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U.S. Power Demand

Multiple Factors Driving Growth

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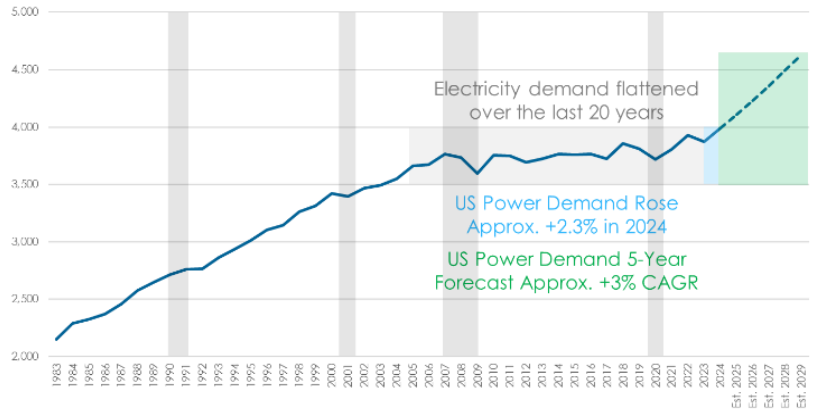
U.S. Power Demand – Multiple Factors Driving Growth

Executive Summary

The U.S. energy landscape is undergoing a transformative shift. After two decades of flat growth, electricity demand is accelerating due to rapid adoption of AI data centers, industrial reshoring, and the broader push for electrification. Over the past year, frequent increases in projected load growth from regulators, utilities, and grid operators have affirmed our view that electricity consumption is entering a new growth era. Recent forecasts expect U.S. load growth to exceed a 3% CAGR for the next five years. While 3% may seem small, we assure you, it is not… It represents emerging market type growth, which could entail 6x the planning and construction of new electricity generation and transmission capacity.[1]

As seen in the chart below (Exhibit 1), U.S. electricity sales rose +2.3% in 2024. This growth trend continued into early 2025, with year-to-date sales as of March 2025 up 4.8% compared to the same period in 2024.[2]

Exhibit 1: Total U.S. Electricity Sales – All Sectors (Billion kWh)



As the U.S. Industrial economy went ex-growth in the early 2000s, U.S. industrial electricity consumption began to turn lower due to a combination of improved energy efficiency and flatlining industrial output. The re-Industrialization of the U.S. economy would create additional strain on the U.S. electric grid where capacity concerns are mounting behind the AI data center build-out, re-shoring of industrial production, electrification of industry and mobility, expansion for new generation capacity, and resilience against adverse weather effects.

This explosive demand growth, coupled with existing constraints on the electrical grid, is creating significant investment opportunities across the utility and infrastructure sectors.

CAPEX, CAPEX, CAPEX

U.S. utility capital expenditures (CAPEX) are on an unprecedented rise, driven by surging electricity demand, the need to modernize aging infrastructure, and the transition to renewable energy sources.

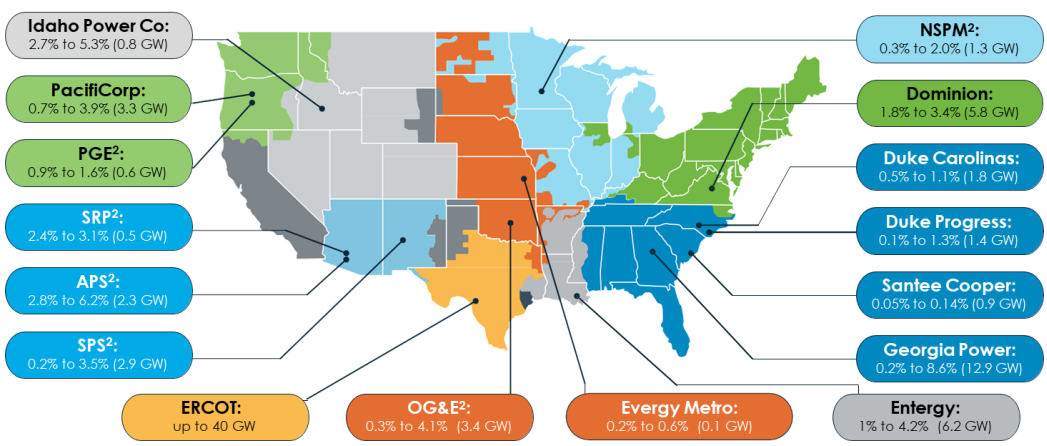
Recent Surge in Investment – In 2024, capital investment in the U.S. power sector reached an all-time high of approximately $174 billion. 2025 projections indicate that CAPEX will climb to $212 billion, a 22% year-over-year increase.[3]

Historical Investment Growth Rates – To put this recent growth into perspective, from 1980-2005, CAPEX grew modestly at 1-3% CAGR and accelerated to a 6-8% CAGR from 2010-2023. We can now expect further acceleration between 2024-2029, which is projected to yield high single- to double digit growth rates.[3]

Investment Outlook Through Rest of the Decade – In nominal terms, we can expect total U.S. utility CAPEX (electric, gas, water), to exceed $1 trillion from 2025-2029, which is more than the total CAPEX from the prior 12 years (2013-2024) – a significant shift in spending pace and priority.

Nationwide Growth – As seen in the graphic to the right (Exhibit 2), the rapid rise in power demand and subsequent rise in utility CAPEX, spans multiple states across the U.S. – reflecting systemic / secular shifts, rather than localized booms. This map illustrates that many utilities are forecasting major electricity demand growth, driven by factors such as data centers, electrification, economic development, and population shifts. Regions like Texas (ERCOT), Georgia, and Virginia are seeing the most significant surges, underscoring a pressing need for grid expansion, new power generation (including natural gas), and renewable integration.

Exhibit 2: Energy Demand Growth Through 2029[4]



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AI Powered Data Centers

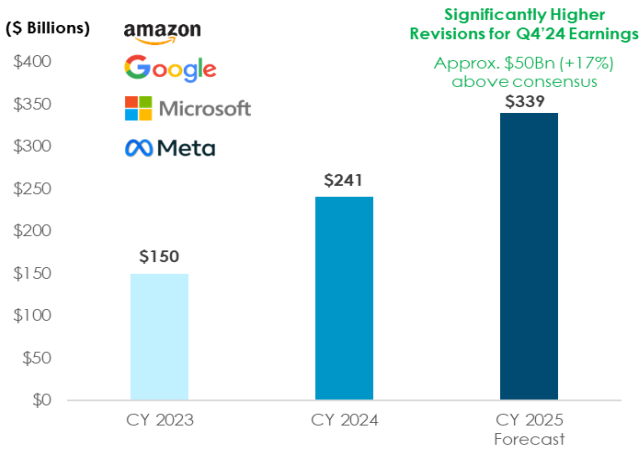
The expansion of hyperscaler data centers by companies like Amazon, Google, Microsoft, and Meta is driving unprecedented electricity demand. 2024 can be marked as the year of discovery, but as we transition into 2025, the focus will shift to solidifying these advancements through tangible announcements, clearer regulatory frameworks, and scaling operations to support future growth. These facilities, which consume 10-50x more energy per square foot than traditional office buildings, are expected to add 170-220 GW of capacity from 2023-2030, growing at a 19-22% CAGR globally, with the U.S. accounting for a large portion.[5]

In Q1 2025, there have already been a number of landmark announcements to expand infrastructure and power generation for AI powered data centers in the U.S.[6]

- **Stargate Project** – On January 21st, OpenAI, Softbank, Oracle, and MGX agreed to invest up to $500 billion in AI infrastructure across the U.S. over the next four years ($100 billion already committed in 2025).
- **GE Vernova & NextEra Energy** – On January 24th, entered into a strategic partnership to develop natural gas projects across the U.S. to address increasing electricity demands from AI data centers, reshoring manufacturing, and utilities.
- **GE Vernova, Chevron, and Engine No. 1** – On January 28th, entered into a joint venture to develop power solutions for U.S. AI data centers, utilizing natural gas, delivering 4+ GW of power by 2027.
- **GE Vernova, NRG Energy, and Kiewitt Corp** – On February 27th, entered into a joint venture to develop power solutions for U.S. AI data centers, utilizing combined cycle natural gas electricity plants, delivering 5+ GW from 2029-2032.

Over the past two years, the four largest hyperscalers (Amazon, Google, Microsoft, and Meta) have increased their CAPEX by more than 2x. More recently, they continue to revise their spending targets higher each quarter to account for the accelerated development of AI powered data centers. For example, from Q3 2024 to Q4 2024, these hyperscalers revised their CAPEX by $50 billion (+17%) above street consensus (Exhibit 3).[7]

Exhibit 3: Hyperscaler CAPEX Growth



Following a year of intense optimism in 2024, the first quarter of 2025 revealed mixed signals in AI data center demand. However, these premature concerns quickly abated in the second quarter.

Recent earnings updates from major tech firms painted a more optimistic picture. On April 24, 2025, Amazon and Nvidia dismissed claims of a slowdown, citing "strong ongoing demand" for AI infrastructure. In early May, Meta raised its 2025 CAPEX guidance to $64-72 billion (up from $60-65 billion), signaling increased infrastructure investment. Similarly, Microsoft reported a significant year-over-year CAPEX jump from $14 billion to $21.4 billion, underscoring its continued focus on AI and cloud growth.[7]

Constellation Energy (CEG), the largest U.S. nuclear power producer, also highlighted positive momentum in data center activity during its May 6 earnings call. The CEO hinted at imminent deal announcements, noting the company held "material nonpublic information" that prevented stock buybacks in Q1.

While some analysts remain cautious, actual CAPEX and commentary from tech leaders, consultants, and energy providers indicate sustained investment in AI infrastructure. This disconnect between investor sentiment and corporate actions points more to a temporary dip in confidence than a structural slowdown.

Reshoring of Industrial Manufacturing

Following two decades of under-investment and stagnation, we believe the U.S. is in the early innings of re-industrialization – a multi decade opportunity which could exceed $10 trillion (incremental industrial production + Capex).[8] A number of factors are responsible for the nation's heightened focus on accelerating re-industrialization:

- **Supply Chain Disruptions** – COVID-19 and geopolitical tensions (e.g., U.S.-China relations) exposed vulnerabilities.
- **National Security Concerns** – The U.S. wants to secure supply chains for sensitive sectors like energy, tech, and defense.
- **Incentives & Policies** – Federal initiatives (e.g., CHIPS Act & IRA) provide subsidies and tax incentives for domestic production.
- **Rising Foreign Labor Costs** – As wages increase abroad (e.g., China), the cost advantage of offshoring diminishes.
- **Automation & Technology** – Advances in robotics and AI make U.S. manufacturing more cost-competitive.

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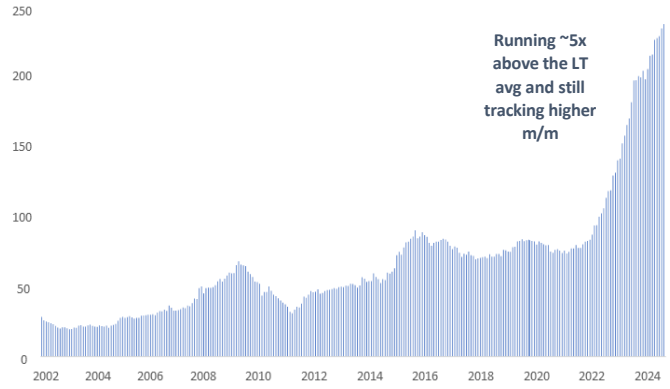
Recent U.S. Energy Information Administration (EIA) and utility projections forecast 4-6% annual electricity demand growth in certain U.S. regions.

We are seeing early signals the tide is beginning to turn with COVID pandemic serving as an initial catalyst to accelerate the inevitable westward shift of global manufacturing. The pandemic shone a light on the true cost of outsourcing (supply chain risk) while subsequent tech advancement not only firmly places the benefit of outsourcing in structural decline (cheap labor) but also sets the stage for the next round of protectionism.

Post pandemic, the U.S. has attracted 24% of global foreign direct investment (FDI), a 900bps spike vs. prior decade levels and equating to $130 billion of incremental annual investment in the country (Exhibit 4). The U.S. is now attracting capital at a rate not seen since the 1990s, prior to China joining the World Trade Organization.[8]

Exhibit 4: U.S. Manufacturing Construction Put in Pace ($Billion, SAAR)



Furthermore, the U.S. is experiencing a manufacturing revival, driven by policy initiatives. These policies are reshaping supply chains, reducing reliance on foreign manufacturing, and creating robust growth opportunities for domestic infrastructure.

Infrastructure & Investment Jobs Act: Passed in 2021, authorizing $1.2 trillion to rebuild the U.S. aging infrastructure and strengthen its supply chain.[9]

Inflation Reduction Act (IRA): Over $116 billion in clean energy manufacturing projects have been announced since the IRA's passage in 2022, creating nearly 100,000 jobs.[10]

CHIPS & Science Act: Over $272 billion in manufacturing projects have been announced since the CHIPS passage in 2022, creating over 36,000 jobs.[10]

We are closely monitoring the status of the IRA tax incentives as early negotiations on the Budget Reconciliation Bill unfold. While the bill is expected to be finalized in the coming months, key Republican lawmakers in both the House and Senate are actively working to preserve these incentives.

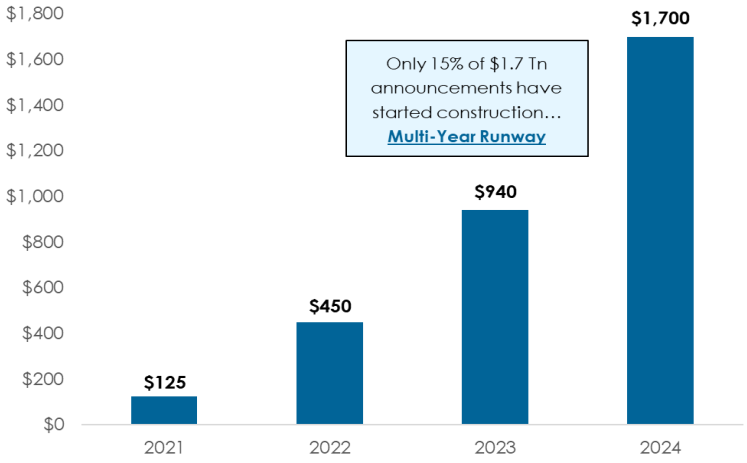
Electrification Across Industries

Electrification is revolutionizing the way energy is consumed across sectors, creating new opportunities along the entire value chain. From homes to transportation and industrial applications, electricity is becoming the dominant energy source.

- **Buildings:** Heat pumps are replacing traditional gas boilers, and energy-efficient appliances are becoming standard, driving demand for advanced grid technologies.
- **Transportation:** The adoption of electric vehicles continues to grow, supported by declining battery costs and expanding charging networks.
- **Industrial Applications:** Heavy industries are transitioning to electric solutions, creating demand for innovative technologies and infrastructure upgrades. For example, O&G industry leaders Shell and Nabors have implemented electric drilling rigs, compressors, and production pumps via grid electricity and integrated solar/wind farms.

As a result, re-industrialization momentum has surged over the past four years, with cumulative North American mega projects ($1bn+) announcements reaching $1.7 trillion (Exhibit 5).[11]

Exhibit 5: Cumulative North American Mega Projects ($1Bn+) Announcements



Electric Grid Expansion & Modernization

To sustain this growth, substantial investment is required in grid infrastructure, including hardening, smartening, and expanding transmission and distribution systems. The Biden Administration's $3.5 billion grid investment in 2023 highlighted the initial scale of this opportunity; however, it is expected that over $720 billion of CAPEX will be needed throughout the rest of the decade (Exhibit 6).[12]

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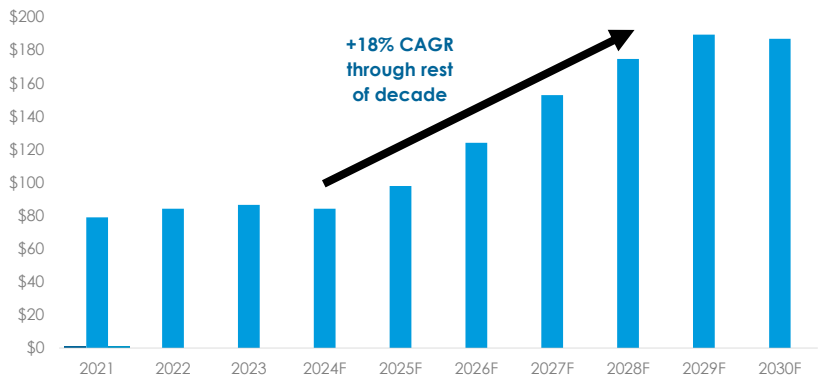
As of 2024, the U.S. electric grid had approximately 1,300 GW of total generation capacity. Remarkably, there is 2,600 GW (1,570 GW of generation and 1,030 of storage) of proposed capacity currently in the active transmission interconnection queue – highlighting a surge in interest to expand or replace existing generation.[14] However, this also reflects growing delays and bottlenecks in the interconnection and transmission approval processes.

Over 90% of the queued capacity comes from solar (1,086 GW) and battery storage (1,030 GW) projects.[14] This strong developer focus on renewables and storage underscores the impact of declining technology costs, supportive policies, and rising market demand for clean energy solutions.

Exhibit 6: Estimated U.S. Annual Grid CAPEX ($US bn)[13]



The U.S. power system is now at a pivotal turning point. Unlocking the potential of this queued capacity will depend on modernizing and expanding the transmission network, streamlining interconnection processes, and enhancing grid flexibility to accommodate high levels of renewable generation.

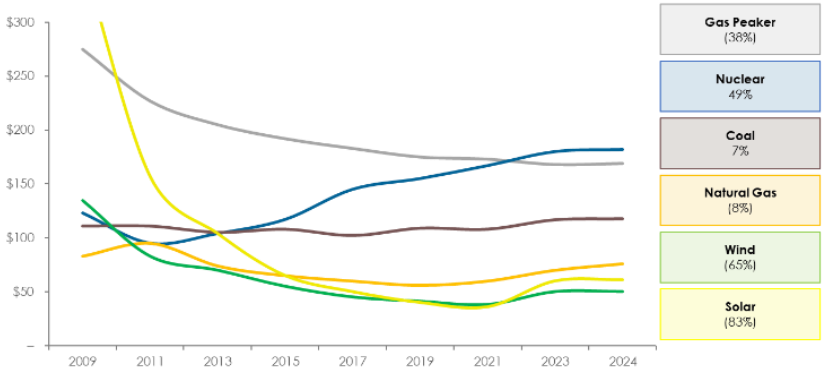
Electricity Sources for New Generation

Renewables – The momentum in demand growth for clean energy sources is surpassing market expectations. Both corporate and consumer appetites for clean energy are increasing, especially as more companies and nations pledge to achieve net-zero targets.

In the utility sector, the appeal of solar, wind, and storage solutions remains remarkably robust, propelled by mounting concerns about energy security and the increasingly evident economic advantages of clean and cost-effective energy sources. Clean energy has been the cheapest form of new energy generation in the U.S. over the past eight years, **without** subsidies (Exhibit 7). Tax incentives from legislation will make these solutions even cheaper and more attractive.

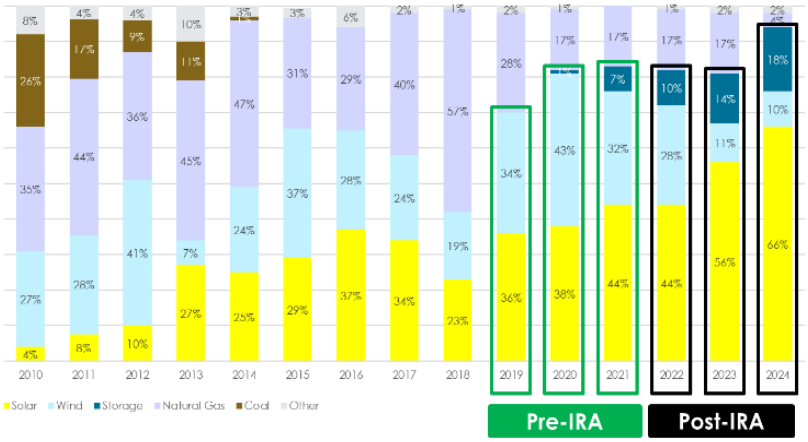
Contrary to popular belief, power producers are rapidly installing solar modules, with 66% of new electricity generation deriving from U.S. utility-scale solar installations in 2024, according to energy consultancy Wood Mackenzie.

Exhibit 7: Unsubsidized LCOE Values (Utility-Scale Generation)[15]



While about 20% of electricity consumed in the U.S. comes from clean energy sources, over 80% of all new energy capacity has originated from clean energy over the last five years (Exhibit 8)). We expect this trend to continue and grow.

Exhibit 8: New U.S. Electricity-Generating Capacity Additions (2010 - 2024)[16]



Natural Gas – Natural gas serves as a crucial bridge in the global energy transition, helping to integrate intermittent renewable sources like solar and wind. Because these renewables are non-dispatchable – they only produce energy when conditions allow – their output often doesn't match demand, creating imbalances and risking grid instability. Although battery storage is expanding, it currently lacks the scale and affordability needed to fully support renewables over longer durations.

Natural gas, through gas turbines and combined-cycle plants, offers flexible, fast-ramping power with greater reliability and significantly lower carbon emissions than coal – around 50% less CO_2. This makes it a relatively cleaner transitional fuel as renewable energy and storage solutions continue to scale.

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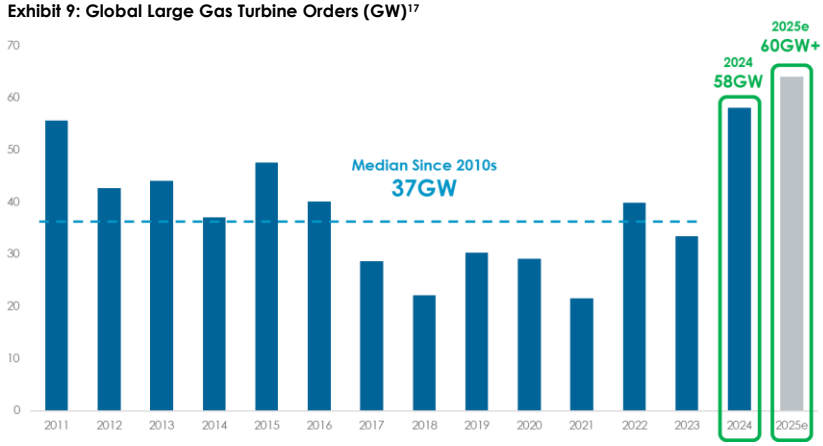
As the chart on the right illustrates (Exhibit 9), global orders for large gas turbines declined steadily from 2011 to 2023. However, a sharp rebound occurred in 2024, with order volumes hitting their highest levels in decades due to rising electricity demand.

This momentum is expected to continue into 2025 and 2026, fueled by growing power needs, cleaner energy initiatives, and advancements in turbine technology. This trend underscores the critical role of gas turbines in meeting the growing global electricity needs, particularly in sectors requiring dependable and scalable power solutions.

Exhibit 9: Global Large Gas Turbine Orders (GW)[17]



Conclusion

Power demand in the U.S. is rising at an unprecedented pace, driven by a combination of factors including data center expansion, re-shoring industrial manufacturing, electrification of transportation and industry, and broader economic growth.

On April 23, 2025, the CEO of NextEra Energy, the world's largest electric utility, summarized the opportunity set perfectly. "We expect more than 450 GW of cumulative demand for new generation between now and 2030 in the United States. To meet this demand, we believe it's important to exercise what I describe as energy realism and energy pragmatism... Energy realism is about **embracing all forms of energy solutions** and understanding the demand for electricity in the U.S. is here now and it's not slowing down. **Frankly, it's unlike anything we've ever seen since the end of World War II**."[6]

Endnotes

1. Source: GridStrategies; Strategic Industries Surging: Driving US Power Demand. December 2024.
2. Source: U.S. Energy Information Administration (EIA). 5-year load forecast growth by Grid Strategies (December 2024).
3. Source: S&P Global, Energy utility CAPEX predicted to top $1 trillion from 2025 through 2029. April 3, 2025.
4. Source: NextEra Energy Investor Conference Presentation(June 2024).
    1. Percentages are 5-yr energy growth forecasts from previous IRP to most recent IRP; GW = potential incremental wind, solar, or gas from energy demand growth; ERCOT = GW peak growth through 2030.
    2. NSPM: Northern States Power Company Minnesota; PGE: Portland General Electric; SRP: Salt River Project; APS: Arizona Power Service; SPS: Southwestern Public Service Company; OG&E: Oklahoma Gas & Electric.
5. Source: McKinsey & Company. AI Power: Expanding data center capacity to meet growing demand. October 29, 2024.
6. Source: Q1 2025 public announcements.
7. Source: Company filings. Earnings reports.
8. Source: U.S. Census Bureau. Morgan Stanley.
9. Source: The White House (build.gov).
10. Source: Jack Conness, Inflation Reduction Act (IRA) Manufacturing Announcements. As of November 14, 2024.
11. Source: Eaton earnings presentations. As of December 31, 2024.
12. Source: Goldman Sachs Global Investment Research, Edison Electric Institute (EEI). January 2025.
13. Source: BNEF New Energy Outlook Grids 2024. October 2024.
14. Source: Berkley Lab, Queued Up: 2024 Edition, Characteristics of Power Plants Seeking Transmission Interconnection as of 2023 end.
15. Source: Lazard's Levelized Cost of Energy Analysis – Version 17.0 (June 2024). Reflects the average of the high and low LCOE for each respective technology in each respective year. Percentages represent total decrease in the avg. LCOE since 2009 analysis.
16. Source: Wood Mackenzie, US Solar Market Insight 2024 Year in Review (as of March 2025).
17. Source: McCoy, BNEF, Company information.

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Disclosures