Beyond the Headlines:

An Empirical Analysis of Data Center Grid Utilization, Cost-of-Service and Revenue Contributions

Large loads, particularly data centers, have become a focal point in recent headlines due to their potential impact on the U.S. electric grid and electricity rates. News outlets across the country from Michigan to Maine and California to New York have reported on bill increases and on new local data center laws that are under consideration.[1,2,3,4] This paper addresses these concerns using historical context and forward-looking modeling to assess how large loads affect system costs, separating broader trends from incremental impacts.

Rather than addressing all drivers of rising electricity costs, the analysis focuses on two questions: (1) how load growth affects average system costs, and (2) how rate design allocates the costs and risks of large loads. It provides one of the first rigorous evaluations of how new large load tariffs mitigate risk and protect existing customers. Our goal is to provide transparent and data-driven insights to inform ongoing policy discussions.

Specifically, this paper 1) clarifies the relationship between electric demand growth and average electric system costs, 2) examines best practices modern large load tariffs can employ to allocate costs and risks between large customers and other ratepayers; and 3) evaluates a hypothetical 100 MW data center under a contemporary tariff to assess system impacts.

Key Findings

1 Grid investment is driven by multiple factors

The U.S. electric grid is already undergoing a significant investment cycle driven by a range of structural factors, independent of load growth. Aging infrastructure, generation retirements, modernization needs, and increasing requirements for system security and resilience have all required substantial capital investment in recent years. These trends largely predate the current wave of data center development and illustrate that grid investment is shaped by multiple, overlapping drivers rather than any single source of demand.

2 High load factor customers can improve utilization

Load factor is the ratio of average demand to peak demand. Data centers are typically high load factor customers (often 80–90%, compared to approximately 30–40% for residential customers). Where existing capacity is available, these loads can increase utilization of the system, allowing fixed costs to be spread over more electricity sales and reducing average cost per unit of energy.

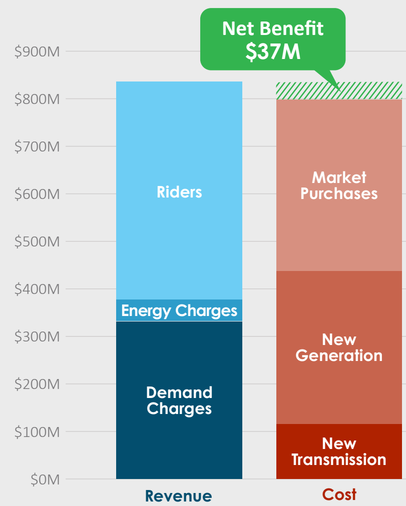
3 Higher utilization can lower average costs, but rate impacts depend on how costs are allocated

While the marginal cost of serving a new large load such as a data center may be significant, these costs are often paid upfront by the customer. High load factor customers can increase total sales and improve utilization of generation and bulk system assets, reducing embedded average costs for those portions of the system. This dynamic may help explain observed outcomes in regions with significant data center penetration. For example, Dominion Energy Virginia's rates were 16% below the national average while serving 25% of U.S. data center load, suggesting that the high utilization characteristics of these customers may contribute to lower average costs.[5,6,7] More broadly, an LBNL study found that statewide load growth from 2019–2024 tended to reduce average retail prices.[8] However, how lower average system costs ultimately translate into retail rates depends on rate design and regulatory decisions.

4 Quantitative modeling shows large loads can be cost-neutral or net beneficial under modern tariffs

The impact of new large loads depends on how costs and risks are allocated through rate design. Historically, few protections existed, reflecting slow demand growth and excess system capacity. Today, in contrast, utilities are introducing more formalized protections: 25 utilities across 19 states have approved data center-specific tariffs, most (18) in 2024–2025, with many more proposed or under review.[9] These tariffs increasingly incorporate best practices such as minimum demand charges, long-term contracts, and collateral requirements to better align cost responsibility with cost causation and mitigate under-recovery risk. In this study we look at a hypothetical 100 MW data center under Dominion Energy's new GS-5 tariff, which includes these types of protections. We find that under the GS-5 tariff the data center can contribute more in revenues than the incremental cost to serve it, thereby generating a net system benefit of $37M, or $0.000027 per kWh, under a reasonable base case.[10] (See Figure 1) Sensitivities range from $166M in net benefits to $92M in net costs, illustrating tariff performance across scenarios. This quantification is important to understand how well these new structures and protections work under a variety of circumstances.

***Figure 1:** Utility revenue and cost streams for a hypothetical 100 MW data center under Dominion Energy's GS-5 Tariff, under base case assumptions*



5 Modern tariff protections significantly reduce risk

GS-5, Dominion's new large load tariff, incorporates a particularly robust set of ratepayer protections designed to prevent cost-shifting and mitigate stranded cost risk. This analysis evaluates scenarios where infrastructure is built but load is delayed or does not materialize. Under previous tariffs, this could lead to unrecovered costs. Under GS-5, provisions such as minimum demand charges, collateral, and contract terms reduce net system costs in a no-load scenario by about 86% compared to the previous tariff design. Even in this worst case, the remaining cost has a minimal per-kWh impact on retail rates, demonstrating how comprehensive tariff design can materially limit risk to other customers, as similar protections continue to evolve across jurisdictions.

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[1] Ivan Penn, "AI Data Centers Face Local Opposition as Construction Expands," New York Times, March 26, 2026, https://www.nytimes.com/2026/03/26/business/economy/ai-data-centers-construction-local-opposition.html

[2] Kayla Wikaryasz, "Huron County Residents Push Back on Proposed Data Centers," Michigan's Thumb, August 18, 2025, https://www.michigansthumb.com/news/article/huron-county-data-centers-22185296.php

[3] Katherine Blunt, "AI Data Centers Are Driving Up Power Costs," Wall Street Journal, February 21, 2026, https://www.wsj.com/business/energy-oil/ai-data-center-power-costs-bbfcd862

[4] Jennifer Hiller, "Maine Town Moves to Ban Data Centers," Wall Street Journal, March 10, 2026, https://www.wsj.com/us-news/maine-data-center-ban-e768fb18

[5] Dominion Energy, "Dominion Energy Virginia, State Corporation Commission Staff, Office of the Attorney General, and Other Parties File Comprehensive Settlement of Biennial Rate Case," Dominion Energy Newsroom, 2023, https://investors.dominionenergy.com/news/press-release-details/2023/Dominion-Energy-Virginia-State-Corporation-Commission-Staff-Office-of-the-Attorney-General-and-Other-Parties-File-Comprehensive-Settlement-of-Biennial-Rate-Case/default.aspx

[6] Electric Power Research Institute (EPRI), Powering Intelligence: Analyzing Artificial Intelligence and Data Center Energy Consumption, May 2024, https://www.epri.com/research/products/3002028905

[7] Based on analysis done using MWh values from the EPRI Whitepaper, translated into MW assuming 85% load factor.

[8] Ryan Wiser, Eric O'Shaughnessy, Galen Barbose, Peter Cappers, and Will Gorman, "Factors Influencing Recent Trends in Retail Electricity Prices in the United States," The Electricity Journal (2025), https://www. sciencedirect.com/science/article/pii/S1040619025000612

[9] Latitude Media, "The Terms of Power: Inside the New Utility Rates for Data Centers," March 2026, https://www.latitudemedia.com/research/the-terms-of-power-inside-the-new-utility-rates-for-data-centers/

[10] The Base Case assumes no additional headroom on the system, and that new capacity and transmission must be built to accommodate the 100 MW data center load. The resource mix assumed is 60% PJM market purchases, 10% utility solar, 10% gas CCGT (including 5 new miles of gas pipeline), 10% onshore wind, and 10% 4-hour battery storage. The resource mix is informed by the Dominion Energy Integrated Resource Plan (IRP).