

LISTED INFRASTRUCTURE

Natural gas supports power demand and the energy transition

Energy infrastructure companies benefit

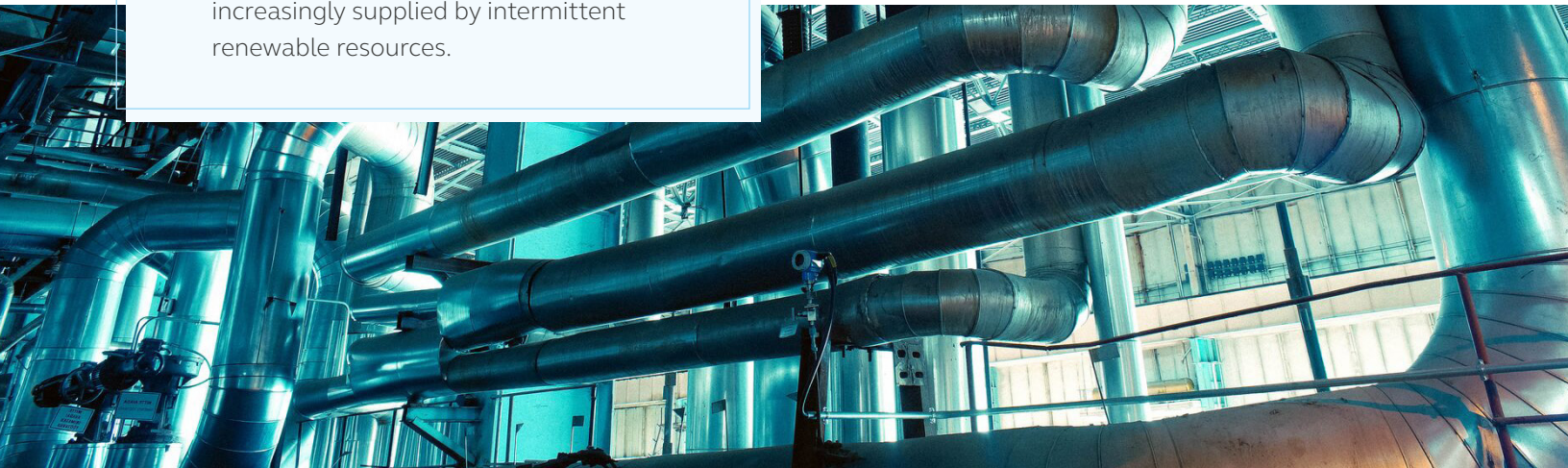


ALEX MOTTERSHEAD, CFA
Portfolio Manager, Listed Infrastructure

KEY POINTS

- Natural gas provides vital support for many aspects of the energy transition.
- North American energy infrastructure companies are positioned to benefit from the growth in demand for natural gas capacity.
- Power generation demand and natural gas exports are the key drivers of this growth.
- Power demand is increasing and natural gas is the only feasible means of meeting around-the-clock demand in a grid increasingly supplied by intermittent renewable resources.

Power generation demand is increasing at an accelerating pace. While the fastest growing sources of new power generation are renewables, this type of generation is intermittent. Natural gas is the most flexible and economically viable source of power to maintain reliability throughout the variability in renewables' output. The flexibility of natural gas means that natural gas infrastructure needs to be sized for peak demand, which is expected to grow faster than average demand. Natural gas infrastructure is also needed in North America to support the growth in exports of liquefied natural gas (LNG), primarily to Asia and Europe. LNG enables the replacement of less clean sources of power generation, such as coal, allowing improvements in living standards in those markets.

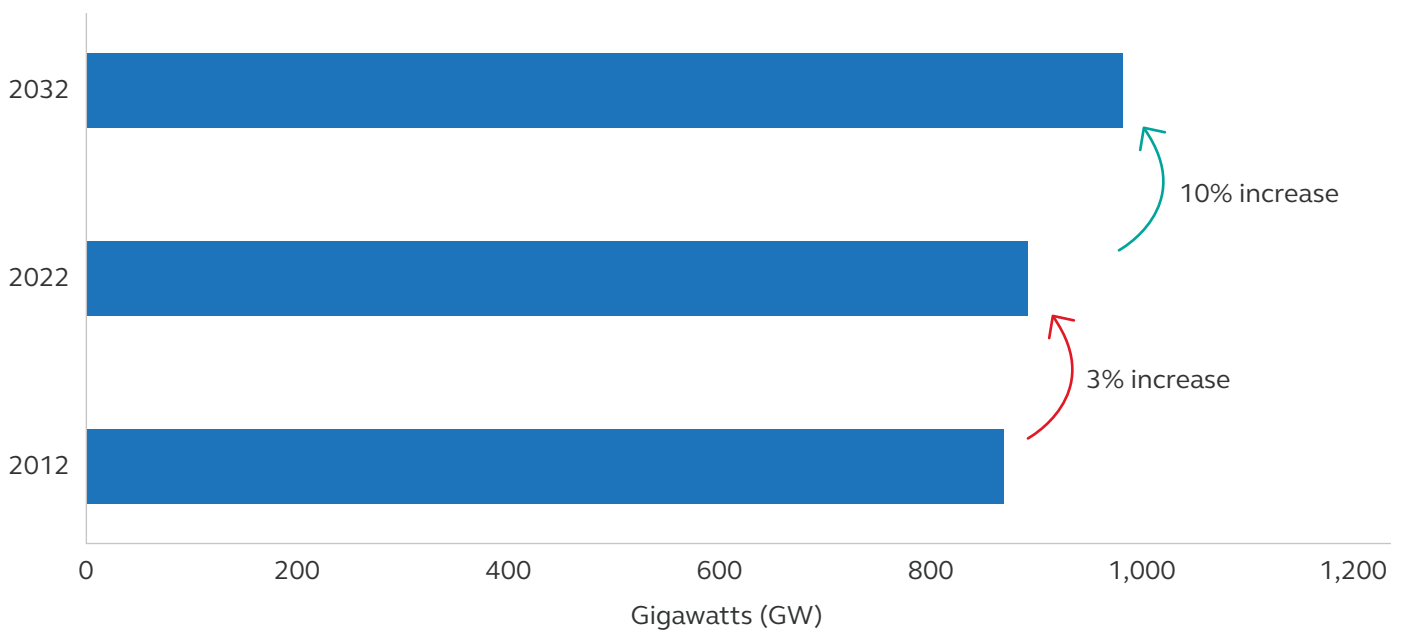


Natural gas offers reliability to support power demand growth

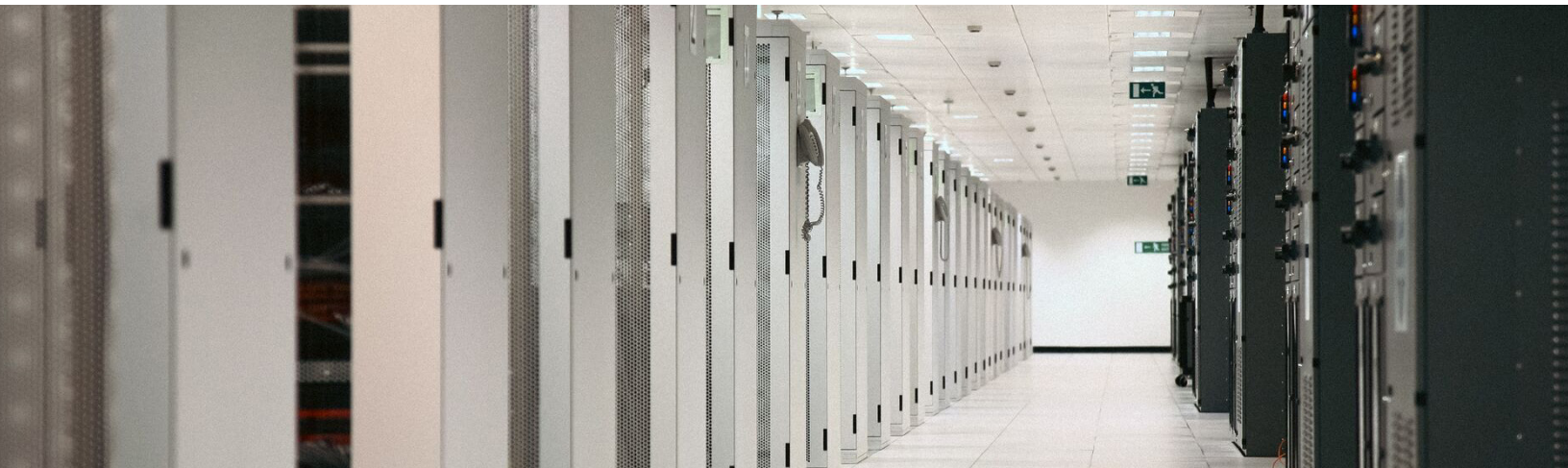
Power generation demand is growing in North America and globally. In the past 20 years, North American and other OECD electricity demand growth has been flattish, as efficiency gains have offset GDP driven demand growth. In the coming years, this is expected to change with the North American Electric Reliability Corporation (NERC), a nonprofit tasked with ensuring electric reliability in the continent, projecting North American summer peak demand will grow at over 3x the rate from 2022-2032 compared to the prior 10 years. See Exhibit 1 below.

This increase in projected peak demand is based on data center demand growth for generative artificial intelligence (AI) and, in North America, the reshoring of important industries such as semiconductors, petrochemicals and metals.

EXHIBIT 1: Change in summer peak capacity and demand forecast (2012-2032)



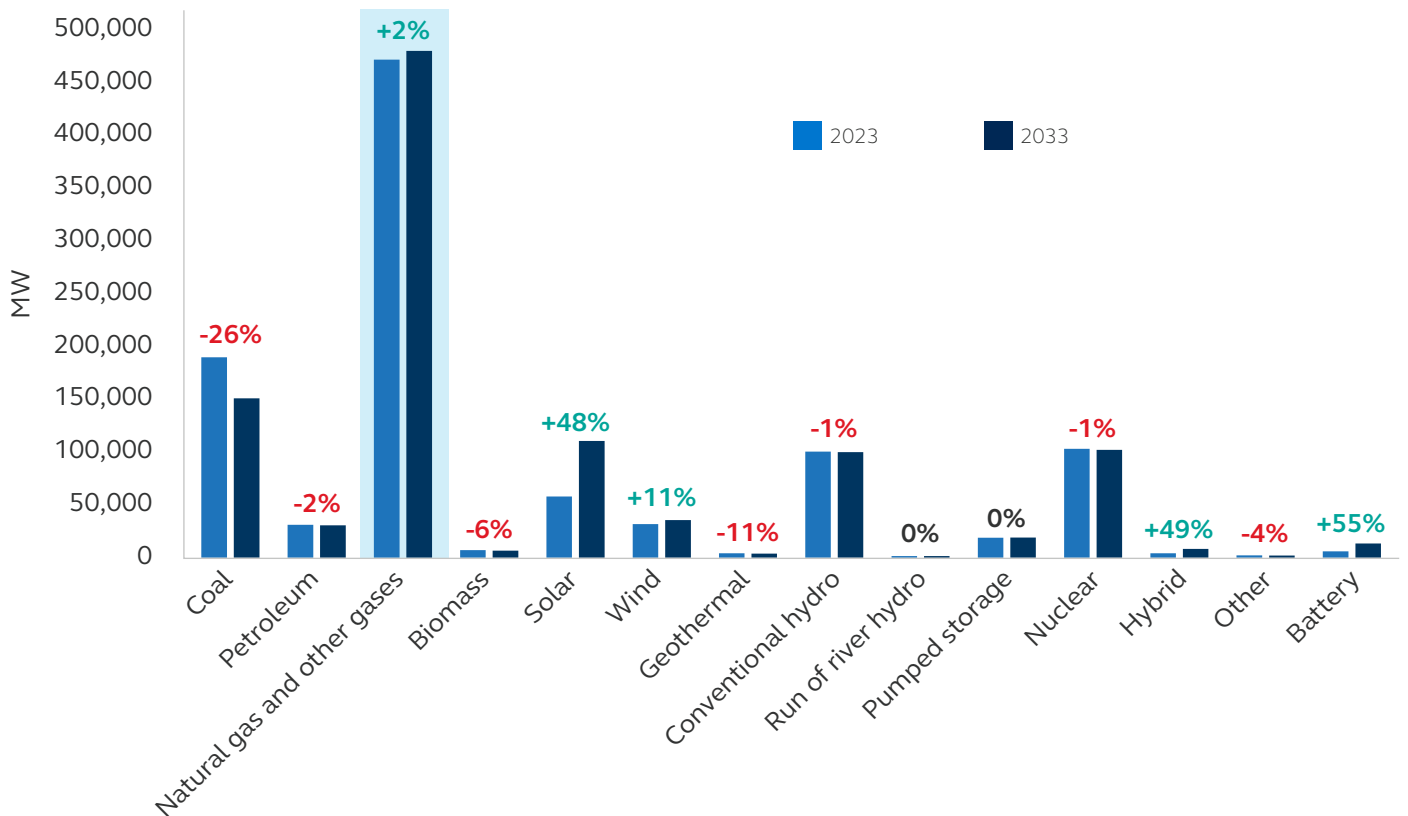
Source: The North American Electric Reliability Corporation (NERC). https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_2023.pdf p16



Today, renewables represent a significant majority of new power generation under construction to meet this new demand. Solar represents 52% and wind represents 16% of total planned generation capacity additions from 2023-27 in the U.S.¹ The share of power generated from renewable sources has increased from 6% in 2013 to 15% in 2023.²

Data center customers are especially keen to secure renewable generation to meet their own decarbonization goals. These numbers demonstrate one of the challenges of the energy transition: renewable sources of power generation generally run less of the time than conventional sources. The times at which renewable generation runs are also less predictable than for conventional sources. The deployment of renewable generation is the key driver of the overall energy transition and offers one of the best avenues to decarbonize, but the intermittency of its output requires balancing with dispatchable generation.³ As you can see in Exhibit 2 below, while renewables and storage are expected to see the most rapid growth over the next decade, natural gas will remain the most important source of generation capacity.

EXHIBIT 2: 2023 vs 2033 peak capacity projection by fuel type



Source: NERC, https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_2023.pdf

¹ https://www.eia.gov/electricity/annual/html/epa_04_05.html

² <https://www.eia.gov/electricity/monthly/archive/february2024.pdf> https://www.eia.gov/electricity/annual/html/epa_01_02.html

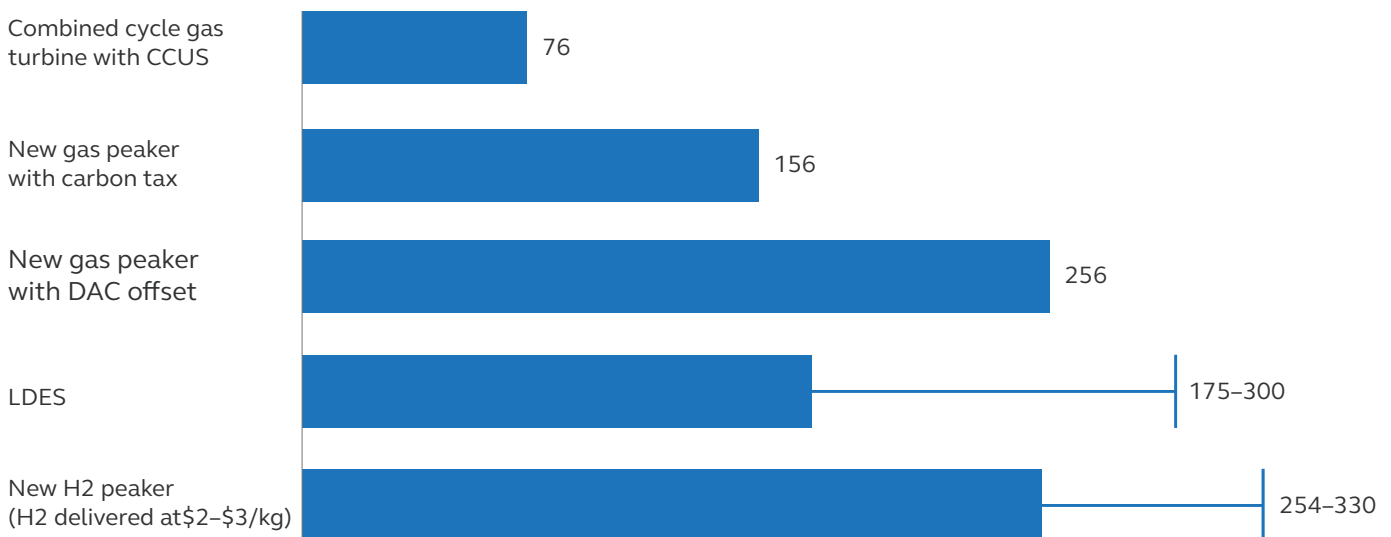
³ Dispatchable power: a type of electricity that can be turned on, off, or adjusted to meet the changing demands of the power grid.

Natural gas is the primary means of balancing the intermittency inherent in renewable power generation. In situations when wind or solar resource is low but power demand is high, this demand must be met either by other sources of generation or by stored power. As nuclear generation cannot be switched up and down easily and coal is environmentally undesirable, natural gas is the preferred source of incremental power when renewables are not running.

While power storage technology can be a solution to renewable power generation's intermittency, it still requires improvement in its technology and economic efficiency before being effective for long durations. Cost estimates of various storage and demand-balancing resources are projected to be relatively expensive, with gas generation offering the most economical solution. Exhibit 3 below compares the cost of gas fired generation with CO2 mitigation to battery and hydrogen storage alternatives.

EXHIBIT 3: Comparison of 2030 electricity cost projections between gas and energy storage solutions

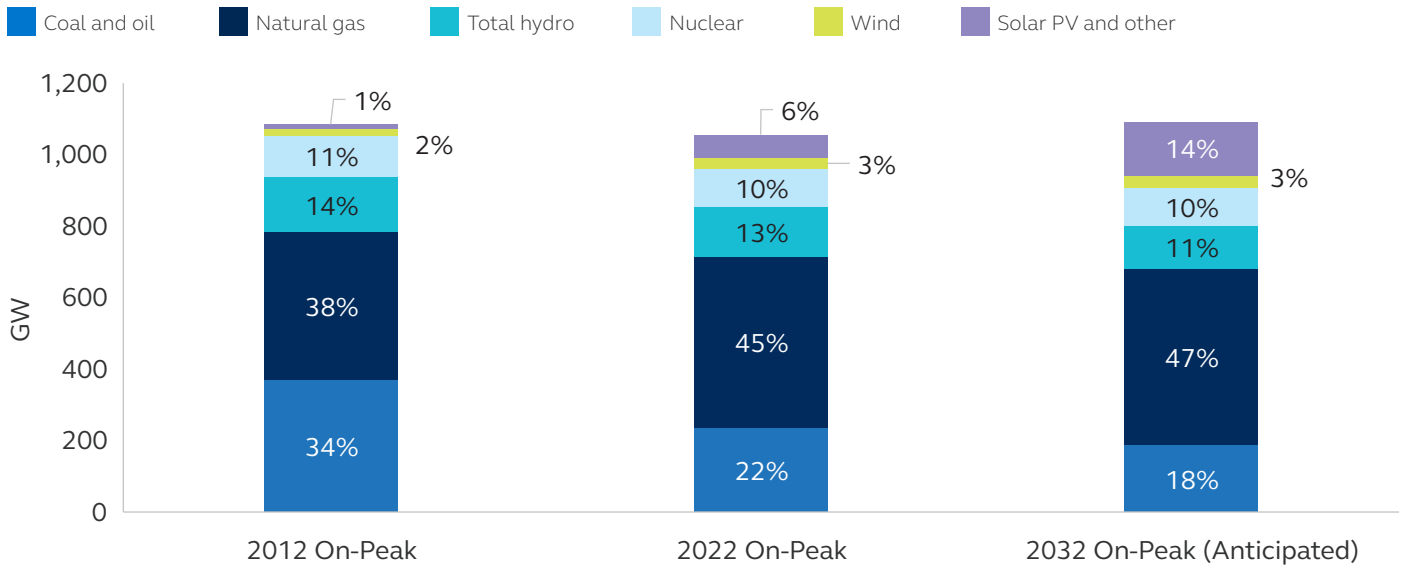
2030 electricity costs¹, \$/megawatt-hour



Source: EIA. Source: McKinsey & Company, <https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/the-role-of-natural-gas-in-the-move-to-cleaner-more-reliable-power> Source: McKinsey & Company, <https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/the-role-of-natural-gas-in-the-move-to-cleaner-more-reliable-power>

Natural gas is likely to remain the primary source of dispatchable power for the foreseeable future. As seen in Exhibit 4, the NERC projects that natural gas will represent 47% of on-peak generation capacity by 2032, representing an increasing share of a power market that is growing and tightening.

EXHIBIT 4: Growth in market share projection by power source



Source: NERC. https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_2023.pdf p16

Coal generation retirements will continue to support the need for cleaner natural gas

The need for natural gas fired power generation is further compounded by ongoing retirements of coal fired generation. Coal is still a major source of baseload power in large parts of the world. Coal generation has lost share in the generation mix as societies have prioritized decarbonization and improvements in air quality. However, this process still has a long way to go, as coal still represented 16% of total U.S. power generation in 2023.⁴

Natural gas has been the primary replacement for coal generation, as it can operate as an around-the-clock baseload source, unlike renewables. The other large source of baseload power is nuclear, but construction of new, large scale nuclear generation is prohibitively expensive, especially in developed markets.

The decarbonization benefit of replacing retiring coal plants with natural gas and renewables is well established. The U.S. electric power sector emitted 40% less CO₂ in absolute terms in 2023 compared to 2005 as the generation mix has evolved to cleaner sources.⁵ Natural gas fired power generation emits 55% less CO₂ than coal per MWh generated.⁶ The ongoing retirement of coal will benefit natural gas demand and the replacement of coal baseload generation capacity is expected to continue to be beneficial to decarbonization.

⁴ <https://www.eia.gov/electricity/monthly/archive/february2024.pdf>

⁵ https://www.eia.gov/totalenergy/data/monthly/pdf/sec11_9.pdf

⁶ <https://www.eia.gov/todayinenergy/detail.php?id=48296>

The relative affordability of natural gas supports ongoing usage in space heating

Traditional sources of natural gas demand such as space heating and cooking are not going away either. They are expected to be supported by the affordability of natural gas relative to other energy sources. The U.S. Department of Energy estimates that natural gas is the cheapest major source of energy for residential customers and is 30% of the cost of electricity on an energy equivalent basis.⁷ Whereas electrification of heating systems is expected to increase over time, the cost advantage of natural gas will support its use for the foreseeable future.

The relatively low cost of gas compared to other energy sources is a social benefit in addition to supporting the economics of energy infrastructure companies through sustaining demand.

Energy infrastructure companies benefit from increased demand for natural gas capacity

Energy infrastructure companies are especially well positioned to benefit from the growing need for natural gas. These listed infrastructure companies operate the pipelines, processing and storage facilities necessary to remove impurities from the natural gas stream and transport it from where it is produced to where it is needed for consumption or export. The companies generally make money for investors via earning fees for the amount of gas that is contracted to move through their infrastructure. Increased need for natural gas is a growth opportunity for the infrastructure companies that process and move the gas, providing a structural tailwind that is not highly sensitive to commodity prices.

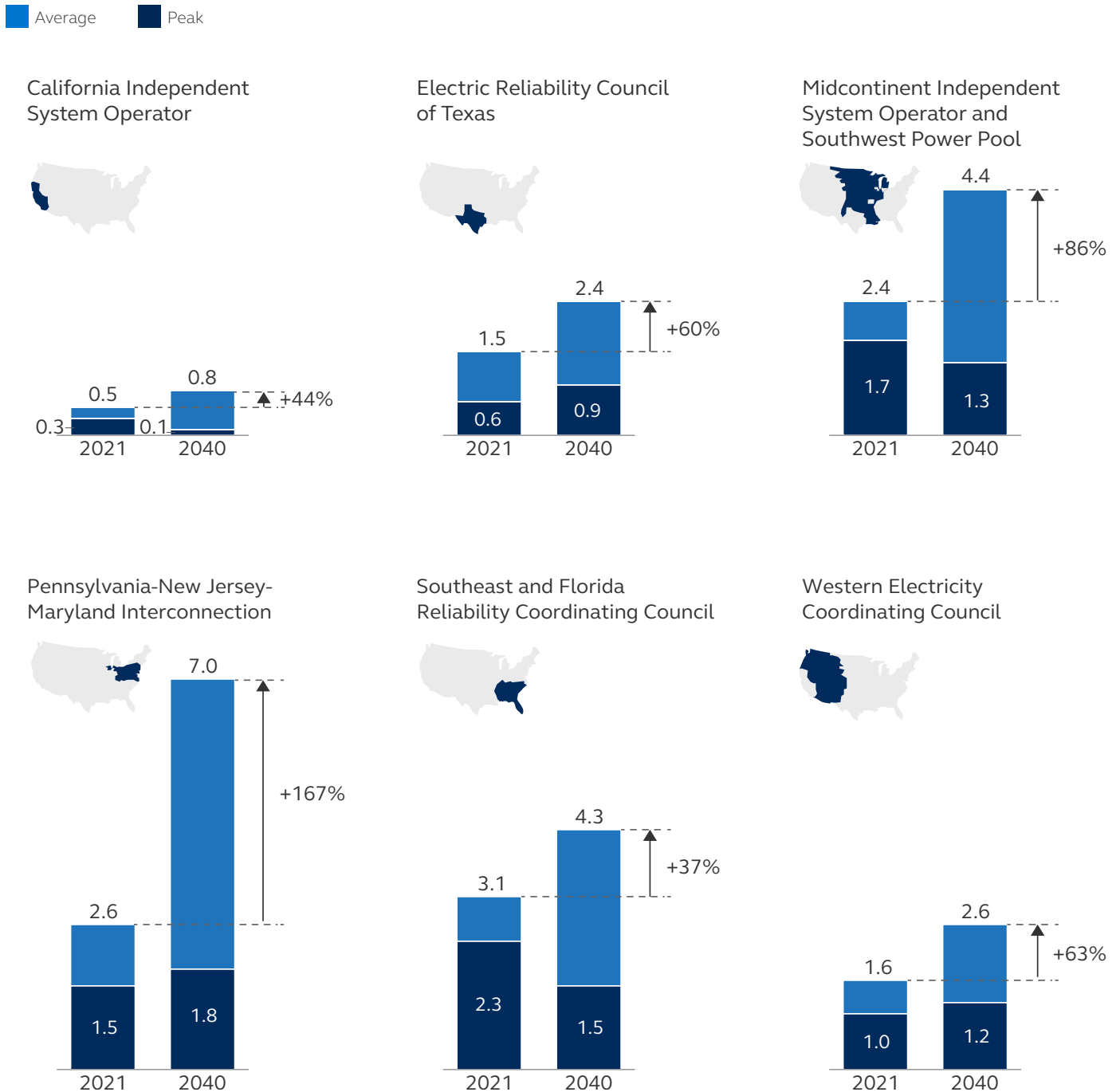
One of the main reasons for this is that infrastructure needs to be sized for peak natural gas needs. This, in turn, means that energy infrastructure companies' revenues are increasingly driven by selling maximum capacity needed rather than on the actual volumes moving through the system. A revenue model based on capacity both increases revenue and reduces commodity price sensitivity for energy infrastructure companies.

⁷ <https://www.govinfo.gov/content/pkg/FR-2023-08-28/pdf/2023-18532.pdf>
<https://www.aga.org/news/news-releases/doe-announces-natural-gas-is-3-3-times-more-affordable-than-electricity/>



Exhibit 5 below shows the estimated increase in gas demand for power at peak in different grids in the U.S., which implies a long runway of opportunity for energy infrastructure names to serve this increasing peak. It also argues for higher variability between on peak and off-peak pricing. Some energy infrastructure companies are well positioned to profit from this increased spread through their ownership of gas storage assets.

EXHIBIT 5: Gas-fired power generation, terawatt-hour of gas-fired generation per day



Source: McKinsey & Company <https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/the-role-of-natural-gas-in-the-move-to-cleaner-more-reliable-power>

North American energy infrastructure companies benefit from growth in natural gas exports

Asia and Europe have experienced increases in demand for imported natural gas. Exports offer two opportunities for North American natural gas infrastructure companies—they can reconfigure their network to serve export facilities or own the export facilities themselves. Exports now comprise 20% of total U.S. production, of which 11% is LNG⁸, and LNG export capacity is projected to almost double by the end of the decade.⁹ Asia is the long-term engine of growth, although Europe has seen a pickup following Russia's invasion of Ukraine.

Exported natural gas offers sustainability benefits to the economies it serves. Imported natural gas helps to decarbonize power generation in the same way domestic natural gas does for the U.S. The availability of gas for heating and cooking in emerging economies benefits economic development and the quality of life compared to traditional sources, and it is often cleaner.

CONCLUSION

North American energy infrastructure companies are expected to benefit from the growth in demand for natural gas. This demand derives largely from power demand growth driven by AI and industrial users, as well as global demand for exported natural gas. The dispatchable nature of natural gas is increasingly needed as intermittent renewables increase market share and remaining coal generation is retired. The growth in natural gas demand and its support of clean renewable generation sources is expected to drive ongoing decarbonization. The contribution of the energy infrastructure sector to represents an attractive investment opportunity that is also beneficial to society.

⁸ <https://www.eia.gov/naturalgas/data.php#imports>

⁹ <https://www.csis.org/analysis/us-lng-export-boom-defining-national-interests>

For Public Distribution in the United States. For Institutional, Professional, Qualified, and/or Wholesale Investor Use Only in other Permitted Jurisdictions as defined by local laws and regulations.

Risk Considerations

Investing involves risk, including possible loss of Principal. Past Performance does not guarantee future return. Infrastructure companies may be subject to a variety of factors that may adversely affect their business, including high interest costs, high leverage, regulation costs, economic slowdown, surplus capacity, increased competition, lack of fuel availability, and energy conservation policies. Infrastructure issuers may be subject to regulation by various governmental authorities and may also be affected by governmental regulation of rates charged to customers, operational or other mishaps, tariffs, and changes in tax laws, regulatory policies, and accounting standards. Foreign securities involve special risks, including currency fluctuation and lower liquidity. Some global securities may represent small and medium-sized companies, which may be more susceptible to price volatility than larger companies. Equity markets are subject to many factors, including economic conditions, government regulations, market sentiment, local and international political events, and environmental and technological issues that may impact return and volatility. Asset allocation and diversification do not ensure a profit or protect against a loss.

Important information

This material covers general information only and does not take account of any investor's investment objectives or financial situation and should not be construed as specific investment advice, a recommendation, or be relied on in any way as a guarantee, promise, forecast or prediction of future events regarding an investment or the markets in general. The opinions and predictions expressed are subject to change without prior notice. The information presented has been derived from sources believed to be accurate; however, we do not independently verify or guarantee its accuracy or validity. Any reference to a specific investment or security does not constitute a recommendation to buy, sell, or hold such investment or security, nor an indication that the investment manager or its affiliates has recommended a specific security for any client account.

Subject to any contrary provisions of applicable law, the investment manager and its affiliates, and their officers, directors, employees, agents, disclaim any express or implied warranty of reliability or accuracy and any responsibility arising in any way (including by reason of negligence) for errors or omissions in the information or data provided. All figures shown in this document are in U.S. dollars unless otherwise noted.

This material may contain 'forward looking' information that is not purely historical in nature. Such information may include, among other things, projections and forecasts. There is no guarantee that any forecasts made will come to pass. Reliance upon information in this material is at the sole discretion of the reader.

This material is not intended for distribution to or use by any person or entity in any jurisdiction or country where such distribution or use would be contrary to local law or regulation.

This document is issued in:

- The United States by Principal Global Investors, LLC, which is regulated by the U.S. Securities and Exchange Commission.
- Europe by Principal Global Investors (Ireland) Limited, 70 Sir John Rogerson's Quay, Dublin 2, D02 R296, Ireland. Principal Global Investors (Ireland) Limited is regulated by the Central Bank of Ireland. Clients that do not directly contract with Principal Global Investors (Europe) Limited ("PGIE") or Principal Global Investors (Ireland) Limited ("PGII") will not benefit from the protections offered by the rules and regulations of the Financial Conduct Authority or the Central Bank of Ireland, including those enacted under MiFID II. Further, where clients do contract with PGIE or PGII, PGIE or PGII may delegate management authority to affiliates that are not authorised and regulated within Europe and in any such case, the client may not benefit from all protections offered by the rules and regulations of the Financial Conduct Authority, or the Central Bank of Ireland. In Europe, this document is directed exclusively at Professional Clients and Eligible Counterparties and should not be relied upon by Retail Clients (all as defined by the MiFID).
- United Kingdom by Principal Global Investors (Europe) Limited, Level 1, 1 Wood Street, London, EC2V 7 JB, registered in England, No. 03819986, which is authorized and regulated by the Financial Conduct Authority ("FCA").
- This document is marketing material and is issued in Switzerland by Principal Global Investors (Switzerland) GmbH.
- United Arab Emirates by Principal Investor Management (DIFC) Limited, an entity registered in the Dubai International Financial Centre and authorized by the Dubai Financial Services Authority as an Authorised Firm, in its capacity as distributor / promoter of the products and services of Principal Asset Management. This document is delivered on an individual basis to the recipient and should not be passed on or otherwise distributed by the recipient to any other person or organisation.
- Singapore by Principal Global Investors (Singapore) Limited (ACRA Reg. No. 199603735H), which is regulated by the Monetary Authority of Singapore and is directed exclusively at institutional investors as defined by the Securities and Futures Act 2001. This advertisement or publication has not been reviewed by the Monetary Authority of Singapore.
- Australia by Principal Global Investors (Australia) Limited (ABN 45 102 488 068, AFS Licence No. 225385), which is regulated by the Australian Securities and Investments Commission and is only directed at wholesale clients as defined under Corporations Act 2001.
- Hong Kong SAR (China) by Principal Asset Management Company (Asia) Limited, which is regulated by the Securities and Futures Commission. This document has not been reviewed by the Securities and Futures Commission.
- Other APAC Countries/Jurisdictions, this material is issued for institutional investors only (or professional/sophisticated/qualified investors, as such term may apply in local jurisdictions) and is delivered on an individual basis to the recipient and should not be passed on, used by any person or entity in any jurisdiction or country where such distribution or use would be contrary to local law or regulation.

Principal Global Investors, LLC (PGI) is registered with the U.S. Commodity Futures Trading Commission (CFTC) as a commodity trading advisor (CTA), a commodity pool operator (CPO) and is a member of the National Futures Association (NFA). PGI advises qualified eligible persons (QEPs) under CFTC Regulation 4.7.

Principal Funds are distributed by Principal Funds Distributor, Inc.

© 2024 Principal Financial Services, Inc. Principal®, Principal Financial Group®, Principal Asset Management, and Principal and the logomark design are registered trademarks and service marks of Principal Financial Services, Inc., a Principal Financial Group company, in various countries around the world and may be used only with the permission of Principal Financial Services, Inc. Principal Asset ManagementSM is a trade name of Principal Global Investors, LLC. Principal Real Estate is a trade name of Principal Real Estate Investors, LLC, an affiliate of Principal Global Investors.

MM14175 | 10/2024 | 3938648-122025