



ROSA & ROUBINI
ASSOCIATES

MACRO PICTURE

The US Power Constraint: AI, Grid Investment and the Race for Electricity

By

Nato Balavadze



2 October 2026

Nato Balavadze

The US Power Constraint: AI, Grid Investment and the Race for Electricity

2 October 2026

Table of Contents

	Page	Page 2
Executive Summary	3	
Introduction.....	4	
The US Power System: Structure and Infrastructure.....	5	
A New Era of Electricity Demand.....	5	
The Grid Bottleneck: Capacity Is Not the Same as Availability.....	6	
Building the Next Power System: Gas Makes a Comeback		
The Next Bottleneck: Local Resistance.....		
Who Pays for the Power Boom?		
Outlook: Power Becomes an Economic Constraint		



Rosa & Roubini Associates Ltd is a private limited company registered in England and Wales (Registration number: 10975116) with registered office at 75 King William Street, London EC4N 7BE, United Kingdom.

For information about Rosa&Roubini Associates, please send an email to info@rosa-roubini-associates.com or call +44 (0)20 7101 0718.

Analyst Certification: I, Nato Balavadze, hereby certify that all the views expressed in this report reflect my personal opinion, which has not been influenced by considerations of Rosa & Roubini Associates' business, nor by personal or client relationships. I also certify that no part of my compensation was, is or will be, directly or indirectly, related to the views expressed in this report.

Disclaimer: All material presented in this report is provided by Rosa & Roubini Associates-Limited for informational purposes only and is not to be used or considered as an offer or a solicitation to sell or to buy, or subscribe for securities, investment products or other financial instruments. Rosa & Roubini Associates Limited does not conduct "investment research" as defined in the FCA Conduct of Business Sourcebook (COBS) section 12 nor does it provide "advice about securities" as defined in the Regulation of Investment Advisors by the US SEC. Rosa & Roubini Associates Limited is not regulated by the FCA, SEC or by any other regulatory body. Nothing in this report shall be deemed to constitute financial or other professional advice in any way, and under no circumstances shall we be liable for any direct or indirect losses, costs or expenses nor for any loss of profit that results from the content of this report or any material in it or website links or references embedded within it. The price and value of financial instruments, securities and investment products referred to in this research and the income from them may fluctuate. Past performance and forecasts should not be treated as a reliable guide of future performance or results; future returns are not guaranteed; and a loss of original capital may occur. This research is based on current public information that Rosa & Roubini Associates considers reliable, but we do not represent it is accurate or complete, and it should not be relied on as such. Rosa & Roubini Associates, its contributors, partners and employees make no representation about the completeness or accuracy of the data, calculations, information or opinions contained in this report. Rosa & Roubini Associates has an internal policy designed to minimize the risk of receiving or misusing confidential or potentially material non-public information. We seek to update our research as appropriate, but the large majority of reports are published at irregular intervals as appropriate in the author's judgment. The information, opinions, estimates and forecasts contained herein are as of the date hereof and may be changed without prior notification. This research is for our clients only and is disseminated and available to all clients simultaneously through electronic publication. Rosa & Roubini Associates is not responsible for the redistribution of our research by third party aggregators. This report is not directed to you if Rosa & Roubini Associates is barred from doing so in your jurisdiction. This report and its content cannot be copied, redistributed or reproduced in part or whole without Rosa & Roubini Associates' written permission.

Nato Balavadze

The US Power Constraint: AI, Grid Investment and the Race for Electricity

2 October 2026

Page | 3

Executive Summary

A New Era of Power Demand

- ✦ After nearly three decades of relatively stagnant electricity consumption, the US is entering a new era of demand growth, driven by AI and data centers, manufacturing investment, electrification and extreme weather.
- ✦ Data centers are at the center of the shift, with individual projects requiring hundreds of megawatts of continuous power—far larger and more concentrated than traditional load growth.
- ✦ The US has roughly 1,250 GW of installed capacity versus peak demand of around 750 GW, yet much of this apparent spare capacity cannot readily be delivered where and when new users need it.
- ✦ Around 1,000 GW of large-load requests are reportedly waiting to connect, although many are speculative, while extreme weather is adding further pressure on grid reliability and electricity prices.

Grid Bottlenecks and the Supply Response

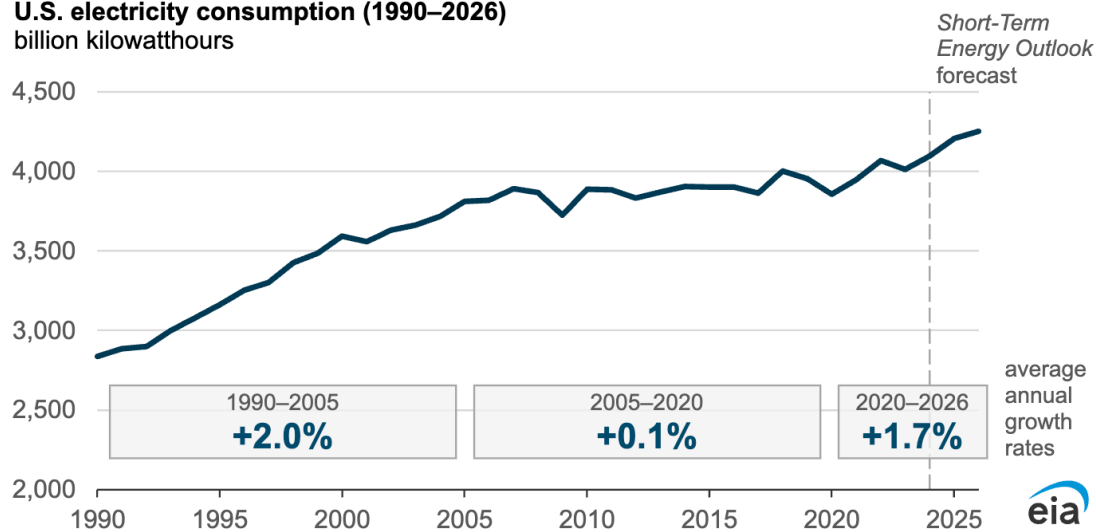
- ✦ The key barriers to expanding electricity supply are interconnection, permitting and cost allocation, with connection delays potentially stretching for years.
- ✦ Existing market design is poorly suited to rapid expansion: PJM capacity auctions provide signals roughly three years ahead, while new generating assets can take five to six years to build.
- ✦ FERC is pushing reforms to large-load interconnection, including clearer procedures and potentially faster connections for data centers willing to curtail demand when the grid is constrained.
- ✦ More transmission is also needed to move electricity between regions, exploit differences in peak demand and connect consumers with lower-cost generation.
- ✦ Natural gas is emerging as a major supply response: BloombergNEF expects it to provide 69% of electricity required by new grid-connected data-center facilities, linking the AI boom to investment in generation, pipelines and transmission.

Who Pays for the Buildout?

- ✦ With electricity infrastructure highly capital intensive, policymakers increasingly argue that data centers should finance the additional capacity and grid infrastructure they require, rather than shifting costs onto existing consumers.
- ✦ Speculative demand creates a risk of overbuilding; collateral requirements and long-term contracts could identify committed projects and protect ratepayers from stranded infrastructure costs if projects fail to materialize.
- ✦ The buildout also faces growing local resistance: 45 data-center projects worth \$68bn were blocked or delayed between April and June 2026, adding a political and social constraint to existing infrastructure bottlenecks

Key Picture: Electricity Consumption Is Rising

U.S. electricity consumption (1990–2026) billion kilowatthours



Source: [EIA](https://www.eia.gov)

Introduction

For roughly three decades, US electricity demand was relatively stagnant, allowing power markets and regulatory frameworks to develop around limited load growth. That era is ending. Rapid expansion of artificial intelligence (AI) and data centers, alongside manufacturing investment, electrification and increasingly extreme weather, is driving a renewed surge in electricity demand. The shift is exposing weaknesses in a fragmented US power system where generation, transmission and distribution are governed through a complex mix of federal regulation, state oversight, competitive markets and vertically integrated utilities. The challenge is no longer simply generating enough electricity, but delivering new capacity quickly while maintaining reliability and preventing the cost of the investment boom from falling disproportionately on households.

The US Power System: Structure and Infrastructure

The US electric grid is a vast network of power plants, transmission lines and distribution systems that balances electricity supply and demand. Electricity is transported over high-voltage transmission lines before substations reduce the voltage for local distribution. The system comprises thousands of power plants and utilities and more than two million miles of power lines, but does not operate as a single national grid. Instead, it is divided into three major interconnections: Eastern, Western and Texas. Transmission and distribution have traditionally operated as natural monopolies because of their high fixed infrastructure costs. Utilities are typically granted exclusive service territories in exchange for providing reliable electricity at regulated prices and are either publicly owned or overseen by state regulatory commissions.

Historically vertically integrated, the US power sector was progressively deregulated through the 1978 Public Utility Regulatory Policies Act and 1992 Energy Policy Act, opening electricity generation to greater competition. Today, regulatory authority remains fragmented: FERC oversees interstate transmission and wholesale power markets, while states regulate retail distribution and utility rates.

Meanwhile, grid modernization has increasingly focused on digital technologies. Smart meters, sensors and automated controls enable real-time monitoring of supply and demand, improve reliability and facilitate distributed generation and battery storage. More than 100 million smart meters had been installed by 2020, reflecting the broader digitalization of US power infrastructure.

A New Era of Electricity Demand

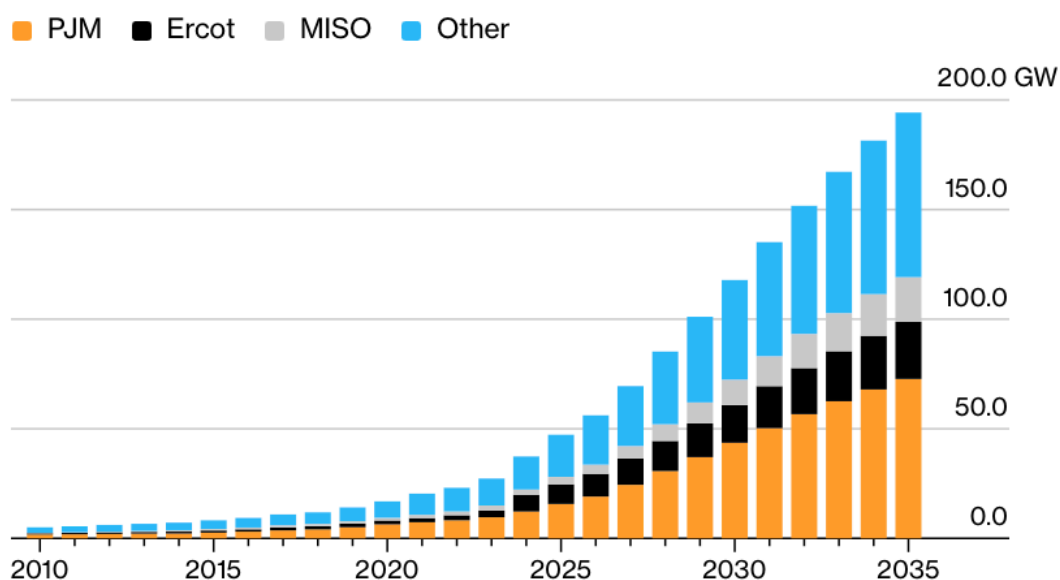
Data centers are at the center of the shift. Unlike the gradual growth in residential and commercial electricity use that utilities traditionally planned around, individual data-center developments can require hundreds of megawatts of continuous power. [White House power official Nick Elliot recalled](#) receiving a request for 500 MW from a data-center developer, followed the next day by another 500 MW request, illustrating the unprecedented scale and speed of new demand.

Page | 5

Despite mounting concerns over power shortages, [the US grid has substantial spare capacity on paper](#). Installed generation capacity stands at roughly 1,250 GW, compared with peak demand of around 750 GW. Yet accessing that capacity is increasingly difficult. Around 1,000 GW of “large-load” requests, individual projects seeking more than 50 MW, are reportedly waiting to connect to the grid, driven largely by rapidly expanding data-center demand. While many requests are speculative, the unprecedented scale of large loads has exposed a regulatory system that was not designed to process them, leaving projects facing potentially years-long connection delays.

The pressure is compounded by extreme weather. [During September's heat wave](#), PJM expected demand above 132 GW while nearly 37 GW of generation was offline, contributing to spot electricity prices briefly exceeding \$4,300/MWh.

Figure 1: Data Center Demand



Source: [BloombergNEF](#)

The Grid Bottleneck: Capacity Is Not the Same as Availability

The emerging constraint is therefore not simply the quantity of generation. It is whether power can be delivered where and when it is needed. [The three major barriers to expanding supply](#): interconnection, cost allocation and permitting.

The interconnection system illustrates the problem. A data center that builds its own generation may have to submit one application to connect its electricity demand and an entirely separate application to connect its generation, even when both connect to the same substation. Combining these processes and making better use of existing transmission “headroom” could allow some projects to connect in months rather than years.

Market design presents another constraint. Much of the existing power-market architecture was developed during decades of weak demand growth, when the emphasis was on limiting unnecessary investment rather

than rapidly adding capacity. In PJM, for example, capacity auctions provide price signals roughly three years ahead, while new generating assets can take five to six years to build and operate for decades.

Regulators are already seeking to accelerate the process. In June, FERC ordered six major grid operators to justify or revise their rules for connecting large loads. Proposed approaches include formalizing large-load interconnection procedures, requiring developers to bear more associated infrastructure costs and allowing data centers to connect more quickly if they agree to curtail consumption when the grid is constrained.

Transmission investment is equally important. Connecting regions with different peak-demand periods can reduce the need for new generation, while allowing lower-cost electricity to reach areas where local generation is more expensive.

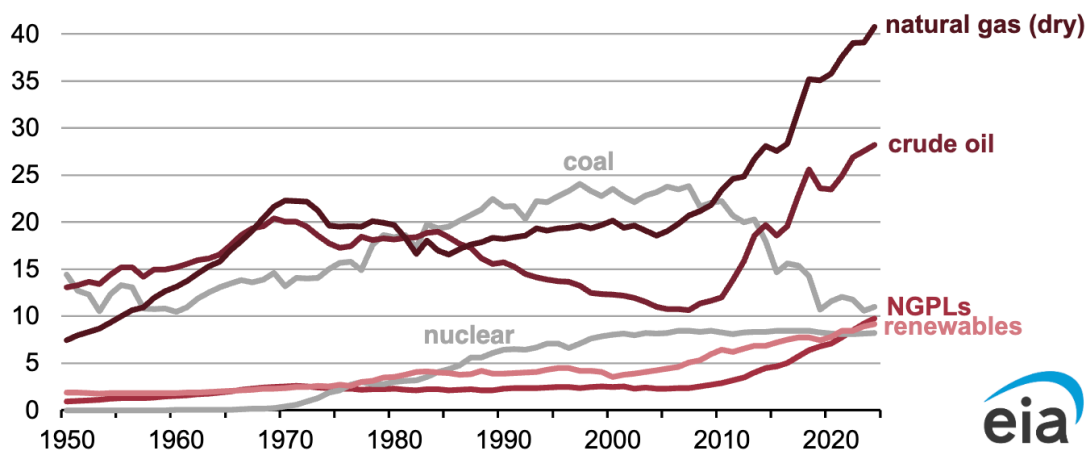
Building the Next Power System: Gas Makes a Comeback

Meeting new demand will nevertheless require substantially more generation. Natural gas is emerging as a major beneficiary because gas-fired plants can provide continuous electricity while ramping output relatively quickly to respond to changing grid conditions.

[BloombergNEF expects](#) natural gas to provide 69% of the electricity required by new grid-connected facilities in its data-center forecast. Gas consumption associated with supplying data centers could increase by 15 billion cubic feet per day by 2035, more than double BloombergNEF's previous forecast, although the outlook remains highly uncertain.

The AI boom could therefore reshape energy markets well beyond electricity. Power-sector gas consumption is projected to increase substantially through 2035, simultaneously with growing demand from LNG export facilities. The race to build computing infrastructure is consequently becoming intertwined with investment in power plants, pipelines and transmission networks.

Figure 2: US Energy Production by Source (Quadrillion British Thermal Units)



Source: [EIA](#)

The Next Bottleneck: Local Resistance

Even if interconnection and financing constraints are addressed, developers increasingly face another obstacle: local opposition. [According to Data Center Watch](#), 45 US data-center projects worth \$68 billion were blocked or delayed by local pushback between April and June 2026, while 843 opposition groups were active across 49 states.

Concerns range from electricity and water consumption to land use and environmental impacts, prompting some communities to impose construction moratoriums even before developers apply for permits. Around 30

state legislatures have introduced or adopted rules addressing data-center siting, electricity or water use. The infrastructure challenge is therefore increasingly political as well as technical: faster federal and regional approvals do not necessarily guarantee that projects can be built locally.

Who Pays for the Power Boom?

The more difficult question may be how the expansion is financed. Electricity infrastructure is capital intensive, and much of its cost is ultimately recovered through utility bills. With households already facing higher electricity prices, policymakers and regulators are under growing pressure to ensure that infrastructure built for data centers is not subsidized by existing consumers. The issue extends beyond data-center hubs: because electricity is traded across regional grids, concentrated demand can raise costs elsewhere. In Washington, D.C., for example, the supply component of electricity bills has roughly tripled over the past three years as demand across PJM has grown faster than new generation.

The emerging principle is that new large loads should bring, or finance, new capacity. [The White House's Ratepayer Protection approach emphasizes](#) both cost and risk allocation: existing customers should neither finance infrastructure primarily required by data centers nor inherit stranded costs if proposed facilities fail to materialize. [Congress is also moving in this direction](#): the House passed the Ratepayer Protection Act in September, aimed at shielding existing customers from costs associated with new data centers, although critics argue its voluntary federal standard may have limited impact because implementation remains largely with the states. Utilities are also adapting, with Duke Energy structuring agreements requiring data centers to cover the infrastructure costs needed to serve them.

Managing the risk of overbuilding is equally important, as large-load forecasts may substantially overstate eventual demand. Requiring developers to provide collateral for generation and grid upgrades could distinguish committed projects from speculative applications while protecting consumers if demand fails to materialize. Long-term contracts are also critical: competitive capacity markets can provide price signals only a few years ahead, while new generating assets may take five or six years to build and operate for decades, making investment harder to finance.

Outlook: Power Becomes an Economic Constraint

The US is entering a power-investment cycle fundamentally different from the low-demand environment of recent decades. Data centers have accelerated the transition, but the challenge extends beyond AI: manufacturing expansion and other new loads will also depend on abundant and reliable electricity. The central constraint is increasingly not how much generating capacity exists nationally, but how quickly new generation and transmission can be financed, permitted and connected where demand is emerging. The success of the next US investment cycle may therefore depend as much on electricity infrastructure as on investment in AI itself.