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SUMMARY

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A data center is a physical facility that houses computer systems for managing and transmitting data. The federal government has been pursuing policies to promote data center development, particularly for artificial intelligence (AI), a "critical and emerging technology" with data storage and processing requirements. On July 23, 2025, the Trump Administration announced the release of "Winning the AI Race: America's AI Action Plan," which includes among its key provisions "promoting rapid buildout of data centers." Demand for data storage and processing capacities, especially for AI deployment, has led to the development of "hyperscale" data centers, which contain thousands of computer servers in very large, warehouse-like facilities.

The growth of data centers—and their associated electricity demand—suggest that significant additional generation will be required to power them. A 2024 Department of Energy study projected that data center electricity consumption would rise from 176 terawatt-hours (TWh) in 2023 to between 325 and 580 TWh by 2028. To ensure access to long-term electricity supplies, developers of data centers are pursuing a range of facility configurations, energy technologies, and third-party contractual arrangements with electricity generators and electric utilities.

Data centers require permits for their construction—including permits for energy infrastructure, such as electric grid connections, on-site electricity generation, and backup electricity facilities. They may also require permits for connections to natural gas pipelines and pipelines for carbon capture and sequestration. Projects developed off-site to serve data center electricity demand—such as power plants, pipelines, or carbon sequestration sites—also have permit requirements. Notwithstanding their energy intensity, individual data centers have a discrete footprint, typically falling under state and local siting jurisdiction. Some federal approvals may still apply. Depending on their configuration and location, energy infrastructure projects may need permits, authorizations, or reviews under various federal statutes.

Specific types of electricity generation may require permits directly from the Federal Energy Regulatory Commission (FERC), the Nuclear Regulatory Commission (NRC), or the U.S. Army Corps of Engineers (Corps). In addition, FERC's authorities over electric transmission may more broadly affect the grid interconnection of new generation and data centers. New natural gas pipeline connections to supply fuel for electricity generation could also require FERC approval. Building infrastructure on or through federal lands or waters generally requires authorization from the federal agency responsible for administering those lands or waters. In addition, energy infrastructure for data center projects may require permits, approvals, or reviews from state, tribal, and local agencies under delegated federal authority. Relevant requirements may fall under the Clean Air Act, the Clean Water Act, the Safe Drinking Water Act, and the Coastal Zone Management Act. State requirements under these statutes may apply more broadly to data center energy infrastructure than federal agency approvals.

The U.S. data center industry has, thus far, procured adequate electricity supplies. Building the energy infrastructure it could need for expansion may become more difficult as data centers grow in number and size. Understanding the extent to which federal permit requirements may affect data center expansion requires clarity about federal jurisdiction. The federal permitting nexus varies across projects, and no universal federal requirement or process applies across all project types. Various approvals under federal law may warrant particular attention in broader congressional initiatives around "permitting reform." Bills such as the SPEED Act (H.R. 4776), the ePermit Act (H.R. 4503), and the PERMIT Act (H.R. 3898), among others, could affect federal permits for certain data center energy infrastructure. If Congress implements overarching reforms, those reforms could impact data center energy infrastructure along with energy infrastructure more broadly. However, if Congress views developing energy infrastructure for data centers as a distinctive national priority, it could consider changes in federal permitting laws specific to this infrastructure. The Securing Reliable Power for Advanced Technologies Act (H.R. 5927) would accelerate the development of energy infrastructure serving "critical artificial intelligence infrastructure." The Clean Cloud Act of 2025 (S. 1475) would give federal agencies authority to collect electricity-related information specifically from data centers and their energy suppliers. Alternatively, Congress could preserve the statutory status quo while monitoring data center energy development. Given the diversity of proposed data center projects and energy facilities, understanding how legislative proposals such as H.R. 5927 might affect specific types of energy infrastructure could be of particular interest to Congress.

Contents

Tables

Contacts

Introduction

Data centers are computer facilities that provide information technology (IT) services for storing, processing, and transmitting large amounts of data. The federal government has been pursuing policies to promote data center development, particularly as a primary component of artificial intelligence (AI), a "critical and emerging technology" with enormous data storage and processing requirements.[1] On July 23, 2025, the Trump Administration announced the release of "Winning the AI Race: America's AI Action Plan," which includes among its key provisions "promoting rapid buildout of data centers."[2] Along with the AI Action Plan, President Trump issued Executive Order (E.O.) 14318, "Accelerating Federal Permitting of Data Center Infrastructure," intended "to facilitate the rapid and efficient buildout of data center infrastructure," including "construction on appropriate Federal lands."[3]

Data centers require large quantities of electrical power. To date, data centers have generally secured electricity supplies from the electric grid, drawing on existing electricity generation sources. However, public- and private-sector entities are developing additional data centers to meet growing computational demands, particularly from AI development and deployment. The growth of data centers—and their associated electricity demand—suggest that additional electricity generation will be required to power them. A 2024 Department of Energy (DOE) study projected that data center electricity consumption would rise from 176 terawatt-hours (TWh) in 2023 to between 325 and 580 TWh by 2028.[4]

Numerous observers have raised concerns that existing and planned U.S. electricity supply will be insufficient to meet future data center demand at the same time that demand for electricity in other sectors is also growing.[5] If insufficient electricity supply is available, then domestic data center deployment could be lower than desired, and data center developers could potentially locate new projects in other countries. Consequently, the timely development of electric generation to serve data centers has become a key issue within the IT industry, among federal agencies, and in Congress.[6]

A particular focus has been the permitting of power plants, including their connections to fuel supplies and the electric grid. Data centers, for the most part, have a discrete geographical footprint involving mostly local and state siting authorities. However, depending on the size and configuration of a given data center, some of its associated energy facilities may fall under federal jurisdiction. Among other provisions, E.O. 14318 explicitly seeks to facilitate the federal

[1] National Science and Technology Council, *Critical and Emerging Technologies List Update*, February 2024, https://www.govinfo.gov/content/pkg/CMR-PREX23-00185928/pdf/CMR-PREX23-00185928.pdf. The report states that "[c]ritical and emerging technologies (CETs) are a subset of advanced technologies that are potentially significant to U.S. national security." See page 1.

[2] White House, "White House Unveils America's AI Action Plan," press release, July 23, 2025, https://www.whitehouse.gov/articles/2025/07/white-house-unveils-americas-ai-action-plan/.

[3] White House, "Fact Sheet: President Donald J. Trump Accelerates Federal Permitting of Data Center Infrastructure," July 23, 2025, https://www.whitehouse.gov/fact-sheets/2025/07/fact-sheet-president-donald-j-trump-accelerates-federal-permitting-of-data-center-infrastructure/.

[4] A. Shehabi et al., *2024 United States Data Center Energy Usage Report*, Lawrence Berkeley National Laboratory (LBNL), LBNL-2001637, December 2024, p. 6, https://escholarship.org/uc/item/32d6m0d1. Hereinafter "LBNL report."

[5] See, for example, projections in American Clean Power, "US National Power Demand Study," March 2025, https://cleanpower.org/resources/us-national-power-demand-study/.

[6] See, for example, House Committee on Oversight and Government Reform, Subcommittee on Economic Growth, Energy Policy, and Regulatory Affairs, *America's AI Moonshot: The Economics of AI, Data Centers, and Power Consumption*, hearing, 119th Cong., 1st sess., April 1, 2025.

permitting of "infrastructure that powers" AI data centers, including certain electric generation equipment, transmission lines, natural gas pipelines, and other energy infrastructure.[7] Members of Congress have introduced legislation on the topic. The Securing Reliable Power for Advanced Technologies Act (H.R. 5927) would amend the Defense Production Act of 1950 to accelerate the development of electric generation, transmission, and associated fuel supply infrastructure serving designated "critical artificial intelligence infrastructure" projects. The Clean Cloud Act of 2025 (S. 1475) would amend the Clean Air Act to provide DOE and the Environmental Protection Agency (EPA) with authority to collect electricity-related information specifically from data centers and their energy suppliers.

This report describes the nature of large-scale data center facilities with a focus on their energy requirements and electricity supply. It discusses data center expansion and ways that data center developers have proposed to meet their future electricity requirements using a range of electricity sources. The report examines the permits required for data center energy infrastructure, with a focus on the key federal permits or authorizations that may be needed either from federal agencies directly or from state agencies under delegated federal authority. The report concludes with considerations for Congress.

This report concentrates on novel aspects of data center energy infrastructure development and key permits for such infrastructure. It does not provide a comprehensive review of all permits, authorizations, or consultations that may be required under federal or state laws. The discussion is limited to statutes and associated permits relevant to data centers. Permit application requirements and agency processes for the review of permit applications—such as environmental review requirements, agency coordination, and permitting timelines—are outside the scope of this report.[8] Also, the report does not cover federal actions that may affect the interconnection to the electric grid of data centers themselves, such as those proposed by the Secretary of Energy in October 2025.[9]

Data Centers and Energy Demand

A data center is a physical facility that houses and runs large computer systems.[10] Data centers typically contain computer servers, data storage devices, and network equipment that can provide IT infrastructure services for storing, managing, processing, and transmitting large amounts of data. Different types of data centers are based on their ownership or intended purposes. For example, a large company may choose to build an on-premises data center (also known as an "enterprise data center") to house and manage its own IT infrastructure.[11] Other, typically smaller,

[7] Executive Order (E.O.) 14318, "Accelerating Federal Permitting of Data Center Infrastructure," July 23, 2025. E.O. 14318 defines "data center energy infrastructure" as transmission lines, natural gas pipelines, and related infrastructure and "natural gas turbines, coal power equipment, nuclear power equipment, geothermal power equipment, and any other dispatchable baseload energy sources, including electrical infrastructure (including backup power supply) constructed or otherwise used principally to serve a Data Center Project."

[8] For an introductory discussion of federal environmental review requirements, see CRS In Focus IF12560, *National Environmental Policy Act: An Overview*, by Kristen Hite and Heather McPherron.

[9] Federal Energy Regulatory Commission (FERC), *Ensuring the Timely and Orderly Interconnection of Large Loads*, Advance Notice of Proposed Rulemaking, October 2025, https://www.energy.gov/sites/default/files/2025-10/403%20Large%20Loads%20Letter.pdf.

[10] For more discussion on data centers and their role in artificial intelligence (AI) development and deployment, see CRS In Focus IF12899, *Data Centers and Cloud Computing: Information Technology Infrastructure for Artificial Intelligence*, by Ling Zhu.

[11] Equinix, "What Is a Data Center? What Are Different Types of Data Centers?," August 1, 2024, https://blog.equinix.com/blog/2022/10/13/what-is-a-data-center-what-are-different-types-of-data-centers/.

organizations often choose to rent space, equipment, or services within a colocation data center (also known as a "managed data center") owned and operated by a third-party company.[12] Some online service providers operate "cloud data centers," which are geographically distributed and interconnected, allowing multiple users to remotely access computing resources.[13] Cloud computing service providers may also operate smaller data centers (called "edge data centers") physically located closer to end users, to improve system performance and the user experience.[14]

The increasing demand for data storage and processing capacities, especially for computational tasks such as AI deployment, has led to the development of "hyperscale" data centers notable for their size.[15] According to industry analysts, a hyperscale data center contains at least 5,000 computer servers and occupies at least 10,000 square feet of physical space.[16] A proposed hyperscale data center in Pennsylvania—Project Bolt—reportedly could occupy 700 acres of land and host 18 buildings (with up to five million square feet of workspace) at a total projected cost of $15 billion.[17]

Data Center Electricity Requirements[18]

Data centers use electricity to run their computers and to run the systems that cool them. Roughly half or more of data center electricity demand stems directly from the operation of electronic IT equipment.[19] Because IT equipment generates heat as it operates, data centers require expansive cooling systems to maintain IT system stability and optimal performance. These cooling systems could account for another 38% to 40% of electricity consumption in a data center.[20] Furthermore, unlike the electricity demands of other commercial and industrial facilities—which may fluctuate considerably depending on product demand or schedule requirements—data center electricity demand tends to be comparatively steady, potentially operating 24 hours per day, 365 days per year.

DOE's 2024 study examined the nationwide energy consumption of data centers in response to direction by Congress in the Energy Act of 2020 (P.L. 116-260, Division Z, Section 1003). The study found that U.S. data center annual electricity consumption in 2023 was approximately 4.4% of total U.S. consumption—176 terawatt-hours (TWh)—and was projected to rise to 6.7%-12% of U.S. consumption by 2028, between 325 TWh and 580 TWh.[21] Growth of data center electricity demand at these levels likely requires additional electricity generation to ensure

[12] Stephanie Susnjara and Ian Smalley, "What Is a Data Center?," IBM, https://www.ibm.com/think/topics/data-centers.

[13] Cisco, "What Is a Data Center?," https://www.cisco.com/c/en/us/solutions/data-center-virtualization/what-is-a-data-center.html#~infrastructure-evolution.

[14] Susnjara and Smalley, "What Is a Data Center?"

[15] Phill Powell and Ian Smalley, "What Is a Hyperscale Data Center?," IBM, https://www.ibm.com/think/topics/hyperscale-data-center.

[16] Powell and Smalley, "What Is a Hyperscale Data Center?" See also VIAVI Solutions, "What Is a Hyperscale Data Center?," https://www.viavisolutions.com/en-us/resources/learning-center/what-hyperscale-data-center.

[17] Charles Thompson, "$15B Data Center Project in Cumberland County to Get First Plan Review Monday," PennLive, August 10, 2025, https://www.pennlive.com/news/2025/08/and-so-it-begins-15-billion-data-center-project-to-get-first-plan-review-monday.html.

[18] For more details, see CRS Report R48646, *Data Centers and Their Energy Consumption: Frequently Asked Questions*, by Martin C. Offutt and Ling Zhu.

[19] LBNL report, p. 47.

[20] Karthik Ramachandran et al., "As Generative AI Asks for More Power, Data Centers Seek More Reliable, Cleaner Energy Solution," Deloitte, https://www.deloitte.com/us/en/insights/industry/technology/technology-media-and-telecom-predictions/2025/genai-power-consumption-creates-need-for-more-sustainable-data-centers.html.

[21] LBNL report, pp. 5-6. These estimates did not account for cryptocurrency.

adequate regional electricity supplies. For example, according to PPL, the electricity provider associated with Project Bolt,

> Within PPL Electric Utilities' service territory in Pennsylvania alone, data center interest has reached over 60 gigawatts (GW) of potential projects, with over 13 GW in advanced stages of planning. If all 13 GW come online, PPL estimates a 6 GW generation shortfall in PPL Electric Utilities' service territory in the next five to six years.[22]

Supporting AI models is particularly energy-intensive and is likely to be the main driver of growth in data center electricity demand. As a 2024 analysis from one industry consultancy stated,

> generative AI (gen AI) could help create between $2.6 trillion and $4.4 trillion in economic value throughout the global economy. But achieving just a quarter of this potential by the end of the decade would require between 50 and 60 GW of additional data center infrastructure in the United States alone.
>
> Meeting this demand will require considerably more electricity than is currently produced in the United States. This spike in electricity needs is unprecedented in the United States, where power demand in the aggregate has barely grown since 2007.[23]

A 2025 white paper from the Electric Power Research Institute similarly identified AI applications as the principal factor in data center development and growth in electricity demand:

> AI-focused growth rates imply that data center power demand in the United States could increase by tens of gigawatts by 2030, perhaps by roughly 50 GW, which would be significant compared to the United States' total generation capacity of 1300 GW. Projections of overall data center growth are not much higher, suggesting that AI data centers are likely the dominant drivers of overall growth.[24]

The ultimate level of AI and associated data center development involves many uncertainties, and may not reach the scale projected at the high end by recent studies. Even moderate growth would likely require investments in new generation capacity.

Electricity Supply for Data Center Projects

Access to adequate long-term electricity supplies is an overarching requirement for data center development and operation. Data centers can procure electricity supplies in three main ways:

- *Grid power*: buying electricity directly from their local utility, relying on the utility's electric generation portfolio;

[22] PPL, "PPL Corporation and Blackstone Infrastructure Create Joint Venture to Build Natural Gas Generation in Pennsylvania in Support of Data Center Development," press release, July 15, 2025, https://investors.pplweb.com/2025-07-15-PPL-Corporation-and-Blackstone-Infrastructure-create-joint-venture-to-build-natural-gas-generation-in-Pennsylvania-in-support-of-data-center-development. PPL Electric Utilities serves 29 counties across Eastern Pennsylvania, but excludes most of Greater Philadelphia. See PPL Electric Utilities, "Service Areas and Tariffs," https://www.pplelectric.com/site/More/About-Us/PPL-Service-Area.

[23] Alastair Green et al., "How Data Centers and the Energy Sector Can Sate AI's Hunger for Power," McKinsey & Company, online article, September 17, 2024, https://www.mckinsey.com/industries/private-capital/our-insights/how-data-centers-and-the-energy-sector-can-sate-ais-hunger-for-power#/. Generative AI is a type of AI that can generate new content—such as text, images, and videos—through learning patterns from preexisting data. For further background, see CRS Report R47569, *Generative Artificial Intelligence and Data Privacy: A Primer*, by Ling Zhu and Laurie Harris.

[24] Electric Power Research Institute (EPRI), *Scaling Intelligence: The Exponential Growth of AI's Power Needs*, white paper, August 2025, p. 22, https://restservice.epri.com/publicattachment/94532.

- *Power purchase agreement (PPA)*: contracting with a specific generation plant or electricity provider that delivers electricity from off-site via the local utility; or
- *Self-supply* (also called *behind-the-meter*): sourcing electricity from on-site generation plants that may be owned and operated by the data center itself or by a third party.

Individual data centers may choose among these options, or choose multiple options, based on several considerations. One consideration is electricity price. Some states allow electricity customers to choose among different independent electricity providers, either those that offer a specified portfolio of supplies (e.g., 100% renewable) or those that sell electricity from a specific generation plant. Buying electricity from a specific plant is typically done through a PPA. Self-supply is also an option in many states and may be cost-competitive with utility-provided electricity. However, self-supply requires a data center project to have its own electric generation facilities (or partner with another company to secure dedicated generation), which may be more financially and administratively burdensome than buying electricity directly from the local utility.

Another consideration is the energy source used to make the electricity. Some data center developers, or their tenants, prefer certain kinds of energy sources. In particular, some may prefer to buy electricity produced from renewable energy sources in order to achieve a voluntary sustainability goal. Google, for example, in 2025 announced an "aim to run on 24/7 carbon-free energy on every grid where we operate by 2030."[25] PPAs or self-supply are options to ensure that data centers are powered by specific energy sources. Some utilities also offer "green power" products through which the utility procures electricity from renewable energy sources on behalf of its customers.[26] Green power products typically cost more than standard utility service and are not available in all areas.

A third consideration is the development timeline for a new generation plant. A data center can typically be built in less time than a new generation plant or other electricity infrastructure. Data center developers, therefore, may prefer to secure their electricity supplies in whatever way can be developed fastest. For example, some developers have reported that self-supply options would be faster to build than procuring grid power by avoiding certain regulatory processes required for utility-owned generation.[27] Data center owners may also choose to locate their facilities in areas with more readily available electricity supplies from existing generation or in areas where recently retired power plants can be relatively quickly returned to service.

A final consideration is local laws and regulations. As data center development has increased across the country, numerous states and localities are exploring policy options to ensure that data center electricity demand does not negatively impact reliability and affordability for other electricity customers.[28] Some states are considering requiring data centers to procure some or all of their electricity from energy sources that do not emit greenhouse gases.[29] Some stakeholders

[25] Google, *Environmental Report 2025*, June 2025, p. 79, https://www.gstatic.com/gumdrop/sustainability/google-2025-environmental-report.pdf.

[26] Environmental Protection Agency (EPA), "Green Power Supply Options," August 4, 2025, https://www.epa.gov/green-power-markets/green-power-supply-options.

[27] Drew Robb, "Data Centers Bypassing the Grid to Obtain the Power They Need," *Data Center Knowledge*, May 1, 2025, https://www.datacenterknowledge.com/energy-power-supply/data-centers-bypassing-the-grid-to-obtain-the-power-they-need.

[28] Marc Levy, "As Electric Bills Rise, Evidence Mounts That Data Centers Share Blame. States Feel Pressure to Act," Associated Press, August 9, 2025, https://apnews.com/article/electricity-prices-data-centers-artificial-intelligence-fbf213a915fb574a4f3e5baaa7041c3a.

[29] National Caucus of Environmental Legislators, *NCEL Issue Brief: Data Centers*, April 2025, https://www.ncelenviro.org/app/uploads/2025/04/CE-Data-Centers-Issue-Brief_updated.pdf.

have proposed requiring data centers to build new generation plants, an approach often referred to as Bring Your Own Power (BYOP) or Bring Your Own Generation (BYOG).[30] Other options are to require data centers to participate in electricity demand response programs or agree to be disconnected first in case of a shortage of electricity supplies. Texas, for example, adopted both of these requirements in a 2025 law.[31]

Proposed Data Center Energy Projects

To ensure access to adequate long-term electricity supplies, developers of data centers are pursuing a wide range of facility configurations, energy technologies, and third-party contractual arrangements with electricity generators and electric utilities. These configurations include traditional connections to the local electric grid, dedicated off-site generation (existing or new), new on-site generation, and combinations of these. As one data center development partner has stated,

> a full energy supply solution would require a balanced portfolio of new resources—including both renewable and on-demand generation—along with infrastructure that integrates with the existing grid. This approach would help ensure reliability for ... tenants while supporting grid stability and cost control for all customers.[32]

Generation technologies being deployed for data centers span fossil fuel-fired thermal power plants (e.g., natural gas turbines), renewable generation (e.g., wind, solar, geothermal), nuclear power, fuel cells, and other types of generation. Some proposals also include carbon capture and storage (CCS) systems to reduce emissions of carbon dioxide—a greenhouse gas—from fossil fuel-fired generation.

Table 1 provides a sample of recently announced data center and related energy projects, including hyperscale projects, illustrating some of the various ways such facilities seek to procure their electricity supplies. The projects are listed in order of announcement. The examples in **Table 1** involve major projects in the data center industry. **Table 1** is not comprehensive of all projects that have been constructed or proposed across the United States. According to one industry source that tracks data center projects, currently over 4,200 data centers operate across all 50 states and the District of Columbia.[33] To ensure high electric reliability, data centers typically also incorporate on-site backup generation (e.g., diesel generators) or uninterruptible power supply systems (e.g., batteries), which can be used to maintain electricity supply for short periods if primary generation supplies are disrupted.

[30] See, for example, Kevin Walker, President and Chief Executive Officer, Duquesne Light, "Duquesne Light's Vision for Powering the AI Economy and Protecting Customers," August 4, 2025, https://newsroom.duquesnelight.com/duquesne-lights-vision-for-powering-the-ai-economy-and-protecting-customers.

[31] For a discussion of the 2025 Texas data center law, see Brian Martucci, *Utility Dive*, "Texas Law Gives Grid Operators Power to Disconnect Data Centers During Crisis," June 25, 2025, https://www.utilitydive.com/news/texas-law-gives-grid-operator-power-to-disconnect-data-centers-during-crisi/751587/.

[32] NorthWestern Energy, "NorthWestern Energy Signs Letter of Intent to Serve Quantica Infrastructure's Montana Data Center Development," press release, July 30, 2025, https://northwesternenergy.com/about-us/news-articles-events/2025/07/30/northwestern-energy-signs-letter-of-intent-to-serve-quantica-infrastructure-s-montana-data-center-development.

[33] Data Center Map, "USA Data Centers," online mapping tool, https://www.datacentermap.com/, accessed November 24, 2025.

Table 1. Selected Energy Infrastructure Projects Proposed for Data Centers

Key Developers	Location	Date Announced	Energy Supply
Google/Fervo Energy/ NV Energy	Beaver County, UT	6/11/2024	500 MW (scalable to 2 GW) new off-site geothermal generation
Microsoft/Constellation Energy Generation	Three Mile Island, PA	9/20/2024	800 MW existing off-site nuclear unit re-start (PPA)
Meta/Entergy	Richland Parish, LA	12/4/2024	2.3 GW new off-site natural gas turbines, new 500 kV and 230 kV transmission lines (grid power)
Meta	TBD	12/5/2024	RFP for1-4 GW new nuclear generation
KDI Wyalusing Power	Wyalusing, PA	12/27/2024	248 MW new on-site natural gas turbines
PSEG	Maryland	12/31/2024	New 67-mile, 500 kV transmission line
Sharon AI/New Era	Ector County, TX	1/22/2025	250 MW new on-site natural gas turbines (with future CCS)
Stargate/Crusoe	Abilene, TX	1/28/2025	360 MW new on-site natural gas turbines
Homer City Redevelopment	Homer City, PA	4/2/2025	4.5 GW on-site gas turbines with new gas transmission pipeline
Amazon/AEP/Aspire Energy	Columbus, OH	6/5/2025	New on-site fuel cells (unspecified MW) and intrastate natural gas pipeline (utility-owned)
Meta/XGS Energy	New Mexico	6/12/25	150 MW of new off-site geothermal generation (grid power, not utility-owned)
Fermi America/Texas Tech University	Carson County, TX	6/26/2025	11 GW new on-site nuclear generation plus solar generation, natural gas turbines, and battery storage
Google/Brookfield	Southeastern PA	7/15/2025	670 MW of existing/expanded off-site hydropower generation (PPA)
Meta/Enbridge	Clear Fork, TX	7/22/2025	600 MW new off-site solar generation (PPA)
Crusoe/Tallgrass Energy	Cheyenne, WY	7/24/2025	1.8 GW new on-site natural gas generation (with CCS) and renewables
Quantica/NorthWestern Energy	Billings, MT	7/30/2025	500 MW on-site renewable energy generation plus battery storage
Energy Transfer Partners	Route through Arizona, New Mexico, and Texas	8/6/2025	New 1.6 Bcfd Desert Southwest interstate natural gas pipeline for "population growth, high-tech ... and data center expansion"
Google/Entergy	Jefferson County, AR	9/5/2025	600 MW new off-site solar generation plus battery storage and transmission
Google/NextEra Energy	Iowa	10/27/2025	616 MW Duane Arnold nuclear plant restart (PPA)

Sources: CRS from trade press, company news releases, regulatory filings, and other industry sources. References available upon request.

Notes: MW = megawatt; GW = gigawatt; CCS = carbon capture and sequestration; PPA = power purchase agreement; RFP = request for proposals; Bcfd = billion cubic feet per day.

Federal Permits for Data Center Energy

Data centers require permits for various aspects of their construction—such as roads, buildings, telecommunications, and utilities. Among these are permits for energy infrastructure, including connections to the local electric grid, any on-site electricity generation, and backup electricity facilities. They may also require connections to the local natural gas pipeline system and, in some cases, pipeline connections to CCS infrastructure. Energy projects developed off-site to serve data center electricity demand—such as power plants, pipelines, or carbon sequestration sites—also have permit requirements.

Notwithstanding their energy intensity as electricity consumers, individual data centers have a discrete geographic footprint, typically falling under state and local siting jurisdiction. But some federal approvals may still apply. Depending on its configuration and location (e.g., federal lands), an energy infrastructure project—especially one supporting a hyperscale data center—may require permits or other authorizations under federal statutes. Federal permits potentially required for data center energy infrastructure are discussed below.

Electric Generation

The Federal Power Act (FPA; 16 U.S.C. §§791 *et seq.*) reserves most authority for permitting and siting of new power plants to the states.[34] This authority applies to off-site power plants used to power data centers as well as any on-site generation. However, specific types of generation facilities may require federal agency authorizations from the Federal Energy Regulatory Commission (FERC), the Nuclear Regulatory Commission (NRC), or the U.S. Army Corps of Engineers (Corps). In addition, FERC has authorities over the electric transmission system that may more broadly affect the interconnection of new generation and data centers to the grid. Lastly, some generation supply arrangements may require separate FERC approvals, depending on project-specific circumstances.[35]

Nuclear Power

Under the Atomic Energy Act of 1954, as amended (42 U.S.C. §§2011 *et seq.*), the NRC licenses and regulates the private sector to own and operate nuclear facilities. By statute, NRC licenses are initially limited to terms of 40 years, but they may be renewed for an additional 20 years, where appropriate.[36]

Some data center developers have proposed using existing or new nuclear generation plants for their electricity supplies. Whether such projects would require NRC licensing or relicensing would depend on the generation facilities involved and the specific supply arrangement. Any new nuclear plants proposed to serve data centers would require NRC licenses. The developers of the Fermi America project (**Table 1**), for example, have applied for an NRC license.[37] Likewise, the

[34] Power plants developed on federal lands are typically sited by a federal land management agency, as discussed in the section "Federal Lands or Waters."

[35] For example, in 2024 an Amazon Web Services data center sought to procure power in a behind-the-meter arrangement from the Susquehanna nuclear power plant owned by Talen Energy. The proposal necessitated a change in a FERC-jurisdictional contractual agreement between the power plant and the grid operator, PJM. FERC denied the request. 189 FERC ¶ 61,078.

[36] Nuclear Regulatory Commission (NRC), "Reactor License Renewal Overview," August 28, 2020, https://www.nrc.gov/reactors/operating/licensing/renewal/overview.html.

[37] Letter from Michele Sampson, Director, NRC Division of New Reactor Licensing, to Toby Neugebauer, Chief (continued...)

expansion of an operating nuclear facility or the restart of a closed nuclear facility—as Microsoft and Constellation Energy propose at Three Mile Island (**Table 1**)—would require NRC licensing or relicensing, respectively. Contracting for existing capacity at a licensed nuclear facility may not require NRC approval. However, if the term of an electricity supply agreement is to extend beyond the expiration of a current nuclear facility license, the nuclear operator would need to relicense the facility to satisfy the agreement.

Hydropower

Under the FPA, FERC has jurisdiction over the construction and operation of "non-federal" hydropower projects.[38] A license from FERC is required for the construction or expansion of privately owned hydropower facilities. Hydropower licenses may be issued for terms of up to 50 years, and facility owners may apply to FERC for relicensing upon their expiration.[39] Examples of such facilities are Brookfield Renewable Partner's hydroelectric plants—Holtwood and Safe Harbor—in Pennsylvania, both of which have FERC licenses that expire in 2030; their owners are in the process of applying for relicensing (**Table 1**).[40] Brookfield has entered into a 20-year power purchase agreement with Google from these facilities, which would require them to be relicensed.[41]

Other federal laws are associated with the regulation of non-federal hydropower projects.[42] Some of these laws may require the project applicant to obtain a permit, certification, or different type of approval from another federal agency, state, or tribe, as well as land access permission.[43] This includes state water quality certifications granted under Section 401 of the Clean Water Act (discussed in the "Clean Water Act" section of this report).[44] A hydropower license applicant is required to obtain a state water quality certification before FERC can issue a hydropower license.[45] In addition, an authorization from the Corps may be required under Section 408 of the Rivers and Harbors Act of 1899 (33 U.S.C. §408). Section 408 authorizes the Secretary of the

Executive Officer, Fermi America, "Fermi America – Acknowledgement of Part One of the Combined License Application for the President Donald J. Trump Advanced Energy and Intelligence Campus, Units 1 Through 4," July 7, 2025, https://www.nrc.gov/docs/ML2518/ML25182A087.pdf.

[38] Section 4(e) (16 U.S.C. §797(e)).

[39] 16 U.S.C. §799; 16 U.S.C. §808. FERC, *Hydropower Licensing—Get Involved: A Guide for the Public*, April 2020, https://www.ferc.gov/sites/default/files/2020-04/hydro-guide.pdf.

[40] Brookfield, "Holtwood Relicensing," https://holtwoodrelicensing.brookfieldusprojects.com/; and Brookfield, "Safe Harbor Relicensing," https://safeharborrelicensing.brookfieldusprojects.com/.

[41] Brookfield, "Brookfield and Google Sign Hydro Framework Agreement to Deliver up to 3,000 MW of Homegrown Energy in the United States," press release, July 15, 2025, https://bep.brookfield.com/press-releases/bep/brookfield-and-google-sign-hydro-framework-agreement-deliver-3000-mw-homegrown.

[42] FERC, *Hydropower Primer: A Handbook of Hydropower Basics*, 2020, https://www.ferc.gov/sites/default/files/2020-04/HydropowerPrimer.pdf. See chapter 2, "Pertinent Laws and Regulations Related to Non-Federal Hydropower Projects."

[43] Aaron Levine et al., *An Examination of the Hydropower Licensing and Federal Authorization Process*, National Renewable Energy Laboratory, NREL/TP-6A20-79242, October 2021, https://docs.nrel.gov/docs/fy22osti/79242.pdf. See section 2.4, "Required Licenses, Permits, and Authorizations to Construct and Operate Non-Federal Hydropower Projects."

[44] EPA, "Overview of CWA Section 401 Certification," accessed December 3, 2025, https://www.epa.gov/cwa-401/overview-cwa-section-401-certification; and FERC, "Establishing Reasonable Period of Time and Clarifications Regarding Clean Water Act Section 401(a)(1) Certifications for Hydroelectric Proceedings," final rule, 89 *Federal Register* 96524, December 5, 2024.

[45] FERC, *Hydropower Primer: A Handbook of Hydropower Basics*, February 2017, https://www.ferc.gov/sites/default/files/2020-04/HydropowerPrimer.pdf.

Army to grant the alteration, occupation or use of Corps properties, under certain conditions, including for non-federal hydroelectric projects.[46]

Electric Transmission

As is the case for power plants, most electricity transmission siting authority resides in the states.[47] FERC does have some statutory authority, known as FERC's "backstop" siting authority, to site some interstate electricity lines (16 U.S.C. §824p). However, the authority applies only to areas designated by DOE and, within those areas, only to projects for which the relevant state siting authority cannot or does not approve the project.[48] DOE has not finalized any such transmission areas, so FERC's backstop siting authority cannot be invoked to site transmission projects at this time.

FERC regulations under the Federal Power Act require that proposals for any new generation plants connecting to the electric transmission grid be reviewed prior to construction by the relevant grid operator.[49] This review, called an *interconnection study*, seeks to identify any potential reliability risks that would arise from the operation of the new generation plant and to identify any modifications to the grid required to ensure reliability.[50] The interconnection study typically must be conducted before power plant construction can commence, although other aspects of project development may proceed concurrently. On-site generation projects must also go through an interconnection study process, but those projects are reviewed by a local utility pursuant to state or local requirements.

Large new sources of electricity demand (load) connecting to the grid may also undergo a form of interconnection study, though this process is not standardized at the federal level.[51] The entity doing the study depends on the load's configuration. For a data center interconnecting directly to the transmission system, the transmission provider would generally be the entity conducting the study. For a data center interconnecting to the distribution system, the local utility would more likely be the entity conducting the study. Smaller data centers typically interconnect at the distribution system level, but data centers with power demands of several hundred megawatts or more typically connect at the transmission system level. Even these transmission-level data centers may be studied by the local utility if the utility owns and operates the electrical equipment used to connect to the grid.[52]

[46] U.S. Army Corps of Engineers, "The Section 408 Program," accessed December 3, 2025, https://www.usace.army.mil/Missions/Civil-Works/Section408/.

[47] For additional background on FERC's role in the development of electricity transmission infrastructure, see CRS Report R47862, *Electricity Transmission: What Is the Role of the Federal Government?*, by Ashley J. Lawson and Adam Vann.

[48] Additional statutory criteria apply. FERC's backstop siting authority is discussed in CRS Report R47862, *Electricity Transmission: What Is the Role of the Federal Government?*, by Ashley J. Lawson and Adam Vann.

[49] FERC's authority over interconnection stems from Sections 205 and 206 of the Federal Power Act (16 U.S.C. §824d and §824e), which authorize FERC to ensure that all rules and regulations affecting FERC-jurisdictional electricity rates are "just and reasonable" and not "unduly discriminatory or preferential." For additional background, see CRS In Focus IF11411, *The Legal Framework of the Federal Power Act*, by Adam Vann.

[50] For details about this process, see FERC, "Improvements to Generator Interconnection Procedures and Agreements," Docket No. M22-14-000, Order No. 2023, issued July 28, 2023, pp. 9-13, https://www.ferc.gov/media/order-no-2023.

[51] Ryan Quint et al., *An Assessment of Large Load Interconnection Risks in the Western Interconnection*, prepared by Elevate Energy Consulting for Western Electricity Coordinating Council, February 2025, p. 11, https://www.wecc.org/sites/default/files/documents/products/2025/Report_WECC%20Large%20Loads%20Risk%20Assessment%204.pdf.

[52] Quint et al., *Assessment*, p. 11.

An area of active policymaking concerns how transmission system costs are paid by data centers that are co-located with generation. FERC held a technical conference on this subject in November 2024.[53] A concern among some consumer advocates and others is that co-located data centers might avoid paying for transmission services they use, therefore shifting transmission costs to other customers. Others argue that co-located data centers do not use the transmission system; therefore, it is appropriate that they not pay costs for it. In February 2025, FERC initiated a regulatory review of this issue in the PJM region.[54] The PJM region includes Virginia, the state with the greatest number of data centers.[55]

FERC's Regional Transmission Planning Authority

FERC may affect transmission project development through its authority over regional transmission planning. FERC requires utilities to participate in planning processes to identify regional transmission infrastructure that may be more cost-effective or provide other benefits relative to transmission infrastructure developed by individual utilities alone. Data center demand could influence these regional processes. For example, PJM, a regional transmission organization (RTO) in the eastern United States, includes data center demand projections as part of its annual evaluation of potential regional transmission projects. At least one PJM regional project, PSEG's 500 kV transmission line in Maryland (**Table 1**), is being developed to ensure reliability in the face of "large block load additions (data center development) ... beyond what PJM originally anticipated," among other factors.[56] In a June 2025 technical conference, FERC examined the question of how certain regions of the country should account for data center demand growth. No consensus emerged as to the best approach (or even as to whether federal action was needed).

In addition to any authorizations under FERC regulations, some transmission line segments may need CWA Section 404 permits from the Corps if they cross waters of the United States. The Corps authorizes most transmission line water or wetland crossings using a general permit (Nationwide Permit 57 – Electric Utility Line and Telecommunications Activities), although individual permits may be required for specific projects with potentially significant impacts.[57]

Pipelines

Data center energy projects may include new natural gas-fired generation or fuel cells, either of which may require new natural gas pipelines to supply the fuel.[58] Constructing new service pipeline connections to local natural gas distribution systems generally falls under state jurisdiction. The same is generally true for new natural gas transmission pipelines constructed within state borders, such as the new pipeline proposed to serve the fuel cells at Amazon's proposed data center in Columbus, OH (**Table 1**). However, if a proposed pipeline connection is

[53] Recordings and information about this technical conference are available at FERC, "Commissioner-Led Technical Conference Regarding Large Loads Co-Located at Generating Facilities," https://www.ferc.gov/news-events/events/commissioner-led-technical-conference-regarding-large-loads-co-located.

[54] FERC, "FERC Orders Action on Co-Location Issues Related to Data Centers Running AI," news release, February 20, 2025, https://www.ferc.gov/news-events/news/ferc-orders-action-co-location-issues-related-data-centers-running-ai.

[55] Data Center Map, "Virginia Data Centers," online mapping tool, https://www.datacentermap.com/usa/virginia/, accessed September 9, 2025.

[56] Maryland Public Service Commission, "Application of PSEG Renewable Transmission LLC for a Certificate of Public Convenience and Necessity to Construct a New 500 kV Transmission Line in Portions of Baltimore, Carroll, and Frederick Counties," December 31, 2024, p. 9, https://webpscxb.psc.state.md.us/DMS/case/9773 (file 01_MPRP CPCN Application_12.31.24).

[57] U.S. Army Corps of Engineers, *Decision Document, Nationwide Permit 57*, January 4, 2021, https://usace.contentdm.oclc.org/utils/getfile/collection/p16021coll7/id/16848.

[58] See, for example, discussion in Commonwealth of Virginia, Joint Legislative Audit and Review Commission, *Data Centers in Virginia*, December 9, 2024, https://jlarc.virginia.gov/pdfs/reports/Rpt598.pdf.

part of the interstate natural gas pipeline system, it would require federal siting approval for the overall route.

Under provisions of the Natural Gas Act (15 U.S.C. §717f), companies seeking to build interstate natural gas pipeline facilities need authorization from FERC in the form of a certificate of public convenience and necessity. For example, the transmission pipeline lateral for Homer City Redevelopment's project, and Energy Transfer Partners' proposed interstate natural gas pipeline (**Table 1**), would both require FERC certificates. Pipelines for commodities other than natural gas, such as carbon dioxide pipelines for CCS projects like the Crusoe/Tallgrass project in Wyoming (**Table 1**), are under state siting jurisdiction.

As in the case of electric transmission, in addition to state or federal siting authorization for a new pipeline, developers may also require federal approval from the Corps for certain pipeline segments. Because most major pipelines cross or potentially affect U.S. waters and wetlands somewhere along their routes, pipeline developers routinely need Corps authorization. The Corps authorizes most pipeline water crossings using Nationwide Permit 12 – Oil or Natural Gas Pipeline Activities, although individual permits may be required for projects with potentially significant impacts to waters or wetlands.[59]

Federal Lands or Waters[60]

To construct and operate energy infrastructure on or through federal lands or federal waters, project developers generally must secure authorization from the federal agency responsible for administering those lands or waters. Four federal land management agencies (FLMAs) administer the vast majority of land owned by the federal government: the Bureau of Land Management (BLM), the National Park Service, and the U.S. Fish and Wildlife Service, all in the Department of the Interior (DOI); and the Forest Service (FS) in the Department of Agriculture.[61] The DOI's Bureau of Ocean Energy Management (BOEM) manages development of energy resources on the U.S. Outer Continental Shelf. Other agencies, including DOE, the Corps, and the Department of Defense (DOD)—which is "using a secondary Department of War designation" under E.O. 14347 dated September 5, 2025—also manage federal lands, primarily associated with their respective facilities (e.g., national laboratories, reservoirs, military bases). These agencies have distinct missions and authorities. As a result, requirements for permits or other authorizations—to access, construct, and operate energy facilities on federal lands or waters they control—vary across agencies.

Some data center energy projects may involve federal lands or waters. As noted above, E.O. 14318 promotes data center infrastructure and associated energy infrastructure permitting and construction on "appropriate Federal lands."[62] Accordingly, on July 24, 2025, DOE announced

[59] U.S. Army Corps of Engineers, "Decision Document, Nationwide Permit 12," January 4, 2021, https://usace.contentdm.oclc.org/utils/getfile/collection/p16021coll7/id/16834.

[60] Tribal lands may have different or additional permitting requirements outside the scope of this report. For information about energy projects on tribal lands, see CRS Report R47640, *Energy Leasing and Agreement Authorities on Tribal Lands: In Brief*, by Mariel J. Murray.

[61] For more information, see CRS In Focus IF10585, *The Federal Land Management Agencies*, by Carol Hardy Vincent et al.

[62] President Biden issued E.O. 14141 (since revoked by President Trump) providing a federal plan to build AI infrastructure—including data centers—in the United States. Among other provisions, the E.O. instructed the Secretary of Defense and the Secretary of Energy to "each identify a minimum of 3 sites on Federal land managed by their respective agencies that may be suitable ... to lease to non-Federal entities for the construction and operation of a frontier AI data center, as well as ... clean energy facilities to serve the data center, by the end of 2027." White House, (continued...)

that it had selected four sites "to move forward with plans to invite private sector partners to develop cutting edge AI data center and energy generation projects."[63] Other projects may require leases or rights way through FLMA or other federal lands. For example, Fervo Energy's geothermal project for Google (**Table 1**), currently under construction, required BLM approval for drilling sites on federal lands.[64] Likewise, the proposed Energy Transfer Partners (**Table 1**) pipeline could potentially cross lands administered by BLM, FS, and DOD, although its exact route has not yet been determined.

State Approvals and Reviews Under Federal Laws

In addition to permits issued directly by federal agencies, energy infrastructure for data center projects may require permits, approvals, or reviews from state, tribal, and local agencies under delegated federal authority. Some of these permit requirements may apply more broadly to data center energy infrastructure than the federal approvals discussed above.

Clean Air Act

Under federal clean air laws, new or modified electric generation facilities may require permits from state, tribal, or local agencies associated with their anticipated air emissions. Two principal requirements applicable to data center projects are New Source Review (NSR) and Title V operating permits, both required under the Clean Air Act (CAA; 42 U.S.C. §§7401 *et seq.*).

New Source Review

NSR is a statutory requirement for preconstruction air permitting that regulates new stationary sources (e.g., generation plants) or major modifications to existing stationary sources.[65] NSR permitting falls under three different permit programs: nonattainment NSR, Prevention of Significant Deterioration (PSD), and minor NSR.[66] The nonattainment NSR and PSD permits apply to new or modified sources with the potential to emit pollutants above major source thresholds.[67] Nonattainment NSR permits are required for sources of a National Ambient Air Quality Standard (NAAQS) criteria pollutant located in an area designated nonattainment for that

"Executive Order on Advancing United States Leadership in Artificial Intelligence Infrastructure," E.O. 14141, January 14, 2025, https://bidenwhitehouse.archives.gov/briefing-room/presidential-actions/2025/01/14/executive-order-on-advancing-united-states-leadership-in-artificial-intelligence-infrastructure/. President Trump's E.O. 14318 revoked E.O. 14141.

[63] Department of Energy, "DOE Announces Site Selection for AI Data Center and Energy Infrastructure Development on Federal Lands," press release, July 24, 2025, https://www.energy.gov/articles/doe-announces-site-selection-ai-data-center-and-energy-infrastructure-development-federal.

[64] Bureau of Land Management, *Cape Geothermal Power Project*, Finding of No Significant Impact and Decision Record, DOI-BLM-UT-C010-2024-0018-EA, October 2024, https://eplanning.blm.gov/public_projects/2033002/200625761/20120795/251020775/DOI-BLM-UT-C010-2024-0018-EA_FONSI_DR_%20Fervo%20EA_signed.pdf.

[65] See 42 U.S.C. §7470, in particular, and Clean Air Act (CAA), Title I, Part C, in general, for Prevention of Significant Deterioration (PSD) permitting program, and 42 U.S.C. §7503, in particular, and CAA, Title I, Part D, in general, for Nonattainment New Source Review (NSR). See 40 C.F.R. Part 51 Subpart I for more information on NSR programs.

[66] For further information, see EPA, "Learn About New Source Review," November 19, 2024, https://www.epa.gov/nsr/learn-about-new-source-review.

[67] For the definition of a major stationary source, see 40 C.F.R. §51.165(a)(1)(iv)(A). Major stationary sources are subject to CAA Sections 111 and 129 (42 U.S.C. §§7411 and 7429) New Source Performance Standards (NSPS) and Section 112 (42 U.S.C. §7412) National Emissions Standards for Hazardous Air Pollutants (NESHAPs). These source category standards apply if the stationary source exceeds the major source threshold.

pollutant.[68] PSD permits are required for new or modified major sources proposed in attainment or unclassifiable areas.[69] Minor NSR permits are required for sources with potential emissions below major source thresholds.[70] Each state develops its own minor NSR program as part of its State Implementation Plan (SIP); the CAA requires EPA to review and approve SIPs.[71] Although EPA establishes the NSR requirements in federal regulations, most NSR permits are issued by state or local agencies under EPA-approved SIPs for states that have EPA-delegated authority.[72] Specific permit requirements and processes may vary depending on the size of a facility and the state where it is located.[73]

Data center electricity generation facilities with a potential to emit air emissions above certain thresholds generally require an NSR permit, but, to date, the majority of existing data center facilities have not required them. For example, of the over 660 data centers located in Virginia as of November 24, 2025, the Virginia Department of Environmental Quality (DEQ) listed 184 existing NSR permits and 21 active applications for new NSR permits associated with data centers in the commonwealth.[74] According to the agency, "the vast majority of data center permits issued by DEQ to date have addressed the diesel engines used by facilities as backup power systems."[75] Backup generators are typically classified as minor NSR facilities when they are intended to operate only rarely (i.e., during grid power disruptions) and for short periods of time.

Title V Operating Permits

Title V of the CAA requires states to administer a comprehensive permit program for the operation of sources that emit, or have the potential to emit, air pollutants.[76] Title V operating permits are legally enforceable documents issued to all major air pollution sources (and certain

[68] EPA, "Nonattainment NSR Basic Information," December 27, 2024, https://www.epa.gov/nsr/nonattainment-nsr-basic-information.

[69] EPA, "Prevention of Significant Deterioration Basic Information," December 27, 2024, https://www.epa.gov/nsr/prevention-significant-deterioration-basic-information. EPA designates an area as *nonattainment* if that area does not meet (or contributes to ambient air quality in a nearby area that does not meet) the National Ambient Air Quality Standard (NAAQS). *Attainment areas* are areas that meet the NAAQS, and *unclassifiable areas* are areas that cannot be classified on the basis of available information. For further information on the designation process, see EPA, "Process to Determine Whether Areas Meet the NAAQS (Designations Process)," November 5, 2025, https://www.epa.gov/criteria-air-pollutants/process-determine-whether-areas-meet-naaqs-designations-process.

[70] EPA, "Minor NSR Basic Information," January 3, 2025, https://www.epa.gov/nsr/minor-nsr-basic-information.

[71] For details, see EPA, "Basic Information About Air Quality SIPs," January 6, 2025, https://www.epa.gov/air-quality-implementation-plans/basic-information-about-air-quality-sips.

[72] EPA, "Delegation of Clean Air Act Authority," December 19, 2024, https://www.epa.gov/caa-permitting/delegation-clean-air-act-authority. Tribes may also assume delegated authority in accordance with the Tribal Authority Rule (TAR) under CAA Section 301 (42 U.S.C. §7601); for more information, see EPA, "Tribal Authority Rule (TAR) Under the Clean Air Act," March 18, 2025, https://www.epa.gov/tribal-air/tribal-authority-rule-tar-under-clean-air-act.

[73] See, for example, Virginia Department of Environmental Quality (Virginia DEQ), "Air Permits," https://www.deq.virginia.gov/permits/air; and Texas Commission on Environmental Quality (Texas CEQ), "Air NSR Permits: Index of Common Permitted Facilities," https://www.tceq.texas.gov/permitting/air/guidance/newsourcereview/nsr_fac_index.html.

[74] Data Center Map, "Virginia Data Centers," online mapping tool, https://www.datacentermap.com/usa/virginia/, accessed November 24, 2025; Virginia DEQ, "Issued Air Permits for Data Centers," web database, accessed November 24, 2025, https://www.deq.virginia.gov/permits/air/issued-air-permits-for-data-centers; and Virginia DEQ, "Active Air Permit Application List," spreadsheet, accessed November 24, 2025, available at https://www.deq.virginia.gov/permits/air.

[75] Virginia DEQ, *Data Center Air Permits Guidelines*, Clarification #2025-02, January 17, 2025, p. 7, https://www.deq.virginia.gov/home/showpublisheddocument/27430/638730583843800000.

[76] 42 U.S.C. §7661a.

smaller sources) that clarify what they must do to control their emissions.[77] Facilities that require Title V permits generally include major sources, such as large electric generation plants, that emit or have the potential to emit pollutants above the major source threshold, plus stationary and area sources that emit or have potential to emit lesser specified amounts of hazardous air pollutants.[78] Title V permits are generally issued by state or local agencies, although a small number may be issued by EPA.[79] The term of a Title V operating permit is typically limited to no more than five years and it can be renewed.[80] The Virginia DEQ has issued Title V permits for two data center projects (for backup generation) and is in the process of reviewing a third application for a data center Title V permit.[81]

Clean Water Act

Certain data center energy infrastructure projects could require water quality certification from state regulators under CWA Section 401 (33 U.S.C. §1341). Any applicant for a federal license or permit to conduct any activity that may result in a discharge into navigable waters (i.e., waters of the United States) is required to provide the authorizing agency with a Section 401 certification. The certification—usually by the state in which the discharge originates, but sometimes by EPA—attests that the discharge will comply with applicable provisions of certain enumerated sections of the CWA.[82] Energy infrastructure projects that typically require Section 401 certifications include hydropower projects licensed by FERC and pipeline projects involving the discharge of dredged or fill material into waters of the United States.[83]

Any discharge of dredge or fill material into waters of the United States associated with data center energy infrastructure projects would also require a CWA Section 404 permit (33 U.S.C. §1344). In most states, the Corps issues these permits, but two states—Michigan and New Jersey—are authorized to administer their own Section 404 permits in certain waters. These permits may be required if the development of a site involves discharges of dredged or fill material into wetlands or other waters of the United States, or if energy infrastructure projects require placement of fill at water crossings, for example.

The CWA also requires any point source, such as a generation plant, that will discharge pollutants into waters of the United States to obtain a National Pollutant Discharge Elimination System (NPDES) permit (33 U.S.C. §1342). The permits are issued by states under delegated EPA authority or by EPA in states without such authority. NPDES permits include discharge limits, monitoring and reporting requirements, and other provisions to protect water quality and public health.[84] Generation plants may need NPDES permits for a variety of discharges, including construction-related stormwater discharges, industrial stormwater discharges, and/or industrial wastewater discharges. For example, nuclear power plants and larger fossil fuel-fired generation

[77] For further information on Title V operating permits, see EPA, "Basic Information About Operating Permits," December 27, 2024, https://www.epa.gov/title-v-operating-permits/basic-information-about-operating-permits.

[78] See 40 C.F.R. §70.2, "Major Source," for the definition of a major source for the purposes of Title V operating permits.

[79] See Appendix A of 40 C.F.R. Part 70 for the approval status of state and local Title V operating permits programs.

[80] 40 C.F.R. §70.6(a)(2).

[81] Virginia DEQ, "Issued Air Permits for Data Centers," accessed November 24, 2025, https://www.deq.virginia.gov/permits/air/issued-air-permits-for-data-centers; and Virginia DEQ, "Active Air Permit Application List," spreadsheet, accessed November 24, 2025, available at https://www.deq.virginia.gov/permits/air.

[82] Tribes may also issue certifications, in some cases.

[83] For further details, see CRS Report R46615, *Clean Water Act Section 401: Overview and Recent Developments*, by Laura Gatz and Kate R. Bowers.

[84] EPA, "NPDES Permit Basics," June 3, 2025, https://www.epa.gov/npdes/npdes-permit-basics.

plants, like those proposed for the Homer City project (**Table 1**), may require NPDES permits for discharges, including cooling water discharges into nearby surface waters, because waste heat is a regulated water pollutant.[85] Constellation Energy Generation has submitted an NPDES permit renewal application to the Pennsylvania Department of Environmental Protection for various discharges into the Susquehanna River associated with its restart of a nuclear unit at Three Mile Island (**Table 1**).[86]

Safe Drinking Water Act

Carbon capture and sequestration—known as CCS—is a process to capture man-made carbon dioxide (CO_2) at its source and store it permanently underground. It is one option for reducing the amount of CO_2—an important greenhouse gas—emitted into the atmosphere from fossil fuel-fired generation.[87] Some advocates have characterized CCS as a potential "enabler for data center decarbonisation."[88]

Under the Clean Water Act, EPA issues permits for underground injection of CO_2 for carbon sequestration through its Underground Injection Control Class VI well program. EPA can issue and enforce these permits directly, or it may delegate its authority ("primacy") to states that apply for it and meet the necessary criteria.[89] Some data center energy projects, such as the Crusoe/Tallgrass Energy project in Wyoming (**Table 1**), propose capturing and sequestering CO_2 from new natural gas-fired generation plants to reduce their greenhouse gas emissions. Meta has likewise reportedly committed to fund CCS technology development at an Entergy power plant as part of its proposal for a new data center in Louisiana.[90] Both Wyoming and Louisiana have Class VI well primacy, so these two projects would require state permits for associated sequestration sites within the respective states.

Coastal Zone Management Act

Under the Coastal Zone Management Act (CZMA; 16 U.S.C. §§1451-1466), participating states or territories can perform reviews of federal agency actions (e.g., issuing permits) in coastal areas to ensure consistency with their federally approved coastal management programs. Project developers proposing an activity pursuant to a federal permit in or near coastal zones must submit a consistency determination to the potentially affected state agency confirming that the proposed activity is consistent with the state's coastal policies. The state agency then conducts a consistency determination review. These reviews are context-specific, depending on the location

[85] Heat is included under the definition of pollutant at 33 U.S.C. §1362(6). CWA Section 316(b) (33 U.S.C. §1326) also requires that NPDES permits for facilities with cooling water intake structures ensure that the location, design, construction, and capacity of the structures reflect the best technology available to minimize harmful impacts on the environment. See EPA, "Cooling Water Intakes," https://www.epa.gov/cooling-water-intakes.

[86] Constellation Energy Generation, LLC, "Re: TMI-1 NPDES (PA0009920) Permit Renewal Application Resubmittal," submittal to the Pennsylvania Department of Environmental Protection, March 7, 2025, https://files.dep.state.pa.us/RegionalResources/SCRO/SCROPortalFiles/Community%20Info/Crane_Clean_Energy/2025.03.07%20PA0009920%20Constellation%20TMI-1%20NPDES%20Application%20Resubmittal.pdf.

[87] For more information, see CRS Report R44902, *Carbon Capture and Sequestration (CCS) in the United States*, by Angela C. Jones and Ashley J. Lawson.

[88] Global CCS Institute, "Role of CCS in US Data Centre Decarbonisation," March 18, 2025, https://www.globalccsinstitute.com/role-of-ccs-in-us-data-centre-decarbonisation/.

[89] To date, Louisiana, North Dakota, Texas, and Wyoming have Class VI well primacy. Arizona and West Virginia are in the primacy process.

[90] Entergy, "Entergy Louisiana to Power Meta's Data Center in Richland Parish," press release, December 6, 2024, https://www.entergy.com/news/entergy-louisiana-to-power-metas-data-center-in-richland-parish.

and action in question, with different rights and responsibilities assigned to the federal agency, developers, and states involved. If the state concludes that the proposed action is inconsistent with its policies and subsequently objects to the project, the federal agency may not grant the permit in question, although the Secretary of Commerce may override the objection on appeal.[91] Data center-related energy infrastructure projects involving federal permits, such as coastal electric generation plants seeking Corps permits, may therefore require state review and consistency certification under the CZMA.[92]

Considerations for Congress

President Trump and some in Congress have advocated for a rapid expansion of U.S. data center capacity—especially to meet projected AI needs—and the energy infrastructure required to operate it.[93] Access to reliable electricity supplies may be the principal physical constraint on data center expansion—determining where these centers may be built, how quickly, and at what cost. In the face of this potential constraint, developers are pursuing different facility configurations to ensure they will have the electricity they need when they need it. Permits for data center energy infrastructure are a policy focus in Congress. Building the energy infrastructure that data centers may need for continued expansion may become more difficult as this infrastructure grows in number and size, has greater impact on the U.S. grid, and faces more public scrutiny.[94] The potential impacts of data center growth on electricity rates for consumers is an emerging area of concern.[95]

Understanding the extent to which federal permit requirements may affect data center expansion requires clarity about federal jurisdiction. The federal permitting nexus can vary significantly across projects depending on their locations and the types of infrastructure involved. Some projects will require permits directly from federal agencies, others will require permits only from state agencies under federal delegation, and still others will require a mix of the two. As the size of a data center increases, it could be that its associated energy infrastructure will require some kind of existing federal approval. Thus, under the status quo, the significance of energy infrastructure permitting for data center development is determined on a case-by-case basis.

No universal permit exists for data center energy infrastructure. The requirements and processes for the various permits currently required under federal law may warrant particular attention in

[91] For more details, see CRS Report R45460, *Coastal Zone Management Act (CZMA): Overview and Issues for Congress*, by Eva Lipiec.

[92] For an example of a data center project (including an electrical substation) that required a CZMA consistency review, see U.S. Army Corps of Engineers, Norfolk District, NAO-2020-00426 (MNZ01 Data Center, Prince William, Virginia), Federal public notice, March 31, 2023, https://www.nao.usace.army.mil/Media/Public-Notices/Article/3346971/nao-2020-00426-mnz01-data-center-prince-william-virginia/.

[93] See, for example, Sen. Dave McCormick, "Senator Dave McCormick Applauds Amazon's Record-Setting Investment in Pennsylvania," press release, June 9, 2025, https://www.mccormick.senate.gov/press-releases/senator-dave-mccormick-applauds-amazons-record-setting-investment-in-pennsylvania/.

[94] See, for example, Ryan Murphy and Emily Feng, "Why More Residents Are Saying 'No' to AI Data Centers in Their Backyard," National Public Radio, July 17, 2025, https://www.npr.org/2025/07/17/nx-s1-5469933/virginia-data-centers-residents-saying-no; and Charles Paullin, "Report Highlights Community Pushback Stalling $64 Billion in Data Center Development Nationwide," *Virginia Mercury*, May 21, 2025, https://virginiamercury.com/2025/05/21/report-highlights-community-pushback-stalling-64-billion-in-data-center-development-nationwide/.

[95] House Committee on Energy and Commerce, Democratic Staff, "E&C Democratic Leaders Demand FERC Protect Families from Skyrocketing Energy Bills as Data Centers Strain Power Grid," press release, December 5, 2025, https://democrats-energycommerce.house.gov/media/press-releases/ec-democratic-leaders-demand-ferc-protect-families-skyrocketing-energy-bills; Josh Saul et al., "AI Data Centers Are Sending Power Bills Soaring," *Bloomberg Technology*, September 29, 2025, https://www.bloomberg.com/graphics/2025-ai-data-centers-electricity-prices/.

broader congressional initiatives around "permitting reform." Bills in the 119th Congress, such as the Standardizing Permitting and Expediting Economic Development (SPEED) Act (H.R. 4776), the ePermit Act (H.R. 4503), and the Promoting Efficient Review for Modern Infrastructure Today (PERMIT) Act (H.R. 3898), among others, could affect the requirements or processes for federal permitting of energy infrastructure. If implemented by Congress, such overarching reforms could benefit data center energy infrastructure along with energy infrastructure more broadly. If Congress views the development of energy infrastructure for data centers as a distinct national priority, it could consider changes in federal permitting laws specific to this infrastructure. Alternatively, Congress could preserve the statutory status quo while paying particular attention to data center energy development to determine if changes to federal law or agency oversight might be needed in the future. Given the diversity of proposed data center projects and energy facilities, understanding how legislative proposals such as the Securing Reliable Power for Advanced Technologies Act (H.R. 5927) might affect specific types of energy infrastructure could be of particular interest to Congress.

Key Policy Staff

Permits for data center energy infrastructure may involve numerous federal authorities, agencies, and policy issues. For further information and analysis, the following table lists the names and contact information for key CRS staff with specific expertise to assist Congress.

Policy Area	Name/Title
Data center development; artificial intelligence (AI) infrastructure	**Ling Zhu** Analyst in Telecommunications Policy
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Nuclear energy; Nuclear Regulatory Commission (NRC)	**Mark Holt** Specialist in Energy Policy
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Non-federal hydropower	**Kelsi Bracmort** Specialist in Energy Policy
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Clean Water Act; U.S. Army Corps of Engineers permits	**Laura Gatz** Specialist in Environmental Policy
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Carbon capture and sequestration	**Angela C. Jones** Specialist in Environmental Policy
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