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AlphaCurrents

The Power Play on AI Data Centers

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Rapid adoption of artificial intelligence technologies has amplified demand for data centers and the electricity they run on. Access to power, in turn, is a critical factor in the growth of data centers. While the utility sector has benefited broadly, with investors' viewing it as a proxy for Big Tech, not every provider is likely to capitalize on the market opportunity of "powering AI." The ability to do so will likely hinge on providers' capacity to supply energy quickly, consistently and sustainably.

Inside, look for a brief discussion of the following:

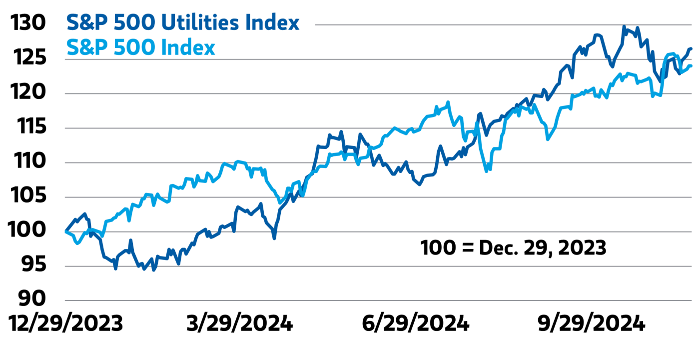
- Opportunities and challenges presented by surging demand for electricity to power data centers
- The most important factors for data centers when it comes to procuring power
- Companies well positioned to benefit across various energy sources
- Securities mentioned: Entergy (ETR), PPL (PPL), AES (AES), NextEra Energy (NEE), Bloom Energy (BE), American Electric Power (AEP), Constellation Energy (CEG), Vistra (VST), Vanguard Utilities ETF (VPU), iShares Global Clean Energy ETF (ICLN), VanEck Uranium and Nuclear ETF (NLR), Pacer Data & Infrastructure Real Estate ETF (SRVR)

Diffusion of artificial intelligence (AI) continues, and enterprises across industries from [health care](https://) to finance to entertainment are adopting the technology in a bid to drive efficiencies and improve decision making. As demand for the technology has increased, along with that for other data-intensive applications like cloud computing and data analytics, so too has the need for scalable and energy-efficient data centers—physical locations that house the computing infrastructure that enables huge volumes of data processing.

Demand Means Opportunity ...

This naturally translates into opportunities for power providers. Data centers require massive amounts of electricity, and investor interest in the utilities sector as a beneficiary of continued AI deployment has been notable. It has helped propel the S&P 500 Utilities Index by about 26% so far in 2024, with some index constituents besting even AI-focused Big Tech names. In this broadening out of the "AI trade" from the initial tech leaders, the index has rivaled the broad S&P 500 Index, a major cohort of which comprises some of the world's biggest technology companies (see Exhibit 1).

Exhibit 1: Investors Send Utilities Index Higher in 2024



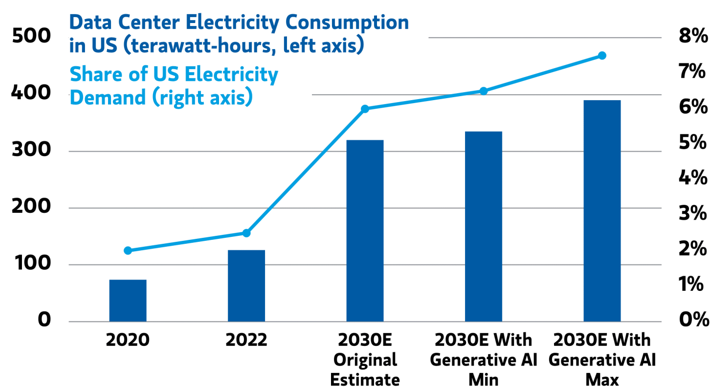
Source: Bloomberg, Morgan Stanley Wealth Management Global Investment Office as of Nov. 20, 2024

... But Not Without a Challenge

Zooming in, we see the opportunity also presents a challenge—namely, how will this demand be met? With AI-related demand likely to be the most significant catalyst of load growth in decades, utility companies face the task of supplying energy efficiently, at a time when power grid systems are becoming increasingly complex as economies around the world ramp up efforts to transition to cleaner energy sources.

As for what that demand looks like, the Department of Energy has pegged data centers' share of total US electricity use at about 2%. Separately, a 2022 Boston Consulting Group study forecast an increase in data center power usage from 2% of total US consumption in 2020 to 6% by 2030, which would represent an annual growth rate in usage of roughly 15% (see Exhibit 2). And that was before considering generative AI—a newer iteration of AI technology that, in short, can create new content and ideas, and is especially hungry for power. With generative AI figured in, the share rises another percentage point or so. While the absolute figures might seem small, AI's spread is apt to put pressure on power suppliers, pushing existing grids to their limit, especially in places with a high concentration of data hubs.

Exhibit 2: Projected Energy Use by Data Centers



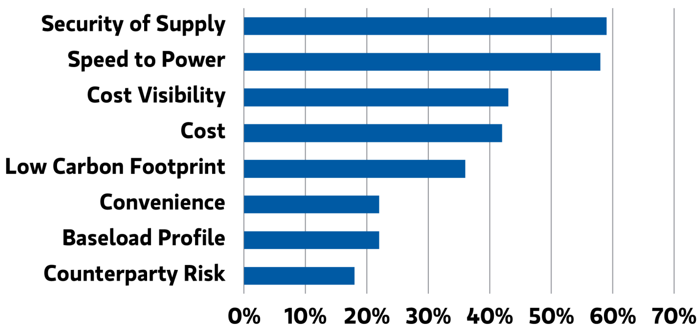
Note: A watt-hour is a unit of energy equivalent to the power of one watt operating for one hour.
Source: Boston Consulting Group, Morgan Stanley & Co. Research, Morgan Stanley Wealth Management Global Investment Office as of Nov. 20, 2024

"Time to Power" Is Key

It's notable that some of the most important factors for data center energy procurement are security of supply and speed to power, as shown in the results of a recent Morgan Stanley & Co. Research AlphaWise survey (see Exhibit 3). And for such things, companies are willing to pay more. The survey, which focused on data centers across the US and Europe, illustrated evidence of a "decommoditization" of power, meaning corporations are willing to pay a significant premium—of about $20 per megawatt-hour (MWh)—for power that is green and rapidly accessible.

Therefore, while utilities as a category may continue to benefit given structurally higher power demand, business models that can differentiate themselves with speed, flexibility and clean-energy capabilities may be best positioned to capitalize on this opportunity set.

Exhibit 3: Most Important Factors in Procuring Energy



Source: AlphaWise, Morgan Stanley & Co. Research, Morgan Stanley Wealth Management Global Investment Office as of Nov. 19, 2024

Actionable Investment Ideas

So where can such companies be found? We consider several investment ideas across energy provider segments that appear to be potential beneficiaries.

Regulated Utilities

Regulated utilities may be experiencing more data center-related demand than was previously expected, and some are committing to increased capital investments to help meet it.

Examples include Entergy (ETR), which recently signed an electric service agreement with a new data center customer in Louisiana. With this, Entergy has meaningfully raised its load-growth forecast and capital expenditure plans. Its long-term earnings outlook is also stronger than that of the industry average. Entergy has indicated there could be other similar customer deals in the pipeline, suggesting further upside potential. Another utility that may benefit from the AI data center trend is PPL (PPL). The company, which counts Pennsylvania and Kentucky among its service areas, has recently emphasized the attractiveness of those states for data centers, plus its more than 39 gigawatts' (GW) worth of prospective interconnection requests.

While data center-related growth potential exists for regulated utilities, the upside stemming from incremental data center demand may be more meaningful for competitive, unregulated providers of power. We continue our discussion on such companies below.

Renewables

Renewable energy such as wind and solar will be an essential piece of the supply generated to meet incremental demand from data centers. With sustainability goals steering companies' investments toward clean-energy solutions, and with what appears to be strong pricing power on the part of renewables developers, companies such as AES (AES) and NextEra Energy (NEE) may stand to benefit.

MS & Co. Research has highlighted AES as being well positioned to supply data centers given competitive advantages like its large scale and ability to offer sophisticated solutions combining wind, solar and storage. AES has several gigawatts' worth of power purchase agreements signed directly with Big Tech customers and has also raised targeted returns for its renewable projects based on strong demand. Higher potential pricing and returns may also help drive NextEra's growth. The company, whose subsidiary is the world's largest generator of renewable energy from wind and solar, earlier this year signed a sizable contract with a Big Tech hyperscaler to power its data centers. In the third quarter, it added roughly 3 GW of renewable energy and storage projects to its backlog, a higher-than-expected addition that continues a streak of several straight quarters of solid bookings.

Fuel Cells

Meanwhile, given an acute time-to-power issue, developers are also looking to fuel cell technology—something that MS & Co. Research has suggested could be among the most exciting alternatives to wind and solar to meet AI power demand.

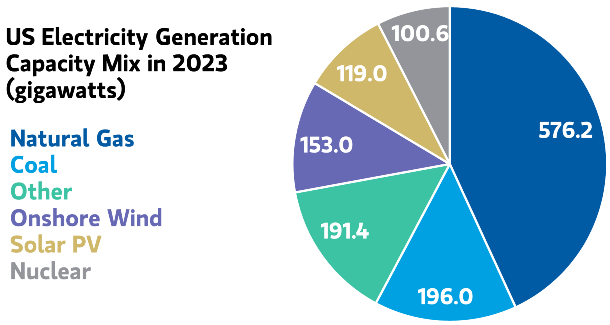
Drawing power from fuel cells can be a faster and more economical solution to revving up a data center than connecting to a grid system. Fuel cells have a high capacity factor, meaning they can more consistently produce closer to their maximum possible output, which compares favorably to sources like wind or solar that rely on weather. Additionally, with some data center operators maintaining a preference for utility power connectivity, fuel cells can serve as a bridge technology as utilities build out transmission and substation infrastructure to support increasing data center load.

With this backdrop, on-site fuel cell solution providers like Bloom Energy (BE) stand to benefit. Bloom, which has an extensive track record in data center installations, recently announced an agreement to supply up to 1 GW of solid oxide fuel cell capacity to American Electric Power (AEP) for AI data center customers and other large commercial energy users that need quick access to power. MS & Co. Research analysts see this agreement as boosting earnings and equity value prospects, as well as illustrating a recognition of time-to-power constraints not only by customers but also by utilities.

Nuclear

Additionally, nuclear power is starting to look more viable as a round-the-clock source of carbon-free power. In MS & Co. Research's survey, 96% of respondents said they are likely to consider nuclear power contracts as part of their clean power procurement policy. The perhaps long-unloved resource is also getting government support, with the White House earlier this month laying out plans for the US to triple nuclear power capacity by 2050 (see Exhibit 4 for how much was generated in 2023). The plans may get continued support under the incoming Trump administration amid bipartisan support for nuclear energy overall. Recent industry focus has centered on the rise of small modular reactors (SMRs), which can offer lower initial investment and enhanced efficiency, although they are unlikely to be a ready source for another several years.

Exhibit 4: US to Deploy 200 GW of Net New Nuclear Capacity



Source: BloombergNEF, Morgan Stanley Wealth Management Global Investment Office as of Nov. 20, 2024

We'd be remiss not to mention the recent headlines about the Federal Energy Regulatory Commission (FERC) rejection of an interconnection service agreement that would have allowed expanded power sales from a nuclear plant to a co-located data center. While the regulatory challenge is significant, MS & Co. Research analysts have noted possible paths forward and around—for instance, addressing the concerns raised and considering alternatives like converting Bitcoin mining sites to data centers—and have suggested that a relatively positive outlook remains for companies such as Constellation Energy (CEG) and Vistra (VST).

Constellation, the biggest producer of carbon-free energy in the US, continues to pursue "behind-the-meter" data center co-location deals at nuclear plants and is seeking FERC clarity to help unlock this market opportunity. (In a "behind-the-meter" setup, the data center does not take power from the electric grid but directly from the power plant.) Similarly, Vistra continues to pursue co-location opportunities at nuclear plants and appears to be well positioned given the substantial amount of data center load coming to various power markets.

ETF Opportunities

Investors seeking related exposure via exchange-traded funds (ETFs) may consider the following: Vanguard Utilities ETF (VPU), iShares Global Clean Energy ETF (ICLN) and VanEck Uranium and Nuclear ETF (NLR). A related approach, though in a shift from the "powering AI" angle, would be a direct play on data centers themselves, which may be achieved via Pacer Data & Infrastructure Real Estate ETF (SRVR).

Risks and Considerations

The incoming administration may implement regulatory changes that could have varying effects contingent on the type of energy at stake. For instance, Morgan Stanley Wealth Management's US Policy team has noted that, while President-elect Trump has signaled support for the traditional energy sector, clean energy is likely to come under fire. The team does not expect a full repeal of the Inflation Reduction Act in part since many of its provisions have benefited Republican-led states, but some of its clean-energy tax credits may be at risk of being rolled back. Moreover, power providers with international businesses may also be exposed to policy changes in the respective countries or regions.

Separately, unlike regulated utilities, independent power producers sell into competitive markets and are exposed to price fluctuations and market conditions. Regulatory dynamics can also negatively impact the viability and profitability of their projects.

Investors should consider that both power providers and data centers are experiencing a dramatic shift. Facing what's been described as a tidal wave of new demand from data centers will likely test power producers' ability to scale up capacity, an expensive feat, and to balance growth with reliability and sustainability. Data center developers, for their part, will need to be transparent with utilities and regulators for as accurate a forecast of load growth as possible. Also, given the various power sources being contemplated and the highly specialized equipment required, developers may need to focus on securing skilled labor in data center design and construction. Meanwhile, public sentiment also poses a risk, with opposition from local communities rising as data center growth continues, especially in areas that already have many existing data centers such as Northern Virginia.

Finally, whether via ETFs or individual stocks, investors should note that thematic exposure should be considered as part of a diversified portfolio. Diversification opportunities exist even within the utilities sector—across geography and type of utility.

Securities Mentioned in Report

AES Corp (AES; $13.28; MS & Co. Rating: Overweight / Industry View: Attractive)

American Electric Power Co (AEP; $96.80; MS & Co. Rating: Overweight / Industry View: Attractive)

Bloom Energy Corp (BE; $24.80; MS & Co. Rating: Overweight / Industry View: In-Line)

Constellation Energy Corp (CEG; $235.42; MS & Co. Rating: Overweight / Industry View: Attractive)

Entergy Corp (ETR; $150.71; MS & Co. Rating: Equal-weight / Industry View: In-Line)

iShares Global Clean Energy ETF* (ICLN; $12.08; MS & Co. Rating: Not Covered / Industry View: Not Covered)

NextEra Energy Inc (NEE; $76.88; MS & Co. Rating: Overweight / Industry View: Attractive)

Pacer Data & Infrastructure Real Estate ETF* (SRVR; $30.76; MS & Co. Rating: Not Covered / Industry View: Not Covered)

PPL Corp (PPL; $34.27; MS & Co. Rating: Overweight / Industry View: In-Line)

VanEck Uranium and Nuclear ETF* (NLR; $92.41; MS & Co. Rating: Not Covered / Industry View: Not Covered)

Vanguard Utilities ETF* (VPU; $173.77; MS & Co. Rating: Not Covered / Industry View: Not Covered)

Vistra Corp (VST; $154.63; MS & Co. Rating: Overweight / Industry View: Attractive)

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Note: Prices as of market close on Nov. 20, 2024

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