

# CCS-ENABLED CLEAN FIRM POWER FOR AI DATA CENTERS

Competitiveness in AI data centers is increasingly dependent on the rapid deployment of clean, firm power. By utilizing proximate infrastructure, onsite natural gas power generation with Carbon Capture and Storage (CCS) represents a scalable option for delivering power within needed timeframes, providing very high reliability and control, and achieving low-carbon targets.

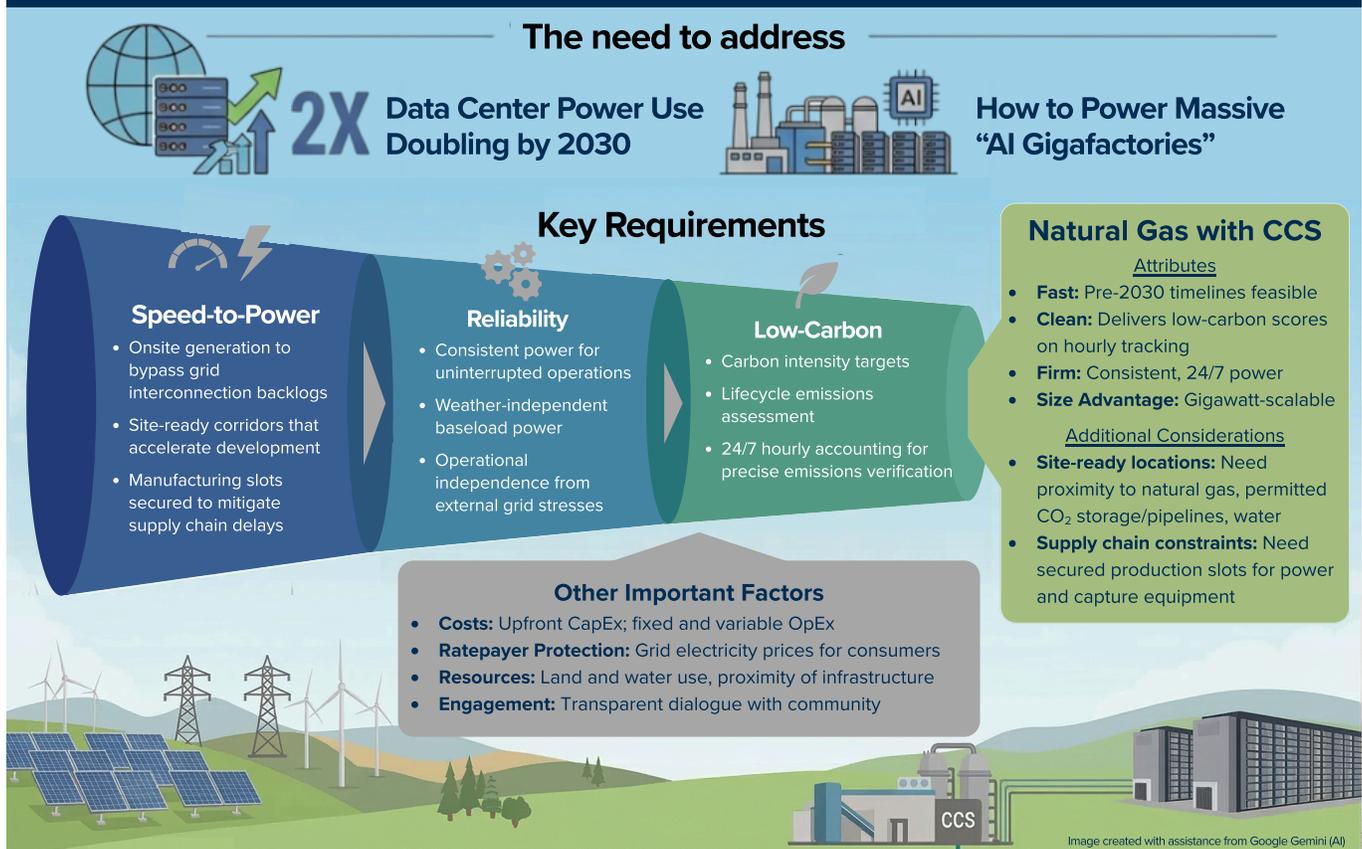
## Meeting the 2030 Power Demand for AI

The rise of 'AI Gigafactories' is redefining the global digital race. An electricity advantage is now the prerequisite for an AI advantage. These facilities require 500 MW to over 1 GW of continuous power, forcing a total rethink of the size and pace of power infrastructure development. With global data center power use projected to double by 2030<sup>[1]</sup>, the industry requires solutions that can be deployed quickly, reliably, and meet emissions goals.

Natural gas power generation with CCS involves capturing CO<sub>2</sub> emissions from high-efficiency gas turbines or fuel cells before they enter the atmosphere. The captured CO<sub>2</sub> is then compressed, transported, and permanently stored in deep geological formations.

Natural gas with CCS is an important pillar to meet this need, offering a scalable, pre-2030 path for low-carbon, high-density, always-on AI data centers.

## CLEAN FIRM POWER FOR GIGA-SCALE AI DATA CENTERS



<sup>[1]</sup> For context, this represents an increase from 415 TWh (2024) to about 945 TWh (2030), more than the total electricity consumption of Japan. Source: International Energy Agency, *Energy and AI*, Apr 2025

The broader growth in electricity demand involves a diverse mix of resources. Natural gas with CCS is an important part of that mix, providing consistent, high-density thermal or electrochemical power. With operators prioritizing "site-ready" locations (sites with proximate gas infrastructure with certified low-emission supply chains, suitable CO<sub>2</sub> storage and permits, and fiber connectivity) solutions incorporating natural gas power generation with CCS can offer gigawatt-scale power needs while satisfying strict development timeframes, 24/7 uptime, and carbon intensity goals.

## Speed, Affordability, and Reliability

The primary constraint for AI scaling is the time-to-power for new data centers. Grid interconnection wait times now span over 4 years in the United States and globally.<sup>[2]</sup> Power solutions such as natural gas with CCS can bypass grid delays by generating electricity onsite behind the meter. Besides speed benefits, these onsite configurations shift the capital requirements and asset risks away from the public, while providing critical experience needed to drive down costs for future projects via technology learning curves. This model insulates ratepayers from the socialization of transmission upgrade costs or grid congestion. By developing onsite, operators gain full control of their power environment to target mission-critical availability, such as the 'Five Nines' (99.999%) benchmark.

### Commercial Momentum

The first wave of commercial-scale natural gas with CCS projects has reached Final Investment Decision (FID) or entered construction. These include landmark corporate offtake agreements for CCS-enabled power as well as industrial CCS clusters that benefit from the economies of scale from shared CO<sub>2</sub> infrastructure. The emergence of models co-locating high-efficiency generation directly with data center load demonstrates that the financial and technical blueprints for this solution are now being actively deployed globally.

### Evolution of Carbon Accounting

Carbon accounting frameworks are evolving from annual volume matching toward hourly-matched methods. This shift highlights the role of natural gas with CCS, which provides continuous low-carbon electricity that aligns with 24/7 compute loads. Unlike variable renewables that often require high-emission 'peaker' plants for backup, CCS maintains a stable low-emission profile. This method can drive deeper system-level decarbonization by displacing the marginal unabated generation typically required to firm up large-scale intermittent portfolios.<sup>[3]</sup>

## Natural Gas with CCS: Select Major Projects



<sup>[2]</sup>Sources: Berkeley Lab, *Queued Up: 2025 Edition*, Dec 2025; IEA, *World Energy Outlook*, Oct 2025

<sup>[3]</sup>Source: Carbon Direct, *Meeting Data Center Electricity Demand*, Jun 2025