A new power paradigm: Rising electricity demand and the implications for listed infrastructure

Utilities, midstream energy and nuclear power are poised to benefit from growth in data centers, manufacturing and the electrification of the economy.

by **Benjamin Morton, Tyler Rosenlicht and Christopher DeNunzio**

Key takeaways

Drivers of power demand

Population growth, data processing led by artificial intelligence (AI), precision manufacturing, and the electrification of the economy will drive power demand growth not seen in a generation.

Implications for infrastructure

Accelerating electricity demand will have significant implications for listed infrastructure, and we see several infrastructure businesses focused on this theme.

Focus on utilities, midstream energy, nuclear power

We believe independent power producers and integrated utilities are the main beneficiaries, while data centers' need for reliable energy should create opportunities for midstream energy companies that own and operate natural gas pipelines.

The world needs more electricity

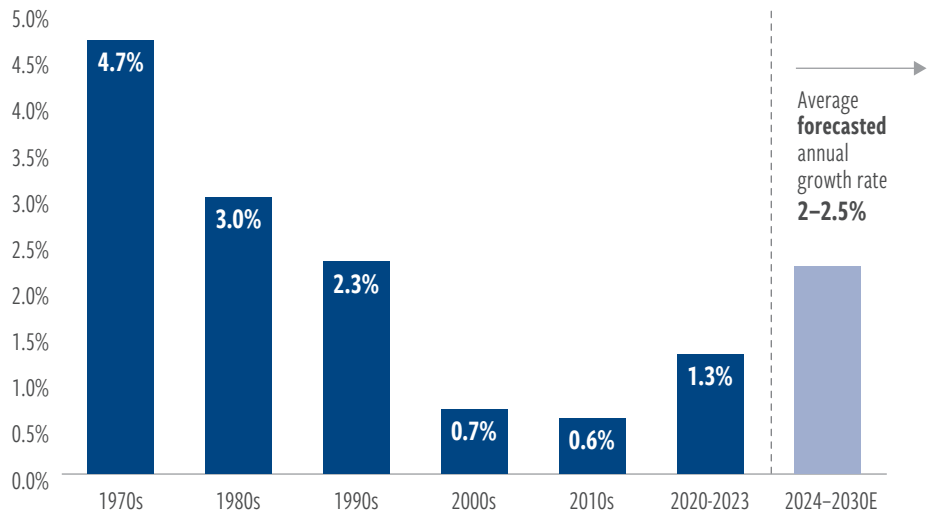
We believe that population growth, data processing led by artificial intelligence (AI), precision manufacturing, and the electrification of the economy will drive power demand growth not seen in a generation. This phenomenon is creating both substantial opportunities and potential challenges for listed infrastructure companies.

While power demand in the United States has been largely flat for nearly two decades, this trend is now reversing. We expect overall power demand to grow ~2.5% per year, on average, through 2030 (Exhibit 1). Some utilities are expected to see demand growth above 5%.

EXHIBIT 1

Back to the '80s: Power demand to climb

Avg. annual growth (%)



As of August 31, 2024. Source: U.S. Energy Information Administration, Cohen & Steers.

There are three notable drivers of higher electricity needs:

1. Data centers that support AI applications
2. Precision manufacturing
3. Electrification

We believe that many investors fail to appreciate the fact that there will be both winners and potential losers in a world of higher power demand.

We believe there will be opportunities for utilities, midstream energy (due to demand for natural gas) and nuclear power. However, there are regulatory nuances to navigate, as well a need to separate hype from substance. We believe active managers that are acutely focused on infrastructure markets are well positioned to identify true beneficiaries.

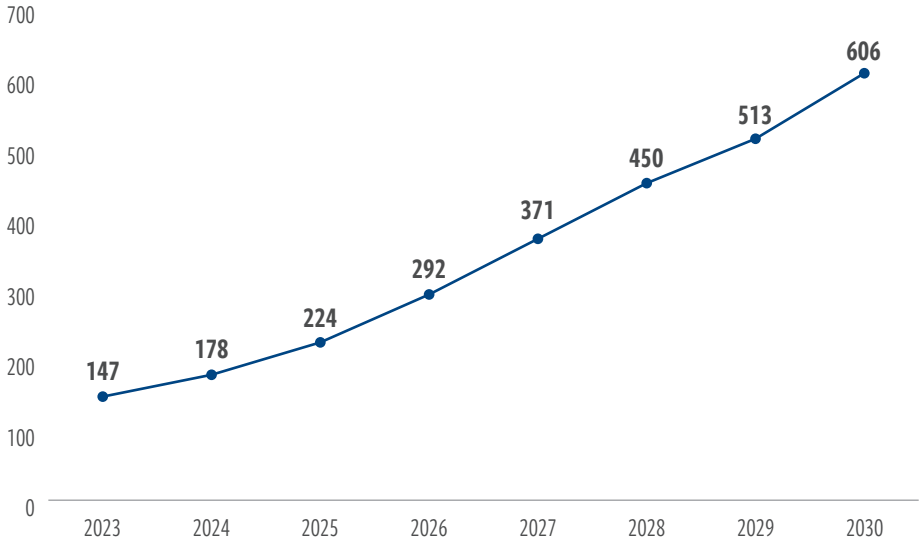
Data centers are a key driver of power demand

From 2023 to 2030, the power demands of U.S. data centers are projected to quadruple, according to a McKinsey study (Exhibit 2). In another study, Goldman Sachs estimates that data centers will make up 11.5% of total power demand by 2030, up from just 3% today. This demand will require well over $50 billion of capital investment in U.S. power generation capacity. We also expect tens of billions of dollars in transmission and related grid investments to support reliability and connect new generation to customers.

EXHIBIT 2

U.S. data center power demand to quadruple by 2030

U.S. data center energy consumption (Terawatt hours)



At September 1, 2024. Source: McKinsey & Company.

There is an arms race among hyperscalers to build and monetize AI models. ("Hyperscalers" are large technology companies that operate extensive global networks of data centers, providing significant cloud computing capabilities and services.) AI workloads, across both training and inference, require significantly more computational power than non-AI applications.

We therefore expect robust hyperscaler capital expenditures to build and maintain AI models, and we believe that U.S. hyperscaler power demand will grow by more than 50 GW by the early 2030s. To put this into context, 50 GW could power approximately 50 million homes. Longer term, the ability of hyperscalers to monetize these models will be key to sustaining growth. Further, the ability of utilities and developers to meet this demand remains an open question.

Growth in power consumption is not just a U.S. phenomenom. We expect global power demand to rise nearly 30% by end of the decade.

Large manufacturers will also require more generation

It's not just data centers driving higher demand. Onshoring of energy-intensive activities, such as precision manufacturing, will play a significant role in power demand growth over time, particularly in the United States.

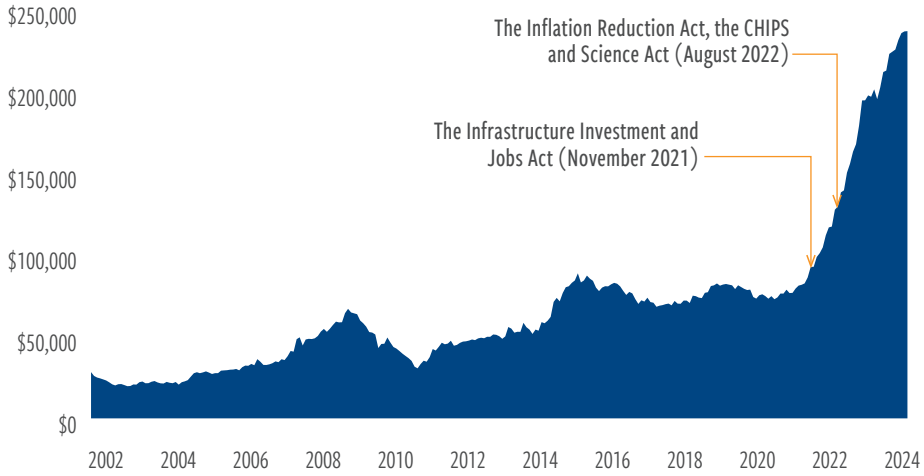
The Inflation Reduction Act, the CHIPS and Science Act, and the Infrastructure Investment and Jobs Act introduced significant incentives that are driving manufacturing investment in the United States. When coupled with existing deglobalization trends, which accelerated when the pandemic revealed the challenges of complex global supply chains, we expect rising energy demand from manufacturing.

We are already seeing this play out. Total construction spending on manufacturing has roughly tripled in the past three years, according to data from the U.S. Federal Reserve Bank (Exhibit 3). And many utilities are investing in new resources to meet the needs of factories being built in their service territories.

EXHIBIT 3

Manufacturing construction has surged amid onshoring, incentives

Total construction spending ($ millions)



At July 1, 2024. Source: Federal Reserve Bank of St. Louis, U.S. Census Bureau.

Electrification creates long-term opportunities

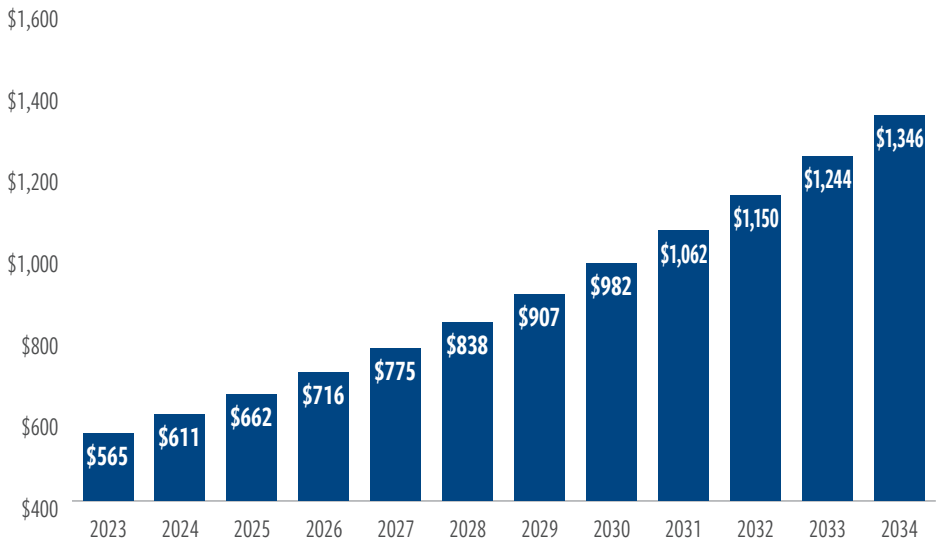
Another driver of higher electricity demand is the increasing internet-of-things economy, including the adoption of electric appliances globally, coupled with the growing number of electric vehicles (EVs) on the road. Bloomberg estimates that global passenger EV sales will climb to 73 million in 2040, up from less than 15 million in 2023.

Global electric appliance adoption is expected to double in the next 10 years (an 8% compound annual growth rate), according to Precedence Research (Exhbit 4).

EXHIBIT 4

Growing electric appliance adoption driving power demand

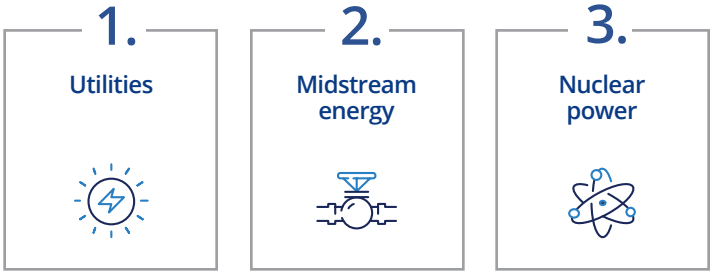
Global household appliance market size (USD billion)



At September 1, 2024. Source: Precedence Research.

Electricity demand impacts several infrastructure businesses

Accelerating electricity demand will have significant implications for listed infrastructure. We see several infrastructure businesses focused on this theme:



1. Utilities will be critical in meeting surging power demand

The demand for electricity is growing faster than the grid can handle, presenting both challenges and opportunities for utilities.

Many utilities have revised annualized demand growth forecasts higher. For example, a large utility in the southeast expects power demand in its service territory to increase by around 9% annually from 2025 through 2028 (up from ~0.5% annual growth), with data centers accounting for 80% of that growth.

As data centers look poised to consume a larger share of total generation, concerns have emerged about rate design—specifically, that residential customers might end up subsidizing data centers' power bills, an outcome that could be unacceptable to utility regulators.

Further, several utilities have indicated they simply can't keep up with potential customer needs for power, and there are long lead times to build both new generation and transmission in many areas. This is causing data centers to explore alternative solutions, away from regulated markets. Constraints across the power and utility value chain could hinder supply.

We also have to recognize the likelihood of substantial "double counting" in reported utility data center pipelines. We believe that data centers are submitting interconnection requests to multiple utilities at once, hoping to obtain the fastest possible time to power.

Overall, the market views rate design and supply chain risks as manageable for now. Optimism about data centers and other demand drivers—as well as lower interest rates—has helped drive the S&P 500 Utilities index to a nearly 20% return this year (through August), slightly ahead of the full S&P return of 19.5%.

However, it is important to distinguish between independent power producers (IPPs), fully regulated utilities, and integrated utilities (regulated utilities that also operate unregulated generation).

EXHIBIT 5

Power and utility business models

Utility type	Description	Earnings/revenue drivers	YTD total shareholder return
Independent power producers (IPPs)	IPPs are the most direct beneficiaries of higher power demand. These companies profit by generating power and selling it on the open market. Higher demand could drive higher prices and higher EBITDA for IPPs. IPPs can also potentially enter into bilateral contracts with data centers to sell their power directly (at a premium to market prices).	**Revenue** = **Energy revenue**: Power price x electricty outpout + **Capacity revenue**: capacity payment ($/MW-day) * installed megawatts of capacity * 365	**94%**
Integrated utilities	Integrated utilities are a hybrid between IPPs and regulated utilities. These companies own and operate regulated utilities, but they also have deregulated generation (usually renewables or nuclear). Integrated utilities are rare in North America, and their unregulated generation generally provides less than 30% of their earnings. No two integrated utilities are exactly alike—some choose to contract their non-regulated generation directly with customers, and others choose to maintain more exposure to power prices.	**Mix of IPP and utility earnings drivers**	**26%**
Fully regulated utilities	Regulated utilities' earnings are largely a function of authorized/earned return on equity and regulator approved capital structure on an authorized asset base (rate base). This regulatory framework generally restricts regulated utilities' ability to directly benefit from surges in power demand for an extended period of time, as any excess returns need to be refunded to customers. We ultimately believe the sector will be able to benefit from growing power demand, which should lead to higher rate base growth over time. However, investors should respect the regulated nature of these utilities' business model and recognize the risk to customer bills and regulatory relationships due to potential energy inflation.	**Net income** = **Annualized rate base** × **Annualized equity ratio** × **Earned ROE**	**20%**

At September 30, 2024. Source: Cohen & Steers, Bloomberg.

2. Natural gas demand expected to benefit midstream energy companies

Hyperscalers have generally committed to investing in clean energy. Microsoft, for instance, just signed a $10 billion agreement with a renewable development company to provide wind and solar power to meet the tech giant's increasing energy demands.

The challenge we see is that solar and wind are not as reliable as traditional baseload resources (~30% capacity factors vs. 80–99%), creating intermittency challenges for data centers that need constant power. Alternative energy such as wind, solar and battery storage will continue to grow, but natural gas (and nuclear power) will remain critical due to its established infrastructure and reliability.

In fact, Goldman Sachs estimates that through 2030, 60% of the incremental power demand from data centers will be met with natural gas, while alternatives will meet the remaining 40%.

The need for gas-fired generation to support higher power demand creates significant opportunities for midstream energy companies that own and operate natural gas pipelines.

We believe the data center opportunity could drive up to 10 billion cubic feet per day of incremental gas demand by 2030, which would require more than $10 billion of high-return, incremental investment in capacity expansions and laterals on existing systems. That has prompted us to increase our long-term annual growth rate expectation for natural gas demand to 2%, from zero previously.

Natural gas is significantly cleaner than coal and oil but much more reliable than wind and solar.

3. Nuclear power will be part of the solution

We believe that existing—and potentially new—nuclear power assets will also be part of the solution to meet rising electricity demand.

Energy security concerns, higher power demand and continued challenges associated with the intermittency of renewables are leading to a nuclear renaissance. Consumers and policymakers generally view nuclear as a clean and reliable energy source. Notably, the Inflation Reduction Act included $6 billion for nuclear energy production.

That said, new nuclear construction is difficult in developed economies with stringent permitting and approval processes, especially given its long history of cost overruns and substantial construction timeline delays.

Regulated utilities are hesitant to invest in new nuclear without explicit regulatory or government guarantees given the large investments with only a regulated rate of return would likely be viewed as an untenable risk by shareholders and credit rating agencies.

Our expectation is that existing nuclear plants will see their lives extended, and startup companies will work to lower costs on small modular reactors (SMRs). We'll see whether cost declines happen, but we believe that the existing nuclear fleet is far more valuable than investors appreciated just a few years ago.

To that point, Constellation Energy recently announced the restart of the Crane Clean Energy Center in Pennsylvania (formerly Three Mile Island Unit 1), with a 20-year agreement to sell power to Microsoft. This follows a similar agreement between Talen Energy and Amazon, where Talen's Susquehanna nuclear plant will help Amazon Web Services meet their clean energy goals. While these types of transactions will face regulatory scrutiny, other similarly structured contracts are being explored as one solution to meet rising electricity demand.

We therefore see opportunities for integrated utilities and IPPs with deregulated nuclear generation to contract directly with data centers, driving higher and more sustainable earnings power and cash flows.

Power demand is part of a favorable backdrop for infrastructure

Overall, though continued regulatory support for investment remains critical, rising power demand is simply part of a wider backdrop that we believe is favorable for listed infrastructure.

For one, listed infrastructure valuations are attractive. Infrastructure trades at a rare discount to global equities and at a steep markdown to historical relative multiples.

We also believe we are entering a macro environment that favors infrastructure. The asset class has historically produced favorable absolute and relative returns in periods of slowing growth and greater-than-expected inflation.

With the global economy shifting into a lower gear, and amid generally more dovish central bank policies, infrastructure's appeal is compelling.

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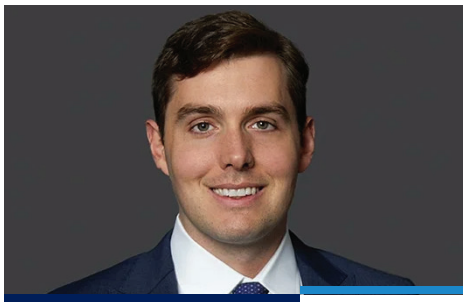

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