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A Message to Data Centers Going Off-Grid: Do Better



By: **Francesca Hsie**, **Ryan Fitzpatrick**

Takeaways

- As AI energy demand expands faster than the US electricity system can accommodate, many hyperscalers are turning to large off-grid gas installations to power their facilities.
- This shortcut allows development to bypass policy, regulatory, and other systemic barriers, but it comes with consequences. It is straining already-tight supply chains, increasing costs, and contributing to local pollution and water concerns.
- To build responsibly and address public backlash, industry leaders should deploy an energy approach that leaves the electricity system better than they found it and keeps energy costs affordable for families. That means increased transparency, investments in grid infrastructure, and spearheading innovation.

Americans are deeply concerned about the rapid development of AI data centers, with impacts on energy and water among their greatest worries. But instead of putting forward real fixes, developers often turn to less-than-optimal solutions to power their facilities–solutions that don't address the public's frustrations with energy costs, water use, and pollution.

Many data centers are getting built alongside high-emission natural gas infrastructure to quickly and fully power their compute needs. While grid operators, utilities, policymakers, and supply chains may not be responding quickly enough to deliver

cleaner, grid-connected power that meets the AI industry's business objectives, this alternative approach is unsustainable and carries tremendous downsides.

It is quickly depleting already-short supplies of electricity equipment, materials, and labor, leaving other energy customers in the lurch. It is prioritizing natural gas over a diversified energy portfolio that can protect against market fluctuations and lower emissions. And while most off-grid developers say they intend to connect to the grid in the future, they are not sufficiently planning for the gigawatt-scale impact their data centers, new supply additions, and the industry writ large will have on the system and economics affecting all electricity users.

Certainly, policymakers must address interconnection processes, permitting bureaucracy, and energy policy uncertainty that push some data center developers toward subpar methods of securing power. But because of its intensive electricity demand and proximity to everyday communities, this industry has a unique responsibility to mitigate and avoid its own impacts.

It is time for data centers to do better.

Going Off-Grid Doesn't Eliminate Costs for the Public

Electricity equipment costs are skyrocketing, and supplies are tightening. Critical components such as turbines, transformers, and switchgear have increased by roughly 50% over the last five years. And while data centers aren't the cause of this shortage, their off-grid power solutions are making it worse and more expensive.

Data centers require a lot of power and can't afford to go dark. Hyperscale facilities need more than 15 times as much electrical equipment as a standard large load. And without the reliability offered by the grid, data centers using on-site electricity need roughly 50% more equipment to support local integration, stabilization, and management than a grid-connected facility.

As data center developers build out their own energy supply, they are outcompeting utilities for the electricity equipment needed for standard grid operations,

maintenance, and investment. Consider a utility procuring equipment to replace turbines in an aging power plant, to harden the local distribution network to withstand storms, and to install a major high-voltage transmission line to alleviate congestion.

What might have cost a utility $100M in 2021 could now cost upwards of $150M. This will affect everyday customers.

These equipment prices are just one example of the rising costs that come with aggressive off-grid power and surging demand. Everything that goes into building and maintaining an electricity system—minerals, equipment, labor—will become more and more expensive as unprecedented demand drives up costs. It will be families and businesses connected to the grid, not tech companies, that bear those added costs.

The Risks of a Gas-Heavy Strategy

Data centers are, by and large, opting to power their facilities with natural gas because it provides a stable baseload power source and the US has large domestic reserves. While natural gas is, and will continue to be, an important part of the US electricity mix, it is not immune to supply and price shocks.

The data center industry accounts for half of forecasted load growth, and favoring gas power so heavily puts long-term diversification at risk. Why does energy supply diversification matter? Increased reliance on gas could put upward pressure on energy prices and make the US energy system more vulnerable to global market fluctuations.

Building large amounts of less efficient, single-cycle gas-fired generation increases demand for the same fuel that supplies much of America's power, industrial, and home heating needs. Whether that demand raises prices for other consumers—and by how much—will depend on how quickly production and pipeline capacity can respond.

Cost isn't the only risk of a gas-focused energy strategy. The public is concerned about impacts on water and air, and rightly so. These co-located gas power systems will contribute to local pollution, worsen air quality, and use substantial amounts of water. Natural gas may be better than backup diesel generators, but it still contributes to a data center industry that is moving the country's emissions in the wrong direction.

Instead of using the grid more efficiently and investing aggressively in cleaner energy, a diversified energy supply strategy, and grid infrastructure that benefits everyone, data centers are relying on an outdated, fossil-fuel-first power mix to serve their own needs.

What Doing Better Looks Like

Companies will continue to invest in natural gas power, and that's OK. Where it becomes a problem is when gas is the overwhelming energy source, with little diversity in the portfolio. Similarly, it's OK for data center developers to pursue interim solutions to power facilities while the grid catches up, as long as their plans account for what the larger system ultimately needs. It is understandable that companies want to protect commercially sensitive and proprietary data, but they still need to provide sufficient information to planners and the public to assess the impacts of development in their communities.

The tech industry has capital, an innovation mindset, and technology that can purportedly solve intractable problems. No one is suggesting it will be easy to prioritize diversification over speed to power, to better plan across fragmented power systems and market structures, and be more transparent, but hyperscalers can apply their considerable resources to contribute to a more efficient, affordable, reliable, and clean grid. If the tech industry wants to show the public it intends to "do better" on its energy and resource impacts, the following guidelines are a good place to start.

- **Be good grid stewards.** Don't overbuild high-emission, lower-efficiency generation. Even if it eventually connects to the grid, it will lock us into a suboptimal resource mix. Instead, work with states, grid operators, and utilities to invest in capacity additions and transmission upgrades that align with their development objectives. Commit to demand flexibility and power management tools that maximize energy use during low-demand periods to more efficiently use existing power plants and backup generation, shave peak demand, and alleviate pressure on the grid during emergencies.
- **Pay your real fair share.** Cover both the costs to power a facility and the indirect costs that the scale and speed of data center development are having on energy

prices. This would include the rising costs and competition for equipment, fuel, labor, etc.

- **Pay to expand technology adoption.** Prioritize investment in commercially available clean generation, storage, and grid-enhancing technologies. Increase the investments many tech companies are already making to commercialize advanced nuclear, geothermal, hydrogen, carbon capture, long-duration storage, demand-side management, and advanced transmission technologies.
- **Be open with the public.** Provide grid operators, utilities, and regulators with accurate data on project development plans and anticipated electricity demand that distinguish between speculative siting and actual development. Report power and water usage and forecast data—with appropriate limits to protect commercially sensitive data—to the Energy Information Administration (EIA) as well as regulators, grid operators, and other authorities.

Don't Wait to Do Better

There is no single entity to blame, nor is there a single entity that can fix the grid and build a better electricity system. These changes don't happen in a vacuum. While the public is asking more of tech companies, federal policy should enable positive changes. That includes permitting reform, ratepayer protection requirements, supply chain and workforce strategies, and data reporting standards.

But the tech industry is the most visible and rapidly growing contributor to energy, resource, and cost issues; it has access to enormous resources to avoid and address problems, and it has the most to gain by finding swift solutions that resolve public concerns.

Shortcuts and workarounds are not a sustainable strategy. For their own success, for the long-term strength of the US energy grid, and in response to a frustrated public, the data center industry has every reason to "do better."



Francesca Hsie

Deputy Director for Electricity



Ryan Fitzpatrick

Vice President of Climate and Energy

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