

Sujet traité : Centres de données, intelligence artificielle et la demande croissante d'énergie / Data Centers, AI and The Increasing Need for Power

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EVERCORE ISI

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James West

Jason Bandel

Andres Obando

Nicholas Amicucci, CFA

Chris Lee



VIDEO! Data Centers, AI, and The Increasing Need for Power (Especially Natural Gas)

The increasing use of digitalization and artificial intelligence has significantly boosted the need for data centers across the U.S. Data centers' power requirements are projected to rise to approximately 2.5 times their present capacity by the decade's end, increasing from 3-4% of total US power consumption today to 11-12% by 2030. Meeting the additional requirement of over 50 GW of data center capacity in the US by the end of the decade will necessitate an investment exceeding \$500 billion solely for data center infrastructure.

The power sector is swiftly emerging as a key player in the AI narrative, with power availability becoming crucial for new data center construction. However, the power ecosystem faces significant challenges in addressing the high-power needs of data centers, including:

- Limited reliable power sources,
- sustainability issues,
- upstream infrastructure for power access,
- power equipment within data centers,
- and a shortage of electrical trade workers to build and maintain facilities and infrastructure.

According to a McKinsey analysis, the U.S. will lead in data center market growth, with power demand rising from 25 GW in 2024 to over 80 GW by 2030.

We believe the energy-intensive nature of data centers and AI operations will significantly drive-up natural gas demand. We are in the Age of Natural Gas. To consume the gas, you must build the infrastructure! Another significant driver of this market is the increasing global demand for natural gas, particularly from the expansion of LNG export facilities. We believe the role of natural gas in the global energy mix remains robust and growing.

Our favorite ways to invest in this theme include BE, BKR, GEV, GTLS and FLNC.

Click [HERE](#) to view the video and the slides!

You can find the presentation slides within!

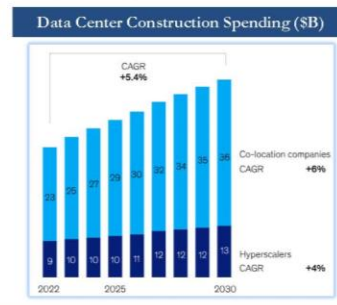
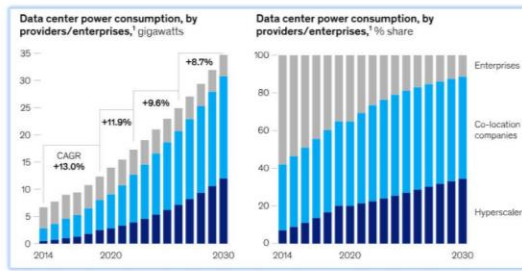
EVERCORE ISI

*Data Centers, AI, and The Increasing
Need for Power*

James West
September 2024

The Growth of Data Centers Rely on the Availability of Power

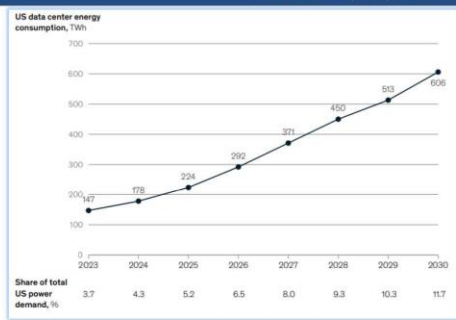
- The increasing use of digitalization and artificial intelligence has significantly boosted the need for data centers across the U.S.
- To match the current adoption rate, data centers' power requirements are projected to rise to approximately 2.5 times their present capacity by the decade's end, increasing from 3-4% of total US power consumption today to 11-12% by 2030.
- Growing demands for computing and data are being further driven by advancements in computing power and decreasing chip efficiency in terms of power usage.
- Meeting the additional requirement of over 50 GW of data center capacity in the US by the end of the decade will necessitate an investment exceeding \$500 billion solely for data center infrastructure.
- The power sector is swiftly emerging as a key player in the AI narrative, with power availability becoming crucial for new data center construction.
- The power ecosystem faces significant challenges in addressing the high-power needs of data centers, including:
 - Limited reliable power sources, sustainability issues, upstream infrastructure for power access, power equipment within data centers, and a shortage of electrical trade workers to build and maintain facilities and infrastructure.



The Scope of Escalating Demand for Data Centers

- According to a McKinsey analysis, the U.S. will lead in data center market growth, with power demand rising from 25 GW in 2024 to over 80 GW by 2030.
 - This surge is driven by the increasing volumes of data, computing power, and connectivity due to digital transformation and cloud adoption, along with the expansion of emerging technologies, particularly AI.
 - McKinsey's research suggests that generative AI could contribute between \$2.6 trillion and \$4.4 trillion to the global economy.
 - However, to realize even 25% of this potential by 2030, an additional 50 GW to 60 GW of data center power capacity would be needed in the U.S. alone.

Demand for power for data centers is expected to rise significantly in the United States
Terawatt-hours (TWh) of electricity demand, medium scenario



Source: Global Energy Perspective 2023, McKinsey, October 18, 2023; McKinsey analysis

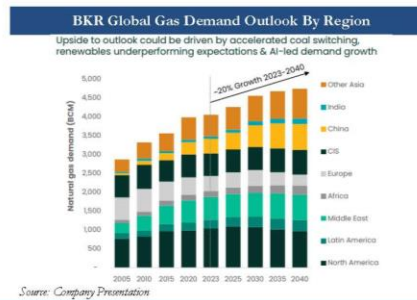
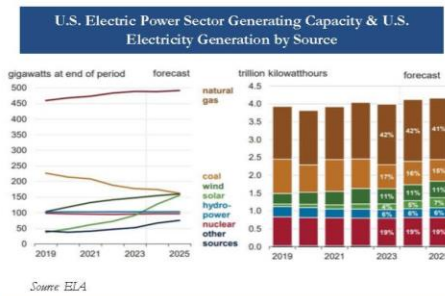


Constraints Across the Power Value Chain May Hinder Progress

- The industry is nearing its maximum capabilities for node sizes and transistor densities, and extended lead times have also impeded progress.
- Power shortages in most markets are primarily due to challenges in connecting to the transmission grid, rather than a lack of power generation.
 - The duration needed to establish new power connections for data center locations in key hubs like Northern Virginia, Santa Clara, California, and Phoenix has been increasing.
 - International locations such as Amsterdam, Dublin, and Singapore have implemented bans on many new data center constructions in recent years mainly due to insufficient power infrastructure.
- The limited labor force is another barrier, particularly the growing shortage of electrical trade workers necessary for these projects.
 - McKinsey forecasts suggest a potential deficit of up to 400,000 trade workers in the United States, considering the expected data center expansions and similar projects requiring equivalent skills, such as semiconductor manufacturing and battery gigafactories.
- Data centers consume power continuously, with some daily fluctuations, similar to other industrial facilities. However, data centers have distinct characteristics that set them apart for utility companies and investors:
 1. Firstly, most data centers are equipped with backup energy storage systems to meet high uptime requirements.
 2. Secondly, data center operators generally exhibit a higher willingness to pay for power compared to other power consumers.
 3. Thirdly, the demand projection for data centers and the operators' readiness to pay are exceptional compared to other electricity users.

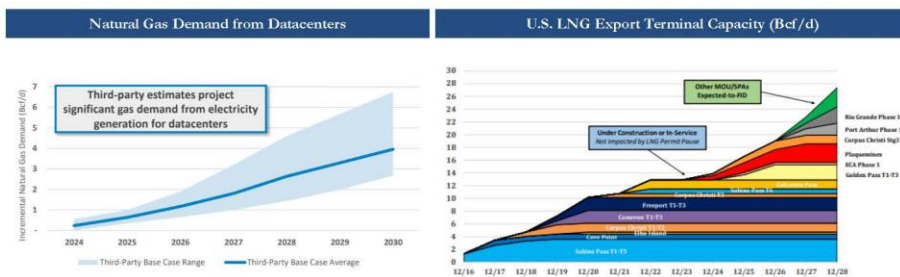
A Symbiotic Growth Story – Natural Gas and Datacenters/GenAI

- **The energy-intensive nature of data centers and AI operations will significantly drive-up natural gas demand.**
 - Data centers alone are estimated to consume 10%-20% more energy annually, with a substantial portion sourced from **natural gas due to its reliability and lower emissions.**
 - This trend is further accelerated by the rapid adoption of AI technologies, which require massive computational power and, consequently, substantial energy resources.
- This increased demand also brings challenges; the natural gas industry must address concerns related to infrastructure capacity, price volatility, and environmental impacts.
 - Companies are investing heavily in expanding pipeline networks and storage facilities, but these projects often face regulatory hurdles and community opposition.
- **We are in the Age of Natural Gas. To consume the gas, you must build the infrastructure!**



The Critical Role of Natural Gas

- Another significant driver of this market is the increasing global demand for natural gas, particularly from the expansion of LNG export facilities.
 - Supply dynamics are influenced by geopolitical factors, including tensions in key producing regions and policies favoring other energy sources.
- **We believe the role of natural gas in the global energy mix remains robust and growing.**
 - The sector's ability to adapt to changing market conditions and embrace technological advancements will be key to its long-term success and sustainability.
- Short-term market conditions are subject to fluctuations based on weather patterns, economic conditions, and geopolitical events.
- While the long-term outlook for natural gas remains positive, with expected growth in demand from emerging markets, industrial applications, and particularly the GenAI revolution.



Source: Range Resources Presentation

The Opportunity for Nuclear in Data Center Build-Out

- The future surge in computing needs may lead to a resurgence in nuclear power interest due to its numerous benefits for both the energy and tech industries:
 1. Nuclear plants offer a stable and dependable power supply, which matches the typical data center's energy requirements.
 2. The cost-per-megawatt of nuclear power plants is comparable to that of data center campuses.
 3. Nuclear energy produces minimal carbon emissions, aligning with the environmental goals of many data center operators, potentially justifying higher payments than current grid rates.
 4. Large tech companies have the financial resources and long-term vision to take on the investment risks associated with nuclear power if it provides a competitive edge. (eg. Microsoft's recent agreement with Constellation Energy).
- For nuclear energy to support the growth of generative AI, substantial investment in the sector is necessary, but the returns could be significant as demand continues to rise.
 - By 2040, the demand for energy could increase by 75%, reaching 6,908 terawatt-hours.



Source: Data Center University



Source: TechCrunch

Opportunities for Investors and Incumbents in Data Center Growth

Investments in Transmission and Distribution:

- Due to the increasing importance of power supply for expanding data centers, more utility firms are recognizing the value of these centers. **Investors can direct funds to utility companies to develop transmission and distribution (T&D) infrastructure in strategic areas.**

Emerging Markets with Affordable and Reliable Power:

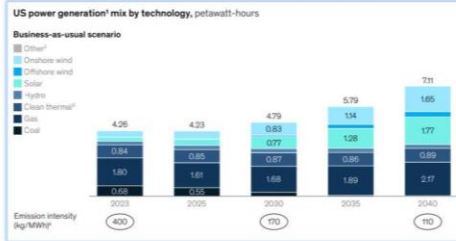
- Investors can capitalize on growth in these developing regions by investing in data center developers at either the company or site level. They can also support the value chain by enhancing the development of fiber or power infrastructure in these secondary markets.

Behind-the-Meter Power Solutions:

- Investors can back behind-the-meter power solutions to ensure energy supply in areas where **utility providers struggle to meet demand or reliability standards** due to local supply issues or **transmission limitations.**

Sustainability Goals Driven by Renewable Energy:

- The push for more renewable energy projects is likely to continue, potentially maintaining the high PPA rates observed recently. While various technologies (such as offshore wind, nuclear fission, fusion, geothermal, gas carbon capture and storage, and clean fuels) may contribute to energy supply in the medium to long term, **most new clean energy generation is expected to come from solar and onshore wind sources.**



Source: McKinsey & Co.



Source: McKinsey & Co.

Top Picks and Quotes from 2Q Earnings Calls Supportive of Our Thesis on “The Age of Natural Gas”

Our Preferred Ways to Invest in this Theme



- **Lorenzo Simonelli, Chairman & Chief Executive Officer, Baker Hughes:** *“We reiterate our positive outlook for global gas markets. Earlier this year, the IEA updated its projections for electricity consumption, noting that global demand for data centers, driven by cryptocurrency and AI, could double by 2026. We believe natural gas will be essential to meet this growing power demand, which will be additive to the growth required for new energy sources in the future. Therefore, the notable rise in generative AI could provide upside to our current expectations for natural gas demand to increase by almost 20% between now and 2040. We are confident that strong underlying natural gas demand will lead to robust and sustainable growth in LNG.”*
- **Stanley G. Chapman, President of U.S. and Mexico Natural Gas Pipelines, TC Energy:** *“Never have I seen such strong prospects for North American natural gas demand growth. We are seeing natural gas demand reach record highs, and this is expected to grow by nearly 40 Bcf per day by 2035. Power generation demand is expected to increase significantly, driven by wide-scale electrification, coal-fired retirements, as well as emerging power needs from AI and data centers. And there is, again, strong demand for natural gas infrastructure from private buyers, given all the encouraging dynamics around natural gas demand growth.”*

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 Neutral - Return 0% to 10%
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 Suspended- the company rating, target price and earnings estimates have been temporarily suspended.

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Buy	455	57	Buy	54	12
Hold	303	38	Hold	26	9
Sell	14	2	Sell	0	0
Coverage Suspended	19	2	Coverage Suspended	6	32
Rating Suspended	7	1	Rating Suspended	1	14

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