BCG | CENTER FOR Energy Impact

Strategies to Ride the Surge in US Natural Gas

SEPTEMBER 2025

Executive Summary

The 21st-century shale revolution has transformed the North American oil and gas industry. The Appalachian Basin alone produces around 30% of the US's natural gas output, and investments of more than $100 billion since 2012 have resulted in an expansion in LNG capacity of over 95 million tons.

BCG developed five scenarios that describe possible futures for the US natural gas industry, none of which indicate that demand will peak in the next ten years. The eventual outcome will depend on exports, power generation, and policy although prices of over $6 per million Btu in the winters could threaten US natural gas exports.

The primary driver of the recent increase in demand for natural gas–based power has been the many large data centers that continue to be built in the US.

Infrastructure strains remain. Despite over $250 billion of infrastructure investment since 2010, constraints persist—as evidenced by price spikes in the US Northeast in 2024 and negative prices in the Permian Basin. As companies use pipelines, storage, and generation facilities more intensively, equipment uptimes will become a key industry focus.

US exports will rise by over 60% in the next five years, but costs will pose a challenge. LNG business models such as niche players and merchant traders will continue to evolve. Changes in business models will increase US companies’ scale and trading capabilities so that they can take advantage of opportunities in the global market.

Upstream players, midstream players, and power generation companies can profit from emerging opportunities. Given their balancing capabilities and access, midstream players have an initial edge over other parts of the value chain.

The Unconventional Rise of an Energy Superpower

The US's natural gas boom in the 2000s has reshaped its energy sector, exports, and economy

Shale has surged. Unconventional energy sources, mainly shale, contributed more than 80% of North America's natural gas output in the past five years. The Appalachian Basin alone accounted for almost 30% of the US total.

Coal has retreated. Natural gas–based generators have tripled in number in the US since 2000 and have largely replaced coal-fired generators.

Industrial demand has soared. Fueled by falling prices, industrial demand for natural gas has grown by 28% since 2009. Demand for gas in the chemical sector has nearly doubled and now makes up almost 50% of the total.

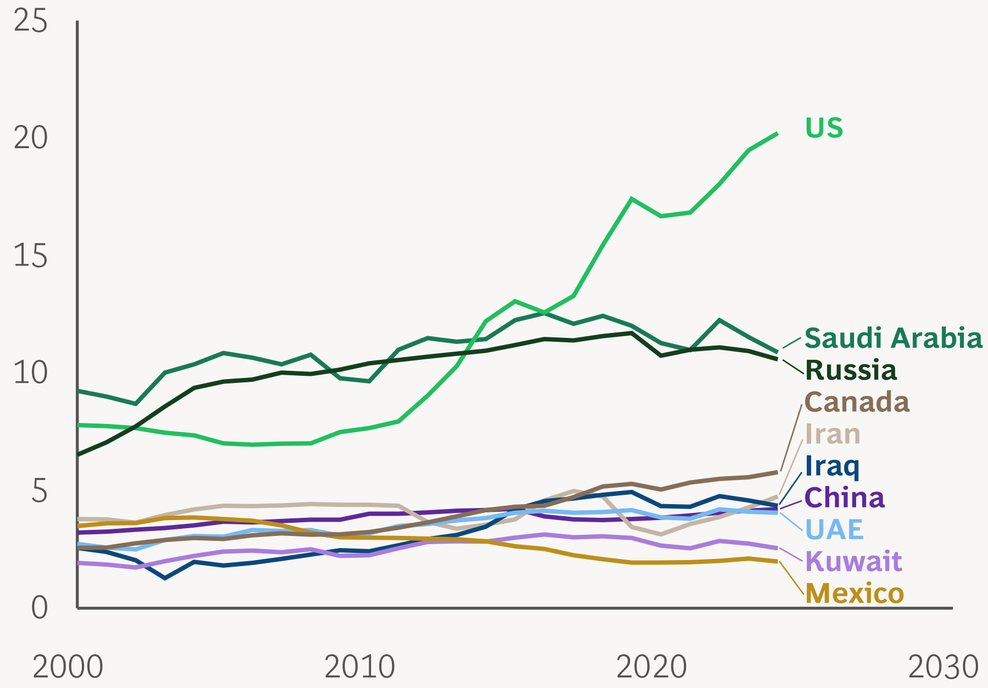
LNG exports have skyrocketed. Now shipping to over 45 countries, America's LNG exports exceed those of Qatar and Australia. The sector has attracted investments of over $100 billion in the past decade.

Nevertheless, the US's natural gas infrastructure is woefully inadequate. Despite the $250 billion invested in US energy infrastructure since 2010, natural gas pipelines, storage, and production have insufficient capacity, and utilization often exceeds licensed capacity.

The US leads the world in the supply of hydrocarbons (oil and natural gas)

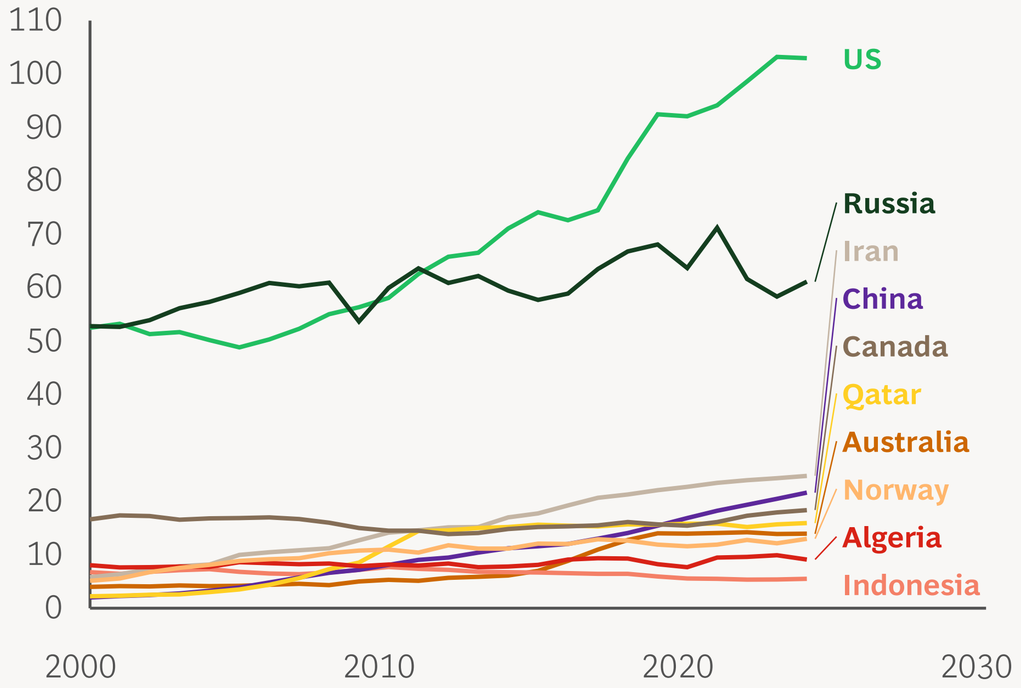
The US surpassed Saudi Arabia and Russia in 2014 in oil production…

Daily liquids production (millions of barrels of oil equivalent)



…and has been the global leader in gas production since 2012

Daily gas production (bcf)

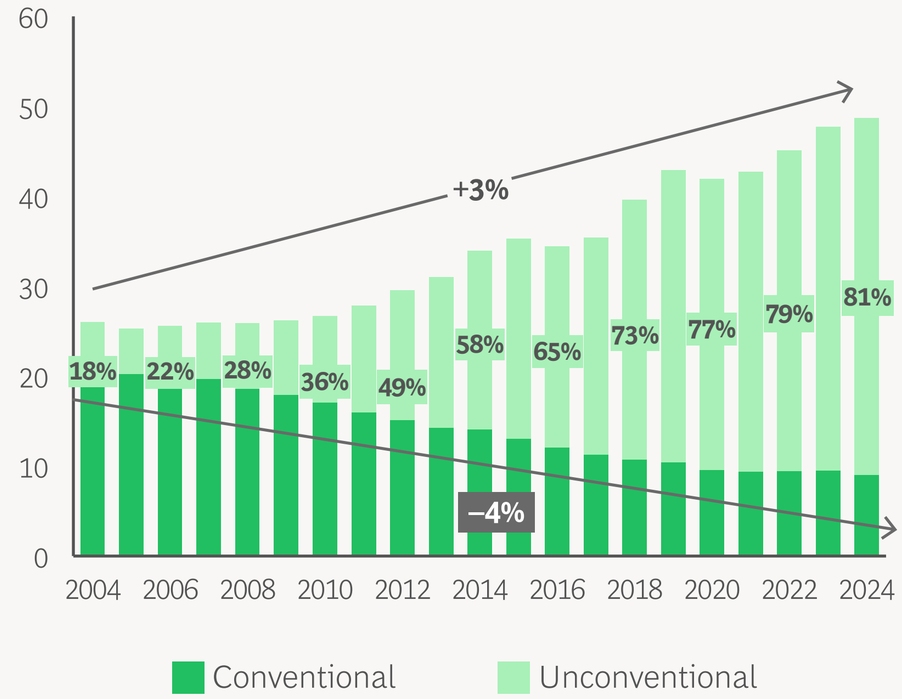


Sources: Rystad Energy; BCG analysis.
Note: Liquids include crude oil, condensates, and natural gas liquids. bcf = billion cubic feet.

Unconventional sources are the primary sources of oil and gas production in North America

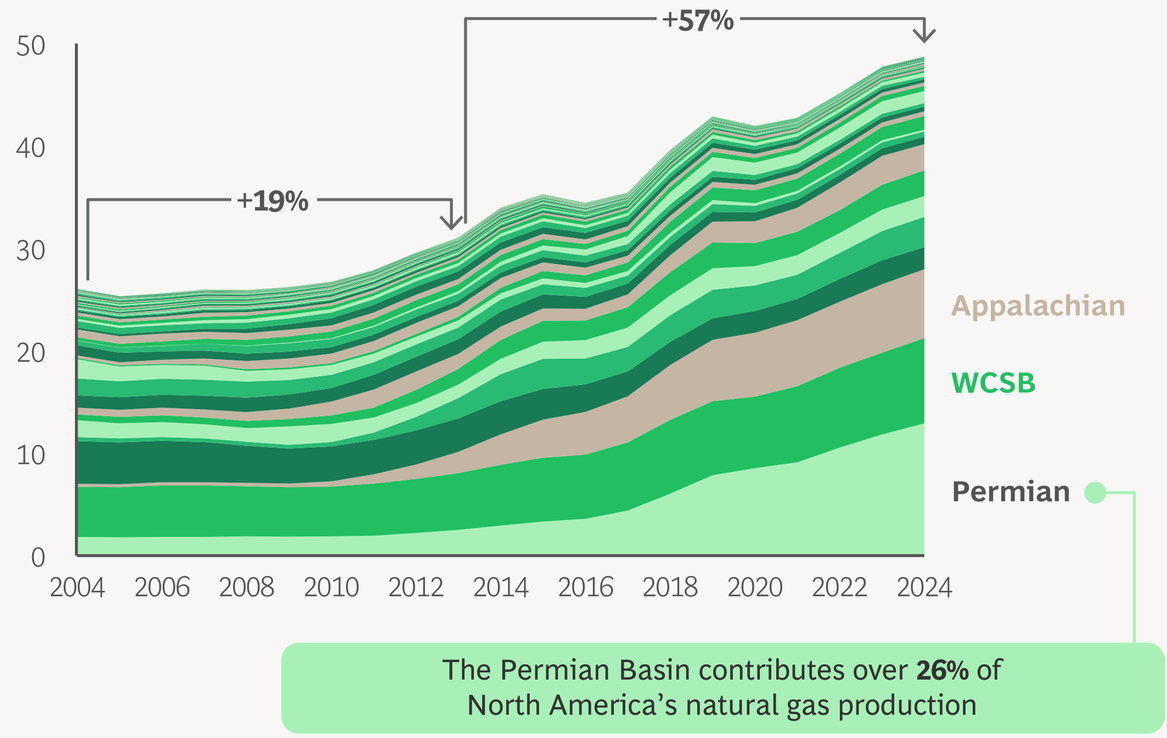
Unconventional oil and gas have accounted for over 80% of US output in the past five years

Daily production (millions of barrels of oil equivalent)



The Permian, West Canada Sedimentary, and Appalachian basins are North America's three biggest gas-producing basins

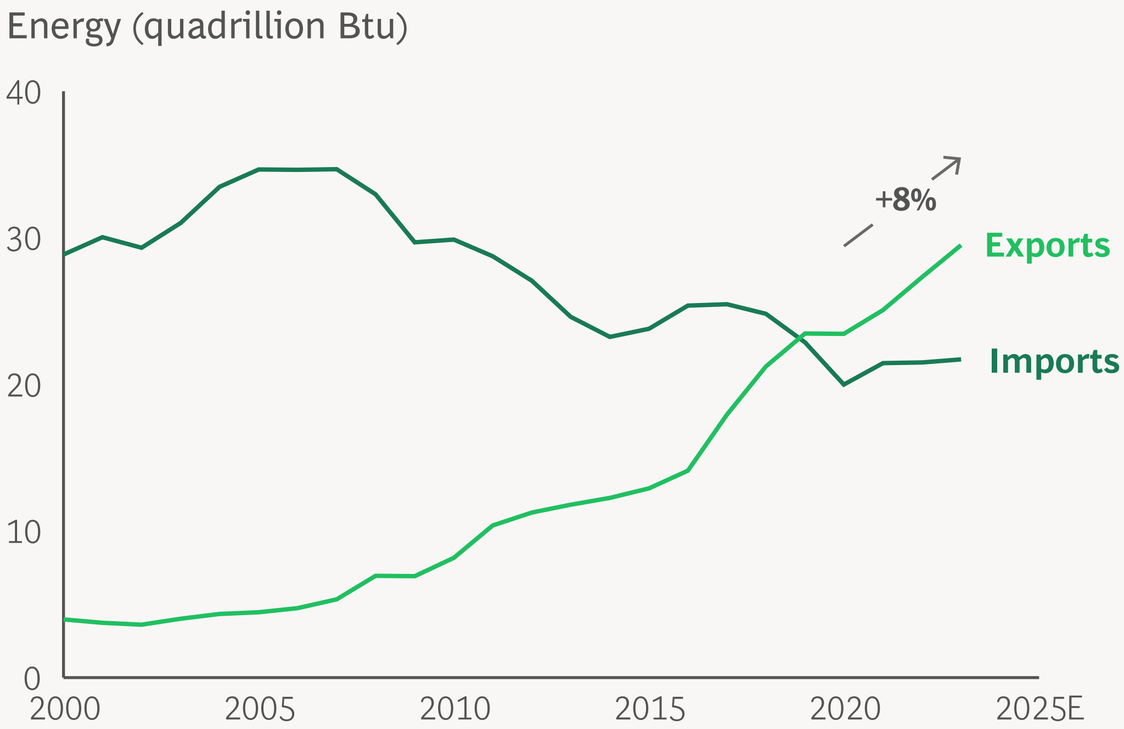
Daily production (millions of barrels of oil equivalent)



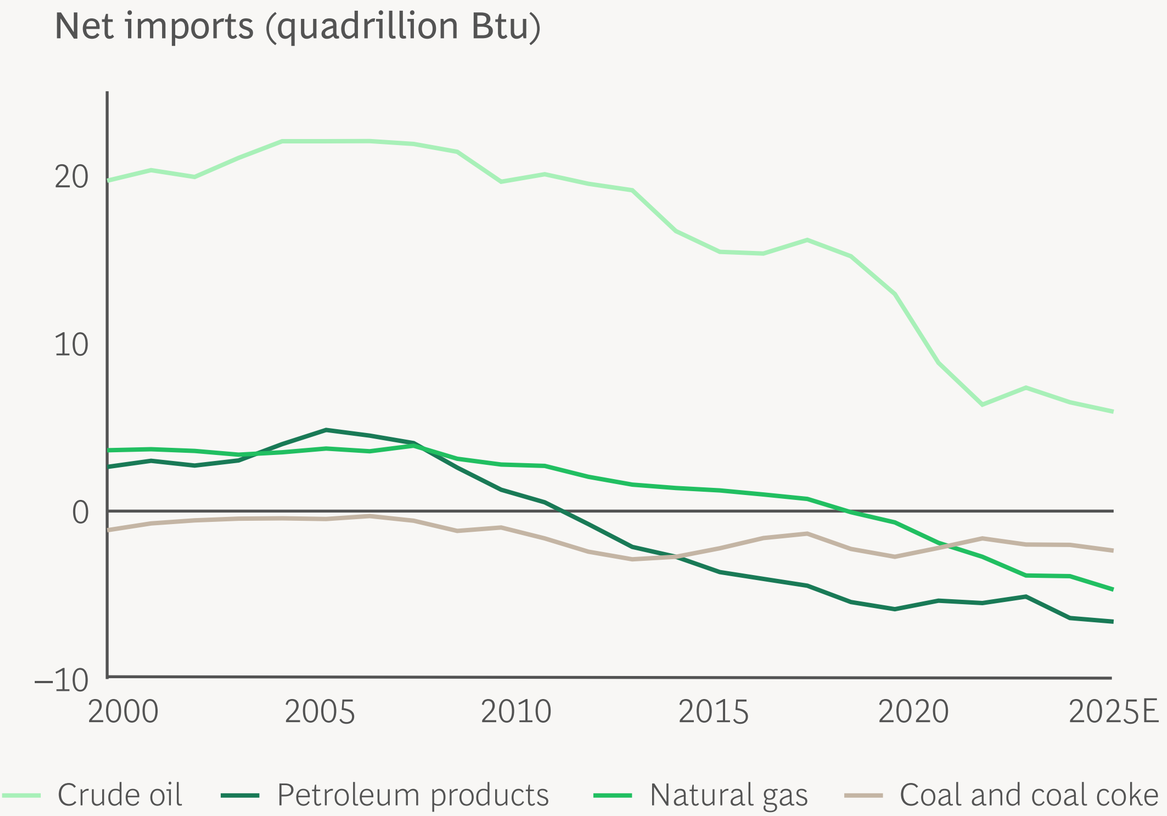
Sources: Rystad Energy; BCG analysis.
Note: Unconventional sources include oil sands, heavy oil, tight oil, and shale oil and gas (the main contributor). WCSB = Western Canada Sedimentary Basin.

The US's energy exports continue to grow with the expansion of low-cost natural gas production

US energy exports exceeded imports in 2019, and they have continued to grow by 8% per year on average since then



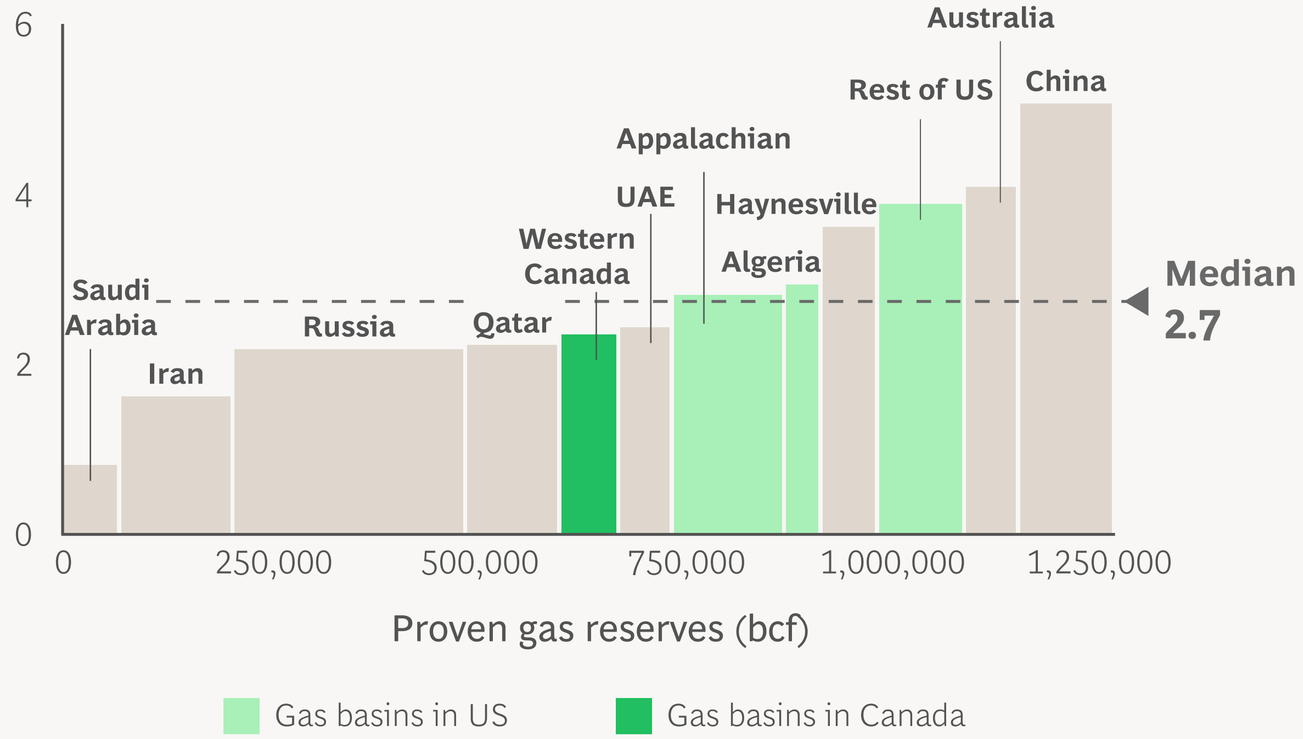
The US has become a net exporter of most kinds of energy, and its energy imports are declining



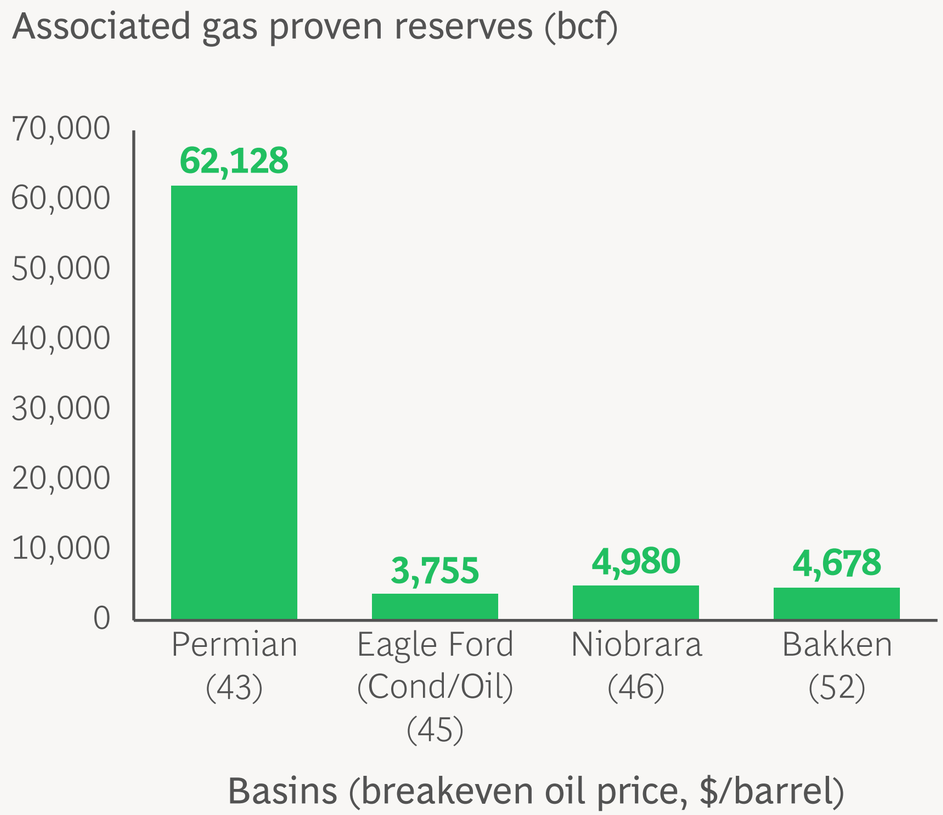
Sources: EIA; BCG analysis.
Note: Btu = British thermal unit.

North America's gas basins closely rival those in the Middle East in terms of costs and reserves, which will ensure continued exports and energy security

The US has more than 178 tcf of proven natural gas reserves, which can be extracted and delivered at a cost of less than $3/Mcf…



…and another 74 tcf of associated gas will probably be economical to tap at oil prices of less than $55/barrel

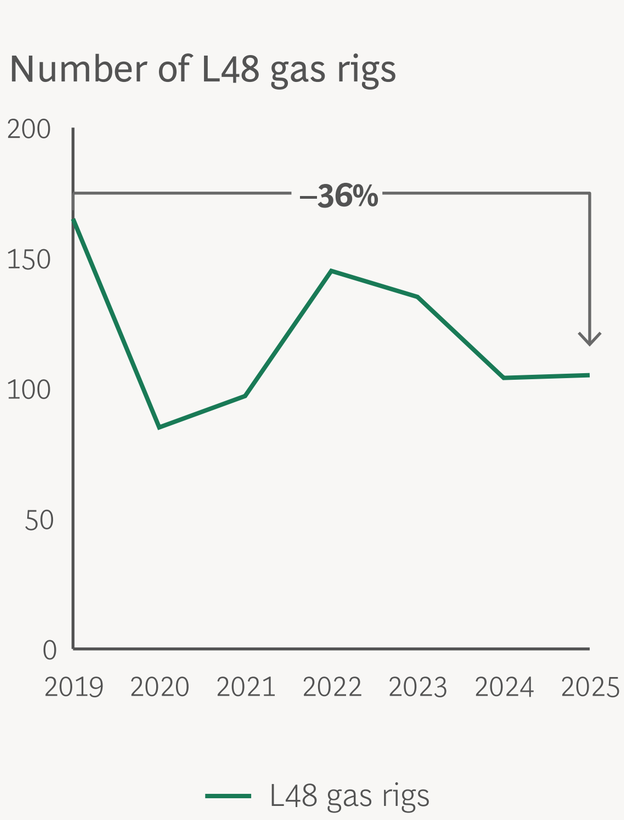


Sources: Rystad energy; BCG analysis.
Note: Associated gas formations can have much lower breakeven points than shown, given dependency on oil revenues. bcf = billion cubic feet; Mcf = thousand cubic feet; tcf = trillion cubic feet.

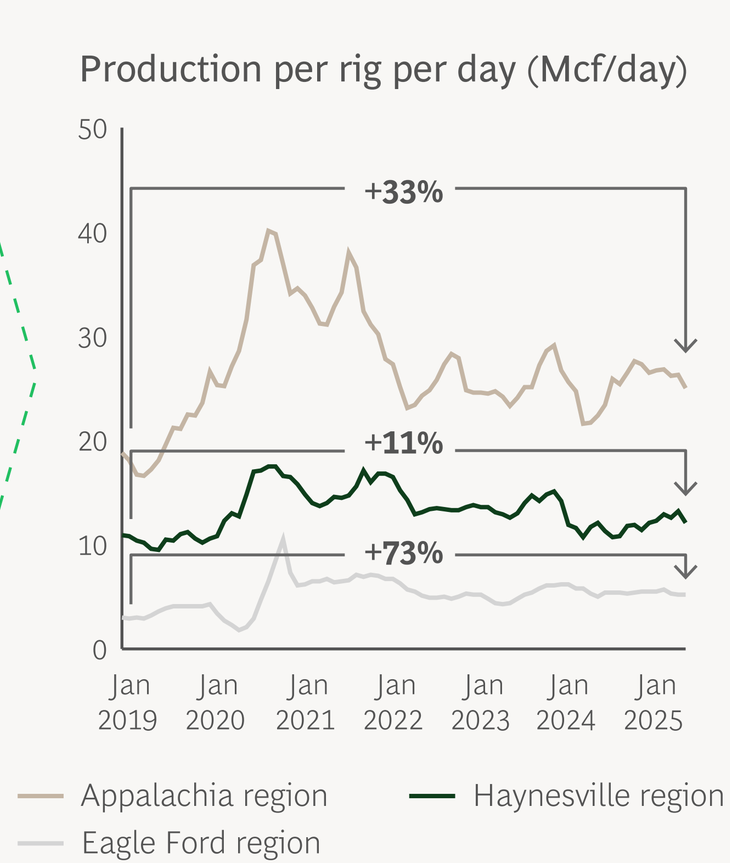
US energy companies have boosted their productivity in the past five years

Gas output has continued to grow…

…..while rig counts have declined…



…indicating that productproductivity has risen

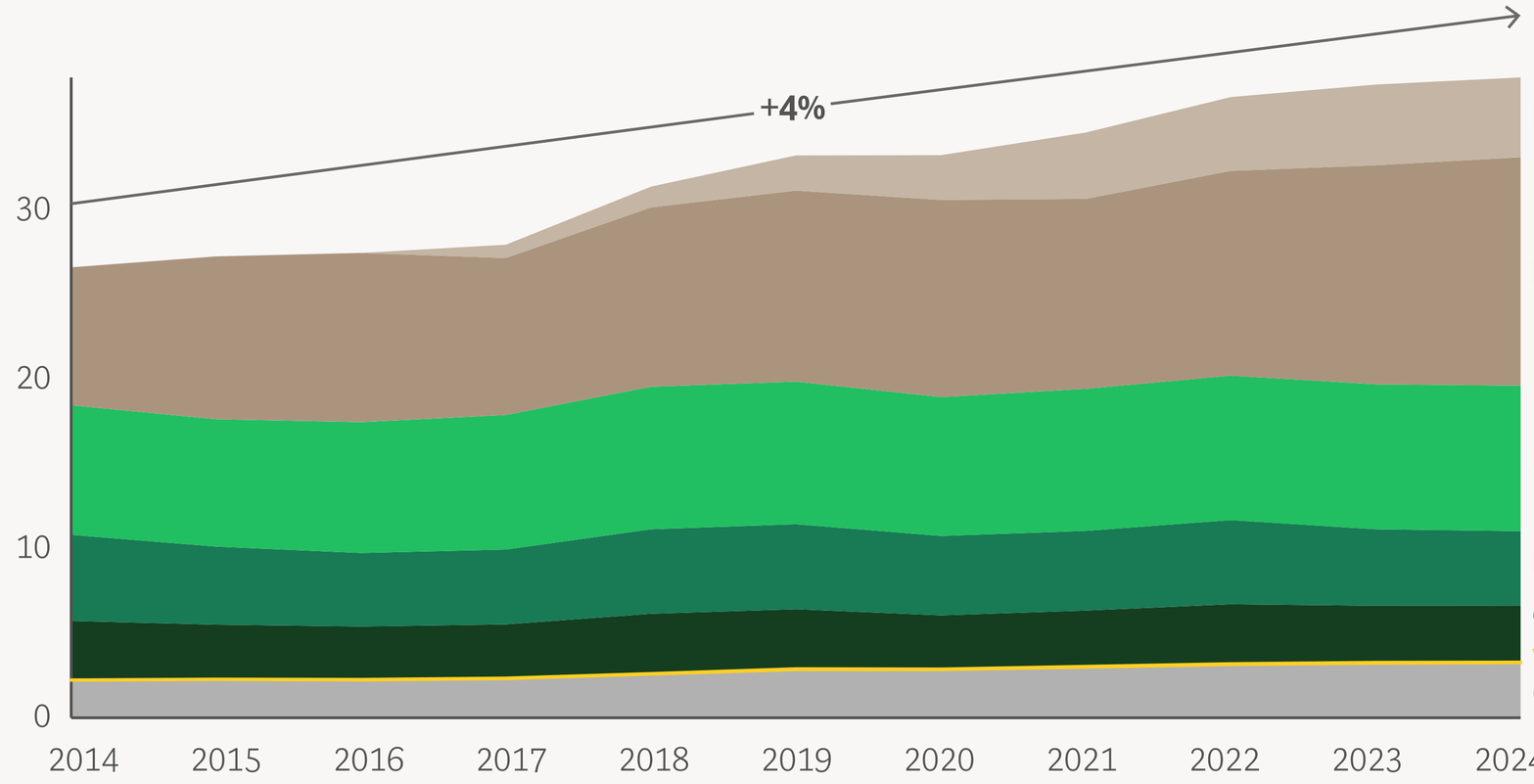


Sources: Baker Hughes rig count; EIA; BCG analysis.
Note: bcf = billion cubic feet; Btu = British thermal unit; HH = Henry Hub; L48 = lower 48 states of the US; Mcf = thousand cubic feet.

The Demand Trifecta Powering the US Boom in Natural Gas

In 2024, exports (in the form of liquefied feed gas), electricity generation, and industrial demand were the three largest uses of natural gas in the US

US gas consumption by sector, 2014–2024 (tcf)

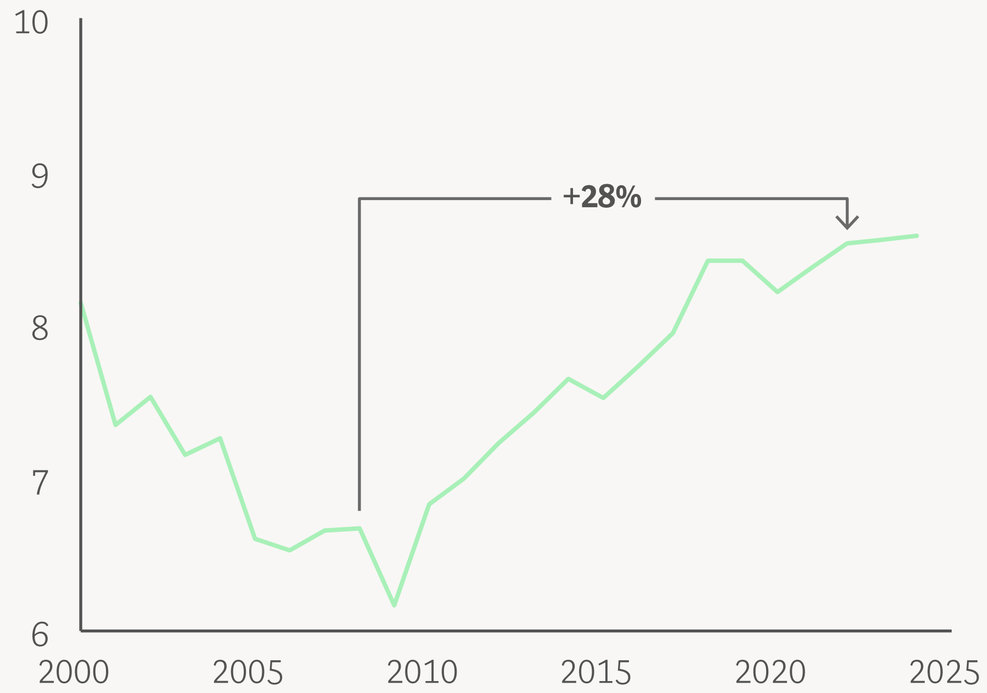


	Percentage of 2024 demand (%)	CAGR, 2014–2024 (%)
LNG feed gas	12.5	+29.6[2]
Electric power	35.7	+5
Industrial	22.7	+1
Residential	11.6	–1
Commercial	8.8	0
Vehicle fuel	0.1	+4
Others[1]	8.6	+4

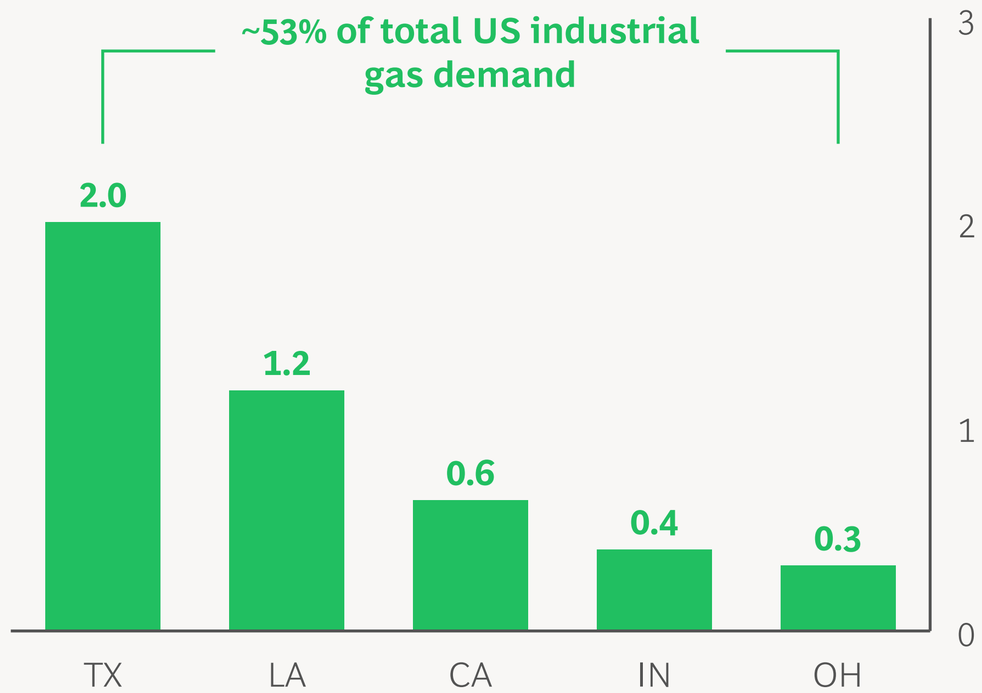
Sources: EIA; BCG analysis.
Note: CAGR = compound annual growth rate; tcf = trillion cubic feet.
[1]Includes natural gas use in pipeline fuel (as consumed in the operation of pipelines, primarily in compressors) and lease fuel in oilfield operations; excludes net pipeline exports.
[2]CAGR for 2017–2024.

From 2009 to 2024, falling prices caused US industrial demand for natural gas to rise by 28% a year—and demand is likely to keep growing at that rate

US industrial demand for gas by year (tcf)



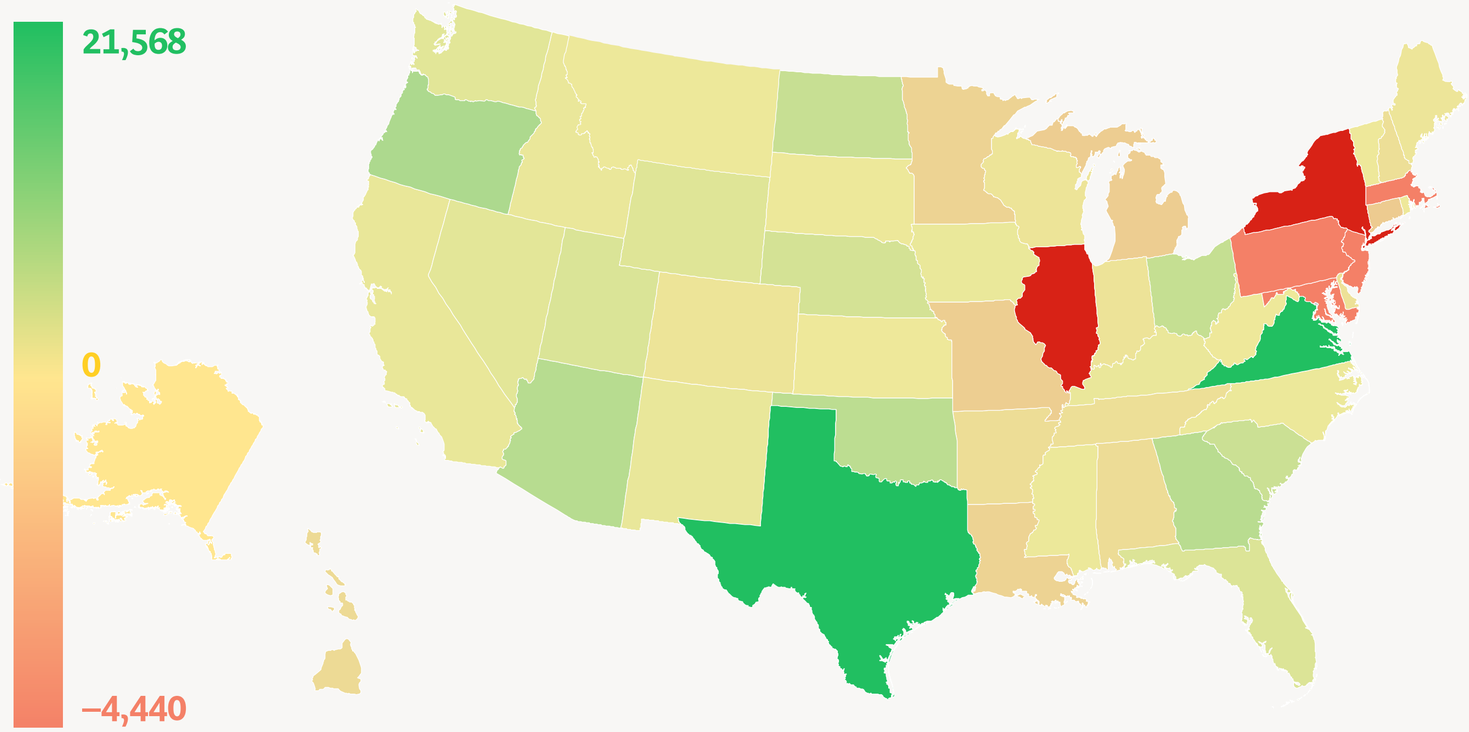
States with the largest industrial demand for gas (tcf)[1]



Sources: EIA; BCG analysis.
Note: TX = Texas, LA = Louisiana , CA = California, IN = Indiana, OH = Ohio; tcf = trillion cubic feet.
[1]Industrial demand in 2023; state-level data for 2024 is not yet available.

The increasing number of data centers being built in the US is driving the country's growing demand for gas-based power

Change in commercial electricity consumption by state, 2019–2023[1]



Growth is concentrated in states that are attracting computing investments

Texas and **Virginia have faced the sharpest increase in demand for gas-based electricity**

* Texas's **low electricity** and land costs have attracted **data center investments and cryptocurrency mining operations**

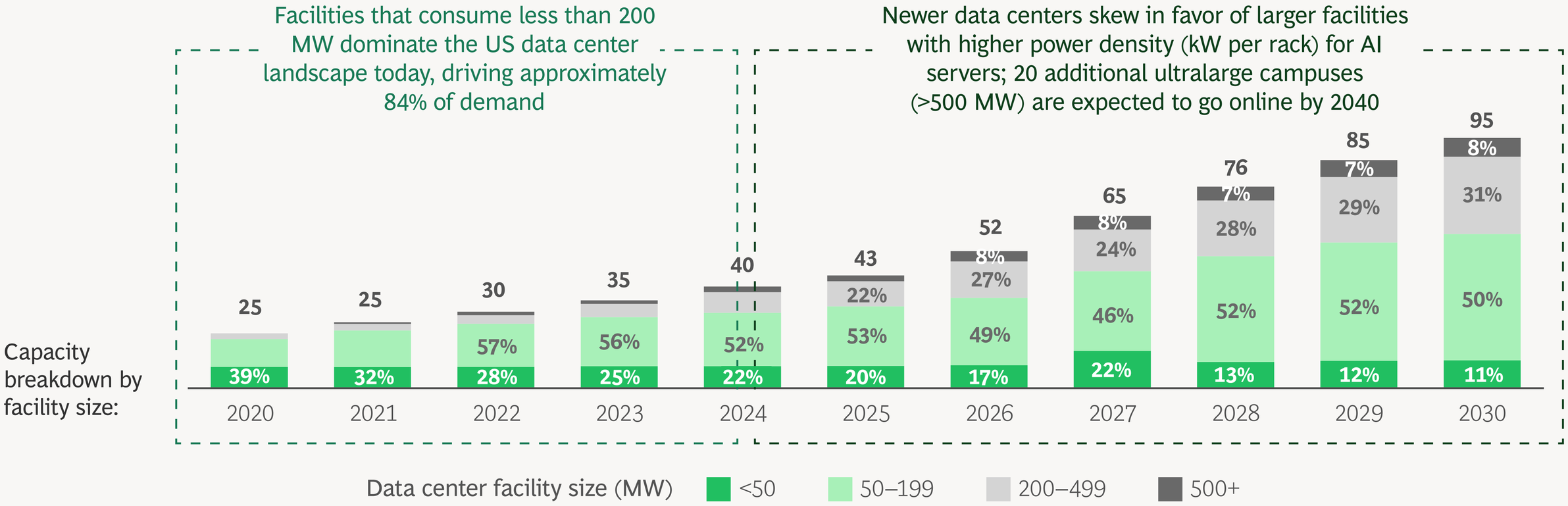
* Virginia is the US's primary **data center hub**; the state's dense fiber optics backbone is one of the drivers of this trend

Sources: EIA; BCG analysis.
Note: GWh = gigawatt-hour.
[1]As reflected by change in annual volume of electricity sold to commercial customers.

By 2040, data campuses that each consume over 200 MW a year will drive over 50% of the demand for power from US data centers

Projected power demand from hyperscaler and co-location provider US data centers (GW)

Data shown does not include enterprise segment

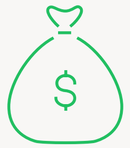


Sources: DC Hawk 2025 refresh; market participant interviews; BCG analysis.
Note: kW = kilowatt; MW = megawatt; GW = gigawatt. Because of rounding, not all percentages add up to 100%.

Despite the constraints that the industry faces, BCG projects a continued boom in the US natural gas industry

Growth Dependencies. The sector's growth will depend on domestic demand for natural gas–based power and on the global market for LNG exports. Electricity demand, driven in part by increasing numbers of large data centers being built in the US, could rise by 58% by 2030, and we expect LNG exports to rise by 60% to 2035.

Infrastructure Constraints. Despite bullish trends in sectors large and small, infrastructure strains in the US are unmistakable. Pipeline constraints have caused price volatility, from negative prices in Texas (Waha Hub) to spikes in the Northeast, reflecting the inadequacy of existing infrastructure to meet demand.



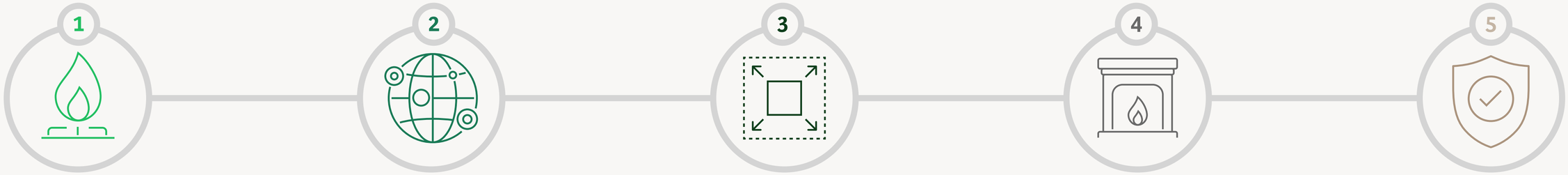
Investment Issues. Jolted by tariffs, inflation, and labor shortages, project costs are rising sharply. For instance, the labor costs of pipeline construction are up by 19%, and gas plant construction costs have risen by 200%—from $785 per kW in 2022 to $2,400 per kW in 2025.

Supply Chain Tangles. Shortages and rising lead times—as, for example, in the case of steam turbine supply times, which, in the past 12 months or so, have ballooned from 12 months to 40 months—will dampen the growth of natural gas generation.

No Peaking. BCG's forecasts don't suggest that output will soon peak. All five of the scenarios we developed find it likely that US natural gas consumption and LNG exports will keep growing over the next decade.

Five Strategic Paths for the US Natural Gas Industry

Five possible futures exist for US natural gas, according to a BCG study



Blue Rush

A new age dawns, with sufficient supplies and infrastructure to meet growth in natural gas demand. Prices rise enough to incentivize gas producers, but not enough to prompt consumers to demand regulatory relief.

America First

The supply of natural gas booms, but a winter with high prices makes it difficult for Americans to stay warm. This prompts a policy shift that slows exports and increases domestic use of natural gas. If production slows, too, offering little long-term price relief, there will be scant political will to revisit export policy.

Export Rush

Demand for natural gas booms, but efficiency gains and other factors cause the demand from the power sector to fizzle out after a few years. Exports then become the primary source of demand growth, followed by petrochemicals.

Slow Burn

Both demand for and supply of natural gas rise, but supply chain delays, higher costs, and permitting delays stymie growth. This leads to reduced growth in demand and more sluggish exports amid slower overall US economic growth.

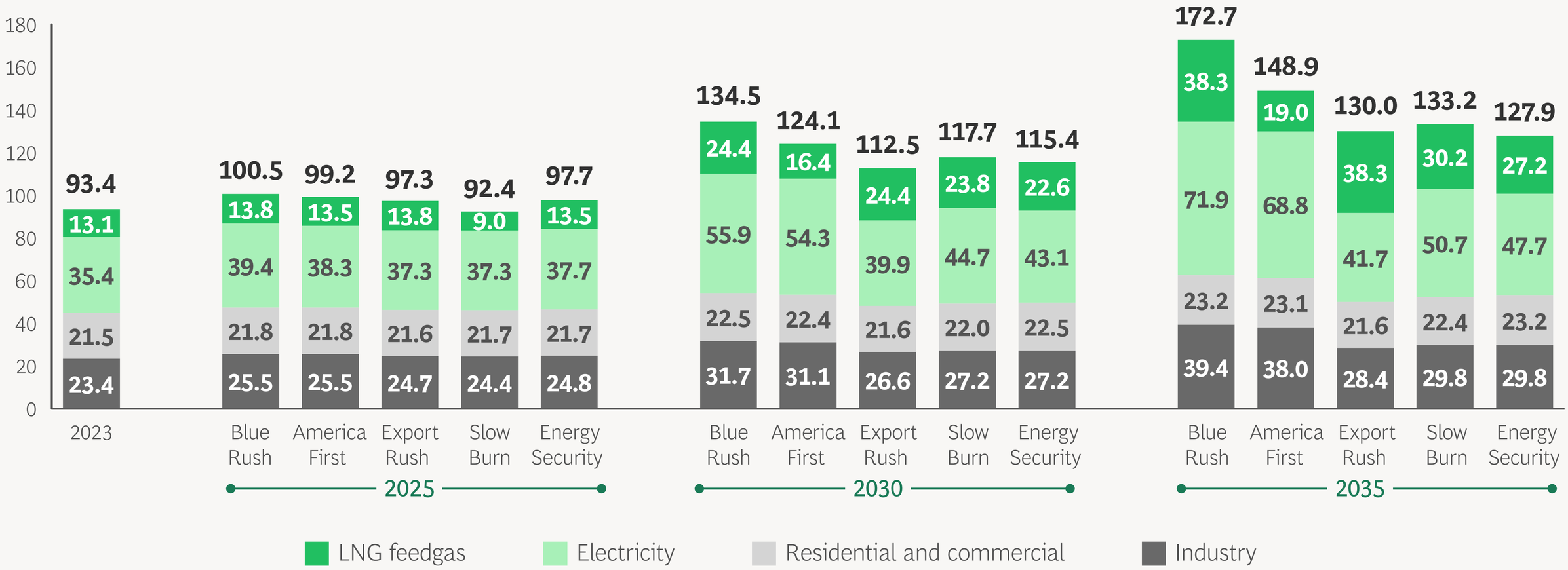
Energy Insecurity

Geopolitical tensions continue to rise, and other countries increasingly see the US as an unreliable partner. They still buy gas from the US, but mainly as a second choice. This limits growth, as demand is usually for short-term or spot LNG. Subdued economic growth weakens domestic demand for natural gas too.

Source: BCG analysis.

In none of the five scenarios that BCG developed does US natural gas consumption peak over the next ten years

Forecast annual natural gas consumption (bcf/day)



Sources: EIA Annual energy outlook 2023; IEA WEO 2023; Energy Innovation US EPS v4.0; BCG analysis.
Note: "Residential and commercial" does not include lease and plant fuel, pipelines and distribution use, or pipe exports. bcf = billion cubic feet.

Unlocking Growth in a System Under Strain

Three constraints could slow the US natural gas market's momentum in the future

Financial constraints

- Market pricing dynamics
- Labor costs
- Inflation
- Supply chain costs (including tariffs)

Construction and operational constraints

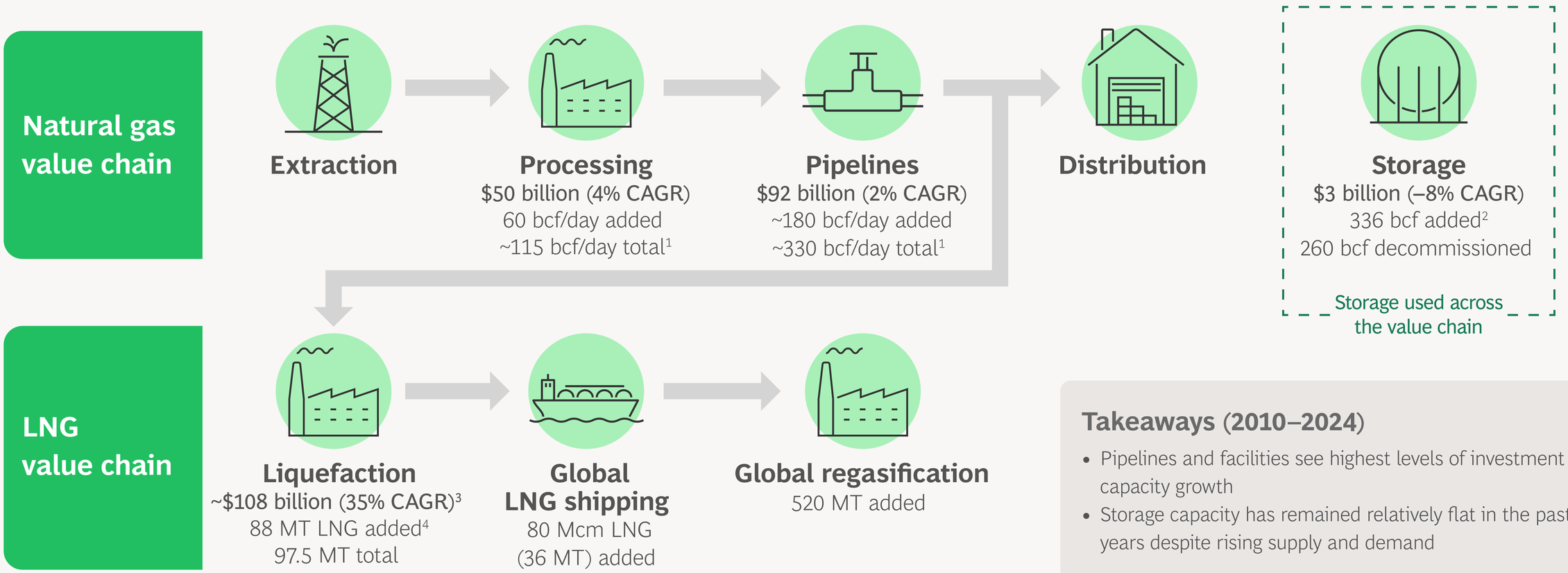
- Skills shortages
- Supply chain shortages (equipment/materials)

Infrastructure constraints

- Limitations on takeaway capacity
- Regulatory and permitting barriers

Source: BCG analysis.

Over $250 billion has been invested in US infrastructure to deliver natural gas to demand centers, but capacity remains inadequate



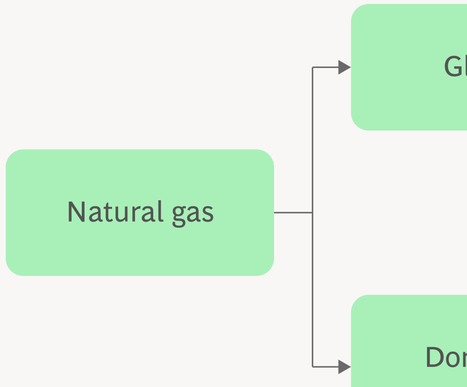
Takeaways (2010–2024)

- Pipelines and facilities see highest levels of investment and capacity growth
- Storage capacity has remained relatively flat in the past few years despite rising supply and demand

Sources: GlobalData; EIA; Rystad Energy; BCG analysis.
Note: Pipeline cost is counted when it reaches commissioning, not when outlays occur. bcf = billion cubic feet; CAGR = compound annual growth rate; Mcm = million cubic meters; MT = million tons.
[1]Built since 1996.
[2]Not counting decommissioning costs. Significant storage capacity has been decommissioned since 2010.
[3]CAGR from 2012.
[4]Since 2016.

Tomorrow’s Growth Plays for the US Natural Gas Industry

To identify the right strategic path forward, US natural gas players need to consider their company's fit with the capabilities they need



	2024 natural gas demand (bcf/day)	2030 US natural gas demand (bcf/day)	Projected CAGR to 2030 (%)	Margin potential over Henry Hub	Requirements to capture margin upside
US LNG	**11.9**	**~16–24**	Low: +**6.1** High: +**15.1**	Medium to high	Significant capital outlay; trading maximizes upside
Electric power[1]	**37.0**	**~40–55**	Low: +**1.6** High: +**8.3**	None to high	Differentiated capabilities; clean integrated power
Other sectors[2]	**53.7**	**~48–55**	Low: **–2.2** High: +**0.5**	Low	Partnerships with petrochemical companies

Sources: Rystad Energy; BCG LNG SupplyVision, NERC; EIA; Energy Innovation Policy Simulator; BCG analysis.
Note: bcf = billion cubic feet; CAGR = compound annual growth rate.
[1]Consists of electricity-only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public. We report CHP plants that identify themselves as operating primarily in the commercial or industrial sectors as members of those sectors.
[2]Includes all consumption other than for electric power: residential, commercial, industrial (including CHP plants that identify themselves as operating primarily in the commercial or industrial sectors and therefore were excluded from the "electric power" classification), vehicle fuel, lease and plant fuel, and pipeline and distribution use.

Six business models have emerged in the LNG segment, each with a distinct value path

Niche players

- Build niche footprints in LNG, using regional infrastructure
- Minimize global activities due to smaller scale
- Represent a business model seen mainly outside North America

Tollers

- Consist of liquefaction plant operators that provide liquefaction services to customers that handle their own gas sourcing and trading
- Generate profits from the fees they charge for liquefaction services

Hybrid merchant tollers

- Consist of liquefaction plant operators that own large-scale LNG plants and terminals and provide liquefaction service
- May have access to regassification capacity
- Buy gas through a combination of spot and term contracts
- Create value by optimizing agreements and connecting source gas with global LNG markets

Value chain optimizers

- Consist of upstream companies that own a large upstream gas position and use LNG as one means of monetizing it
- Have set up an in-house trading unit that is skilled in trading equity flows
- Focus on flow assurance and maximizing value from equity production

Portfolio players

- Develop a global LNG merchant play that includes storage assets, long-term sourcing, and ways for oil companies to find homes for their upstream operations
- Trade physical and paper assets
- Leverage a global footprint

Merchant traders

- Consist primarily of trading companies that take both long and short positions in the LNG market
- Trade only third-party volumes
- Use market intelligence to identify deals that will create value

Sources: Interviews with industry experts; BCG analysis.

America's LNG players can develop different strategies to tackle the five projected scenarios, with agility and cost reduction being common threads

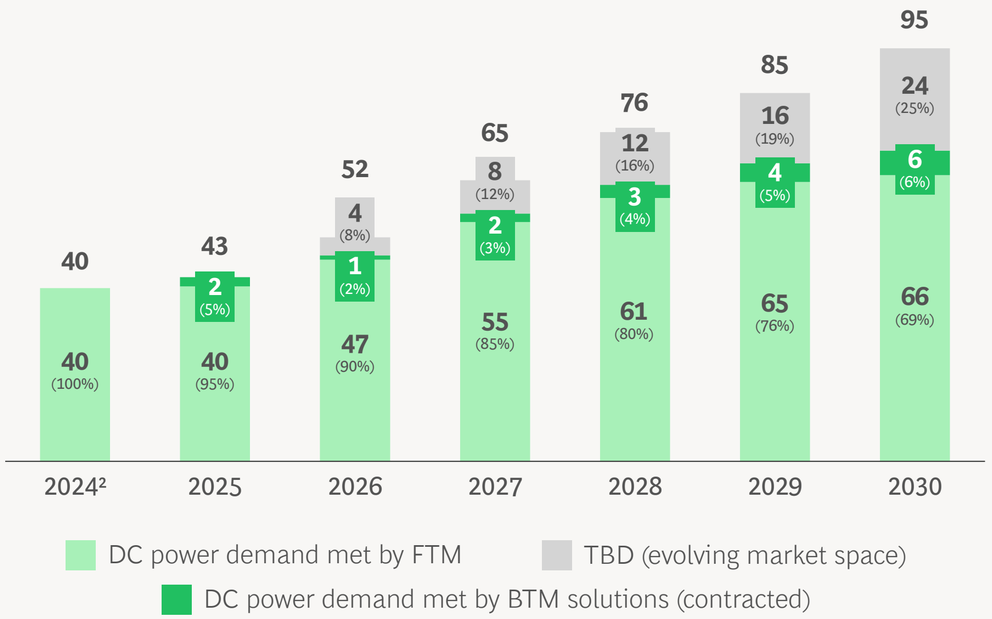
	1 Blue Rush	2 America First	3 Export Rush	4 Slow Burn	5 Energy Security
Tollers	Shift to hybrid business models to capture more value amid rising competition	Secure long-term contracts with flexible structures	Offer flexible pricing to stay competitive amid rising competition	Focus on efficient execution and cost control to offset low margins and project delays	Capture near-term value with spare capacity for short-term tolling contracts
Merchant traders	Enhance trading with AI, data analytics, and talent; prioritize Europe	Protect flexibility by maintaining long-term US contracts and using destination-free terms	Diversify the customer base; use flexible contracts to reduce exposure to volatile spot pricing	Manage the LNG slowdown by trading other commodities and hedging	Exploit price gaps between gas and oil-linked contracts via active price monitoring
Hybrid merchant tollers	Foster commercial relationships, hedge risks, and develop infrastructure	Improve margins by sourcing cheaper feed gas; evaluate alternatives to secure low-cost supply (i.e., own upstream assets)	Pursue additional tolling opportunities; delay nonessential maintenance to maximize gains	Prioritize disciplined capital allocation; streamline operations	Foster relationships with creditworthy clients, and optimize plant operations
Value chain optimizers	Upgrade infrastructure and de-bottleneck	Address supply chain bottlenecks by investing in efficient, low-cost gas resources	Focus on low-cost, high-quality assets; consider divesting more expensive operations	Improve efficiency, reduce costs, and adapt trading strategies to lower-volume operations	Consider shifting to a portfolio player model, and pursue foreign investment
Portfolio players	Scale trading and prioritize low-cost gas plays with metrics	Focus on cost efficiency; secure midstream partnerships to ensure consistent product delivery	Enhance trading with AI and data analytics; boost volume through tolling partnerships	Manage exposure to mitigate volatility and protect portfolio value	Enhance trading with AI, data analytics, and talent; reduce US exposure

Sources: Interviews with industry experts; BCG analysis.

Gas is turning into gigawatts, as the increasing demand for power creates new opportunities for upstream natural gas players

"Behind the meter" is gaining traction to overcome grid connectivity problems in the short term, but "front of the meter" is the preferred play in the long run

US data center power demand midpoint (GW)



Potential gas volume, 2030 (bcf/day)¹

1.8

0.5

5

Opportunities for upstream players

1. Provide integrated clean power
2. Monetize stranded gas
3. Monetize nonstranded gas

Requires new business models and commercial structures

Contract with IPPs; upstream companies will require demand management capability

Provide more supply to meet growing demand; focus on being a low-cost gas producer

Uses existing business models and contracting

Sources: EIA; NERC, interviews with industry experts, BCG power demand market model; BCG analysis.
Note: Estimated power demand is based on expected utilization rates for each DC segment by year (ranging from approximately 85% to 87% in 2024 to approximately 85% to 90% in 2030). Values are rounded. Enterprise demand is excluded. bcf = billion cubic feet; BTM = behind the meter; DC = direct current; FTM = front of the meter; IPP = independent power producer; TBD = to be determined.
¹Gas is assumed to power 50% of the BTM demand in 2030. Other BTM solutions include small modular reactors, renewables (wind and solar), and other technologies.
²In 2024, ~44% of FTM power comes from gas generation which is assumed to increase to 50% in 2030. Today, BTM solutions cover negligible power demand; we anticipate that on-site power generation will grow from 2026 onward.

Electricity business models are evolving as upstream natural gas players try to monetize demand for behind-the-meter solutions

Integrated clean power

Deliver end-to-end integrated power solutions to data centers (hyperscalers)

- Build, own, and operate gas-fired power plants with optional carbon capture
- Own and operate gas-fired plants (optional CCUS)
- Supply directly to hyperscalers

Target: Hyperscalers

Behind-the-meter power for data centers

Place gas in behind-the-meter solutions for data centers

- Use proximity to data centers and legacy infrastructure that is strategically advantaged
- Partner with third parties for setup

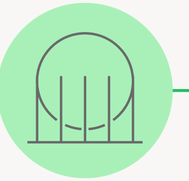
Target: Co-locators

Behind-the-meter and low-carbon solutions for data centers

Layer CO_2 offtake and CCUS services into behind-the-meter supply

- Supply both gas and decarbonization services to ESG-conscious data centers
- Partner with third parties for setup

Target: Co-locators



Onsite gas to power

Use modular systems to convert stranded gas to onsite power

- Use wellhead gas with proved, probable, and possible reserves to power niche AI and batch workloads

Target: Small-scale computing

Sources: Interviews with industry experts; BCG analysis.
Note: CCUS = carbon capture, utilization, and storage; ESG = environmental, social, and governance.

Midstream players' unique capabilities position them to supply power to data centers cost-effectively and reliably

Control of critical infrastructure

- Swiftly deploy large-scale gas pipelines to data centers
- Maximize reliability through storage access and supply redundancy
- Flexibly manage gas flows, and rapidly respond to demand swings
- Quickly invest in infrastructure expansion

Ability to balance demand

- Use line pack and underground storage to absorb demand swings
- Maintain high-reliability (99.99999%) uptime

Direct connectivity and last-mile reach

- Own pipeline routes near major data center hubs
- Enable short spur connections and rapid deployment
- Use hot tap access to reduce the need for new infrastructure

Sophisticated commercial models

- Offer flexible contracts that include fixed-fee and passthrough pricing options
- Lower costs by eliminating intermediaries
- Bundle energy services (energy as a service)

Sources: Interviews with industry experts; BCG analysis.

Midstream players are investing to improve efficiency

Reduce operating costs

Midstream players have unveiled multiple initiatives to unlock financial and operational efficiency and better manage suppliers

Enhance capital delivery

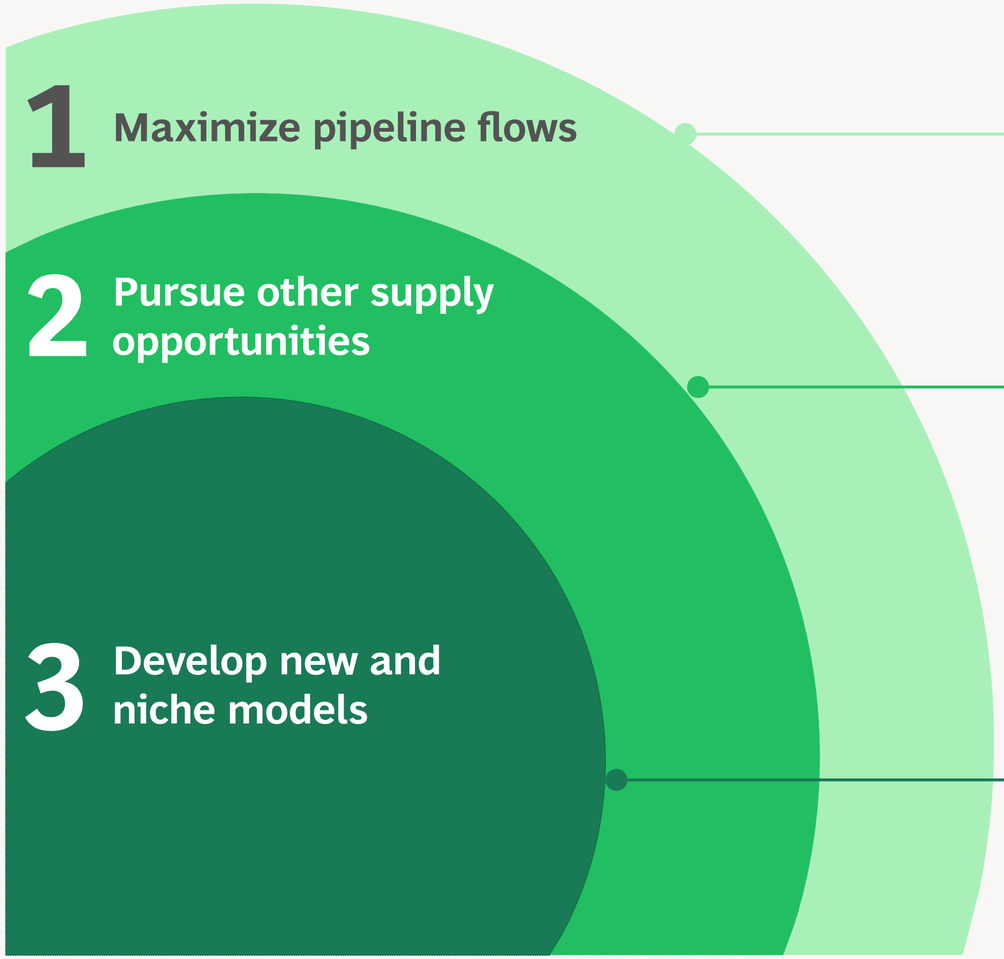
Midstream companies have invested in increasing their capacity

Optimize capabilities

Midstream leaders have strengthened their analytical capabilities to reduce unplanned downtime and maintenance costs

Sources: Interviews with industry experts; BCG analysis.

Midstream players are exploring new business models to capture increased demand



1. Build and expand long-distance pipeline infrastructure
2. Invest in short-haul pipeline projects

1. Contract to directly supply natural gas
2. Attract power companies to construct electricity generators near gas processing plants
3. Accommodate storage expansion in the form of line packs and onsite liquefied gas

1. Offer full end-to-end solutions, from supply to power generation
2. Provide integrated decarbonization solutions

Uses existing business models and contracting

Requires new business models and a greater risk appetite

Sources: Interviews with industry experts; BCG analysis.

In sum, the US natural gas industry is ready to keep growing despite the current constraints and uncertainty

Natural gas demand is poised for growth, with US exports likely to increase by 11% per year, from around 16 billion cubic feet per day (bcf/day) in 2024 to as much as 55 bcf/day by 2030.

Several opportunities exist for midstream and upstream natural gas companies, but some of them will require companies to create differentiated offerings.

Integrated upstream players can capture the highest margin by delivering turnkey clean-power solutions directly to data centers.

Niche upstream models can monetize stranded gas, providing onsite modular power solutions for smaller data centers (under 50 MW) and thereby capturing extra value.

Midstream operators can benefit from infrastructure proximity, with projects that involve directly supplying reliable behind-the-meter power.

Their balancing capabilities—such as line-pack and storage flexibility, which is crucial for supplying power to data centers—give midstream players an advantage over upstream players.