

Working Paper – Second Edition

Policy Approaches for Environmentally Responsible Data Center Growth in North Carolina



**Data
Driven
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Executive Summary

Data center growth and development are accelerating throughout the US and in North Carolina, creating an important window of opportunity for state policymakers to balance economic growth with climate and environmental stewardship and ensure that every resident benefits from this transformation. As data center policy continues to evolve, North Carolina can establish itself as a leader in environmentally responsible data center development. State policymakers can work with existing tools and approaches to address specific concerns related to data centers or learn from proposed approaches from other parts of the U.S.

This policy brief examines five policy approaches and industry trends that state policymakers should consider to align data center growth with climate and environmental objectives:

Electricity Tariff and Program Design can incentivize load flexibility and clean energy investment. State governments, regulators, and utilities can draw on a long history of rate and program design to develop approaches that align data center, utility, and state goals. Utilities in North Carolina are beginning to engage with special tariff design and programs for large load customers. State governments and regulators could consider how to encourage greater use of these tools.

State Legislation offers a more targeted and flexible approach for aligning data center development and operations with climate and environmental goals. Twenty-two states introduced bills aimed at limiting the environmental impacts of data centers in 2025, demonstrating a wide variety of tools available to state legislators. Two states – Minnesota and Texas – have enacted comprehensive legislation. With more bills being introduced and evaluated in 2026, this represents a growing policy area. In May 2026, North Carolina state house members introduced regulations targeted towards the energy and community impacts of data centers as part of the larger Ratepayer Protection Act, and individual legislators have proposed bills focused on data centers alone.

On-site Energy Development has been proposed by state policymakers and data center developers as a solution to long interconnection queues and cost impacts on ratepayers. Particularly common in rural regions, companies have begun co-locating modular data centers (e.g., manufactured off-site) with on-site natural gas power generation, energy storage systems, enhanced geothermal systems, or renewable

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resources, specifically solar and wind. In 2025, seven states introduced or passed legislation aimed at incentivizing on-site, off-grid power generation at data centers. Whether these bills include incentives or requirements that this off-grid power come from clean energy sources influences the environmental impact of these emerging combined data center and energy facilities.

Air Quality Permitting provides oversight of on-site backup electricity generation, which typically consists of diesel generators emitting hazardous pollutants. While most data centers currently limit the operations of these generators, policymakers must carefully consider how encouraging load flexibility policies might increase emissions from backup generators. Only five data center campuses in North Carolina are regulated by air permits, suggesting potential gaps in these regulations.

Data Transparency Requirements address critical information asymmetries that limit effective policymaking and our ability to understand the climate and environmental impacts of data centers. Given the history of limited reporting on data center development and operations, data transparency requirements are emerging as one of the most popular policy areas in other states and have garnered bipartisan support. North Carolina's current laws are lenient on transparency in economic development and the state has no specific reporting requirements for data center operations.

Introduction

The unprecedented growth in data centers due to investments in artificial intelligence (AI) technology is anticipated to transform the energy landscape of the US. In 2023, data centers accounted for 4.4% of total electricity consumption in the US.¹ Although electricity load growth in the US has remained steady over the past decade, data centers are forecasted to contribute to a significant increase in energy needs throughout the country despite uncertainty around the extent of this load growth.² Most recently, BloombergNEF reported that electricity demand from data centers could increase by 324% between 2024 and 2035, with these numbers increasing 36% from a forecast seven months prior in April 2025.³ Duke Energy's 2025 Carolinas Resource Plan projects that system annual net load will increase by 38% between 2026 and 2040 under a moderate growth scenario, much of which is driven by data center projects.⁴

The realized and predicted growth of the data center industry has triggered concerns about the impact of data center electricity consumption on climate change and local environmental conditions. In California, greenhouse gas emissions and water consumption from data centers are anticipated to increase by 49.3 to 133.6% by 2028.⁵ Across the US, the carbon intensity of electricity consumption by data centers is 48% higher than the national average.⁶ The carbon intensity of emissions related to energy consumption will continue to increase with new investments in fossil fuel infrastructure that have been proposed by utilities to meet the energy needs of new data centers, particularly in the Southeast.⁷ In response to concerns that their high demand will increase costs for ratepayers, developers are also building data centers "off-grid" with on-site renewables and/or natural gas generation.^{8,9} With current technologies, behind-the-meter renewable options alone are not sufficient to provide reliable energy and trend towards being more expensive than natural gas alternatives.¹⁰ The carbon intensity of emissions from energy consumed by data centers that receive their power from on-site natural gas is much higher than emissions from grid-supplied energy that comes from a mix of renewables and fossil fuels.

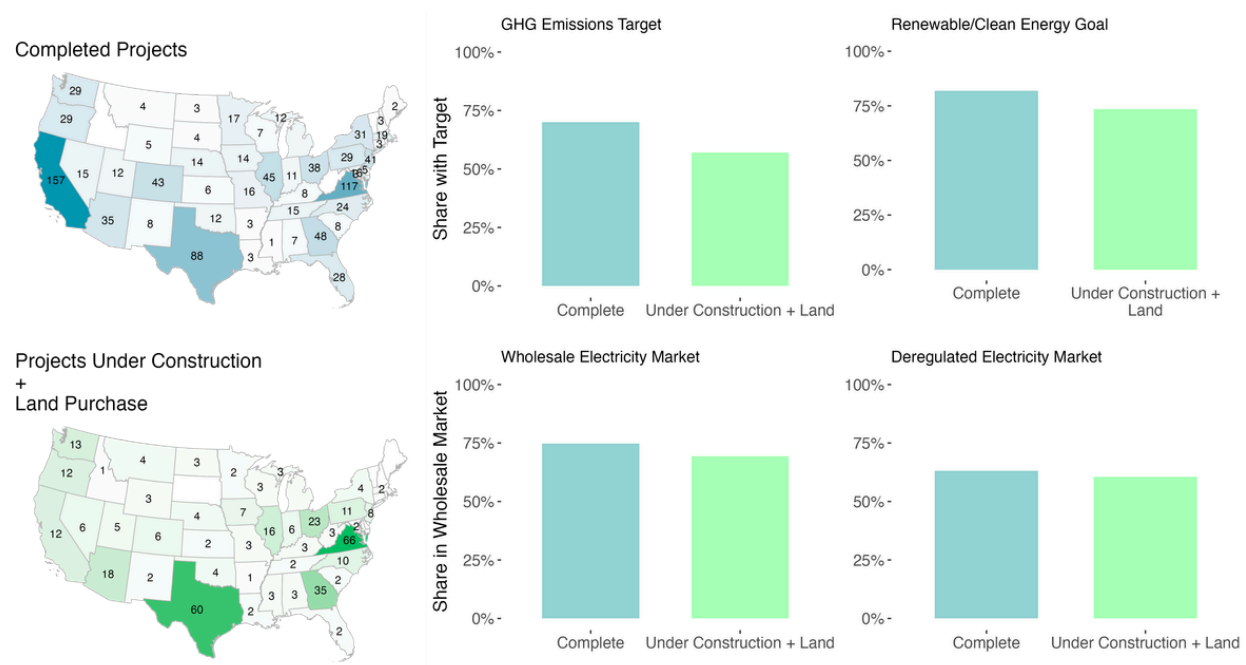
Data centers can also exacerbate local air quality and public health issues through the emission of particulate matter from co-located natural gas power plants and backup diesel generators. Although the focus of this memo is on the environmental impacts of energy consumption from data centers, other data-center-related activities such as

high water consumption, electronic waste generation, land use modifications, and construction-related traffic may have detrimental local environmental impacts.¹¹ Although early research and industry reports suggest that the environmental and climate impacts of data centers may be significant, evidence remains limited due to the lack of transparency in reporting on data center operations. There are a number of ways in which data centers can reduce the climate and environmental impacts of their energy consumption, including:

- **Grid decarbonization:** Investing in or advocating for new carbon-free energy generation and storage that can displace the use of fossil-fuel energy for meeting data center loads
- **Flexibility:** Shifting data center activities temporally or geographically to align with energy supply from clean and renewable sources
- **Efficiency:** Implementing approaches to reduce the amount of energy required to perform the same amount of work
- **On-site clean energy generation:** Reducing reliance on fossil-fuel-based backup generation and installing clean energy resources behind the meter
- **Siting decisions:** Developing data centers in places with more existing and planned clean and renewable energy generation

Across the US, we find that data center investments from large tech companies are moving away from states with climate and renewable energy goals and towards traditionally regulated, vertically integrated electricity markets. This suggests that places with new data center investments may have fewer tools already in place for managing the climate and environmental impacts of these facilities. State policymakers, local governments, and utility regulators in states where data centers are moving, like North Carolina, have a critical opportunity to implement policies that can limit the negative environmental impacts of data centers, while ensuring continued economic investment and the reliability of energy systems in their state.

Figure 1 Distribution of Data Center Projects from Major Technology Companies Stratified by Campus Status



Drawing on emerging literature, previous cases, and data on data center campuses from five major tech companies across the continental US, we review a set of policy tools that can be leveraged to incentivize data centers to take actions that limit the climate and environmental impacts of their operations, including electricity tariff and program design, data transparency requirements, state legislation, onsite energy development, and air quality permitting. In each section, we briefly discuss North Carolina's current level of engagement with these policy tools.

1. Electricity Tariff and Program Design

Incentivizes: Flexibility and Grid Decarbonization

Implementing Authorities: Utilities and Utility Regulators

The use of special electricity tariffs and programs designed for data centers is an emerging approach for encouraging load flexibility for data center electric customers and investment in utility scale clean energy generation.

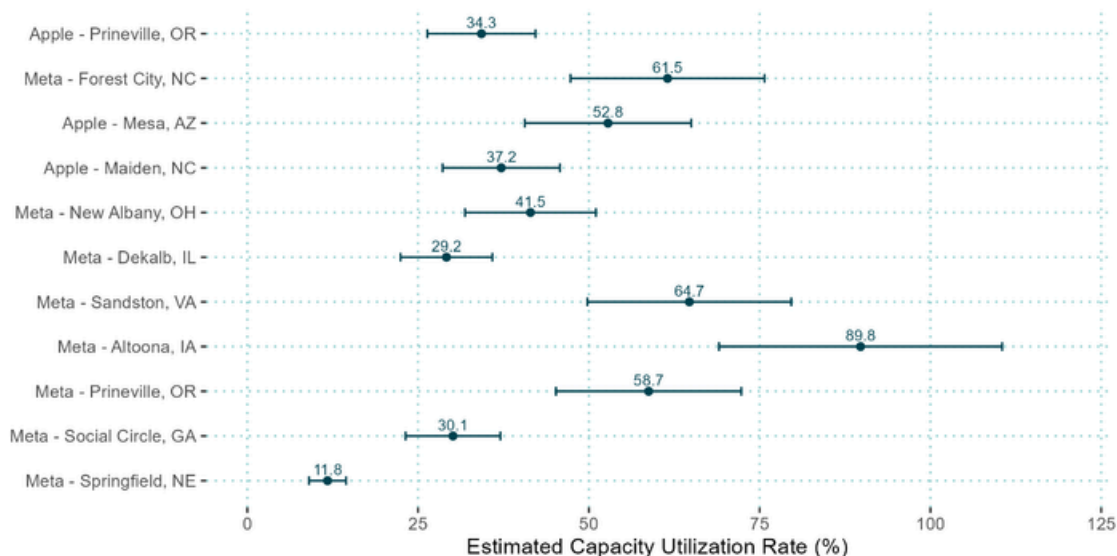
Load Flexibility

Demand side management programs for large commercial and industrial customers are a longstanding approach for electricity providers to ensure grid reliability and reduce operational costs while serving large electric loads. Although load flexibility for data centers has typically been discussed as a method for ensuring grid reliability and reducing costs to customers by shifting load away from peak hours, these approaches can also achieve climate benefits when coupled with pricing and reliability signals.¹² Historically, data centers have had limited engagement with demand side management approaches and are perceived as inflexible loads that operate consistently at full capacity and require uninterrupted power supply. Despite this perception, evidence indicates there is an opportunity for data centers to adjust their energy consumption given the right incentives.

In 2024 the Department of Energy reported that spatio-temporal load flexibility is technically feasible for data centers, based on stakeholder feedback from hyperscalers and other technology providers.¹³ Additionally, the actual operational time of servers in data centers varies substantially by data center type: AI training servers are estimated to be operational between 75-85% of the time, while servers at other types of data centers – including hyperscale, colocation, and enterprise – may range between 20-60%.¹³ These numbers align closely with overall capacity utilization rate estimates, including both servers and other electricity needs, for 11 data center campuses owned

by Meta and Apple, where both company-reported electricity consumption and backup electricity generation capacity for 2024 were available at the campus level.

Figure 2 Estimated Capacity Utilization Rates for Apple and Meta Data Center Campuses^a



States, utilities, and data center developers are beginning to engage with two well-established tools to encourage load flexibility from data centers: special large load tariffs and demand response programs. Following a March 2026 update, twenty-five states have approved at least one large load tariff (greater than 1 MW), and another four states have pending large load tariffs.¹⁴ Approximately half of these tariffs include provisions intended to incentivize customers to manage load and support clean energy objectives, such as time of use pricing, interruptible service agreements, or clean energy riders.¹⁴

a. Notes on Figure 2:

- Permitted backup generation comes from state air permitting documents for each facility, obtained directly by DDL or included in the Business Insider Database.
- 2024 electricity consumption comes from each company's annual sustainability reports.
- The upper and lower bounds of the capacity utilization rate for each campus are estimated using assumptions on how backup generation redundancy relates to maximum campus load. The upper bound is estimated assuming the full load capacity of the data center is 50% of its backup generation capacity, while the lower bound assumes full load capacity is 80% of its backup generation capacity.

There are a handful of recent examples of efforts to demonstrate the feasibility of flexible operations at data centers and develop utility-side programs to incentivize flexibility and load curtailment. In late 2024, the Electric Power Research Institute (EPRI) launched a 3-year initiative engaging with both data centers and energy industry stakeholders to develop 10 data center load flexibility field demonstrations, focusing on developing the operational capabilities of data centers and utility program design.¹⁵ By February 2026, EPRI had started six additional DCFlex active demonstration sites across the U.S. and EU.¹⁶ Google is reported to have completed a demand-response pilot with Omaha Public Power District and signed demand-response agreements with Tennessee Valley Authority and Indiana Michigan Power.¹⁷ However, additional details on the pilot demonstrations and demand-response agreements are currently lacking. Collaboration between stakeholders is key to successful implementation of demand-response program design, as the data center industry has continued to oppose proposals for voluntary or mandatory demand response.^{18,19}

Electricity Tariff and Program Design for Load Flexibility in North Carolina

Special Electricity Tariffs: North Carolina has two electricity tariffs designed for large-load customers, with one for Duke Energy Carolinas customers and one for Duke Energy Progress customers with similar characteristics. In both cases, non-residential customers with a minimum demand of 1 MW located at a single site are eligible. The demand charge for this rate, which is calculated as the maximum recorded demand within the current billing cycle (with a minimum of 1 MW), is relatively higher than other large customer tariffs. These rates do not include any provisions to support energy transition objectives.¹⁴

Demand Side Management Programs: Duke Energy and Google are participating in one of the first EPRI DC Flex field demonstrations, with the pilot focusing on IT Workload Flexibility. There are no additional details available on this pilot. Preliminary results were anticipated to be released in fall of 2025 but are not yet available.^{20,21}

Electricity Tariff and Program Design for Load Flexibility in North Carolina

North Carolina Energy Policy Task Force: Established through Executive Order No. 23 in August 2025, the Task Force released its interim report in February 2026, outlining nine preliminary recommendations to address the rapid growth in electricity demand, largely driven by data centers. These recommendations include exploring the adoption of large-load tariffs, allowing large-load customers to directly procure the energy resources they require, expanding sales tax exemptions, and promoting demand-side management strategies such as load flexibility. A more comprehensive final report is expected in February 2027.²²

Clean Energy Electricity Generation Investment

Electricity rate and program design can also be used to support accelerated investment in grid decarbonization, especially in states with traditional utility regulation such as North Carolina. “Green tariffs” and “green power products” allow utility customers to support utility investments in renewable and clean energy through optional special rates or voluntary program participation. Green tariff options first appeared in the mid-2010s but have gained renewed attention for their applicability to data centers and other large load customers.^{23,24} Most program designs targeted at large electricity customers enable program participants to receive credits or certificates that can be used to meet their voluntary climate goals. Programs that provide hourly certificates or credits are more likely to have an impact on system-level emissions compared to those that provide annual or monthly credits. Programs that provide hourly environmental attributes will also be set up to align with forthcoming changes to protocols for estimating the greenhouse gas emissions associated with electricity consumption and enable companies to move towards voluntary 24/7 carbon-free energy goals.^{25,26} These programs can also incorporate provisions that ensure fair cost distribution between customers and mitigate financial risks of large loads that don’t materialize, such as minimum load requirements, contracted capacity, and exit fees, among other mechanisms.²⁷

Other recent innovations in green tariffs and power product designs allow large load customers to identify clean energy resources and bring them online where they are operating. Recent examples of green tariff design for large load customers include:

- NV Energy's Clean Transition Tariff: Enables NV Energy and eligible customers to establish long-term "energy supply agreements" where NV Energy purchases electricity from a third-party clean energy resource and the contracting customer claims the hourly energy attributes from that resource.²⁸ This tariff was specifically designed to enable Google to invest in and receive credits from a 115-MW geothermal project in Nevada to offset electricity at one of its Nevada data center campuses.²⁹ This tariff design allows large utility customers to offset the cost of higher-price clean energy resources that the utility would not otherwise have been able to invest in under least-cost utility regulations.
- Georgia Power's Clean and Renewable Energy Subscription (CARES) Program: In the CARES program, Georgia Power commercial and industrial customers purchase a subscription to receive a pro-rata share of hourly renewable energy credits from utility-scale renewable energy resources obtained through requests for proposals issued by the company. In the 2025 Integrated Resource Plan Update, Georgia Power received approval for 1,068 MW of new solar PPAs under CARES, and expanded its subscription program to procure 2,100 MW of renewable resources and enable potential subscribers to support their preferred clean energy projects by "buying down" the price of project bids in the traditional RFP process or work with developers to submit bids for clean energy projects if subscription program needs are not met through the traditional RFP process.^{30,31}

Electricity Tariff and Program Design for Clean Energy Investment in North Carolina

Under Duke Energy's "Green Source Advantage" Program, customers with at least 1 MW of annual peak demand may identify a renewable energy supplier to bring onto Duke Energy's grid through the program.³² This supplier enters a power purchase agreement with Duke Energy and the customer receives annual Clean Energy Environmental Attributes from energy delivered by the supplier. The original version of the program, approved in 2019, limited total program capacity to 600 MW across North Carolina, with 250 MW reserved for the UNC system and 100 MW reserved for military installations.³³ In 2024, the North Carolina Utilities Commission (NCUC) approved an update to the program called "Green Source Advantage – Choice," which would increase program capacity up to 4,000 MW total across both DEP and DEC in NC. Under the terms of the updated program, clean energy and environmental attributes (CEEAs) are retired on behalf of the GSA customer and applied towards the Carbon Plan procurement targets required by North Carolina law (HB 951). This feature has been critiqued by environmental advocates in the state, as it would essentially enable GSA-Choice program participants to subsidize Duke Energy's compliance with state law, rather than provide additional clean energy above and beyond regulatory requirements.^{34,35}

2. State Legislation

Incentivizes: Siting decisions, grid decarbonization, flexibility

Implementing Authorities: State governments

State governments have a long history of providing economic incentives for data centers to locate in their territories, but more recently have turned to legislation as a tool for ensuring that data center operations align with state climate and environmental goals. According to the National Caucus of Environmental Legislators, twenty-two states have introduced bills in 2025 to address the energy and environmental impacts of data centers, although only a small fraction of these bills have been enacted into law.³⁶ By 2026, legislative activity accelerated substantially. More than 300 data center-related bills had been introduced across more than 30 states within the first months of the year, reflecting growing concerns regarding electricity demand growth, grid reliability, water consumption, and the allocation of infrastructure costs.^{37,38} State legislators in Virginia, which leads the US in data center development, introduced 33 bills related to the regulation of data centers, although only 13 were enacted. For the following discussion, we specifically focus on bills designed to align data center development with state climate and clean energy goals, although state legislation has been introduced across a variety of other topics, including ratepayer protections, siting, and transparency.

Of the 200 data center-related bills identified by NCEL in 2026, 37 bills across 17 states include specific provisions intended to align data center operations with clean energy and climate goals. These bills typically create new obligations for data center owners and operators (or large load businesses), utility regulatory bodies, utilities, or state agencies. In most cases, these provisions are coupled with rules for other data-center-related issues, such as utility ratepayer protections, siting, and transparency requirements. Two of these bills have been passed into state law: Minnesota H.F. 16 and Texas S.B. 6. In both cases, these bills established broader regulatory requirements on the operation of data centers within the state under which clean energy and climate requirements play a smaller role.

- **Minnesota H.F. 16:** Established multiple environmental and energy regulatory requirements for data centers. The bill requires increased scrutiny and oversight of water appropriation projects related to data centers by the Board of Water and Soil Resources, enhances oversight of the Minnesota Public Utilities Commission over electricity tariffs between public utilities and very large customers, directs public utilities to develop clean energy and capacity tariffs for commercial and industrial customers, and establishes a fee for qualified, large scale data centers that will be used to support energy conservation and optimization in the state.
- **Texas S.B. 6:** This bill focuses on ensuring grid reliability in Texas while meeting anticipated data center driven load growth. In addition to ratepayer protection and transparency requirements, the bill establishes a requirement for load curtailment from large load customers in times of shortage. While this requirement could avoid additional investment in fossil-fuel generation on the grid, it also poses a risk of increased reliance on behind-the-meter fossil-fuel based backup generation.

Other bills have established a variety of policy mechanisms that could be used to encourage alignment of data-center operations with climate, environmental, and clean energy goals:

- Linking facility qualifications for tax, utility, or other state incentives to climate goals, clean energy, energy demand management, or efficiency (Colorado SB25-280, Kansas S.B. 81, Texas S.B. 2888, Virginia S.B. 1196, Virginia H.B. 2578, California AB-1095, New York S.6394A, Texas H.B. 3970)
- Specifically authorizing and directing utility regulatory bodies or other state agencies to evaluate large load customer applications based on the alignment of the application with state climate, environmental, or clean energy goals (Delaware S.B. 205, Virginia H.B. 2027, Virginia S.B. 1448, Maine L.D. 912)
- Establishing energy and water efficiency requirements for data centers or large load facilities (Connecticut H.B. 5076, West Virginia H.B. 2418)
- Requiring utilities or utility regulatory bodies to establish separate rates for large load facilities that align with climate and energy goals (Delaware H.B. 233)
- Requirements for all or a set portion of energy supply for data centers or large load facilities to come from clean or renewable energy sources (New Jersey S. 4143)

On December 11, 2025, President Trump issued an executive order requiring that state AI laws align with federal objectives and that current state AI laws will be evaluated for conflicts.³⁹ While it is not yet clear if this order is enforceable, it is important to note that the bills and laws discussed in this section have not yet been evaluated for alignment with this Executive Order and it is still unknown how the order would affect the use of state legislation related to data center climate, energy, and environmental impacts.

Data Center-Related State Legislation in North Carolina

To our knowledge, the North Carolina legislature has not introduced or enacted any bills explicitly aligning data center operations with state climate or clean energy goals. In April 2025, one bill was introduced intending to prohibit utilities from passing costs for serving data centers to other customer classes.⁴⁰ No action has been taken on this bill since April.

In 2026, two bills were introduced to address the environmental, energy, and affordability impacts of hyperscale data centers, though neither makes a direct connection with state goals. Drafts of SB 730, first filed in March, supplement the 2025 bill's rate requirements by banning local government incentives for data center construction and requiring closed-loop cooling systems and noise impact assessments for facilities that use over 100 MW of power.⁴¹ HB 1063 from April introduces similar rate and water efficiency requirements and bans local government incentives; additionally, it mandates that new data centers generate at least 25% of their electricity using on-site renewable energy.⁴² As of June 2026, SB 730 returned to the Senate for concurrence, while HB 1063 remained pending in committee.

Data Center-Related State Legislation in North Carolina

- North Carolina does have several climate and energy-related goals established in law, including House Bill 951 which set state carbon dioxide emissions reduction targets for 2030 and 2050 and required regulated utilities and the NCUC to report on plans to align with these goals, although the 2030 interim target was repealed in 2025 with Senate Bill 266.^{43,44} Additionally, SB 730 would require further study of the affordability impacts of the 2050 target and recommendations for policies that limit the cost impact of large load consumers, potentially impacting the longevity of current goals.^{45,46} North Carolina also has a clean energy and energy efficiency portfolio standard, which expanded on the former renewable energy portfolio standard in 2023.⁴⁷

3. On-Site Energy Development

Incentivizes: Siting decisions, grid decarbonization, flexibility

Implementing Authorities: State governments, utilities and utility regulators

In response to growing concerns from constituents around rising electricity prices, policymakers, utilities, and data center developers have begun proposing off-grid, on-site energy development to reduce the impact of these large load facilities on the grid. The increasing use of modular data center designs with multiple small computing facilities manufactured off-site has allowed for the construction of data centers in locations previously considered cost-prohibitive or logistically inaccessible. These types of data centers have been built with on-site fossil fuel and clean energy generation at existing power plants and in rural areas with ample solar and wind energy resources.

In the late 2010s, many cryptocurrency mining companies chose to locate their modular facilities on or adjacent to existing natural gas and coal power plants. As the need for AI computing power continues to grow, companies like BitFarms (now Keel Infrastructure) are transitioning their existing facilities and business model towards AI services.^{48,49,50} This has resulted in the growing prevalence of modular data centers, similar in appearance to cryptocurrency mining facilities, at fossil fuel power plants. The majority of these conversions we identified have occurred in midwestern states like Pennsylvania.

Because these facilities are replacing existing computing infrastructure, the full scale of their net environmental impact is difficult to quantify. However, while these conversions may not result in a net negative environmental impact, they lead to continued reliance on fossil fuel power that inhibits state and national-level progress towards net-zero energy goals.

- **BitFarms and T5 Data Centers Facility in Panther Creek, PA (DDL ID PA32):** In 2025, BitFarms (now Keel Infrastructure) announced plans to convert their cryptocurrency mining operation at the former coal-fired Panther Creek Power Plant in collaboration with T5 Data Centers. The availability of transmission infrastructure tied to the power plant allowed the facility to come online faster with a guaranteed 350 MW capacity from the grid. While the site previously housed a power plant, it is unclear whether on-site power generation will continue to support the facility.^{51,52,53}
- **MARA Data Center in Granbury, TX (DDL ID TX103):** This facility was originally built as a data center for US Bitcoin Corp at the Wolf Hollow Generating Station before MARA purchased the site and converted it into a traditional data center in 2024.⁵⁴ The on-site power plant is natural gas-powered and provides energy to both the grid and the MARA data center.⁵⁵

In addition to cryptocurrency-AI conversions, data center developers have also targeted existing power plants for development, either by building data center facilities on-site or, in some cases, repurposing previously closed facilities to power their data centers. This trend has also been most common in midwestern states where stranded coal assets are more common.

When these data centers are built on existing grid-connected power plants, they may lead to indirect environmental impacts because of their strain on the grid. While

community opposition may be lower because they are being sited in areas with existing industrial development, these large load facilities will have the same net impact on the grid as a data center located elsewhere, taking power that would otherwise go to residential and commercial ratepayers and potentially requiring the construction of new fossil fuel infrastructure to handle peak load.

In cases when these data centers are built in conjunction with the repurposing of a defunct power generation facility, the strain on ratepayers is lessened because all of the power from this plant will go directly to the on-site data center. However, by reopening old fossil fuel infrastructure, the energy consumption of these data centers leads to worsening local air quality and increased carbon emissions. Furthermore, because all of the energy powering this data center will be sourced from fossil fuel sources like natural gas, the carbon intensity of the emissions from the data center's electricity consumption will be much greater than those from a data center whose power comes from a grid that is partially powered by clean energy resources.

- **Homer City Redevelopment Project in Homer City, PA (DDL ID PA26):** The coal-fired Homer City Generating Station was opened in the late 1960s before being retired in 2023. In 2025, as demand for energy to power data centers nationwide grew, Homer City Redevelopment announced the signing of a contract with Kiewit, a construction company, to build a natural gas-fired power plant and hyperscale data centers on the site. In its announcement, the company claims that the new natural gas-powered facility will emit 60-65% less CO₂/MW compared to the former coal plant and deliver up to 4.4 GW to the on-site data centers.^{56,57}
- **Xcel Energy**, another energy developer, is planning similar projects to reopen previous coal-fired power plants as natural gas and/or renewable-powered sites for hyperscale data centers in Texas, Minnesota, and Colorado.⁵⁸

In addition to data centers near large natural gas and coal-fired power plants, companies are building modular and full-scale facilities with on-site natural gas power in rural areas throughout the Western U.S. In our dataset, these facilities are most common in Montana, North Dakota, Wyoming, and Texas, all states with more lenient permitting requirements. Crusoe, a company that markets itself as "the industry's first vertically integrated AI infrastructure provider,"⁵⁹ has built or announced some of these data centers with the greatest amount of media coverage.

- **Crusoe and Tallgrass Data Center in Cheyenne, WY (DDL ID WY21):** In 2025, Crusoe and Tallgrass announced plans to build a data center with up to 2.7 GW of on-site natural gas power generation south of Cheyenne, WY.⁶⁰ This facility is designed to eventually support up to 10 GW of capacity and will also require energy from the grid. Earlier this year, Crusoe announced that they were withdrawing from the project due to conflicts with the customer that would eventually be using the data center's computing power.⁶¹ However, representatives from Tallgrass have released statements that the project is continuing on schedule.⁶²
- **Stargate in Abilene, TX (DDL ID TX113):** Crusoe began constructing the first Stargate data center for Oracle and OpenAI in 2024 with the facility going live in September 2025.⁶³ While originally designed to rely on grid-supplied energy, Stargate announced plans to construct a natural gas power plant on-site with generating capacity of up to 360.5 MW in January 2025.^{64,65} Additional capacity will be provided by renewable power from solar and battery storage assets built by one of the project's partners, SB Energy.⁶⁶

While many of these rural data centers are co-located with renewable assets, such as solar farms in the case of Crusoe's Abilene facility, the scale of their energy needs necessitates natural gas power as well. Thus, while their rural siting may avoid community opposition and lessen their human health impacts, these data centers also create a net negative environmental impact by adding carbon emissions from fossil fuel infrastructure. A few emerging companies are building and deploying data centers that are entirely powered by off-site renewable assets to address these challenges.

- **Soluna Computing's Project Sophie in Murray, KY (DDL ID KY10):** Soluna has built multiple small and medium-scale data centers throughout the US that are entirely powered by renewable energy. On their company website, they proclaim a mission of "turn[ing] stranded renewable energy into powerful computing solutions for AI, Bitcoin, and more."⁶⁷ Project Sophie is one of their flagship facilities in Kentucky; with 25 MW of capacity, the facility was manufactured off-site before being installed on farmland. It was brought online at the end of 2021.⁶⁸

States have proposed incentives to encourage data center operators to source their energy from renewables in alignment with state climate goals. While the emissions impact of data centers is limited by the fuel mix of grid-supplied energy, developers have proposed investing in on-site or nearby renewable power to offset their energy

demand. While additional capacity from renewables is net beneficial for climate, solar and other clean energy infrastructure will require grid interconnection, thus supplying power to all users, not just the data center developer. This introduces challenges with emissions reduction allocation in Scope 2 accounting because the data center company that funded the clean energy infrastructure is not the sole consumer. To overcome this challenge, states like Illinois have introduced “bring your own clean energy” legislation that provides additional incentives to data centers that are co-located with and connected to new on-grid clean energy infrastructure.

- Illinois H.B. 5513: Among additional requirements for large load tariffs and community benefits agreements, this bill would mandate that all utilities in Illinois use “flexible” and “fast-class” interconnection approaches for hyperscale data centers. These facilities will be required to submit “Clean Energy Supply Plans” outlining plans for current and future behind-the-meter renewable energy resources. Data centers that, among other requirements, prove that at least 80% of their projected load will come from new, grid-connected renewable resources by 2030 receive expedited interconnection. Those that do not meet these requirements are given lower priority in the queue. Additionally, all data centers must submit to utility demand-response measures for any capacity not covered by on-site or procured renewable energy infrastructure.^{69,70}

4. Air Permitting for On-Site Backup Generation

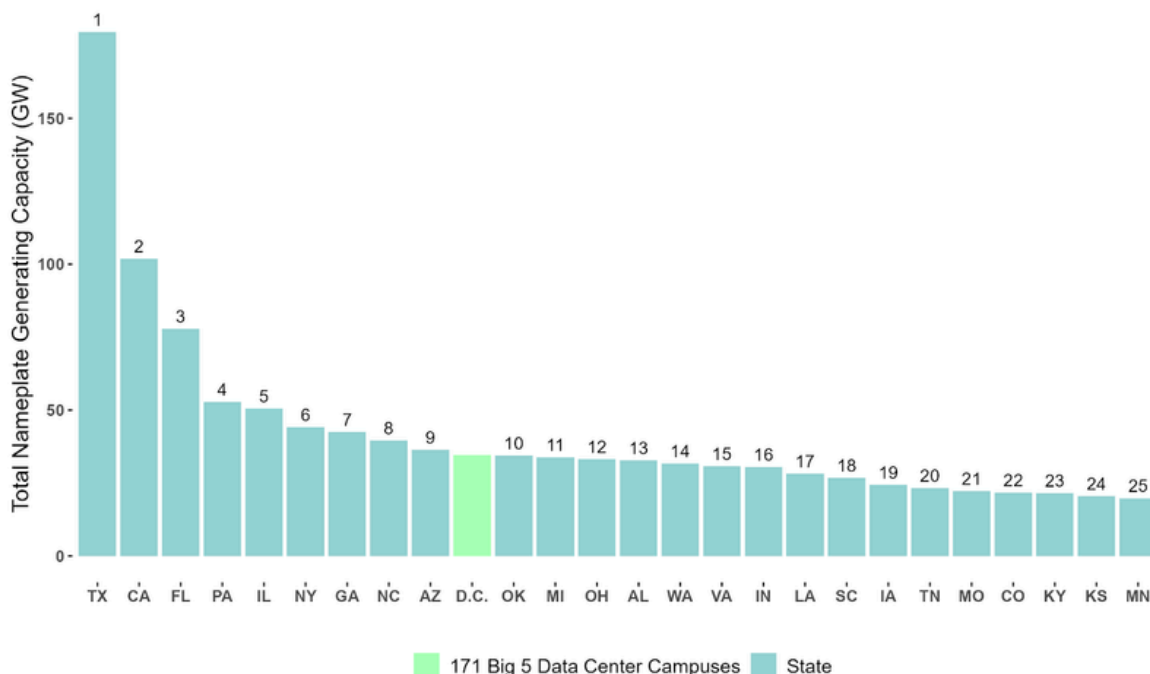
Incentivizes: On-site clean energy generation

Implementing Authorities: State departments of environmental quality, state

High customer-facing reliability is a key component of the business case for many data centers. Since access to electricity is critical for ensuring that servers remain online, most data centers are outfitted with “optional standby systems” of on-site, backup electricity generation. In many cases, backup generation consists of diesel or natural gas generators that emit hazardous air pollutants and are subject to federal and state air pollution regulations. In this section, we discuss the current regulations on fossil-fuel based backup generation, policy approaches for incentivizing data centers to invest in clean energy generation behind the meter, and the risks of increasing reliance on fossil-fuel backup generators in pursuit of load flexibility.

DDL identified air permits for approximately one-third of 263 existing and planned data center campuses from five major technology companies (Amazon, Apple, Google, Meta, Microsoft). The combined capacity of fossil-fuel based backup generators from 171 of these companies’ data center campuses, where generating unit information was not redacted from the air permits, was 34,652 MW. The backup generation from these campuses alone is greater than the total nameplate capacity of electric generating facilities in 41 states and only slightly less than all of North Carolina’s total at 39,630.5 MW.⁷¹ These 171 campuses account for approximately 17% of total data center campuses with air permits identified through public records requests, but nearly 48% of the total permitted backup generation capacity.⁷²

Figure 3 Permitted Backup Generator Capacity at Data Center Campuses Compared to States



Internal combustion backup generators emit both greenhouse gases and common and hazardous air pollutants, such as nitrogen dioxide and diesel exhaust, subjecting them to federal regulation under the Clean Air Act^b and varying state air pollution rules.⁷³ The vast majority of backup generators at these campuses run on diesel, while a small number rely on other fuels for combustion. Data center owners and operators typically obtain air quality permits from state or local agencies for the construction, modification, or operation of backup generators as qualifying stationary sources of air pollution. Although data center campuses often have backup generation capacity rivaling that of utility-scale power plants, many data centers qualify as minor air pollution sources or are exempt from air quality permitting altogether by limiting their operating conditions to system testing and “emergency” situations, such as the failure of on-site equipment or power outages, which place them under the annual hourly and/or emissions thresholds for higher levels of regulation.

Although the concerns around the climate and environmental impacts of fossil-fuel based backup generation at data centers continue to grow, there are challenges associated with moving towards cleaner alternatives. While natural gas generators are increasingly viable and have lower air quality and emissions impacts, they also generate greenhouse gas emissions and create fuel access challenges for operators, as natural gas is not possible to store on site like diesel.⁷⁴ In 2024, industry stakeholders reported little experience with cleaner alternatives to diesel backup generation.¹³ Some backup technologies, such as hydrogen fuel cells and small modular reactors, have been demonstrated as promising solutions, but are still in earlier stages of development. For example, Microsoft successfully demonstrated the feasibility of using hydrogen fuel cell and battery energy storage systems to provide backup services at a Cheyenne, Wyoming data center in 2024.⁷⁵ Using battery energy storage systems alone (BESS) or BESS paired with renewable energy is a relatively more mature technology compared to fuel cells, but data center owners and operators have been reluctant to adopt these systems due to higher costs, space constraints, reliability, and safety.⁷⁵

In some cases, states have even loosened energy permitting requirements to incentivize data center development. Maryland S.B. 474, the Critical Infrastructure Streamlining Act of 2024, changed the state’s definition of “generating station” to exclude on-site backup power generation like that at data centers.⁷⁶ This change

b. In January 2026, the Environmental Protection Agency released updated new source performance standards. The final rules loosened nitrogen oxide emissions standards for most subcategories of combustion turbines, but confirmed that both permanent and temporary stationary combustion or gas turbines, such as those used at data centers, are subject to this federal regulation. ([US EPA, 2026](#), [SELC, 2026](#))

exempts data center backup generators from review by the Maryland Public Service Commission, a review process that is often used to assess whether cleaner energy sources can be used or if all generators at a site are necessary. The bill was passed in response to a 2023 case where the Commission limited the number of diesel generators at a proposed 264-MW data center, ultimately causing a developer to withdraw their application.⁷⁷ Expedited environmental review processes have also been used to incentivize data center construction. In Minnesota, proposed HF28 would exempt data centers from state environmental impact assessments in favor of local, less onerous alternative urban areawide reviews and allow backup generators to be treated as a single source in permits; the bill remains in the House.⁷⁸ Expedited permitting processes eliminate opportunities for stakeholder engagement around potential environmental and grid impacts, and weaker environmental reviews reduce the ability of regulators to make informed permitting decisions regarding local GHG and air pollution impacts. At the federal level, the U.S. EPA has moved in a similar direction. The online “Clean Air Act Resources for Data Centers” hub, launched in December 2025, intended to streamline permitting, including guidance on qualifying as a synthetic minor source and on which activities may begin before a permit is issued, and in May 2026 it proposed redefining “begin actual construction” to allow developers to start more site work before obtaining an air permit.^{79,80}

Regulators and policymakers should be wary of how policy tools that encourage data center load flexibility may increase emissions from on-site backup generators. Current federal rules limit the use of backup generators for non-emergency, load management purposes to 50 hours/year.⁸¹ An EPA decision from February 2025 clarified that this rule allows for the use of emergency generators in utility-run demand response programs, providing regulatory assurance for states and utilities interested in these strategies.⁸² As calls for load flexibility at data centers increase, some states are considering allowing greater use of on-site backup generation at data centers as a concession for flexibility or curtailment agreements.

For example, Texas Senate Bill 6 directs ERCOT to establish an energy emergency alert threshold at which large load customers may be directed to curtail load or deploy their backup generating facilities.⁸³ In other cases, utilities are considering using backup generators as a grid balancing resource, just like power plants on the grid. Since 2023, Georgia Power has established three programs that enable the company to operate generation systems located at customer premises for economic dispatch and not just emergency dispatch.³¹ Additionally, these programs specifically exclude clean distributed energy resources from participation, with only dispatchable distributed energy resources such as “natural gas generators, diesel generators, and other technologies with firm fuel supply” qualifying. Programs and policies like these could significantly increase the hours of operation of fossil-fuel based backup generators at data centers, resulting in higher GHG and local air pollution emissions.

To address the climate and environmental impacts of on-site backup generators, states may consider if current air permitting processes are sufficient to address the operations of backup generators at data centers. Several states have advanced measures to clarify or revise their air quality permitting processes for data centers, primarily through state environmental quality departments:

- In Oregon, a proposed state bill would direct the Environmental Quality Commission to adopt special emissions standards for backup generators used at data centers.⁸⁴ Oregon also offers streamlined permits to data center developers who implement emissions controls or choose lower-emission engines.⁸⁵
- Oregon and Illinois have set a precedent requiring air quality modeling before issuing construction permits for data centers to assess the impacts of generators on local air quality and health risk.⁸⁶
- In 2025, Washington’s Department of Ecology proposed a mandate that all new data centers use Tier 4 engines.^{86,87}
- Illinois’s Clean and Reliable Grid Affordability Act, enacted in late 2025, requires new and modified diesel backup generators at covered data centers to meet emissions standards at least as protective as EPA Tier 4, phasing in with permit applications submitted on or after December 1, 2026.⁸⁸

- Throughout 2025, the Virginia Department of Environmental Quality issued memos addressing air permitting for data centers, such as clarifications for “emergency use,” how to identify and handle multiple data centers in close proximity, and what construction activities are allowed before permits are issued.⁸⁹

Air Permitting for On-Site Backup Generation in North Carolina

Although North Carolina is reported to have over 100 planned, under construction, and operational data center buildings, only 5 data center campuses are covered by state air permits.^{90,91} Four of the five facilities are permitted as Synthetic Minor Sources, while the remaining facility – Google’s Lenoir data center – is classed as Title V. Synthetic minor facilities may meet the potential emissions thresholds of Title V facilities, but accept federally enforceable physical and/or operational limits to keep their emissions below the Title V threshold.⁹² Synthetic minor permits are also typically cheaper than Title V permits.⁹² Meta’s Forest City, NC data center – operating as Andale, Inc. – was previously classified as a synthetic minor source and applied for a permit renewal in 2024. After reviewing the application, NC DEQ determined that the facility qualified for a permit exemption by limiting actual emissions of regulated air pollutants to less than 100 tons per year. Meta rescinded the permit renewal request and was granted an exemption in June 2024, despite emitting nearly 320 tons of carbon dioxide from backup generators in 2023 and increasing their electricity consumption at the site by approximately 9% between 2022 and 2024.^{93,94}

5. Data Transparency Requirements

Incentivizes: Transparency in data center operations to facilitate appropriate policy responses and cooperation

Implementing Authorities: State and local governments

Robust analyses of the climate and environmental impacts of data centers remain limited due to a lack of transparency around the water and energy consumption associated with operations.⁹⁵ Without appropriate data, policymakers are restricted in their ability to develop appropriate approaches that limit the environmental impacts of data centers while ensuring benefits remain for data centers, local residents, and state and local governments.⁹⁶ Because data center operations account for a substantial proportion of corporate emissions footprints for major tech companies, limited and inconsistent reporting on data center energy consumption and emissions makes it difficult to accurately quantify and compare emissions for these companies and creates opportunities for greenwashing.⁹⁷ At worst, the restriction of data may be used intentionally to create information asymmetry that benefits data center developers and other parties at the expense of other state residents and utility ratepayers.⁹⁸

Data center owners and operators often request, and are granted, exemptions from public reporting requirements due to the “trade secret” nature of their development plans and operations. In 2025, researchers and reporters found that over 80% of localities in Virginia with data center developments had signed non-disclosure agreements with developers.⁹⁹ Data center operators may attempt to restrict reporting of operational data, such as water and energy consumption, in order to protect information on a data center’s efficiency, infrastructure, and customer activity.⁹⁶ Although electric and water utilities have access to this information, they are also restricted in their ability to share data on individual customers. However, the protected status of this data has been successfully challenged:

- In 2022, The Oregonian requested records on water usage at a Google data center in The Dalles, OR. When the request was denied by city officials, the newspaper sued the city for failing to meet the burden of demonstrating that the water usage data was a trade secret. After the district attorney ruled in favor of The Oregonian, the city submitted a reverse public records lawsuit to protect the data, with their legal fees covered by Google. Ultimately, the newspaper and city council reached a settlement where the city council agreed to release the annual water usage data and comply with future public records requests of that nature.¹⁰⁰
- In 2022, the Piedmont Environmental Council requested zoning application information for a data center development from Orange County, VA and received redacted documentation. The Piedmont Environmental Council subsequently sued the county for improperly denying the public access to documents. The county cited proprietary information as a justification for redactions in the documents. In 2024, the county settled the lawsuit, revealing non-disclosure agreements signed by 10 local officials for the benefit of Amazon as well as all previously redacted documents.^{101,102}
- In 2025, Dorchester County agreed to release water consumption data for a Google data center under construction in South Carolina in a settlement with a resident who sued the county, arguing that the information is public record under the SC Freedom of Information Act. Under the settlement, the county agreed to release daily and monthly water consumption data for the facility and retracted its claim that the information qualifies as a trade secret.¹⁰³

There are several examples of laws that have been introduced or enacted to encourage greater transparency on data center operations and consistency in the metrics used for reporting. In the 2023 update of the Energy Efficiency Directive, the European Union requires data centers with over 500 kW of installed IT power demand to report annually on a set of key performance indicators.¹⁰⁴ In the US, at least 28 state bills across 16 states have been introduced or enacted to encourage greater transparency in data center operations. Most of these bills would require quarterly or annual reporting on energy and/or water consumption or estimates of water and energy consumption as part of the application processes. In most cases, the reporting obligation falls on data center owners and operators, although a handful of cases place the reporting requirements on state departments, localities, or utilities. In some cases, the bills would require reporting on a broader set of metrics, such as power usage effectiveness and renewable energy factors.^{105,106} In three states – California, New Jersey, and Virginia – bills have passed both legislative houses but faced vetoes by governors asking for

modifications.¹⁰⁷ Efforts to increase transparency on water and energy use from data centers have generally garnered bipartisan support and introductions of these types of bills are continuing in 2026.¹⁰⁷ At the federal level, members of Congress introduced the Data Center Water and Energy Transparency Act in March 2026, requiring operators to report energy and water use to the states where they operate and directing federal agencies to publish aggregated regional figures.^{108,109} Although there are no examples of cross-state coordination on data transparency, engaging with other states and industry stakeholders to create consistent and comparable reporting requirements would enhance the benefits of these requirements for all parties and reduce the burden of varying requirements on data centers.

Data Transparency Requirements in North Carolina:

Currently, there are no laws or processes specifically requiring reporting on energy consumption or other environmental information, outside of those mandated through other regulations, such as air permitting. While most government activities are public record in North Carolina, state law allows public records on business and industrial projects to be withheld so long as their publication would “frustrate the purpose for which such public records were created.”¹¹⁰ Once the project has been announced or final decisions have been made, this exemption no longer applies to public records related to these projects.¹¹⁰

Two bills have been introduced in the 2025-2026 legislative session which focus on transparency regarding data center developments:

- H.B. 1063: In addition to clean energy, water efficiency, and rate requirements, this bill would require any data center developer to submit a “Preconstruction Disclosure Statement” prior to construction that outlines the facility’s projected peak electricity demand, annual energy and water consumption, and any on-site cooling and renewable energy technologies.¹¹¹
- H.B. 1189: This bill would both establish a two-year moratorium on new data centers in the state and mandate that all existing and future data centers submit detailed information annually on property ownership, employee information, and itemized expenditures on utilities, on-site power generation, and cooling infrastructure to receive current sales tax exemptions.¹¹²

Conclusion

The rapid expansion of data centers presents both challenges and unprecedented opportunities for North Carolina to support economic growth while limiting the climate and environmental impacts of energy consumption from these facilities. Drawing on emerging literature, examples from other states, and an analysis of over 1,500 data centers from companies throughout the U.S., we discuss five policy tools that North Carolina policymakers could consider to ensure that data center development aligns with the state's climate and energy goals: electricity tariff and program design, state legislation, air permitting, on-site energy development, and data transparency requirements. For each approach, we provide a snapshot of North Carolina's current related policies and proposed legislation. With data center policy still in development across the country, North Carolina has a critical opportunity to establish itself as a national leader in low-impact, environmentally responsible development by learning from early efforts in other states and building on existing state regulatory frameworks.

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