocation and risk mitigation mechanisms

PG&E Tariff B-20 and Rule 30 Proposal

- **PG&E forecasts over 5.5 GW of new data center load across Silicon Valley and the greater Bay Area over the next decade, along with 1 GW of growth from existing facilities.**
- **Current large industrial loads are served under Tariff B-20, while the proposed Rule 30 Tariff—pending CPUC approval—is designed for large transmission-voltage customers, including data centers.**
- **In parallel with tariff developments, CAISO has released its final Interconnection Process Enhancements (IPE) proposal ahead of Cluster 16.**

Tariff B-20

PG&E's current tariff for large industrial customers, including data centers, typically applies to loads served at substation-level voltages (below transmission level).

- Designed for general large commercial and industrial users with peak demands typically above 500 kW.
- Includes time-of-use energy and demand charges, with limited flexibility for atypical high-load profiles or transmission-level interconnections.
- Not optimized for hyperscale or clustered data center developments with long-term infrastructure planning needs.

Rule 30 Tariff Proposal

A new tariff proposed by PG&E and currently under CPUC review, aimed at better serving large, transmission-connected loads such as hyperscale data centers.

- Specifically designed for new load additions >10MW, interconnected at 50kV-230kV. For customers >230kV, PG&E retains discretion to file review under CPUC's "exceptional case" provisions
- Establishes tailored cost recovery mechanisms, reliability standards, and service terms appropriate for large-scale, mission-critical facilities.
- Seeks to improve predictability and coordination between PG&E and developers during project planning and execution.

CAISO Interconnection Process (IPE)

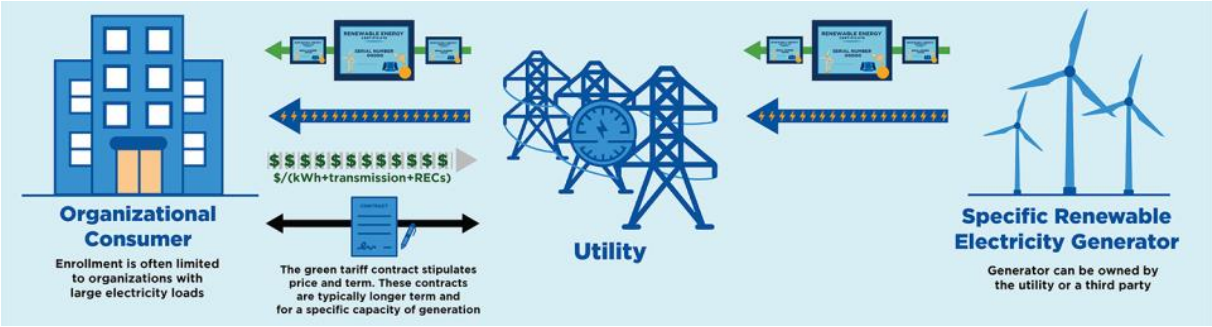
CAISO has finalized its IPE proposal in preparation for Cluster 16, opening October 2026, to modernize and streamline generator and load interconnections.

- Introduces stricter site control and readiness requirements to filter speculative projects and improve queue discipline.
- Enhances study processes, transparency, and coordination with utilities like PG&E to reflect growing interconnection demand from large loads, including data centers.
- Aims to reduce interconnection bottlenecks and align queue management with California's broader grid planning and reliability goals.

https://investor.pgecorp.com/news-events/press-releases/press-release-details/2025/PGE-Accelerating-Connection-of-New-Data-Centers-throughout-Northern-and-Central-California/default.aspx

NV Energy's Clean Transition Tariff (CTT)

+ **Tariff approved by Public Utilities Commission of Nevada creates a scalable pathway for partnerships between utilities and large loads to develop new resources and accelerate advanced technologies, while managing risk**
  - Eligibility: >5MW average annual load
  - Utility procurement or "bring your own" new renewable generation
  - Energy supply agreement (ESA) with large load customer
  - Regulatory approval needed for both the ESA and new resource
  - Must demonstrate no cost shift/harm to non-participating rate payers



+ **While development of this first-of-a-kind tariff was an extensive effort involving extensive regulatory scrutiny, it may serve as precedent for more expedited adoption of similar tariff structures in other jurisdictions seeking highly customizable resource solutions to meet the needs of large loads**

Utility Green Tariffs, US Environmental Protection Agency, https://www.epa.gov/green-power-markets/utility-green-tariffs
Our first-of-its-kind partnership for clean energy has been approved in Nevada, Google, 2025, https://blog.google/feed/nevada-clean-energy/

Large Load Rate Impact

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Virgina Rate Impact Analysis – JLARC Virginia Data Center Study

E3 examined rate designs for three utilities in Virginia, each with different needs, interests, and approaches

+ Dominion Virginia ("Dominion")

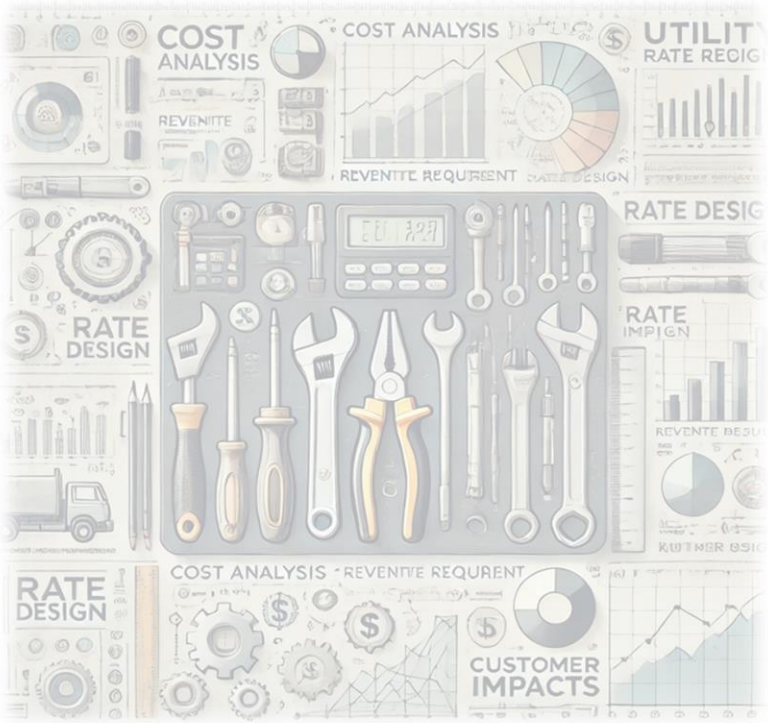
- The largest load serving entity of the three examined with the most significant existing and forecasted data center load
- An investor –owned utility with vertically integrated transmission service
  - Regulation compels biennial review of rates and other periodic stipulations by Virginia SCC
  - Serves as the transmission provider for PJM's Dominion Load Zone ("DOM Zone")

+ Northern Virginia Electric Cooperative (NOVEC)

- As a public power cooperative NOVEC receives transmission service from Dominion and provides distribution service to its members

+ Mecklenburg Electric Cooperative (MEC)

- A public power cooperative receiving transmission service from Old Dominion Electric Cooperative (ODEC) and providing distribution services to its members



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Utility System Profiles

Dominion Virginia

>100 Data Centers

- **Customer count**
  - Residential: 2.3 million
  - Commercial & Industrial: 267,143
- **Peak demand:** 17.1 GW
- **Annual sales:** 92.9 TWh (8.5 TWh of which is delivery only)
- **Load growth:** Projected to increase from 17 GW in 2023 to 33 GW in 2048, including data centers and vehicle electrification[2]

MEC

1 Data Center

- **Customer count**
  - Residential: 29,816
  - Commercial & Industrial: 1,910
- **Peak demand:** 153 MW
- **Annual sales:** 860 GWh

NOVEC

~28 Data Centers

- **Customer count**
  - Residential: 164,645
  - Commercial & Industrial: 14,258
- **Peak demand:** 1.5 GW
- **Annual sales:** 8,526 GWh
- **Peak electric load growth:** >**12%/year** over 15 years, almost exclusively driven by data centers[1]

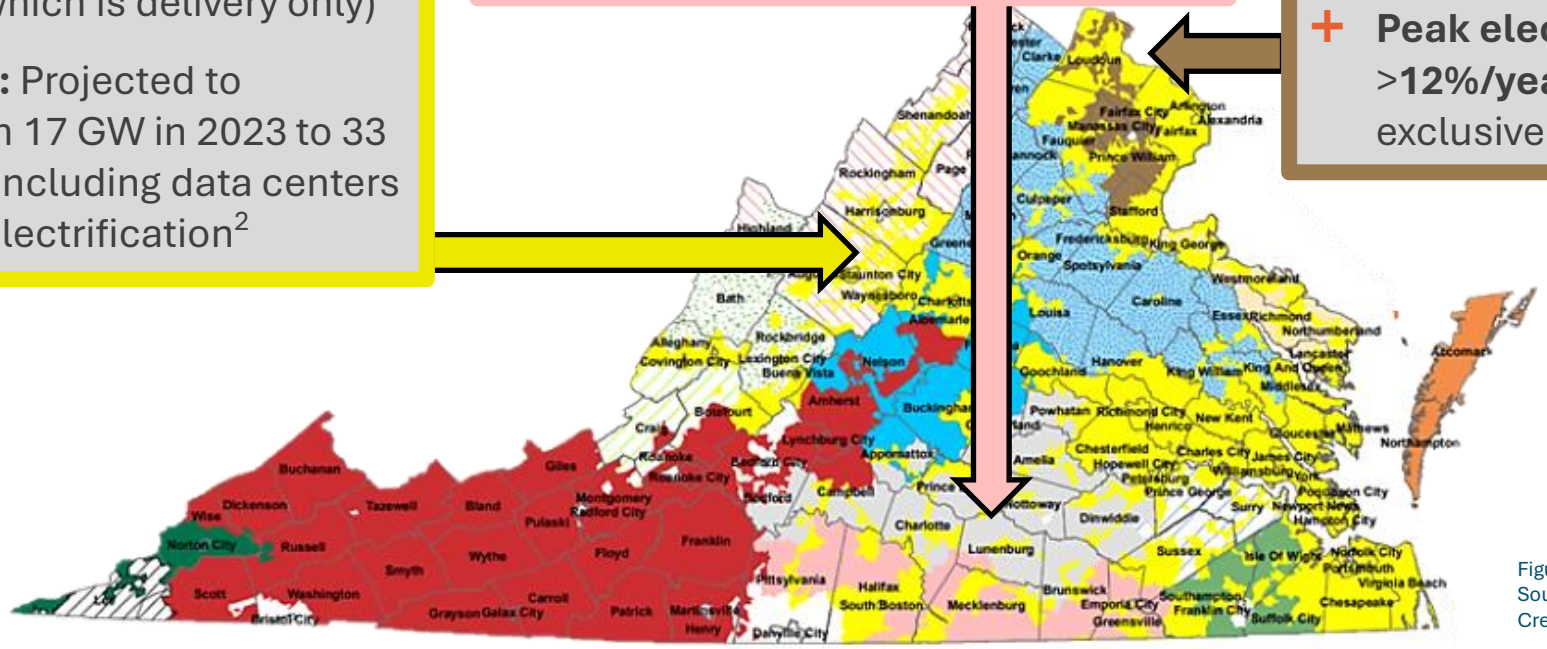


Figure is an approximation
Source: State Corporation Commission, 2020
Created by: Division of Public Utility Regulation, 2020

[1] NOVEC 2022-2023 Annual Report
[2] Dominion Virginia 2023 Integrated Resource Plan

Various Approaches to Cost Recovery

Cost Recovery Method

Embedded Cost Allocation — **Directly Assigned Costs**

Dominion

+ Data centers are included with other industrial customers in GS-3 (distribution voltage) and GS-4 (transmission voltage) rates
+ All non-redundant investments necessary for service and interconnection are provided by the utility, with costs recovered over time through cost allocation factors applied to the corresponding rate class.
+ Variable costs are based on metered contribution to average costs of transmission and generation
  - Unbundled generation is offered through retail choice
+ Contribution to system fixed costs is recovered through cost allocation as determined by the portion of plant costs attributed to each rate class portion of plant

NOVEC

A dedicated HV-1 rate class strictly serves data center customers

+ Interconnection costs are assigned to the customer through a series of deposits and installment payments as the project develops
+ Generation is offered as an embedded rate or through an unbundled option
+ System costs recovered through rate design whereas delivery charges are cross-subsidized
+ The load factor requirement under HV-1 rate class ensures demand charges recover the cost if the dedicated substation use is below contracted capacity.
+ The HV-2 rate class, for the largest data center customers, limits energy supply options to market rate, protecting other customers from the increased risk and cost due to growing load from data centers

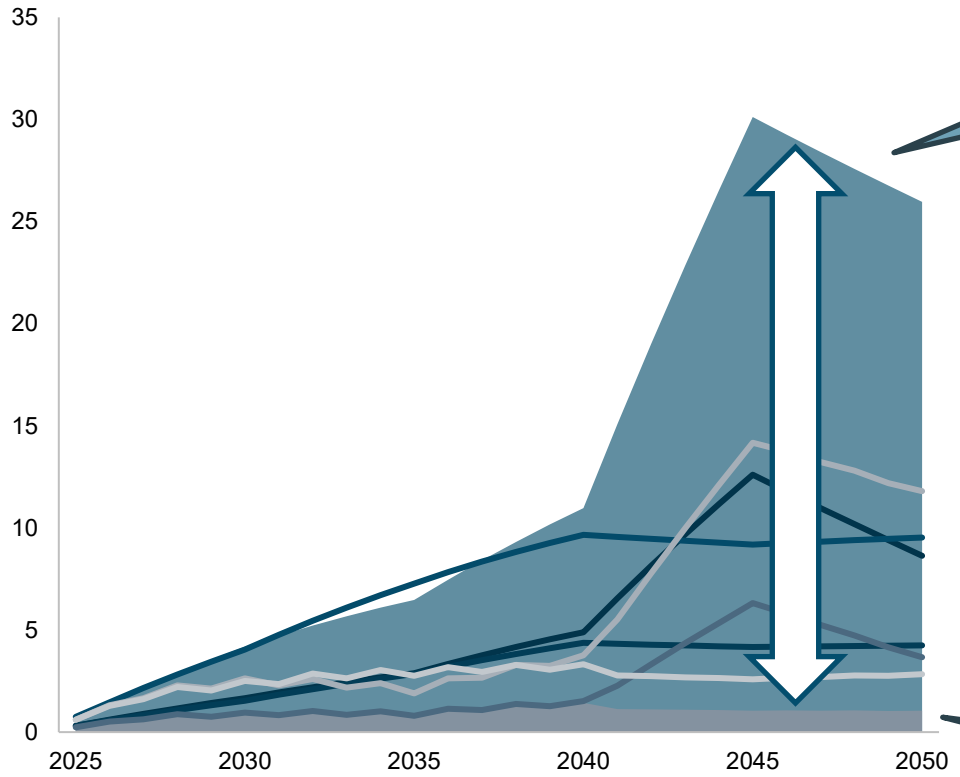
MEC

With only one data center customer, Mecklenburg has a dedicated rate class tailored specifically to the facility that fully and directly assigns all costs

+ Interconnection costs are paid by the customer concurrent with development
+ All generation is paid for directly through a separate Energy Services Agreement (ESA)
+ The data center built and paid for dedicated substations that are metered for direct allocation of contributions toward system transmission and capacity costs
+ Distribution charges are designed to recover costs for supporting system operations and maintenance
+ Delivery charges are intended to collect contribution toward embedded fixed costs and provide some benefit (i.e., return) to other cooperative members

Range of Potential Impacts

Range of Anticipated Residential Rate Impacts for Dominion Virginia
cents/kWh (2022$)



Upper boundary assumes no adjustment of cost allocation factors, which is not realistic, but shown for illustrative purposes

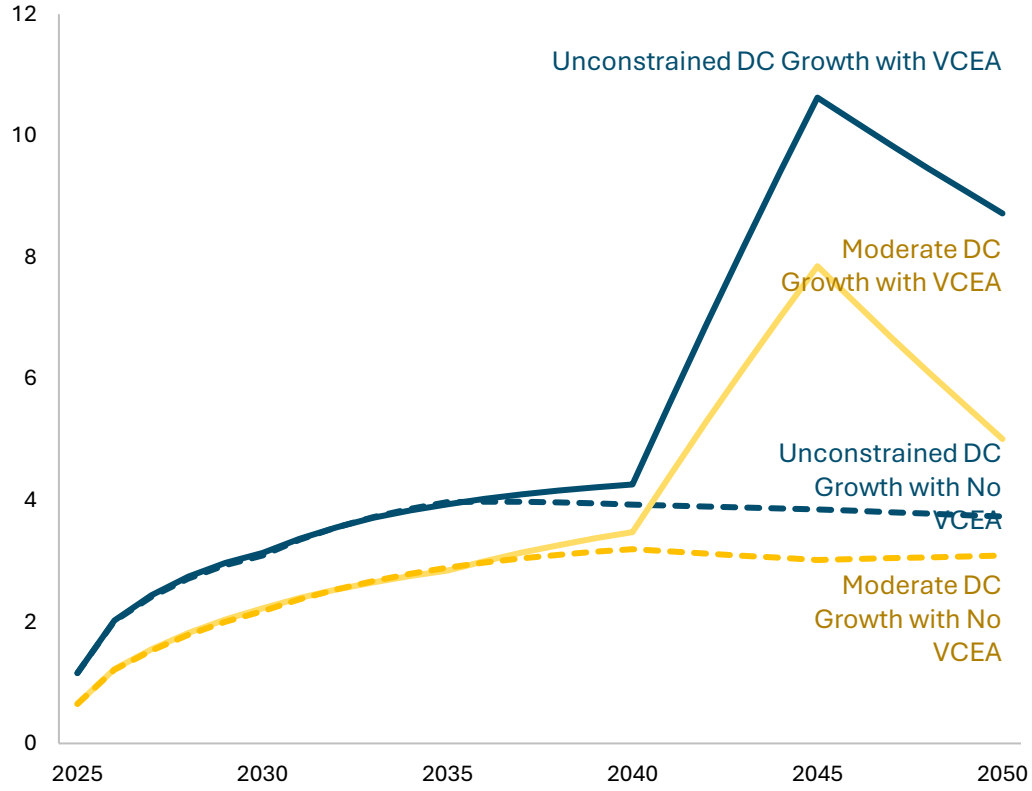
+ **Range of possibilities is influenced by several factors:**
  - Data center growth rate
  - Cost allocation adjustments
    - Where applicable, periodic adjustment of cost allocation factors is anticipated to occur as required by the Commonwealth of Virginia
  - VCEA policy
+ **Rate impacts correspond only to those from incremental data center load; other cost increases are expected**
+ **Rate impacts stabilize as the load forecast levels, but effects will persist beyond load growth**

Lower boundary assumes perfect foresight and real-time adjustment of cost allocation factors, which is not practical

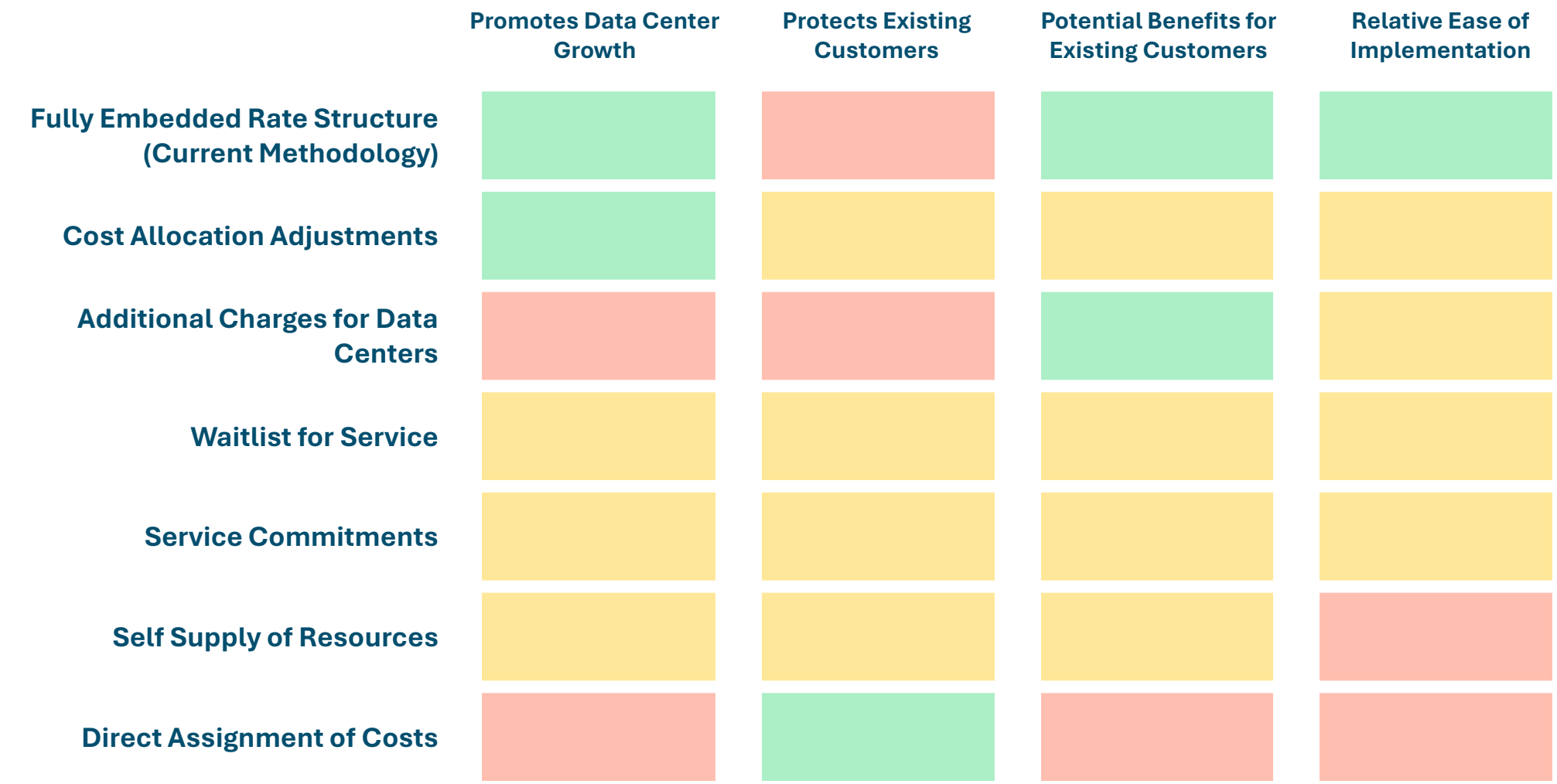
Data Center Rate Impacts

+ **Data centers bear a greater financial burden than residential customers for the economic impacts of data center development under existing rate structures**
  - Data centers are projected to experience an increase in 3-4 cents/kWh by 2040, compared to an estimated increase of 1-3 cents/kWh for residential customers
+ **The same economic pressures influencing residential rates are likely to have similar impacts on data center rates**
  - Data centers are expected contribute three-to-seven times more toward incremental costs than residential customers by 2050
  - Total incremental cost contributions from data centers are anticipated to range from $2-$10 billion by 2050, depending on scenario

Average Data Center Rate Impacts - Dominion
(Adjusted Allocation Factors)
cents/kWh (2022$)



Rate Impact Management: Spectrum of Rate Design Tools



Risk Mitigation Tools

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Utility Risks From Large Load Growth

+ **Utilities face a range of risks from large load growth, from project risk (e.g., load uncertainty, nonpayment) to how that risk impacts the utility (e.g., credit, balance sheet risk, regulatory risk, cost shifting)**

+ **Aligning on these key concerns is essential to identifying pragmatic risk mitigation alternatives**

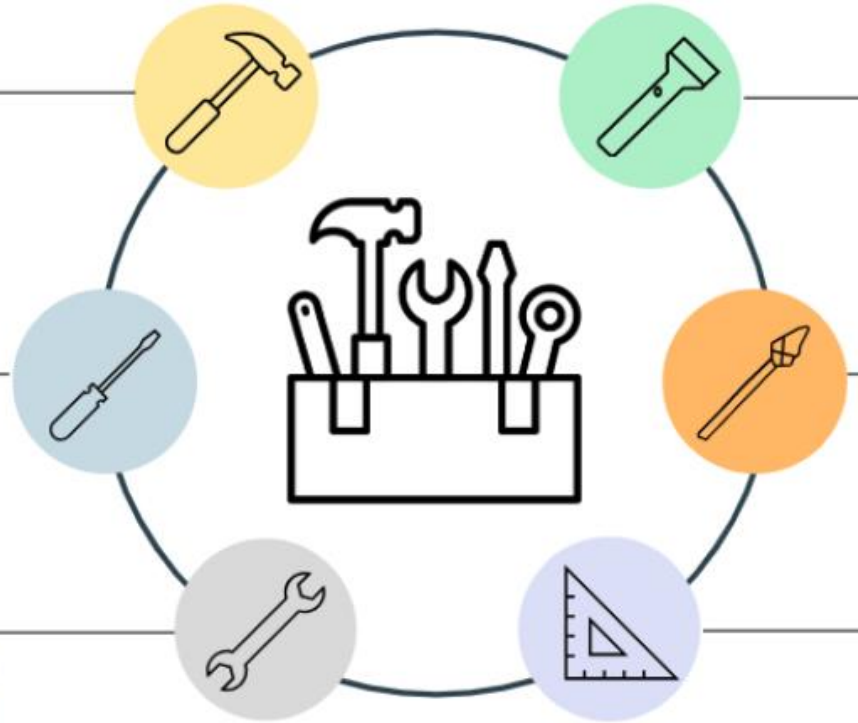
Category of Risk	Description of Risk	Current Utility Risk Mitigation Practice
Nonpayment Risk	• To determine project risk and likelihood of default, utilities assess large customers' credit rating, financial strength, and payment history	• If the customer is unrated or has a weak balance sheet, may require letters of credit, deposits, parental guarantees and/or collateral equal to several months of expected bills
Stranded Asset Risk	• Utilities often must build new infrastructure to serve new large loads • If the load growth fails to materialize/ramp or exits early, utilities may face revenue shortfalls and shift costs onto other ratepayers, triggering regulatory scrutiny/potential disallowance	• Utilities mitigate the risks of load growth uncertainty with collateral requirements, advance payments, minimum demand charges, exit fees to ensure cost recovery if the data center fails to meet load projections
Utility Credit Risk	• Utilities may face significant upfront costs to serve large loads, straining capital budgets and borrowing • If a data center is seen as high risk, rating agencies may view the exposure as a negative credit factor, potentially raising borrowing costs	• Utilities may require prepaid contributions, upfront cost-sharing agreements, or refundable deposits from the data center customer to spread the risk

A Variety Of Tools To Help Manage Risk Associated With Large Loads

Upfront Payments
Require paying a percentage of projected energy needs upfront as a deposit, which can be refunded after the minimum term

Load Flexibility & Self Supply
Facilitate leveraging load flexibility or on-site generation to cover peak periods to avoid costly new buildout. Can also look like offer non-firm service for faster interconnection and lower cost

Interconnection Queue Management
To reduce the risk associated with forecast error and stranded assets, utilities can reform their interconnection queues, i.e., develop a "wait list" of data centers to take the position of a load that doesn't materialize; "bundle" loads to maintain diversity of customer types



Minimum Contract Length
Contractual obligation for a fixed term with an exit fee for early cancellation to ensure utility cost recovery

"Take or Pay"
Customer pays minimum charges, even when using less than contract capacity, to ensure utility cost recovery and incentivize accurate load estimates.

Credit Rating and/or Collateral Requirement
To mitigate the financial risks of customers failing to pay future bills, utility tariffs may require customers to meet minimum credit ratings and/or provide collateral

Risk Management Techniques Through Large Load Contracting

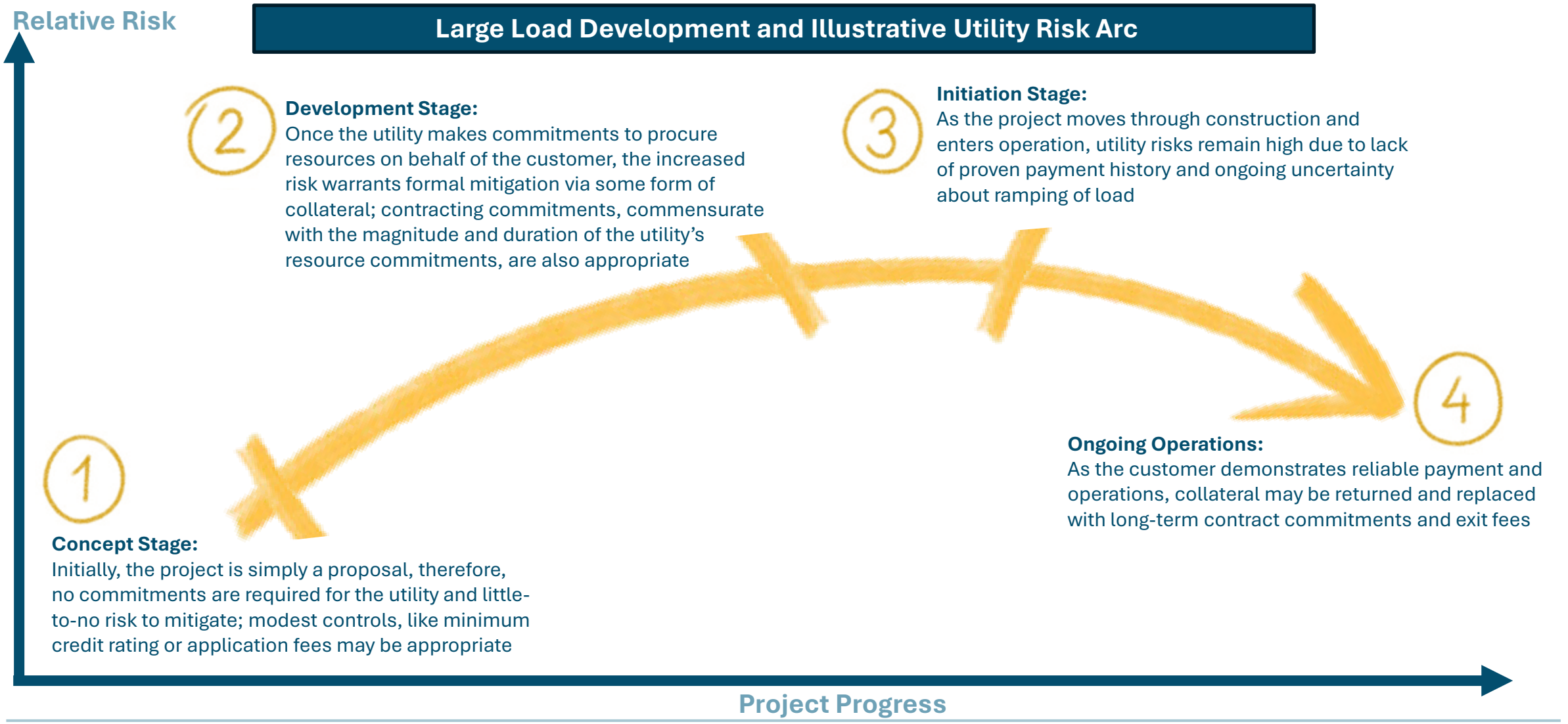
A Utilities risk mitigation approach should enable cost recovery, support responsible growth, and promote fair treatment of all customers

- Align financial security requirements with evolving risk exposure using phased, “milestone“ approach
- Avoid redundancy with overlapping forms of security that address the same risk
- Accept a variety of collateral instruments to accommodate different customer financial structures while maintaining protection
- Clearly define credit evaluation criteria, including liquidity thresholds, credit ratings, affiliate guarantees, and exemption standards
- Frameworks must also be scalable and adaptable to accommodate growing and evolving large load interconnection requests

Principles of Best Practice

- Flexible
- Transparent
- Consistent
- Scalable
- Adaptable
- Standardized

Risk Mitigation Strategy Should Evolve To Reflect Actual Risk



Thank You

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