Articles + Publications | March 17, 2026

Off-Grid Data Centers: A Potential Power Solution For AI

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Data center developers, including hyperscalers, are responding to the rapid expansion of artificial intelligence (AI) and migration of data into the cloud by expediting and scaling up the construction of data centers in the U.S., especially in Texas.

This growth brings with it challenges for the developers and their partners, including how to reliably power these projects, and the scale of this challenge will only grow as new generations of microchips are rolled out. More companies are looking at off-grid energy solutions at their data center sites to avoid or minimize issues associated with grid power. Hyperscalers also face practical issues, including access to water and supply chain pressures.

This report explores five key dynamics affecting the rollout of off-grid data centers in the U.S., and considers what this means for hyperscalers, energy project developers, and financiers. The focus is predominantly on Texas because of its deregulated retail electricity market, and because its behind-the-meter market is more advanced than most of the rest of the U.S. However, many of the trends related to energy generation, community reactions, and infrastructure investments are relevant in other markets.

This report includes insights from external data center and energy experts, as well as the legal professionals from Troutman Pepper Locke's energy and real estate teams.

Click here to read the report.

INTRODUCTION

The U.S. has experienced a data center boom and that is continuing in 2026.

By 2030, data centers are projected to require $6.7 trillion of investment globally to meet rising demand for computing power, according to McKinsey & Co. Over 40% of that, or $2.7 trillion, is set to be invested in the U.S. as the market leader and home country of the hyperscalers.

Despite this, U.S. states face practical challenges to hit this ambitious goal. For example, a forecast from independent system operator the Electric Reliability Council of Texas (ERCOT) in April 2025 predicted that data center energy demand in Texas could grow by 22GW between 2025 and 2031. This would mean Texas data centers would reach 78GW of electricity demand by 2031, or around 36% of the state's total power demand.

In addition, analysts say there is currently no slowdown to the rapid rollout of power-hungry AI tools globally, and a

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new generation of more energy-intensive microchips will add more pressure. The growth of data centers is putting unprecedented stress on the power system, essential physical infrastructure including water, and businesses in the energy supply chain.

Besides the challenges involved in securing the electrical power and water needed to run data centers, developers and hyperscalers also face increased pressures from prospective neighbors concerned about power prices, water availability, and potential impacts to property values.

In March 2025, AI research and technology group 10a Labs reported that “local, bipartisan opposition” had delayed $64 billion of U.S. data center developments for reasons including the strain they put on power grids and consumer energy bills; tax incentives; pressure on water resources; and the perceived impacts on property values. The company’s Data Center Watch report said “data centers are squarely in the crosshairs” of local resistance.

But there are reasons to be hopeful. Hyperscalers and energy companies are now working together to develop off-grid data centers. These projects, which can also be known as “island-moded,” do not connect to the grid and are powered by self-contained energy generation systems. These systems can be located on the same site as the data center if space allows, or on a nearby site and linked via private off-grid infrastructure.

This off-grid approach ensures the end user has a dedicated power source to run their data center without interruption and without putting pressure on the wider power system. Some off-grid data centers have considered incorporating a limited grid connection for certain types of emergency backup power. An off-grid arrangement allows data center developers to sidestep the issues presented when connecting to the grid, helping to alleviate some of the friction that they and energy companies often face from local communities when seeking to build new projects that would compete with existing loads for transmission and distribution capacity.

In this report, we look at the challenges and opportunities for hyperscalers, energy companies, and investors as off-grid data centers grow in popularity. We focus on five main areas:

1. Why off-grid data center developers are looking to natural gas for reliable power.
2. Microchips are getting more powerful and sidelining intermittent power sources.
3. Regulatory responses to data center expansion that aim to boost grid stability.
4. Managing objections to data centers with outreach and technical innovations.
5. Picking reliable partners and creditworthy counterparties to deliver success.

We deal with each of these areas in the coming sections of the report drawing on insights from experts in the development of off-grid data center and power generation projects.

1. DEVELOPERS TURN TO NATURAL GAS

The main reason developers and hyperscalers are looking to build off-grid data centers is to avoid the challenges from integrating new generation and load on power grids such as ERCOT.

This rapid buildout of data centers in U.S. states such as Texas has forced developers to look at how fast they can roll out dispatchable and reliable generating resources of all kinds, with the carbon emissions of such generation,

for now at least, a less important consideration in their plans than in the first half of the 2020s. Emissions of all kinds will remain an issue at the state level, and potentially the federal level as well, due to binding legal targets for obtaining required air permits.

Gage Nelson, sector lead for Conventional & Low Carbon Energy at project manager Turner & Townsend, said he has seen a major change in attitudes in the sector even since summer 2025, with developers of data centers and energy suppliers recognizing that off-grid, natural-gas-fed power is an ideal solution in the immediate term, relative to renewable-powered or direct grid-connected data centers.

Nelson said developers are focused on using natural gas to power off-grid data centers because it can be deployed quickly: “From an energy perspective, the market is going to be really constrained as to where they can get the quickest return. That’s why you’re seeing a lot of gas-fired turbines being choice number one. Although the supply chain for turbines is a challenge, the fuel source is pretty plentiful, it’s fairly easy to get, and that supports your route to market while other energy solutions scale.”

These other solutions would include solar and/or wind power paired with battery storage, and small modular reactors. For battery storage in particular, even a marginal role in the AI-driven data center boom represents a huge growth opportunity for that fast-moving sector. However, renewables are struggling to keep up with the fast growth of data centers due to the amount of space they require and the intermittency that is inherent in the technology, while small modular reactors are still commercializing.

Maura Yates, co-founder and chief executive officer of electricity services provider Mothership Energy, has heard increased discussion about off-grid data centers in the last 12 months as data center developers find it harder to secure grid interconnections.

“We’re seeing this increased demand for it because the grid-tied interconnect queue is congested and this alternative may provide a way to bypass it,” she said. “We’re going to see this demand for off-grid projects because the juice is now worth the squeeze.”

Yates said typically off-grid data centers are more complex to deliver than grid-connected cousins because companies need power-engineering expertise to develop a reliable system. She said the concept had not yet achieved critical mass but there is early adoption: “I think it’ll gain increased popularity as ERCOT refines its large-load interconnection process and promulgates final rules over the course of 2026.”

Haynes Strader, chief development officer at Skybox Datacenters, which is developing data center campuses in Texas of up to 600MW capacity each, said criticisms of the ERCOT grid after failures during Winter Storm Uri in February 2021 have been overstated.

He said that during that storm, 11 million people lost power under freezing temperatures, primarily due to the lack of wind and solar power combined with the failure to ensure that coal, gas, and peaker plants had access to electricity in a weather emergency. This meant those thermal plants switched off in brownout conditions but could not switch back on four hours later when needed. Strader said PUCT and ERCOT have since changed the process by treating generation plants as critical infrastructure, and the problem has not been repeated.

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“The reality is that ERCOT is probably one of the most resilient systems in the country, if not the world. People don’t understand what caused that event. It wasn’t that there was too much demand on the grid. It was that a significant portion of critical generation assets ceased to operate. Those assets went offline and weren’t able to be brought back online,” he said.

Strader said Skybox’s preference has been for grid interconnected campuses, but that data center developers are being held up by the high volume of connection requests ERCOT has to manage: “For newer projects, we’re looking at the primary power being behind-the-meter with a hope to eventually interconnect to the grid. Natural gas is going to be the immediate solution, and I think the answer to all of this long-term is nuclear power,” he said.

He added that most data center operators have carbon-neutral pledges and would offset the electricity they use with power from renewable sources elsewhere.

Competition and the ‘Five Nines’

Whitney Switzer, CEO at data center development services provider Sorellis, who has previously held leadership roles in data center expansion at Google and Amazon Web Services, said developers have become more comfortable with behind-the-meter power solutions. She added that the difficulty with using natural gas as a fast route to power is the existing strain in the relevant supply chains.

Switzer said developers are involved in a “battle for what is available” in terms of energy supply, technology and skills: “Even when you’re thinking about gas generation, there are only a couple of companies that produce the equipment that is validated and tried and true to deploy. So, when you’re looking at it, you are really looking at a couple of different things. What is the track record of who’s delivering natural gas? What is the supply chain and their track record? When you’re in these big projects, especially in remote areas, everybody on site is dependent on certain processes and timelines in these contracts.”

She said that companies seeking to develop off-grid data centers could face difficulties in securing the electricity transformers or skilled technicians that they need.

In short, off-grid power solutions enable developers to avoid the delays and difficulties of linking their projects to the grid, but developers need to ensure their solutions are robust.

Peter Perri III, managing partner at AI and data center investor Jupiter Island Capital, said data center operators are looking for a power or fuel source and supporting infrastructure that offers 99.999% efficiency: “The buzzword is five nines, and the reality is that this was typically only able to be provided by the power grid because any plant, whether it’s a coal-fired power plant or a gas-fired power plant, will deliver somewhere in the neighborhood of 90% reliability, not 99.999%,” he explained.

Perri III added that data center operators are more interested in near term behind-the-meter or off-grid ‘island-moded’ power solutions as they seek to control their risks and provide 24/7 power for AI solutions. In the long run they still want grid connection but see behind-the-meter as a potential bridge to grid solution. This need for 24/7 power has not been an issue for previous high-energy-user bitcoin miners in Texas as these firms did not need to be continually operating in the same way as AI-driven data centers do. This is a new and evolving challenge.

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2. MICROCHIPS GROW MORE POWER-HUNGRY

The focus on reliability in AI-driven data centers means that developers, hyperscalers, and their partners need the most efficient power solutions. This has taken discussion toward natural gas and away from renewables among the early adopters of off-grid solutions.

The rapid evolution of microchip technology will make data centers more power-hungry and puts a new generation of companies in the driver's seat of U.S. data center expansion.

Jon Clark, associate director at property and construction consultancy Gleeds, who has worked in the U.S. data center market for two decades, said technology giants such as Amazon Web Services, Google, Meta, and Microsoft are "no longer the sole drivers" of the marginal expansion of data centers in the U.S. These companies have offered cloud-based software for a long time, underpinned by their own data center infrastructure and powered largely by renewables including solar and wind power until recent market shifts.

He said these companies are now integrating AI within their systems, which means many believe they cannot now rely on the grid because the server racks in their data centers are becoming more power-hungry. Clark said the major drivers of data center expansion will be AI giants including Anthropic, Nscale, Nvidia, and OpenAI as AI becomes more ubiquitous and as they each roll out more energy-intensive microchips.

For example, a traditional data center server rack would run on 5kW–10kW of power, but AI-specialized racks have started to require 50kW–100kW each over the last two years, and this power need is forecast to keep increasing.

This shows that power demand from data centers will grow rapidly: "The chips are driving the power, the cooling, the infrastructure, the sites, where the availability is, where the customers need to be, where the customers are then buying that technology, and where they need to be placed," said Clark. "As more people apply the technology and want to have AI tools then it's the infrastructure that is changing."

He argued that solar and wind farms cannot provide the stable supply of power for this new generation of assets on their own without dispatchable backup, and added that batteries would not be large enough to provide long-term power. He also said no energy technology works perfectly as even natural gas plants need diesel generators as backup, and possibly a grid connection too.

This expansion is bringing with it more regulatory oversight.

In Texas, Senate Bill 6 that passed with bipartisan support and became effective in June 2025 increased the oversight of data centers and other large power users, which it classifies as those with power demands of 75MW or more.

This bill specifies that these major power users must inform ERCOT if they have on-site, nongrid connected backup generation that could serve at least 50% of their power demand, and it can require deployment of that backup power or curtailment of the load during grid emergencies.

It also requires ERCOT to ensure that protocols are developed to allow large loads to be curtailed during load shed emergencies. In addition, it directs the PUCT to establish rules ensuring that large load customers contribute to the costs incurred by utilities to interconnect their loads.

Mothership's Yates said Senate Bill 6 was challenging for developers and market participants in Texas as the state is introducing new rules while simultaneously working through projects that are currently in its grid interconnection queue: "ERCOT is trying to implement Senate Bill 6 requirements at the same time as projects are still needing to move through. It is not possible for the market to shut down while these rules are developed and implemented," she said.

This challenge is driving a growing interest in off-grid data center power solutions as these solutions may help market participants reduce regulatory risk: "If you find a process that has less regulatory intervention then the larger and more sophisticated companies, the hyperscalers, can spend money to dig into that… This interconnection-limbo is driving alternative strategies."

She said there is still appeal in renewable generation projects that are advanced in the interconnection queue as these tend to be the most advanced power assets, but that all large electricity users in Texas were exploring options including renewables and gas.

Renewable Capacity Factors

Jupiter Island's Perri III said rapid advancement in microchips means they are no longer the main barrier to growth in data centers, as they were two years ago.

"In 2024, the biggest scaling constraint to adding digital infrastructure was chips, and so you saw concerns around chip supply chains and shortages. What we've seen over the last couple of years is that movement from chips being the primary scaling constraint to power generation being the primary scaling constraint," he said. "Because wind and solar can only provide at best 20%–35% capacity factors, there's a lot more interest in dispatchable generation, which in the near term can only be provided by natural gas."

He said such capacity factors limit the role of renewables in the growth of data centers in Texas because developers would need vast and remote sites for solar or wind farms.

"Let's take a nominal 1GW type of power plant in natural gas. You can build that on about 40 acres. If you tried to build 1GW of solar, because of the capacity factor of solar, it has to be built on about 5,000 acres. You're very limited on where you can build it because you would typically only find 5,000 acres available in very remote locations, and then you also tend to run into grid constraints. The AI data centers would generally prefer to be located near metro areas where there's a critical mass of fiber infrastructure, so it becomes difficult to power those facilities exclusively with wind or solar," he argued.

Perri III added that the capacity of battery storage means it is of limited use too: "Even if you put batteries in conjunction with solar or wind, you're typically only getting about an hour of storage and dispatch from what we've seen in terms of cost-effective utility-scale battery options. That doesn't really solve the issue."

Off-grid data center developers could over-build their renewables generating capacity to ensure there is no disruption to their operations, but this is frequently impractical today — although evolutions in areas including battery technology could change these dynamics.

3. REGULATORY RESPONSES AND PITFALLS

The AI 'gold rush' means data center developers and energy companies are coming under greater scrutiny at both the federal and state level, but that is not necessarily a bad thing. Many of the policy interventions are focused on removing permitting roadblocks and reducing data centers' impacts on other users.

In the last section, we looked briefly at Senate Bill 6 in Texas, a bipartisan law that passed with the goal of protecting the ERCOT grid from disruption caused by large energy users, including data centers, by ensuring those users pay their fair share of grid infrastructure necessary for their connections, and we see no indication it will slow the growth of Texas data centers.

Skybox's Strader said the three purposes of Senate Bill 6 were to manage how large loads interconnect to the grid to ensure that Texans have access to power; to correctly allocate costs for any transmission upgrades; and to mandate how large power loads should turn off in an emergency event.

"We're spending a ton of time working with ERCOT, working with the PUC [Public Utility Commission], and working with other large load users," he said. "It's being run as a very thoughtful stakeholder process, the results of which are probably not going to be firmed up until the end of this year."

He added that this "thoughtful" approach was contrasted with other U.S. states: "I think you've seen a lot of states take much more restrictive approaches without really engaging the industry or understanding the potential benefits, not only economically, but also to their grid infrastructure as a result of these investments in data centers."

In addition, much of the new and proposed statutes and regulation at the federal level focuses on accelerating the growth of data centers to ensure the U.S. can compete in the global AI race.

Key Policy Interventions:

- **Accelerating Data Center Permitting EO:** President Trump issued an executive order on June 23, 2025 to support the "rapid and efficient buildout" of U.S. digital infrastructure by streamlining permitting processes under the Clean Air Act, Clean Water Act, and National Environmental Policy Act. This also emphasized that data centers should not be built using "adversarial technology," such as from China.
- **Decentralized Access to Technology Alternatives Act of 2026:** The DATA Act was introduced to the Senate on January 7, 2026, with a proposal to exempt private off-grid electricity facilities, including those supplying data centers, from regulation by the Federal Energy Regulatory Commission (FERC) and Department of Energy (DOE). It would amend the Public Utility Regulatory Policies Act of 1978 and Public Utility Holding Company Act of 2005, and clarify that off-grid data centers do not have to follow the North American Electric Reliability Corporation's Reliability Standards. Its goal is to help operators avoid the costs associated with compliance.
- **FERC Large-Load Interconnection Rulemaking**: On October 23, 2025, the DOE directed that FERC should standardize procedures for the interconnection of large loads and take "final action" by April 30, 2026. It wants FERC to address the lack of standardized rules over how 20MW-plus loads are interconnected to the grid, and the best ways for off-grid data centers to qualify for expedited permitting processes.

- **Data Center Infrastructure Pact:** In February 2026, the Trump administration was reportedly looking to enter into a voluntary pact with technology and AI giants that data centers should not raise household electricity prices, strain water supplies, undermine the reliability of grids, or load additional infrastructure costs on others. This is likely to drive more interest in off-grid data center power solutions, but has not yet been formally announced by the White House.

Many of these federal regulations are in development, which shows politicians are having to adapt to the AI 'gold rush' almost as quickly as businesses. We expect federal policies to lead to the adoption of supportive policies at the state level too, such as the laws adopted in New Hampshire in late 2025 to allow companies to generate, transmit and sell power without regulatory oversight if their facilities are not linked to the grid.

These interventions are vital to support the grid through rapid AI-driven changes.

Tackling Transmission Troubles

Ralph Rodriguez, business development and industrial sales lead at Legend Energy Advisors, said regulatory clarity and thoughtful market structures will be essential to support the growth of off-grid power as data center demand accelerates.

"Texas offers the ability for data center companies to execute in a market with abundant resources, including natural gas and skilled labor. But the pace of compute-driven load growth is outstripping the traditional grid expansion timeline. Without structural adjustments, reliability pressures will intensify," he said.

Rodriguez added that adaptation is achievable because large data center loads are highly predictable.

"It's important to understand that data centers are large but predictable loads. With the right capital planning, transmission coordination, and control systems, Texas is uniquely positioned to manage that growth."

While acknowledging Texas' rapid renewable expansion, Rodriguez emphasized the importance of firm, dispatchable capacity for hyperscale operations: "It's not a workaround. It's a structural response to a timing problem. Compute capital and customer demand are moving faster than transmission expansion cycles. Developers are being forced to solve for reliability earlier in the process."

Maguette Fall, U.S. transmission lead at Turner & Townsend, agreed that off-grid power solutions are crucial to help data centers co-exist with the grid. She said: "When you have data centers connected to the grid, their scale and operational flexibility introduce new reliability considerations. Significant or coordinated changes in large load profiles can create supply and demand balancing challenges that system operators are actively addressing. For this reason, there are conversations about hybrid and off-grid power architectures that can complement grid infrastructure and maintain system reliability."

There have also been instances in ERCOT where large loads have tripped offline under normal disturbances. This has led to the development of new technical requirements of these large loads to avoid reliability issues as a priority project to complete this year. Those new requirements are the subject of intense stakeholder negotiations as they could potentially impact the economics of grid-connected data center projects.

Brandon Lobb, partner at Troutman Pepper Locke, said one issue for energy companies and data center operators to avoid when setting up an off-grid power solution is to ensure they are not seen as a regulated utility and thus subject to the same rules as those utilities.

“Texas is on the forefront because it deregulated the sale of electricity in the state over 20 years ago and now have many areas where there is no prohibition on selling or self-generating electricity,” he said. This is where a deregulated approach frees up data center operators to work with off-grid energy systems.

4. ADDRESSING COMMUNITY OBJECTIONS

Energy generation facilities, real estate developments, and transmission links often face scrutiny and objections from local communities, and data centers are no exception.

Indeed, earlier we highlighted research from AI group 10a Labs that $64 billion of data center developments in the U.S. had been delayed by “local, bipartisan opposition” as of March 2025, and the voices speaking against these projects have only grown louder. Data center developers and energy companies must therefore find ways to manage objections, and must be aware that communities may increasingly challenge companies over the environmental credentials of their data centers and use of fossil-based power. Communities tend to express concerns about the impact of data centers on energy bills, water resources, vehicle movements, and property values. The federal government has been looking at legislation to reduce the impacts of data centers on power users, and the industry move toward off-grid data centers can at least answer the concern over bills.

Sam Lai, head of development at Sorellis, said the AI-driven data center ‘gold rush’ has brought a level of scrutiny and opposition that data centers have not experienced before: “There’s no getting around the fact that data centers are not super-popular right now,” he said, adding that companies needed to effectively manage their community outreach.

“It goes a long way to getting ahead of the problem if you engage early and often with the local community and the local jurisdiction,” he said. “If you’re coming in with behind-the-meter generation or other mitigation solutions, and proving your economic benefit to the community, that can help alleviate a community’s concerns.”

Jim McMahon, vice president and Practice Leader of the Energy Practice at advisory firm Charles River Associates, said communities are also seeking clarity on whether new data centers will add to their bills by burdening transmission system operators with the costs of building new electricity infrastructure that are then passed on to consumers.

McMahon highlighted differences in approach between vertically integrated power states, where electric utilities own and manage generation, transmission and distribution, and unbundled states, where jurisdictions have broken up these monopolies.

He said some vertically integrated states had created tariffs to shield their other customers from the costs of data center transmission links by directly charging data center customers for incremental infrastructure costs, and creating tariffs to impose exit fees and penalties on data center operators who do not operate long enough. In certain unbundled states, capacity has become tight leading to the emergence of behind-the-meter power

generation solutions that can speed energization of data centers and offer other customers a degree of protection.

McMahon added that off-grid power solutions raised questions about the structure of the U.S. power system long-term.

“Three or four years ago, most data centers were served by utilities via the grid. Then you started seeing more of them getting served by independent power producers (IPPs) but still at grid level, and now you’re seeing this shift towards behind-the-meter. Originally it was the IPPs serving and now utilities are thinking they should be playing in that space too. There are interesting questions around are we moving towards a confederation of microgrids with the utilities as grid operator and connector, or do utilities retain dominance from the power supply side,” he said.

Data center developers and operators are frequently looking to remote locations such as West Texas where there is access to gas and fewer people thereby avoiding the need to manage community reactions to their projects as this potential transformation of the U.S. grid takes shape.

Alternative On-Site Solutions

Other technology solutions to pair energy generation with AI processing facilities could also ease pressure on the grid. One is from Rune, which set up in 2023 to roll out modular data centers that can fit within the footprint of an existing solar or wind farm, and are powered with only the excess electricity generated by that facility. This is a different approach from huge power-hungry, always-on data centers, and one that could also bolster grid stability.

Will Layden, co-founder and chief executive officer at Rune, said the company currently has three operational sites: one at a Texas solar farm, one at a solar farm in the Atacama Desert in Chile, and one at a wind farm in Sweden.

“We operate the data centers and make money by selling computing power focused on the most energy-intensive workloads: one is bitcoin mining and another is AI workloads like inference,” he said.

Rachel Sacknoff, head of commercial strategy at Rune Energy, who previously worked at investment giant Macquarie alongside the team that owned Aligned Data Centers, said modular on-site data centers would boost the stability of the grid and help communities by using curtailed power: “We enhance grid operations because, as we consume curtailed power, there’s less congestion at the point of interconnection,” she explained.

This solution is complementary to off-grid data centers rather than a competitor to them, and shows there are technological innovations that enable data centers to reduce strain on the grid rather than add to it. This should help the sector’s credibility with communities.

5. WORKING WITH CREDIBLE PARTNERS

The interest in building off-grid data centers in Texas and other markets would likely ramp up already intense competition among data center developers, energy providers, and their partners through the energy supply chain. This will cause a challenge for companies to find credible and creditworthy partners to work with and deliver successful projects.

For example, data center providers and energy companies want to know that their chosen partner will be there long-term, and that they are working with reliable partners across the supply chain, including turbine suppliers. Switzer from Sorellis said competition is fierce in the market and she expected some companies to fail, meaning that robust due diligence is essential.

She explained: “They are having to take qualified risks to become relevant in the market because everyone else is going to get ahead of them and capture the customers.”

This means it is vital for firms to know the track records of their potential partners: “You’re buying people not parcels of land, because it is the people that are responsible for delivering the power and making sure those sites are going to work… You want to go through your checks, and with any first-of-a-kind equipment you want it proved out.”

McMahon from Charles River Associates agreed that finding creditworthy counterparties was key to ensuring the success of off-grid data centers. For utilities, this means they will naturally lean towards hyperscalers and are “a little more concerned about developers that aren’t credit-worthy and don’t have a clear line of sight to off-takers.”

This is a challenge for data center developers because they are often securing the permits they need to develop sites at the same time as trying to find an off-taker for their compute power. He said energy groups could gain confidence by insisting development partners make a financial investment up-front or enter a contractual arrangement to show they are serious.

Building an off-grid data center presents a unique scenario involving generation being stranded without a means to export electricity to the grid and a load without the means of importing power from the grid to that location. Such off-grid data centers require significant investment, and both the tenants and developers will need to rely on the ability of the other party to execute on their commitments. Companies could also check if a potential partner is creditworthy by seeing if they have an investment-grade credit rating with the likes of Standard & Poor’s, Moody’s or Fitch, although this may curtail opportunities for smaller players who are less likely to have these ratings.

Considerations about partner creditworthiness are especially important for off-grid data center projects because there is no grid as a fallback for power procurement.

Brandon Lobb, partner at Troutman Pepper Locke, said this underlines the importance for energy companies of working with credible and creditworthy counterparties: “I can’t go and build a gigawatt-scale power plant unless I know I’ve got a creditworthy counterparty. There can be a ton of issues, land, fuel, air permits, etc, and developers need to know they’ve got a partner who can handle those issues so the developer can go and build the power block for that campus,” he said.

Reliability in the Supply Chain

The rapid growth of data centers to serve increased demand for AI is driving high demand for natural gas generators, which is also putting pressure on companies in the supply chain. Perri III said companies developing and powering off-grid data centers could struggle to secure the gas generators they need from a sector that was already under pressure.

He explained: “Even if you remove the AI demand, dispatchable generation was vastly underbuilt in the U.S. for years, and you add to that markets like Texas are rapidly growing with population growth, reindustrialization and electrification, including electric vehicles. You already had a generational challenge before AI came to the fore.”

As a result, he said the availability of gas turbines and reciprocating engines would be a constraint on the scale-up of data centers, and that small modular nuclear reactors don’t “provide a near-term solution except for maybe some unique cases”.

Off-grid data center developers need to ensure they work with reliable partners that are going to be there long-term. Carrying out effective due diligence on any potential partners and suppliers can make a difference between getting projects off the ground or not.

CONCLUSION

The Trump administration and U.S. states are making regulatory changes that they expect to unlock the growth of AI without further destabilizing grids. This is likely to make off-grid data centers a more attractive proposition in the years ahead.

However, we have seen in this report that there is a trade-off. Renewables can be faster to interconnect and more environmentally friendly than natural gas, but interviewees have highlighted a current industry preference for gas for certain data center applications.

The attractions of off-grid data centers could also include greater reliability, protection from grid instability, exemption from operational requirements from grid connections, faster permitting, and avoiding community relation issues. In due course, this may support commercialization of small modular nuclear reactors.

The key for data center developers and energy companies is reliability. Ensuring the data centers can work as close to 24/7 is vital and while the demand for power remains high, there appears to be little interest from data center operators in the arbitrage opportunities of selling excess power through a grid connection, as this would distract from their main business and potentially open them up to more regulation.

Carl Bivens, partner at Troutman Pepper Locke, said that reliability is essential because “all hyperscalers are racing to be at the forefront of AI development, and they’re pushing hard to get as much power capacity and as many data centers as possible.” But this pressure to roll out new facilities must be balanced against achieving reliable operations at the data centers they do roll out because a large facility can cost over $1 billion to build.

“You are talking $1 billion per data center, and then you talk about campuses with five, six or seven data centers,” he said. “For the hyperscalers, it is a case of reliability first, second and third. They want to know the power is going to be on however and whatever, and that takes a very substantial investment but the hyperscalers say: ‘We’re good with that.’”

The ways that data center operators power their rapidly expanding and increasingly-high-powered facilities are changing, and off-grid systems powered by natural gas currently look like an attractive option for many in Texas. But whether they use gas, renewables with battery storage, or new nuclear technology, the main goal is to deliver

stable projects in a fast-changing market.

This AI ‘gold rush’ can be exhilarating and daunting in equal measure, but the onus is on companies to make smart decisions. Troutman Pepper Locke is available to help you navigate the challenges and opportunities in this crucial sector.

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