MEKETA

Powering the Future: Private Infrastructure's Role in the AI-Driven Energy Transition

CONNECTIVES
JULY 2024

Key takeaways

- → **AI's Growing Energy Demand: The development and commercialization of AI models require substantial power, with data centers around the world experiencing unprecedented surges in electricity demand.**
- → **Renewable Energy Integration: The International Energy Agency (IEA) forecasts that most incremental power capacity will come from renewables. This transition is crucial for decarbonizing power generation and supporting the rapid growth of AI, data centers, and cryptocurrencies.**
- → **Global Power Demand Projections: Data center power consumption is projected to rise dramatically, with estimates suggesting it could reach over 1,580 terawatt hours by the next decade. This increase is roughly equivalent to Japan's current power generation.**

Private infrastructure includes regulated utilities, contracted power, and GDP linked assets. Exposure to these sectors has the potential to make private infrastructure ideally situated to participate in the AI (artificial intelligence) driven electrical grid upgrades focused on powering data centers. Speaking at a Bloomberg event on the sidelines of the World Economic Forum's annual meeting in Davos, Sam Altman, Open AI CEO, mentioned there is a need for an energy breakthrough because the semiconductors that process AI applications consume enormous amounts of electrical power. "The power requirements for the semiconductors that run AI software applications are much greater than expected."[1]

According to the IEA, most of this incremental power capacity generation will come from renewables.[2] Alex Murray – a researcher at Preqin - stated, "Infrastructure is the asset class that is going to capture most of the fund raising from the energy transition."[3] Globally, the demand for electricity is rising rapidly as the world moves to decarbonize power generation and integrate renewable energy sources into traditional coal and gas fired power generators.

Artificial Intelligence demands power – a lot of power. The training of AI models is perhaps the most energy intensive part of the AI development and commercialization process. "The almost overnight surge in electricity demand for data centers is now outstripping the available power supply in many parts of the world, according to interviews with data center operators, energy producers and tech executives."[4] Google's Head of Data Center Energy – Amanda Peterson Corio – said in order to power their data centers, "we need terawatts and terawatts more of traditional green energy, whether its wind or solar, and that's across the globe."[5] As data centers rush to upgrade and boost computing power by adding graphics processing units (GPUs), the newest AI GPU chips may well be faster than the central processing units (CPUs) and train and run AI models more quickly than CPUs. However, their relative efficiency compared to CPUs may not mitigate future energy demands. "Nvidia's newest chip, the B100, is expected to use twice as much power as the H100, the chip its replacing."[6] According to a recent report from Goldman Sachs a ChatGPT query currently uses ten times the amount of power as a traditional Google search.[7]

In the US alone, the number of data centers grew by 26% in 2023 with a power capacity of 5,174 megawatts and there are another 3,77.8 megawatts of data center capacity under construction.[8] According to the IEA, data center power demand in the US is just three percent of capacity and this is expected to nearly triple over the next few years to eight percent. Power demand in the US is expected to grow by forty percent over the next two decades compared to just nine percent of the last twenty years.[9] The International Energy Agency forecasts that demand for power from data centers, AI dedicated data centers and cryptocurrencies will rise from approximately "460 terawatt hours in 2022, data centers power consumption could reach over 1,000 terawatt hours by 2026. This demand is roughly equal to the power generation of Japan."[10] (Figure 1) Private estimates see data center power demand to reach 1,580-Terawhat hours (TWh) over the next decade.[11]

[1] Source: Reuters, "OpenAI CEO Altman Says at Davos Future AI Depends on Energy Breakthrough," January 16, 2024.

[2] Source: International Energy Agency (IEA), "Electricity 2024: Analysis and Forecast to 2026," January, 2024.

[3] Source: Financial Times, A. Gara et al., ""Infrastructure Funds Draw Billions of Dollars as Energy and Supply Chains Shift," December 14, 2023.

[4] Source: Bloomberg, "AI is Already Wreaking Havoc on Global Power Systems," June 21, 2024.

[5] Ibid.

[6] Ibid.

[7] Source: Goldman Sachs, "AI is Poised to Drive 160% Increase in Data Center Power Demand," May 14, 2024.

[8] Source: CBRE, "North American Data Center Trends 2H23," April 6, 2024.

[9] Source: Bloomberg, "AI Is Already Wrecking Havoc on Global Power Systems," June 21, 2024. Quoting John Ketchum CEO of NextEraEnergy.

[10] Source:International Energy Agency (IEA), "Electricity 2024: Analysis and Forecast to 2026," January, 2024.

[11] Source: Bloomberg, "AI is Already Wreaking Havoc on Global Power Systems," June 21, 2024.

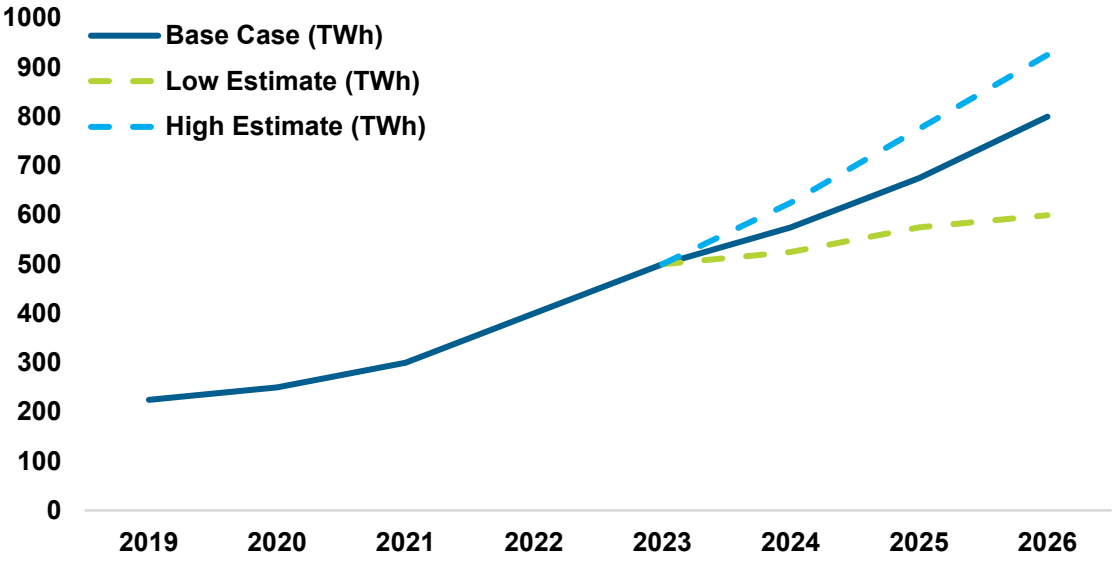


FIGURE 1

Global Electricity Demand from Data Centers, AI, and Crypto (TWh)

Source: International Energy Agency (IEA), "Electricity 2024: Analysis and Forecast to 2026," January, 2024. "Notes: Includes traditional data centres [sic], dedicated AI data centres, and cryptocurrency consumption; excludes demand from data transmission networks. The base case scenario has been used in the overall forecast in this report. Lo and high case scenarios reflect the uncertainties in the pace of deployment and efficiency gains amid future technological developments. Sources: Joule, (2023_, de Vires, The Growing Energy Footprint of AI; CCRI Indices (carbon-ratins.com); The Guardian, "The Use of AI to Reduce Data Centre Energy Use; Motors in data centers; THe Royal Society, The Future of Computing Beyond Moore's Law; Ireland Central Statistics Office, Data Centres Electricity Consumption 2022, and the Danish Energy Agency, Denmark's energy and climate outlook 2018. Terawatt hours (TWh), abbreviated as TWh, is a unit of energy representing one trillion-watt hours. A terawatt is equal to 1,000,000 megawatts (MW). A kilowatt hour is equivalent to a steady power of one kilowatt running for one hour and is equivalent to 3.6 million joules or 3.6 megajoules. The US produced over 4,000 TWh in 2023.

As corporate and government leaders alike focus on upgrading and greening of the world power supply, it is anticipated over one trillion dollars in investment is needed annually until 2030 in order to help meet global energy transition demands.[12] Global inflation pressures in the post pandemic economy have added to pricing pressures for utility companies focused on investment and upgrading the grid to meet growing demand. Here in the US, inflation has helped utility companies win rate increases along with a wider band for equity returns. "Returns on equity requested in the 116 gas and electric US rate cases pending as of the end of Q3 2023 ranged from 9.30% -12.95%."[13] The requests for rate increases hit sequential annual records in 2021, 2022, and 2023.[14] Gas utilities requested $4.62 billion in rate increases while electric utilities requested $13.51 billion in rate increases for a total record increase of over $18 billion in 2023.[15]

With AI continuing to dominate headlines and occupy the minds of everyone, from CEOs to those in the creative fields, the world marches forward towards decarbonization and the integration of renewable energy. Considering the need for innovation, private infrastructure is likely to play an outsized role in ensuring a stable and sustainable energy supply.

[12] Source: World Bank, "Catalyzing Private Investment and Climate Finance To Turn Energy Transition Ambitions to Reality," August 4, 2023.

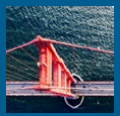
[13] Source: JP Morgan, "Private Infrastructure Outlook2024," January 2024.

[14] Source: S&P Global, D. Lowery, "Rate Requests by US Energy Utilities Set Record in 2023 for the Third Straight Year," February 7th, 2024.

[15] Ibid.

For more information on Digital Infrastructure, Generative AI, or to view a primer on Private Infrastructure, please visit the **Thought Leadership** section of our **website** or click the links here to learn more.

Exploring the Backbone of Digital Communications: Towers
https://meketa.com/leadership/exploring-the-backbone-of-digital-communications-towers/



Infrastructure Primer
https://meketa.com/leadership/infrastructure-primer/

Generative AI
https://meketa.com/leadership/generative-artificial-intelligence/

Disclaimers

This document is for general information and educational purposes only, and must not be considered investment advice or a recommendation that the reader is to engage in, or refrain from taking, a particular investment-related course of action. Any such advice or recommendation must be tailored to your situation and objectives. You should consult all available information, investment, legal, tax and accounting professionals, before making or executing any investment strategy. You must exercise your own independent judgment when making any investment decision.

All information contained in this document is provided "as is," without any representations or warranties of any kind. We disclaim all express and implied warranties including those with respect to accuracy, completeness, timeliness, or fitness for a particular purpose. We assume no responsibility for any losses, whether direct, indirect, special or consequential, which arise out of the use of this presentation.

All investments involve risk. There can be no guarantee that the strategies, tactics, and methods discussed in this document will be successful.

Data contained in this document may be obtained from a variety of sources and may be subject to change. We disclaim any and all liability for such data, including without limitation, any express or implied representations or warranties for information or errors contained in, or omissions from, the information. We shall not be liable for any loss or liability suffered by you resulting from the provision to you of such data or your use or reliance in any way thereon.

Nothing in this document should be interpreted to state or imply that past results are an indication of future performance. Investing involves substantial risk. It is highly unlikely that the past will repeat itself. Selecting an advisor, fund, or strategy based solely on past returns is a poor investment strategy. Past performance does not guarantee future results.