

# Powering the Intelligence Revolution

## Why the Energy Bottleneck Will Not Stop AI

### Scarce Today, Abundant Tomorrow: Power and the AI Buildout

We are in the middle of what could be a once in a generation industrial buildout. It requires semiconductors, equipment, labor, data centers, and massive amounts of power. Power is one of the bottlenecks, but the system is adapting across the short and long-term. We are building the physical foundation for scaling machine intelligence and accelerating the next wave of productivity growth.



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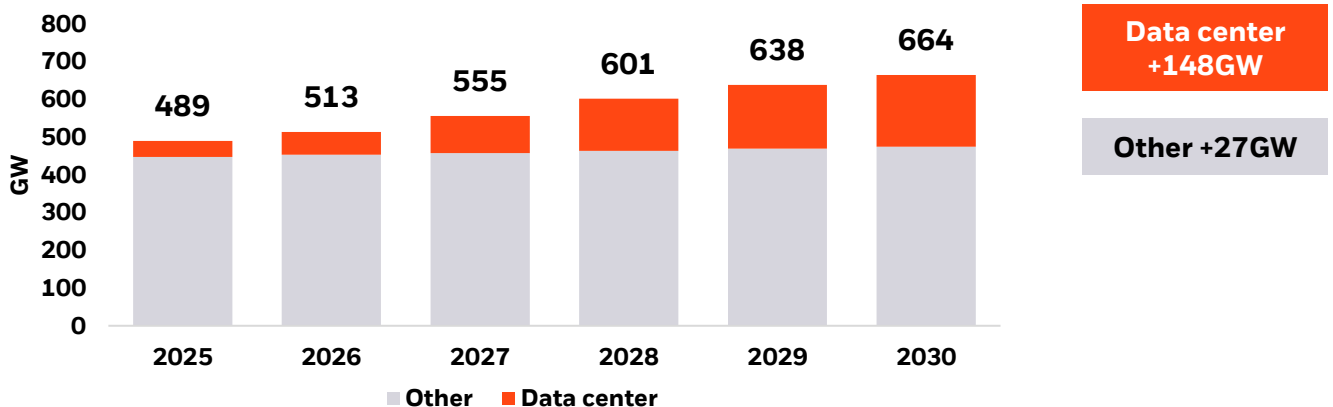
Fundamental Equities  
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### What Is the Demand From Data Centers?

We expect approximately 148GW of additional power capacity will be needed by the end of the decade to satisfy data center demand, more than quadrupling the roughly 42GW in power capacity consumed by data centers in 2025. Including non-data center load growth, we expect power demand to rise by 23GW in 2026 and 43GW in 2027.

### Data centers to require 148GW of additional capacity this decade

Forecasted U.S. Power Demand



### How Did We Get Here?

Since the launch of ChatGPT in late 2022, AI compute investments have risen massively, tracking to exceed \$1T per year. Even so, demand for compute has been systematically underestimated. As AI evolves from simple queries to multimodal systems and persistent agents, across more users, and with longer runtimes, compute demand compounds. Efficiency gains have lowered unit costs, but aggregate demand has scaled even faster, making electricity a key factor in AI deployment.

### What is the Urgency?

We believe the economics are decisive. Our research shows that a 1GW AI data center can cost roughly \$40B to build, including equipment such as GPUs and networking systems, yet can possibly generate more than \$12B of annual high margin revenue almost immediately. Power is the gate to that cash flow. But the urgency is not only economic. AI is also a strategic priority. In this environment, power develops a yield curve: capacity available today could be worth far more than capacity delivered years from now.

### What is the Power Bottleneck?

Current indications suggest that the system is nearly sold out. There is very little incremental AI power capacity available over the next two years beyond what is already under construction or in advanced development. Grid interconnection queues are congested. Gas turbine deliveries extend into 2030. Transformers and switchgear are in short supply. Engineering, procurement, and construction crews are in high demand.

## Will Power Constraints Stop the AI Data Center Buildout?

Based on our comprehensive review of on-going and future power supply needs for the AI data center buildout, the answer is no. Near-term constraints are being addressed through pragmatic solutions. In the out years of 2029-2030 we see incentives and innovation as likely combining to meet modest shortfalls. The system is adjusting across multiple time horizons, solving for immediate gaps while expanding the structural base.

### A Collision Between Two Worlds: Tech and Power

The increasing use of power to build AI Infrastructure has forced a collision between two radically different operating cultures.

- The AI ecosystem, including labs, hyperscalers, and semiconductor companies, moves quickly, with competitive and financial incentives for rapid iteration, aggressive capital deployment and first-mover advantage.
- The power complex, including utilities, grid operators, regional markets, and equipment manufacturers, has seen little structural growth for nearly two decades and is optimized for reliability, regulatory compliance, capital preservation, and risk minimization.

When unprecedented demand collides with slow moving, risk averse institutions, strain is inevitable. The response is creativity. The AI ecosystem is shifting to new geographies, underwriting long-term contracts, and pushing supply chains to expand. Developers are also reducing grid dependence by building generation alongside compute, a trend known as “Behind the Meter” or “Bring Your Own Power (BYOP)”. Projects launch with anchor capacity and scale in phases, accelerating capacity beyond what the grid can deliver.

### Case Studies: New Models for Powering AI

#### xAI in Memphis, Tennessee

xAI built one of the largest AI compute clusters in the world, deploying 100,000 GPUs in roughly 122 days. The site operates at close to 1GW of power capacity, comparable to the electricity demand of a major city. Faced with multi-year grid interconnection timelines, xAI moved quickly, deploying road portable natural gas turbines under temporary permits. The site integrates batteries, mobile generation, and grid supply in a layered system designed for load variability. Launch fast, then optimize.

#### Stargate in Abilene, Texas

The data center campus in Abilene, Texas, part of the Stargate project and developed with Crusoe, reflects the next phase of large-scale AI infrastructure. The campus was developed with a 1.2GW grid interconnection, behind-the-meter energy resources including natural gas turbines to support on-site generation. The campus is now live, with expansion underway toward its planned 1.2GW of total capacity. West Texas offers abundant land, existing energy infrastructure, and a supportive regulatory environment. This is not only bridge power, it is vertically integrated infrastructure purpose built for AI.

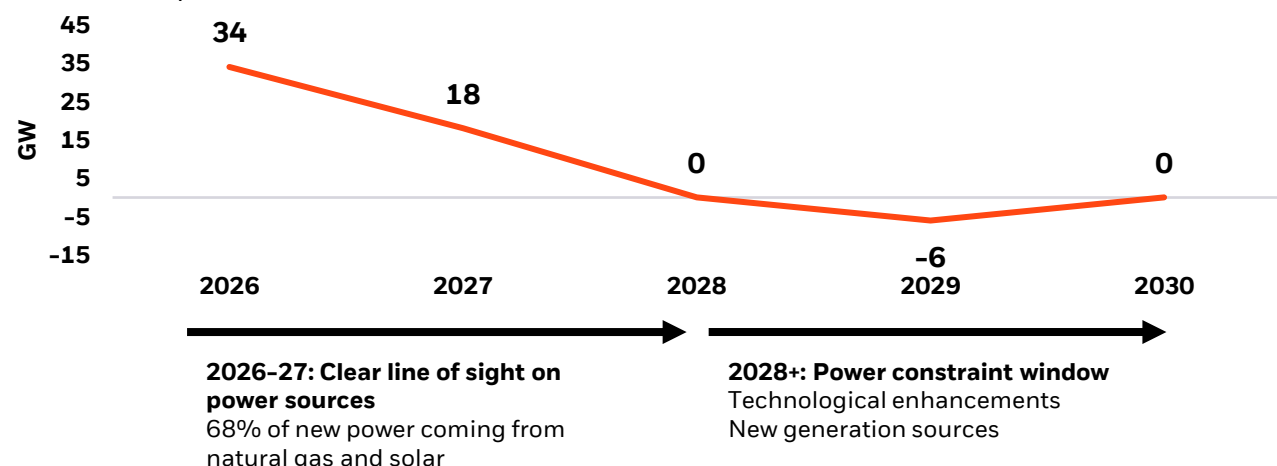
*Case studies are shown for illustrative and educational purposes only. They do not represent BlackRock investments or strategies and are not a prediction of future results. Outcomes may differ materially depending on market, regulatory, and operational factors. References to specific companies are for illustrative purposes only and should not be construed as investment advice or investment recommendations.*

### Can the System Support the Current View on Demand?

In the near term, yes. Based on our exhaustive analysis, we conclude that the power supply systems fueling AI are more flexible than commonly assumed. Gas turbine manufacturing is already scaling and can accelerate further, solar is growing rapidly, and emerging technologies such as fuel cells are contributing. Batteries play a growing and meaningful role by raising the yield of power-generating sources. Through 2026–2027, available capacity, ongoing buildouts, and interim solutions appear sufficient. After 2027, the system is more stretched, but uncertainty on both sides is higher.

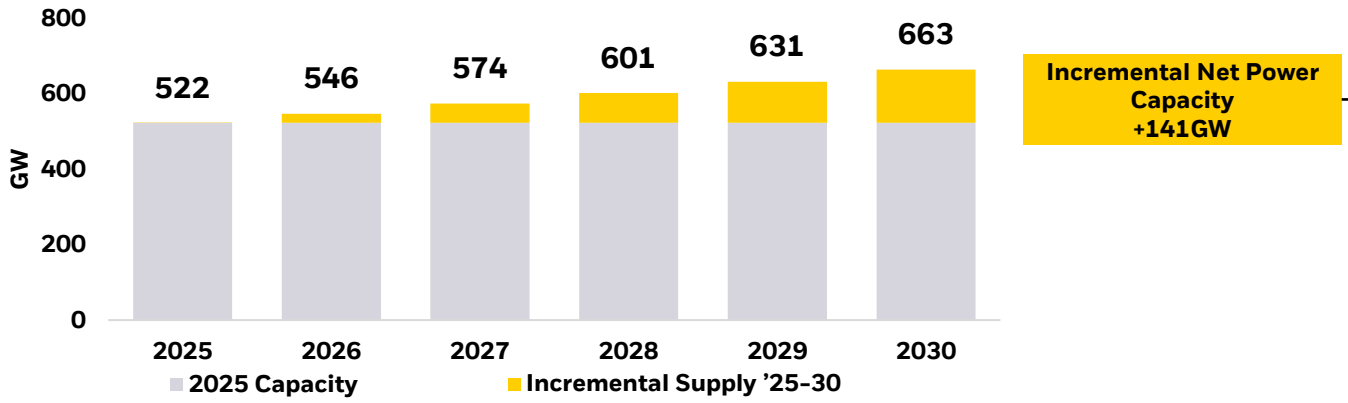
### Power pressures grow, but solutions emerging

US Power Surplus



# Power supply systems fueling AI are more flexible than assumed

Forecasted U.S. Power Supply

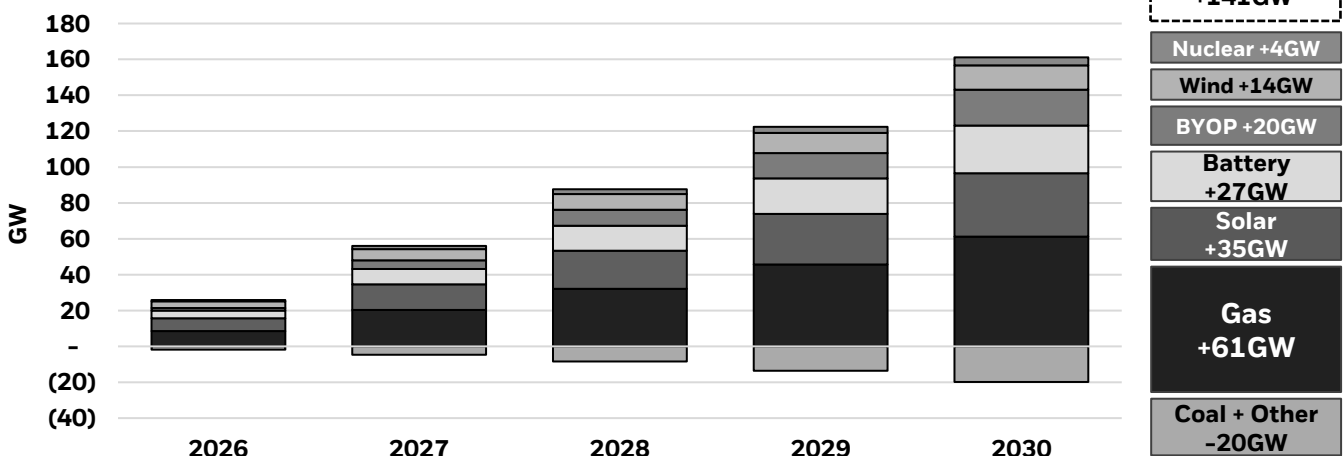


- **Natural gas** is the primary source of incremental AI-grade power over the next several years, particularly in regions with existing pipeline infrastructure. In 2026–2027, supply may come from higher utilization of the existing fleet, slower retirements, and increasingly net new gas additions. New-build gas capacity could ramp more materially in 2027–2028 and beyond as turbine deliveries accelerate. Turbine manufacturers are expanding capacity, supported by U.S. policy aimed at increasing output, and we see upside to current production plans. We expect approximately +20GW of net new gas capacity in 2026–2027 and +61GW through the end of the decade.
- **Solar** is large, growing rapidly, and highly cost-competitive. It can be deployed faster than gas in many instances and, given intermittency, is deployed as part of the grid or with battery storage systems. Global manufacturing capacity is ample, albeit concentrated in Asia. We expect approximately +14GW of net new solar capacity in 2026–2027 and +35GW through 2030, with additional upside if demand accelerates.
- **Wind** adds utility-scale, cost-competitive generation in high-resource regions with existing transmission. While development timelines can be longer than solar, wind complements solar output and improves overall grid reliability. We expect approximately +6GW in 2026–2027 and +14GW through 2030.
- **Batteries** (stationary storage) expand power supply by improving utilization of existing assets. Storage enables balancing and peak support, allowing operators to defer or avoid other investments. Storage is quick to deploy and is a critical tool supporting demand growth. We estimate batteries can support approximately +9GW in 2026–2027 and +27GW through 2030.
- **Bring Your Own Power (BYOP)** has emerged as a source of incremental supply that did not exist at scale 18 months ago. Some projects are true standalone power islands using large gas turbines, while turbine scarcity has driven modular solutions including smaller gas turbines, reciprocating engines, batteries, and fuel cells. Together, these approaches have created a new layer of supply that can be brought online faster than conventional grid-connected generation. We estimate BYOP deployments can support approximately +5GW in 2026–2027 and +20GW through the end of the decade, with upside if grid constraints persist and demand exceeds expectations.
- **Coal** retirement schedules are not immutable. When grid reliability is at stake, timelines can shift, as recent emergency orders delaying plant closures amid rising data center load demonstrate. Existing coal plants represent supply that can remain online for years if economics and policy align. We expect retirements of 5GW net capacity in 2026–2027 and 20GW through the end of the decade.

BlackRock Fundamental Equities, with data from Bloomberg New Energy Finance and US Energy Information Administration as of February 24, 2026. Chart shows power generation net capacity broken down by fuel source (Nuclear, Wind, Bring-Your-Own-Power, Battery, Solar, Gas, and Coal + Other).

## Gas and solar make up 68% of new power capacity expected this decade

Forecasted Incremental US Power Supply by Source – from 2025 levels



## How Is the Ecosystem Adapting?

Generation is only part of the adjustment. The AI buildout is reshaping geography, capital flows, infrastructure design, and policy.

- **Location, location, location?** Historically, data centers clustered near population centers to minimize latency. Today, much of the incremental build, particularly large-scale AI training clusters, is moving toward power-rich regions such as West Texas, where large blocks of capacity can be secured and developed faster.
- **Capital is underwriting supply.** Hyperscalers are no longer passive buyers of electricity. Through long-dated contracts and development partnerships, they are anchoring new generation projects and accelerating capacity.
- **Stranded infrastructure is being repriced.** Decommissioned power plants, idle industrial sites, and crypto mining facilities with existing transmission or fuel access are now among the fastest paths to incremental AI-grade power.
- **Policy is compressing timelines and expanding supply.** AI is now a strategic priority. Regulators are rethinking interconnection processes and ensuring hyperscalers fund infrastructure. Governments are also pushing manufacturers of turbines and other critical equipment to expand production capacity.

## What Long-Term Solutions Could Expand Supply in the 2030s?

As we move into the 2030s, two developments have the potential to materially change how AI infrastructure is powered and scaled.

- **Nuclear energy** is one of the few clean, always-on sources capable of supporting large, concentrated AI loads. Hyperscalers are already contracting for output tied to extending, refurbishing, or restarting existing plants. Small modular reactors (SMRs) offer a model that could be deployed closer to data centers. Sustained AI demand is increasing political and financial support for new build nuclear, positioning nuclear as a critical pillar of AI power beyond 2030.
- **Data centers in space** are moving from theory to exploration. Space X has proposed orbital data centers powered by continuous solar exposure, leveraging natural cooling and eliminating terrestrial grid constraints. Google, Amazon, and others are evaluating similar concepts. With reusable launch systems reducing launch costs and increasing payload capacity, deploying large-scale orbital compute over time is technically plausible, introducing an entirely new supply frontier.

## The Bigger Prize

Every megawatt unlocked expands our capacity to scale machine intelligence. This is not simply an infrastructure story. It is a productivity story. For most of modern history, labor has accounted for more than half of global GDP. AI has the potential to alter the relationship between labor, capital, and output itself. That is why the power constraint should be solved. The prize is too consequential, and too strategically visible, for it not to be.

## Conclusion

Power constraints are unlikely to derail AI data center deployment on their own. Over the next two years, the gap is bridged by a mix of in-flight capacity, gas-led additions, storage, BYOP, and site re-optimization. Beyond 2027, the challenge becomes less about “is there enough power?” and more about how quickly the system can translate capital into energized capacity.

Importantly, these frictions create a self-regulating mechanism: they cap the pace of expansion, prioritize the highest-return projects, and reduce the risk of indiscriminate overbuilding.

For investors, that means the opportunity is shifting from a broad AI rally to more selective stock exposure. In an environment with dynamic bottlenecks and timelines, dispersion should rise, and we believe an active, nimble approach is best positioned to capture the winners.

# Sources

**[Power Supply Chart] Source:** BlackRock Fundamental Equities, with data from Bloomberg New Energy Finance and US Energy Information Administration as of February 24, 2026. Chart shows power generation net capacity broken down by fuel source (Nuclear, Wind, Bring-Your-Own-Power, Battery, Solar, Gas, and Coal + Other).

**[Power Demand Chart] Source:** BlackRock Fundamental Equities, with data from US Energy Information Administration as of October 16, 2025 and from Semianalysis as of January 12, 2026. Chart shows US power demand by sector (Data center and Other).

**[Power Surplus Chart] Source:** BlackRock Fundamental Equities, with data from Bloomberg New Energy Finance and US Energy Information Administration as of February 24, 2026, and Semianalysis as of January 12, 2026. Chart shows surplus/deficit of US net power generation capacity in excess of US power demand.

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