What's Old is New Again: The Next Act for U.S. LNG

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Teneo

Executive Summary

The U.S. energy system faces competing challenges of accelerating demand, constrained supply and rising operational risks. In this environment, smaller-scale inland Liquified Natural Gas (LNG) facilities re-emerge as a pragmatic, proven solution for enhancing reliability and resilience.

Today's operating environment and development outlook is characterized by several important challenges and opportunities:

- **System under pressure:** Exponential electricity demand growth from data centers and industrial reshoring is colliding with renewable bottlenecks, fossil retirements and gas turbine delays.
- **Rising risks:** Extreme weather, cyber intrusions and physical attacks are exposing gaps in coordination between gas and electric networks.
- **LNG as resilience infrastructure:** With ~180 facilities already operating in the U.S., inland LNG offers flexible siting, relatively fast deployment and regulatory precedent as a cost-effective reliability asset.
- **Strategic imperative:** Operators, regulators and investors must treat LNG as an insurance policy—modernizing prudence tests, incentivizing resilience assets and aligning costs with direct beneficiaries.

The Growing U.S. Energy Paradox

We have entered a new era for the U.S. bulk energy system, where system reliability and energy security are as uncertain as ever. Record demand growth from industrial reshoring, electrification and the digital economy is colliding with delays and deferrals in renewable deployment, turbine manufacturing bottlenecks and thermal resource retirements. Complicating these structural challenges are intensifying operational threats—extreme weather, cyber intrusions and physical attacks—that have already tested the resilience of both gas and electric infrastructure.

Ten years of federal and state policy whiplash have created confusion about which infrastructure investments will be prioritized among the many energy resource alternatives available to operators. Meanwhile, the more urgent challenge of keeping the lights on is forcing utilities and regulators to reevaluate near-term reliability tools. Smaller-scale, inland LNG storage and regasification facilities stand out as one practical option. These assets, for which there are many precedent examples, can provide emergency or peak-shaving fuel supply where geology, permitting or economics prevent alternatives such as underground storage or greenfield pipelines. They are quicker to deploy than linear assets that cover long distances, highly flexible in siting and proven to support customer reliability.

Rising demand in a constrained supply landscape

If hyper-scaler investment plans are to be believed, electric demand growth in the U.S. is poised to go exponential. Based on recent analysis from the U.S. Energy Information Administration (EIA),[1] nationwide

[1] https://www.eia.gov/outlooks/steo/

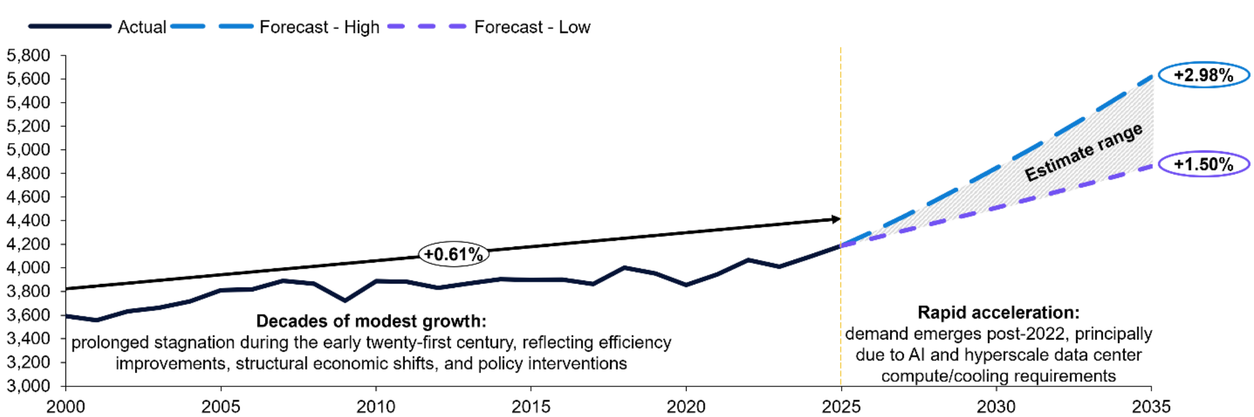
electricity consumption is projected to reach record highs in 2025 and 2026 (see Figure 1), reversing two decades of stagnation. Within this growth outlook, the Lawrence Berkeley National Laboratory (LBNL) projects that gross electricity demand from data centers alone will increase 2-3x by 2028 (compared to 2023 levels). Industrial reshoring is compounding the growth story, as shifting trade alliances and tariff policies have driven manufacturers to invest in U.S.-based, energy-intensive operations such as semiconductor fabrication and industrial metals manufacturing.

On the supply side, however, the story is one of constraints. Renewable development looks robust in theory—more than 1,570 gigawatts of new generation and 1,030 gigawatts[2] of storage were sitting in U.S. interconnection queues at the end of 2023—but LBNL analysis shows development activity within those queues has been modest and average commissioning timelines are long. There have also been meaningful increases in attrition as project economics are challenged by transmission congestion, permitting delays and rising equipment costs.

The Natural Environment Research Council's (NERC) 2024 Long-Term Reliability Assessment (LTRA) offered a blunt warning: "Resource adequacy and operating reliability are increasingly threatened as dispatchable [generation] retirements outpace firm replacement."[3] Nearly every planning region now faces elevated risk of supply shortfalls during peak demand. In many cases, gas-fired generation is the only resource capable of providing the necessary dispatchable capacity, but here too, operators face hurdles. S&P Global reported in 2024[4] that gas turbine order backlogs stretched from one to seven years, while development costs have nearly tripled to $2,500/kW. These combined-cycle gas turbines (CCGT), once assumed to be the obvious backfill for coal power retirements, can no longer be counted on to arrive quickly enough to plug the gap.

The result is a paradox: demand is accelerating, supply additions are uncertain and the very resources required to ensure energy security are caught in bottlenecks.

Figure 1: U.S. Annual Electricity Consumption (2000-2035)



Sources: EIA STEO; EIA AEO

[2] Berkeley Lab (2024). Queued Up: Characteristics of Power Plants Seeking Transmission
[3] NERC (2024) Reliability Assessments
[4] S&P Global (2024). Global Turbine Market Report

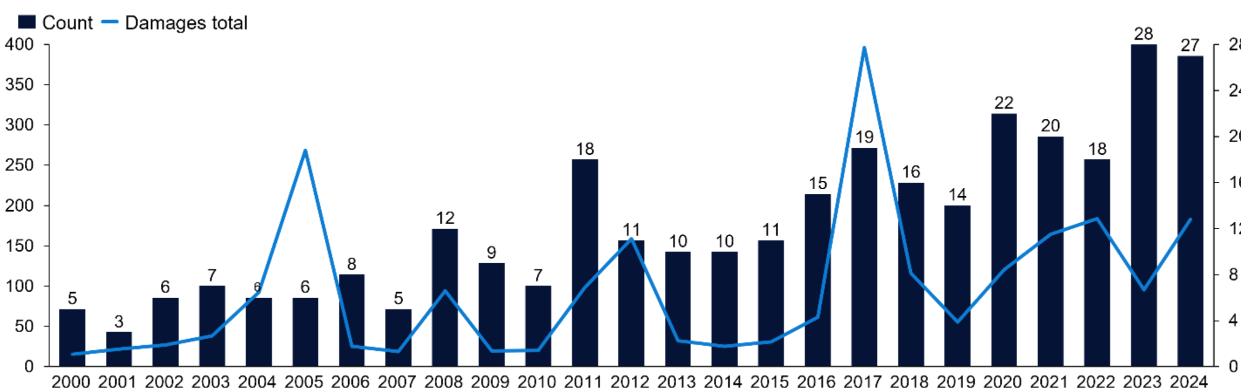
A risk environment defined by weather and interdependence

The operational backdrop is equally concerning. NOAA data show more than $400 billion weather disasters in the U.S. since 1980, with cumulative costs exceeding $2.9 trillion (nominal). The trend is accelerating, and in 2023 alone, there were $ 28 billion events, including hurricanes, severe storms and winter freezes.[5]

Looking back just a bit further, the imagery in the aftermath of Winter Storms Uri (2021) and Elliott (2022) remains fresh. Joint reports by the Federal Energy Regulatory Commission (FERC) and NERC[6] concluded that widespread outages were caused not only by extreme weather but by inadequate fuel assurance, insufficient winterization and weak coordination between gas and electric operators. Millions of customers lost power—some for days—with economic damages running into the tens of billions of dollars.

Cyber and physical risks add yet another layer of unknowns for our energy system. Long-haul, high-capacity transmission represents a single point of failure for many parts of the country, while ransomware attacks on energy companies are proliferating. The Gas-Electric Alignment and Resilience (GEAR) Task Force underscored in 2023[7] that "system operators and regulators lack fully formulated playbooks for responding to shared operational interdependencies." This gap in planning leaves the system exposed to multi-sector failures that can cascade quickly.

Figure 2: Billion-Dollar Weather and Climate Disasters in the U.S. (2000–2024)



Source: NOAA
Note: Disaster costs do not consider losses to: natural capital or environmental degradation; mental or physical healthcare related costs, the value of a statistical life (VSL); or supply chain, contingent business interruption costs

[5] Billion-Dollar Weather and Climate Disasters | National Centers for Environmental Information (NCEI)
[6] FERC/NERC (2023). Winter Storm Elliott Report
[7] GEAR Task Force (2023). Gas-Electric Alignment and Resilience Findings

The Case for LNG

In this environment, LNG is not just a story about export growth but also a story about energy resiliency. While much of the past decade's investment has gone toward liquefaction terminals on the Gulf Coast, the U.S. also has a history of building smaller LNG facilities for domestic use.

Piedmont Natural Gas, currently part of Duke Energy, operates several LNG peak-shaving plants across the Carolinas and Tennessee. Its Robeson County facility in North Carolina—a roughly $250 million project with 1 Bcf of storage—was advanced in 2018–2021 specifically to operate in a winter reliability role. National Grid's Fields Point site in Rhode Island, overseen by FERC, has long played a peak-shaving role for New England. Atlanta Gas Light's Cherokee LNG facility in Georgia received PSC approval in 2021 for an expansion under its Integrated Capacity and Delivery Plan, doubling capacity to meet growing system needs. Puget Sound Energy's Tacoma LNG project in Washington was permitted by state regulators to recover construction and operating costs that benefited gas customers, even as costs related to marine fueling were excluded.

As illustrated by these examples, LNG developments have played an important role in a variety of regions and under a variety of regulatory frameworks. According to the Pipeline and Hazardous Materials Safety Administration (PHMSA), the U.S. has ~180 LNG facilities today,[8] with peak-shaving units making up ~40 percent. These examples make clear that LNG is not speculative – it has been built, rate-based and integrated into utility systems where geology or pipeline capacity was insufficient.

Developer options and trade-offs

Utilities and regulators considering reliability investments must evaluate and pick from a wide menu of options. Pipeline expansions can deliver large volumes of gas, but they are traditionally slow to permit, expensive and often face public opposition. Recent INGAA data[9] estimate average capital costs at ~$230,000 per inch-mile (2016 dollars) for pipeline installations, though a wide regional variance can be expected. Underground storage is economical and highly effective where geology allows, but the ideal formations are concentrated in just a few states—Michigan, Texas, Louisiana, Pennsylvania and California account for half of U.S. capacity. Much of the Southeast and Northeast has no viable geology for this type of storage.

By contrast, smaller-scale LNG assets are location-flexible and relatively fast to deploy. Modular units can be built in 12 to 24 months (excluding permitting and regulatory approval), at costs ranging from $50 million to $250 million. They can be sited near large load centers with access to trucking or rail, thereby serving as emergency supply during disruptions or as peak-shaving capacity in high-demand seasons. In economic terms, they often represent the least-regrets option in geographies where storage geology is unattractive and pipeline development faces steep opposition.

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[8] Pipeline and Hazardous Materials Safety Administration
[9] INGAA (2017). Pipeline Construction Costs Study

Table 1: Comparative Assessment of Gas Reliability Options

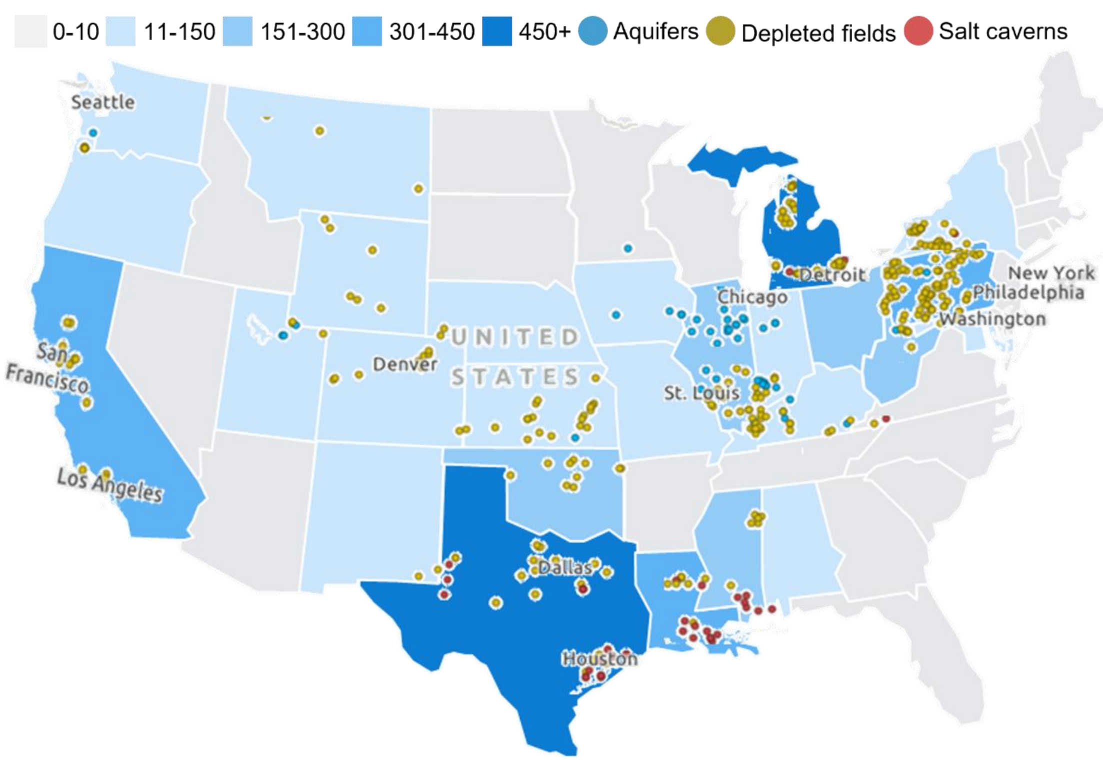
Option	Cost	Timeline	Location Flexibility
Pipeline Expansion	$1B+; $230k/inch-mile	5–7 years	Low
Underground Storage	$5–15/Mcf capacity	3–5 years	N/A (geology constrained)
Inland LNG Facility	$50–250M	12–24 months	High
Floating LNG (FSRU)	$100–500M	18–36 months	Moderate (coastal)

Regional relevance

The case for inland LNG is not uniform. It is strongest in regions where three conditions converge: limited underground storage, rapid demand growth and heightened risk exposure.

In the Southeast—particularly the Carolinas and Georgia—underground storage options are scarce and industrial load is growing rapidly (see Figure 3). Hurricanes add another layer of system vulnerability. In the Mid-Atlantic, PJM is grappling with explosive data center demand in Virginia and Maryland. In Texas, ERCOT continues to face surging load and the vivid memories of devastating winter outages.

Figure 3: Map of Underground Natural Gas Storage Capacity by Region[1] and Type[2] (Peak Bcf)



Source: EIA; U.S. Energy Atlas Teneo research and analysis
Notes: 1. 2024 capacity data; 2. Map includes both active and inactive fields

NERC's 2024 reliability assessment identified each of these regions as carrying above-average risk of resource adequacy shortfalls. In all cases, inland LNG could provide targeted reliability support where other infrastructure solutions are unavailable or too slow to respond.

Regulatory and economic considerations

For LNG to be deployed effectively, regulators and developers must adhere to clear and consistent evaluation criteria. As summarized in recent filings, commissions focus on design prudency, assessment of alternatives, cost-effectiveness relative to avoided outages, reasonable tariff structures and demonstrable customer benefits. Precedents such as Tacoma LNG and Cherokee LNG show that when benefits are clearly articulated, regulators have approved cost recovery.

However, the economic rationale for LNG investments should rely on more than just low construction costs relative to other options. Outages from Winter Storm Elliott alone were estimated by FERC to impose tens of billions of dollars in economic damages. Even modest LNG facilities can prevent such losses by ensuring firm fuel supply during critical events. When framed as investments that can also prevent economic losses, LNG becomes not just a backup supply resource but also an insurance policy for ratepayers.

Strategic Imperatives

For infrastructure operators, the priority should be to identify geographic vulnerabilities—regions with limited N-1 redundancy and high exposure to demand spikes—and to deploy smaller-scale, modular LNG solutions accordingly. Additionally, utilities should be proactive in engaging with data center operators, industrial developers and municipalities to align costs with the assets' greatest direct beneficiaries.

For regulators, the most challenging task will be to modernize prudence tests to incorporate avoided-cost frameworks, recognizing that the cost of inaction can far exceed the cost of proactive investment. Similarly, state policymakers should support targeted incentives for resilience infrastructure that can complement renewables and sustainability investments rather than get framed as direct competition for achieving the same goal.

Investors, meanwhile, should view LNG as a hedge against volatility in both electricity markets and ESG-driven capital cycles. As shown in the AGA-CGA 2024 investor survey,[10] natural gas utilities are increasingly seen as critical for affordability and reliability. LNG assets that can demonstrate both community and system benefits are well positioned to attract capital.

Figure 5: Developer Levers to Build Support for LNG Reliability Investments

[10] AGA-CGA_Investor_Report_FINAL_11-5-24

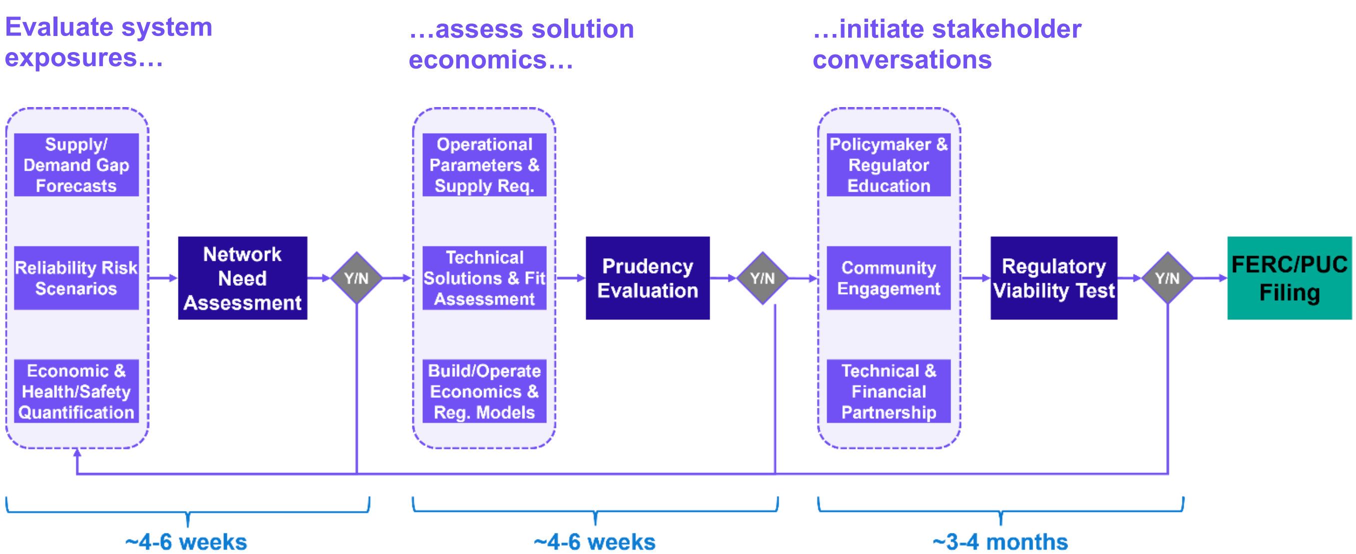
Where to Go from Here?

The U.S. power system is being stress-tested by simultaneous forces: accelerating demand, uncertain supply additions, power equipment bottlenecks and intensifying threats from weather, cyber and physical attacks. Traditional solutions—pipelines and underground storage—are limited by geography, permitting and time.

Smaller-scale inland LNG facilities represent a proven, pragmatic alternative. They are flexible in siting, rapid to deploy and already supported by regulatory precedent. By investing in these assets, operators can provide firm supply during emergencies, peak-shaving during extreme weather and hedges against systemic reliability risks. The cost of building them is modest compared to the economic losses of outages, making LNG a rational component of resilience planning.

To get on the front foot in this very unstable U.S. energy complex, infrastructure operators can take a series of steps (see Figure 6) to assess their investment options and determine what form of reliability investment best suits their risk environment.

Figure 6: Steps and Indicative Time Required to Assess Reliability Investment Options



As the GEAR Task Force emphasized, the U.S. has yet to develop full playbooks for managing interdependent risks. Inland LNG can be a cornerstone of that playbook—bridging the gap between long-term decarbonization ambitions and the near-term imperative of keeping the lights on.

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