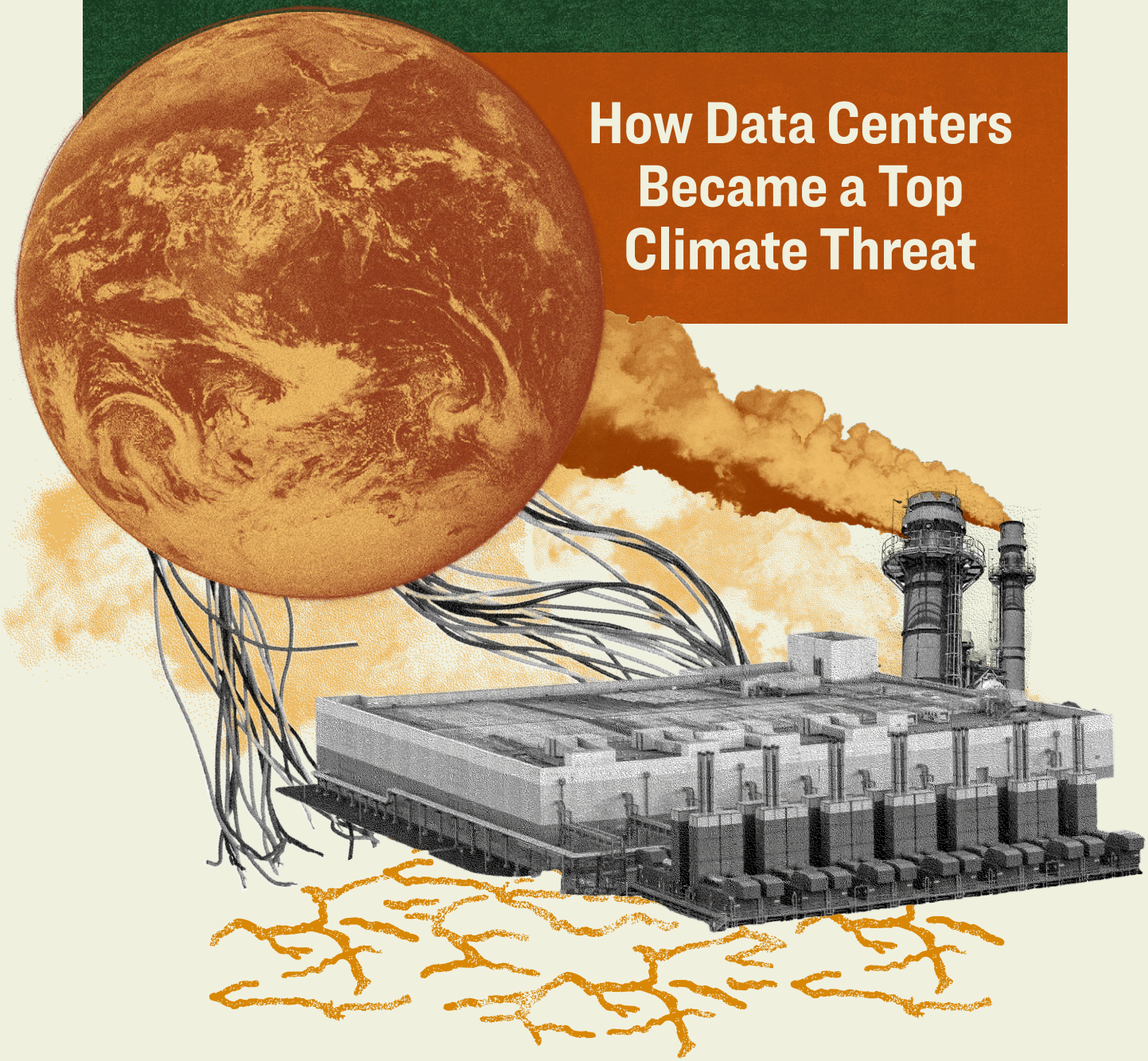
ARTIFICIAL INTELLIGENCE, REAL POLLUTION

How Data Centers Became a Top Climate Threat



SIERRA CLUB

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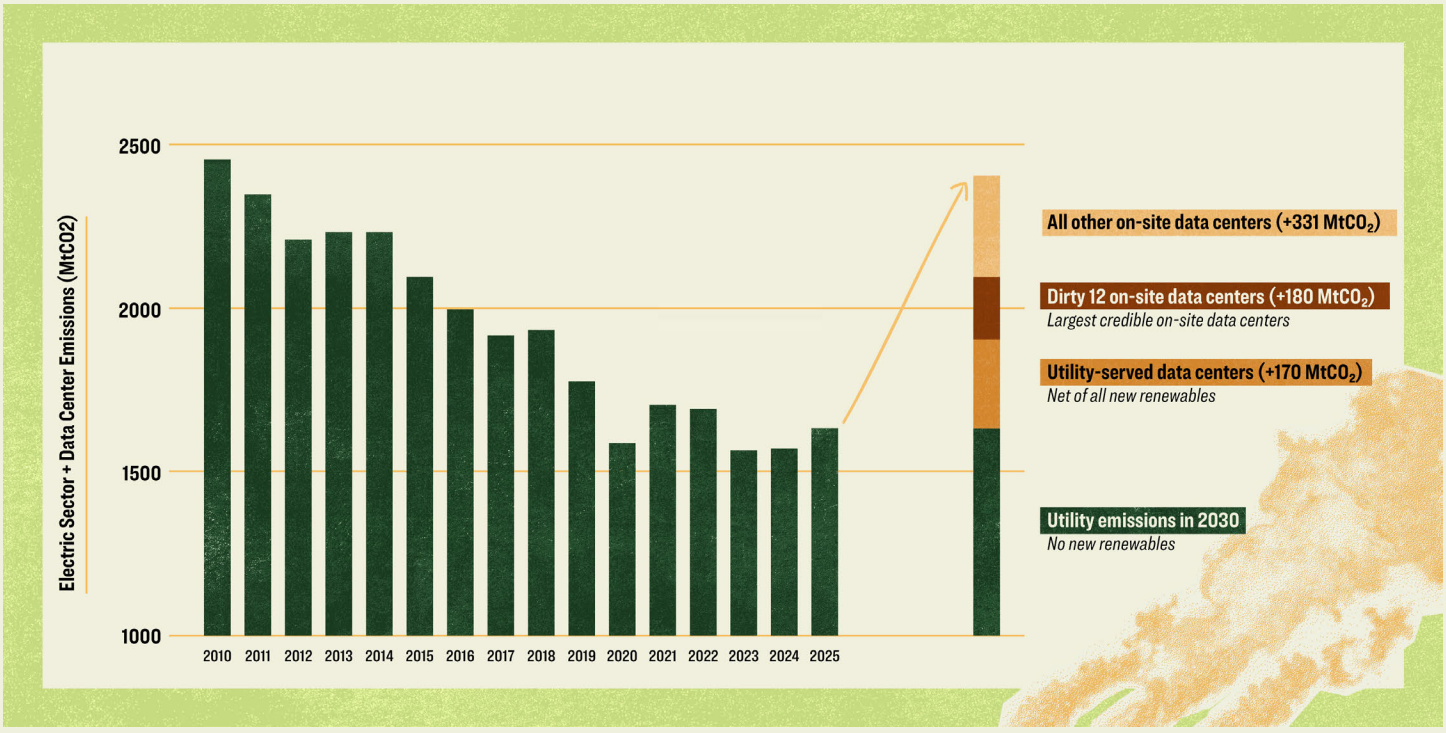
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Data Centers Could Erase 15 Years of U.S. Climate Progress

The rapid growth of large-scale data centers for artificial intelligence (AI) training and processing could undo 15 years of climate pollution reductions in the U.S. in just three years, largely driven by the rush to build new gas plants intended to serve data centers.

By 2030, the U.S. electric sector could emit 2,316 million tons of carbon dioxide (CO_2) emissions. As proposed, we are seeing data center campuses that will demand more electricity than entire states, and data center developers and utilities are reaching for fleets of gas-fired power plants, on-site diesel generators, and even coal plants pulled out of retirement. The pollution reductions and climate gains over the last 15 years were primarily achieved by retiring coal-burning power plants and replacing them with clean energy.[1] The climate pollution associated with data centers is happening more rapidly than anyone predicted.



Electric sector CO_2 emissions from 2010-2025 (dark green) from EPA Clean Air Markets Program Database, includes any utility-served data centers to 2025. All new zero-emissions resources online by 2030 are accounted for in utility-served data centers (orange). The Top 12 Polluting Data Centers demand and emissions are incremental from permit applications. All other on-site data centers filtered from Environmental Integrity Project database to exclude utility-served projects potentially included in the utility projections. For a complete methodology, refer to **Appendix 1**.



Monarch Compute Campus under construction in Mason County, West Virginia.
Photo: Roger May

The rapid buildout of super-sized data centers is not only driving up climate emissions, it also has ramifications for local air quality. Exploiting loopholes in federal air safety regulations in their rush to be operational—and at times allegedly violating those regulations outright[2] — certain data center developers are preparing to build some of the most polluting facilities in the country. These data center projects prioritize on-site diesel and gas generators that will negatively impact air quality in nearby communities, and are further detailed in the Top 12 Polluting Data Centers section below.

> **The race to power AI threatens our climate and the air we breathe, and we must move to enact guardrails with urgency.**

This report is not an argument about the ethics of AI; it is about how the machines behind it are powered, and how those decisions will impact our future, unless we enact guardrails expediently. It is a call to affirmatively stop locking in fossil fuels before it is too late, and implement the critical measures required to preserve our hard-fought climate and air pollution progress. The data centers that do get built must be transparent and accountable, utilize around-the-clock, local, additional clean energy, and address local community concerns, including those around water use, which is often associated with the same gas power plants at issue in this report.

Data Centers are Driving A Rush to Gas

The evidence is unequivocal: **the proposed buildout of data centers is driving massive new investments in gas, diesel, and coal power plants,**[3] and setting back critical climate benchmarks.[4] Data center developers, and utilities that are gearing up to serve data center loads, have increasingly turned to new gas-fired power plants — and are even keeping aging coal plants online.

Gas has become the default for many utilities and data center developers,[5] including both utility-served and on-site projects. Several utilities and private power plant owners

have announced plans to delay coal plant retirements to meet data center demand,[6] and the Trump administration has promoted reviving coal to power AI[7] while undermining clean energy development and slashing public health safeguards.[8]

Sierra Club's gas plant tracker shows more than **550 new gas-fired power plants** planned or under construction, representing 351 GW of utility-served electric capacity,[9] or a nearly 40 percent increase in the capacity of gas-fired power plants.[10] We conservatively estimate that at least one-third of this gas capacity is intended to serve data center load growth. In addition, developers and energy providers have announced up to 138 GW of on-site, or behind-the meter, gas for data centers.[11]

> **Combined the gas capacity projected for data centers alone (nearly 250 GW) is enough to power 75 percent of all residential demand in the U.S. — i.e. three-quarters of all U.S. homes.[12]**

The coming gas fleet is not just 'peaker' plants meant to provide power for a few times a year when demand on the grid is high. They are being built to run around-the-clock, which means they will pollute around-the-clock. The buildout of data centers, and the power plants meant to serve them, is happening at breakneck speeds and is layered in uncertainty.

Notably, the energy requirements of new data centers could be met largely with renewable energy. The projected demand from both utility-served and all on-site data centers tracked here is about 1,790 TWh, about 80 percent of **all** wind, solar, and geothermal projects in US interconnection queues today.[13] Historically, only a fraction of projects in the queue come to fruition, but the scale of the proposed buildout could consume every increment of proposed new renewable energy.

'Utility-served' vs. 'on-site' data centers
Throughout this report, we use the term **"utility-served"** data center to mean any data center that is directly interconnected to a regional transmission system, and reliant on system generation to meet its energy requirements. These data centers may be served by vertically-integrated utilities or through wholesale markets, and may even have physical power purchase agreements (PPAs) with specific resources, but are taken into consideration as a system demand by utility balancing authorities.

In this report, the term **"on-site"** gas for a data center refers to energy campuses meant to serve data centers that are either entirely on-site (i.e. not interconnected to utility transmission systems) or are largely behind-the-meter generation resources or microgrids (i.e. behind the point of utility interconnection) or are co-located with data center.


Photo: Hrach, Adobe Stock

Gas-Powered Data Centers Will Reverse Climate Progress on the Electric Grid

Between 2015 and 2025, CO_2 emissions from utility-served power plants fell by over 460 million short tons (22 percent)[14] as utilities replaced aging coal infrastructure and brought significant amounts of renewable energy and storage online.

The rush to serve data centers has both utilities and data center developers turning back to fossil fuel power plants. Based on end-of-year 2025 demand projections, we conservatively estimate that **grid emissions will grow by 170 million tons of CO_2 by 2030 from utility-served data centers alone, erasing roughly 6 years of U.S. climate progress,** even accounting for renewable energy additions.[15]

We derive our emissions estimate from projections by the nation's grid operators, who now expect a 20 percent increase in electricity demand by 2030, and attribute the vast majority of that growth to data centers.[16] Here is the problem: **the entire national total of new non-emitting generation through 2030—every solar, wind, geothermal, hydro etc. project on the books—covers barely a third of that projected growth.**[17] Many data center developers are also working to add clean energy to power their operations, but it's simply not enough. Even if we assume that every clean energy project in the country goes toward serving new data centers (instead of homes and existing businesses), two-thirds of the new demand, 380 million megawatt hours (MWh), will come from existing coal and gas plants running more often, and new gas plant operations.

> **As a result, utility-served data centers will increase electric sector emissions by 170 million tons CO_2 by 2030.**

(For full methodology, **see Appendix 1: Grid Load Growth Emissions Methodology).**

Our estimate forms a mid-point between other modeling studies. Other recent studies project incremental emissions from utility-served U.S. data centers of 200-460 million short tons CO_2 by 2030.[18]

Holding all else equal, the emissions increase attributable to utility-served data centers by 2030 is equivalent to the electric sector emissions reductions achieved in the U.S. from 2019 to 2025.



Photo: Ann Bennett

On-site Gas-Fired Data Centers Pose an Urgent New Climate Threat

One of the largest looming threats to U.S. climate progress is the rapid rise of on-site fossil-fired data center campuses. We estimate that **just the twelve highest emitting on-site gas proposals are permitted to emit up to nearly 180 million short tons of CO_2 when developed**[19] — equivalent to the combined electric sector emissions of Florida and Pennsylvania.

All of the data center projects here have announced an intention to build on-site fossil generation, and (with the exception of one site) have filed air permit applications required to build emitting facilities. We count only the capacity and emissions under consideration in permits, or for which we have a high level of confidence. At least two sites, Monarch and PORTS, have announced intentions to scale well beyond current permits or applications, which means total permitted emissions could be substantially higher in the future. **Together, these 12 projects alone represent over 45 GW of proposed gas generation, more than the capacity of all gas plants built nationwide since 2019.**[20]

Proposals for on-site gas data centers have become prevalent as utilities, grid operators, and regulators increasingly raise concerns about grid stress and electricity cost increases brought about by utility-served data centers.

The Top 12 Polluting Data Centers: Climate Emissions From On-Site Gas-Fired Data Center Proposals

Site Name	Location	Capacity (MW)	Proposed Emissions ($MtCO_2$)
Project Matador / Fermi America	Carson County, TX	11,280	39.9
GW Ranch	Pecos County, TX	7,650	33.2
Nexus - Apex DFW HB1	Hill County, TX	7,227	22.7
Project Kilby / Energy Forge One	Reeves County, TX	2,595	11.6
Monarch Compute Campus	Mason County, WV	2,160	11.1[a]
VoltaGrid ABI-1	Shackleford County, TX	2,582	10.6
Project Tembo / Project Jade	Laramie County, WY	2,758	10.5
Project Jupiter	Dona Ana County, NM	2,462	8.8
Project Roman	Deaf Smith County, TX	1,474	8.4
Stargate 1 / Project Longhorn	Taylor County, TX	2,119	8.4
PORTS Technology Campus	Pike County, OH	1,770	7.5[b]
Colossus - Southhaven	DeSoto County, MS	1,241	6.7[c]
		45,317	**179.5**

Data from Environmental Integrity Project, September 2026, with modifications.

[a]Monarch air permit application is for 2.1 GW only; the developer has proposed expanding to 8 GW.

[b]PORTS facility has not yet applied for an air permit, represents first phase application before Ohio PUC. The developer has proposed expanding to 9.2 GW.

[c]Southaven facility air permit only specifies emissions per unit of fuel burn. Total assumes 90% capacity factor operation.

Top 12 Dirtiest On-site Data Center Projects



For example, in January 2026, the North American Electric Reliability Corporation (NERC) warned that "Projections for resource and transmission growth lag what is needed to support new data centers and other large loads that drive escalating demand forecasts," and in May issued a rare "Level 3" alert, identifying that sudden swings in load at super-sized data centers could introduce critical instabilities into the electric grid.[21]

Data center developers and merchant energy providers have turned to building their own generation, almost always in the form of new gas power. In most of these cases, real estate developers or energy providers push forward proposals to create a ready-made data center campus. Developers then solicit data center anchor tenants to legitimize the build. In many cases, the developer races to acquire generation or transmission infrastructure, air permits (or exemptions from air permits), and land in hopes of flipping a property to a technology company.

The Top 12 Polluting Data Centers are just the tip of the on-site gas iceberg. As of July 2026, the Environmental Integrity Project (EIP) tracked nearly 143 GW of on-site gas proposals.[22] As of August 2026, Global Energy Monitor tracked up to 150 GW of on-site gas data center proposals in the U.S.[23] By September 2026, EIP had tracked 98 on-site gas projects for data centers representing 154 GW of on-site gas generation.

Working from EIP's tracking,[24] **all on-site gas plants for data centers could emit up to 510 million tons CO_2 annually, equivalent to about 1/3rd of all U.S. electric sector emissions in 2025, and bring U.S. emissions back up to levels not seen since 2015.**

Data Centers are Threatening Air Quality

Large data centers — utility-served and those served by on-site gas — are becoming air pollution hotspots. Air pollution sources include both on-site backup diesel generators already running today and the around-the-clock fossil plants now moving through permitting. These oil- and gas-burning facilities release hundreds, or even thousands, of tons of harmful pollutants, including ozone precursors like oxides of nitrogen (NOx) and fine particulate matter ($PM_{2.5}$) that exacerbate asthma, increase the risk of heart attacks and strokes, and result in hospitalizations and premature mortality.[25]

Superclusters of Data Centers Could Emit as Much Air Pollution as a Coal Plant

Almost every data center employs backup diesel generators to support strict reliability requirements. Unlike the small generators that other businesses, hospitals, and critical services keep around, the backup generators at data centers are each big enough to power whole neighborhoods (between 2.5 and 4 MW each), and data centers deploy anywhere from dozens to hundreds at each site. Each backup generator has the equivalent power of 7-8 diesel trucks.[26] Each uncontrolled generator may emit as much NOx (oxides of nitrogen), a smog-forming pollutant, as nearly 300 diesel trucks per year, and as much PM (fine particulates) or soot as 90 diesel trucks.[27] These emissions can have acute health impacts, such as respiratory and cardiac damage.

The cumulative permitted emissions from backup diesel generators are rising to levels that rival emissions from coal plants. A Sierra Club survey of data centers in Virginia[28] found 176 permits covering more than 10,000 diesel generators at data centers as of April 2026. **Those permits allow over 13,000 tons of NOx per year, more than the emissions of the largest coal plants in the country.**[29] At their permit limits, these generators could cause between 126 to 177 premature deaths per year, along with thousands of hospitalizations and lost work days.

While backup generators are typically permitted for emergency purposes only, they may be used under times of grid stress, which has increasingly been brought about by data center demands. For example, in just the first half of 2026, the Department of Energy issued 14 different emergency 202(c) authorizations to allow grid operators to deploy backup generators at data centers to meet what the Department deemed reliability issues.[30]

The vast majority of air permits are issued under "minor source" provisions, which regularly shield applicants from public review. Data centers are generally not required to report how often they operate backup generators, or the emissions from those generators. In some cases, data centers are not even required to report operations to the state, and instead are just required to maintain their own records if air agencies elect to audit them.

Sierra Club's Virginia backup generator survey shows a particular trend: of the 176 permits, 174 of them are minor source permits, effectively promising not to emit more than 100 tons of harmful pollutants every year, even though the equipment is capable of far exceeding that amount. Each permit, on paper, is minor. Where data centers cluster, the cumulative impact is anything but.

> **Between August 2022 and January 2025, Amazon received five different permits for 16 different data centers—476 tons of NOx and 22 tons of PM, all within a one mile radius.[31]**

In Virginia, Amazon alone holds 49 permits for data center facilities with an aggregate emissions limit of almost 4,000 tons of NOx (equivalent to the actual emissions of a large coal plant). Some of these facilities sit as close as half a mile apart on separate permits. Built adjacently, a cluster like this would need a single major-source permit, with public notice, agency scrutiny, and reporting. Spaced just far enough apart, they require only a pro-forma review.

Promising to stay under "major source" limits can relieve companies from reporting requirements, public scrutiny, agency review, and other requirements under the Clean Air Act. Virginia, like almost every other state in the nation, provides no opportunity for the public to weigh in before issuing a minor source permit,



and almost every data center looks to use this loophole when siting on-site fossil generators. To date, only Virginia has systematically published data center minor source air permits.[32] Some states do not provide access to minor source air permits without a special request, and in many cases the permits are issued to shell companies or affiliates designed to hide the data center owner. In July 2026, the Trump EPA proposed removing all federal requirements for public participation in minor source air permit review,[33] which would hide these emissions from the public entirely.

The scale of the diesel generator buildout for data centers is enormous. Sierra Club's assessment found permits for 27 GW of backup generation at data centers in Virginia alone,[34] **more than Virginia's electricity peak demand in 2025.**[35] As a rough rule, we can estimate that on-site backup generation roughly mirrors online data center capacity, about 92 GW today. The numbers bear out from the suppliers of diesel generation equipment, which are reporting and projecting significant growth.[36]

On-Site Gas-Fired Data Centers Could Create Pollution Hotspots

The on-site gas proposals for data centers could become not only some of the largest sources of new climate pollution in the country, but some of the largest sources of air pollution in the country.

SpaceX's (previously xAI) Colossus facility in Memphis is perhaps the most well-known example, which installed 59 allegedly unpermitted gas turbines at the facility.[37] Its on-site gas generators in Tennessee and Mississippi are the subject of ongoing legal action,[38] in which the Trump administration moved to dismiss the suit on SpaceX's behalf in June 2026.[39] In May 2026, SpaceX announced it signed a deal to allow Anthropic to use the Colossus data center.[40]

The rest of the Top 12 Polluting Data Centers are not far behind. Filed and finalized air permit applications across the 12 sites show anticipated emissions of 13,000 tons of NOx, nearly 6,400 tons of fine particulate matter, and 1,800 tons of hazardous air pollutants (HAPs). HAPS are a special category of pollutants that are known or suspected to cause cancer or other serious health effects.[41] EPA defines a major source of HAPS pollution as any facility with the potential to emit over 10 tons per year of any single HAP, or 25 tons per year combined HAPs.[42]

The Top 12 Polluting Data Centers: Criteria and Hazardous Emissions From On-Site Gas-Fired Data Center Proposals (in tons per year)

Site Name	Location	NOX (tpy)	$PM_{2.5}$ (tpy)	HAPS (tpy)
Project Matador / Fermi America	Carson County, TX	3,440	1,772	197
GW Ranch	Pecos County, TX	2,830	991	[a]
Nexus - Apex DFW HB1	Hill County, TX	1,550	1,298	[a]
Project Kilby / Energy Forge One	Reeves County, TX	1087	739	139
Project Roman	Deaf Smith County, TX	989	19	618
Project Tembo / Project Jade	Laramie County, WY	849	663	38
Stargate 1 / Project Longhorn	Taylor County, TX	722	383	44
VoltaGrid ABI-1	Shackleford County, TX	570	378	[a]
Monarch Compute Campus	Mason County, WV	506[b]	39[b]	620[b]
PORTS Technology Campus	Pike County, OH	[c]	[c]	[c]
Colossus - Southhaven	DeSoto County, MS	423	20	19
Project Jupiter	Dona Ana County, NM	37	75	1
		13,003	**6,378**	**1,806**

Data from Environmental Integrity Project, September 2026, with modifications.
[a]Air permit or air permit application does not contain limits or estimates of HAPS.
[b]Based on air permit application for 2.1 GW segment only. The entire facility is expected to be 8.1 GW.
[c]Facility has not filed for an air permit.

The extraordinary levels of hazardous pollution from the Project Roman and Monarch Compute Campuses put these two facilities in categories of their own. Against EPA's 25-ton major-source threshold, Project Roman and Monarch's applications each propose over **600 tons of HAPs per year.** Monarch's application breaks down the multitude of HAPS, and could emit 277 tons of formaldehyde,[43] a known carcinogen,[44] and more than any other facility in the United States reported to EPA's most recent National Emissions Inventory (NEI)—more than gas storage facilities, refineries, military installations, or gas liquefaction plants.[45] The application also proposes emitting up to 135 tons per year of acetaldehyde, a strong irritant and potential carcinogen, and 83 tons per year of acrolein, a respiratory irritant. **The hazardous emissions from Monarch would exceed all other sources that report to EPA,** making it one of the most toxic sources in the country.

In West Virginia alone, data center infrastructure developers have applied for permits for nearly 10 GW of data center campuses served by on-site gas,[46] including the Monarch Cloud Campus. Two facilities, both named Adams Fork, are each permitted to emit nearly 200 tons of particulate matter.

Other supersized projects are poised to become major air hazards unto themselves. Fermi America's Project Matador outside of Amarillo, Texas, has put forward two separate air permit applications to build a staggering 141 single or combined-cycle gas generators that could generate more than 10 GWs of power, proposing to emit nearly 40 million tons of CO_2 (exceeding even the largest coal plants) and 1,772 tons of toxic particulate matter annually.[47]

Some data center developers are aware that their air emissions could lead to local impacts, and have taken action to head off both legal and community opposition. In late 2025, a Sierra Club records request to the U.S. EPA revealed that a new entrant data center energy developer, Thunderhead, submitted 11 requests to the Trump administration for exemptions from Clean Air Act requirements for a total of 23 GW of generation.[48] In Santa Teresa, New Mexico, Project Jupiter initially split its proposed on-site gas into two smaller air permits at either end of the campus in an attempt to fall under public review thresholds (under public pressure, the facility has since withdrawn and reissued permits for fuel cells instead).



On-site gas plants for Stargate Data Center in Taylor County, Texas
Photo: Rick Baraff

The Path Ahead: Guardrails on Data Centers to Avoid Climate Backsliding and Protect Public Health

Public opposition to data centers is increasing: seventy-five percent of Americans now indicate that they oppose local construction of data centers,[49] with 50 percent of those citing some form of environmental concern. This report adds additional credibility to these concerns as we grapple with the scale of fossil fuel emissions contributing to climate backsliding and local air pollution.

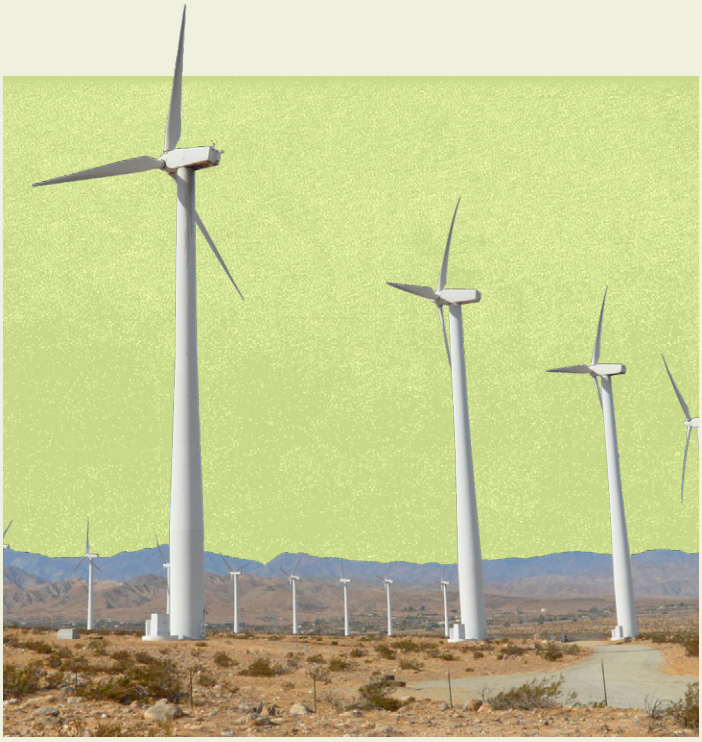
The public outcry and local organizing against data centers are increasingly leading to the cancellation of data center projects. Tracking organizations recorded 20 data center project cancellations in the first quarter of 2026 alone, estimating that they accounted for an enormous 3.5 gigawatts (GW) of electricity demand.[50]

The industry needs regulations, guardrails, and limitations that protect the climate and nearby communities. These guardrails have the additional benefit of protecting consumers, both from short-run cost-shifts and long-run fuel cost increases. While the landscape of broad AI regulation changes rapidly (which falls outside the scope of this report), we can make significant strides towards developing new industries—of many forms—without sacrificing community health, wealth, and our shared environment. Moreover, our guardrails could level the playing field and offer a "no regrets" pathway of deploying the clean energy that will be needed to decarbonize the grid and prevent locking in risky new gas plants.

Sierra Club's 2024 paper **Demanding Better** laid out the basic framework for data center companies to become better actors on climate and pollution.

> **Here, we reaffirm the growing urgency to impose guardrails on an industry choosing to rapidly wind back climate and pollution progress.**

The guardrails here address only a subset of issues important to the data center buildout, and do not address very real concerns around noise, zoning, tax incentives, or community benefit agreements.



Climate: Drive Additional, Local Clean Energy Around-the-Clock

To support a livable climate, data centers should be required to meet their energy needs at all times with new, additional, local renewables, storage, and demand management. Policies that drive clean energy development also shield electricity customers from long-term fuel cost inflation and price spikes — a no-regrets solution for the grid regardless of whether the data center buildout ultimately materializes.

Investing in clean energy rather than gas, diesel and coal power to meet data center demand not only maintains progress towards a livable climate, but is also lower cost over the long run and less risky because it protects customers from fuel cost volatility, like that brought about by extreme weather or international conflict.[51] A recent assessment finds that amongst other actions,

> **Tripling solar and doubling wind on the grid would meet U.S. electricity demand even with moderate data center growth, while reducing CO_2 emissions 25 percent below 2025 levels and reducing average electricity costs by more than $5 billion annually**

relative to a scenario that locks in coal plants and limits clean energy development.[52] Another study finds that concerted data center investments to replace coal with clean energy could result in 22 percent emissions reductions by 2035 (relative to 2024).[53]

There are some cases where technology companies have elected to build new, local clean energy and storage expressly to meet data center requirements. Unfortunately, those clean energy deals remain the exception, not the norm. The guardrails holding technology companies to a higher standard on clean energy are based on state renewable requirements or climate policies, consumer accountability standards and tariffs, and stricter air permitting requirements.

New and additional:
Data centers must drive new clean energy projects that would not otherwise exist, and not simply claim credit for previously planned or already-developed projects.

Local:
Data centers must strengthen the system where they interconnect, even where doing so is harder or more expensive, rather than claiming credit for distant projects sited where renewables are cheap.

At all times:
Data centers must invest in technologies that support meeting their requirements around the clock, like storage or clean baseload technologies.

1. Reinforce compliance with existing state clean energy standards

States with clean energy or renewable standards, or explicit climate goals, should ensure data center load growth does not undermine those goals, whether by straining the ability of utilities to meet clean energy requirements, allowing data centers to bypass regulated utilities, or enabling off-system fossil-fired campuses. States should make clear that complying with clean energy and climate standards is a condition of interconnection.

Example: In **Oregon,** Portland General Electric's large load tariff requires that data center customers demonstrate that their interconnection will not undermine compliance with the state's clean energy goals.[54]

2. Require complete or substantial clean energy for large loads

Even without an overarching clean energy standard, states can set clean energy requirements specifically for large loads and data centers, mandating that some or all of their energy and capacity needs be met with new, additional clean energy. States can condition interconnection or energization on those clean energy projects actually coming online, or provide a more streamlined route to interconnection for clean and community-engaged data centers.

Examples: Delaware HB 445 (June 2026) requires that new data center customers procure sufficient renewable energy upon energization sufficient to meet the state standard at the end of their anticipated useful life (e.g. meet 2050 standards in 2030 if the data center has a 20-year life).[55] **Oregon's** implementation of the POWER Act, HB 3546 (June 2025),[56] requires that data center load may not undermine the state's rigorous carbon reduction requirements. As a result, large load tariffs from both of the state's investor-owned utilities will require clean energy for all new data center loads.

3. Require data centers to Bring Your Own New Clean Energy

States can require data centers to contract for or develop new clean energy projects to serve their own energy and capacity needs. This applies whether the data center is utility-served and served by grid resources, or uses on-site generation. Data centers can also be required to contribute to capacity requirements through consumer energy efficiency programs.

Example: Tennessee proposed HB2463 / SB2681 (2026) would require data centers over 100 MW to serve at least half of their energy demand through new, carbon-free resources on-site or directly interconnected to the facility.

4. Require utilities to offer clean transition tariffs or clean energy riders

States can require that utility contracts with data centers include provisions requiring, or at least offering, pathways for data centers to procure new, proximate renewable energy to meet customer loads. These can be stand-alone tariffs, or riders on existing large customer tariffs.

Examples: In March 2025, NV Energy **(Nevada)** successfully secured the generic first clean transition tariff,[57] used to support a Google agreement with enhanced geothermal developer Fervo. **Colorado** proposed SB 102 would have required data centers to procure 100 percent renewable energy by 2031.[58] Utilities Evergy and Ameren in **Kansas** and **Missouri** introduced large load tariffs with robust clean energy riders,[59] allowing large customers to pay the incremental cost of new clean energy to serve their requirements.

Consumers: Slow Speculation and Hold Data Centers Accountable for Risk and Cost

Curbing speculative data center development is critical to both align development with real demand and to protect consumers from stranded-asset risk (i.e. the risk of building for data center customers that do not transpire or abandon a site after starting) and rushed utility planning. Limiting development to projects backed by real, long-term financing reduces

the pressure to rush turnkey fossil projects and helps protect electric utility customers.

5. Implement stringent large load tariffs

States should require utilities to adopt large load tariffs that clearly define terms of service for data centers: long contract terms, minimum bills regardless of actual usage, termination or exit fees that recover utility costs, and collateral requirements that protect the utility and existing customers if the project fails. These terms act as a high-level filter against speculative development.

Examples: Large load tariffs have been established in **Indiana, Kansas, Missouri, Ohio, Oregon,** and **Wisconsin,** amongst other states. As of this writing, a database of emerging and established large load tariffs is maintained by Smart Electric Power Alliance.[60]

6. Require tariffs or contracts that fully allocate all new infrastructure costs to data centers

State regulators should require tariff structures or contract terms that assign data-center-driven infrastructure costs, including generation, transmission, and distribution, to data center customers. These terms help ensure that other customers, including residential and small businesses, are not saddled with the boutique costs of serving data centers.

Example: Wisconsin Electric Power Company's coupled Very Large Customer and Bespoke Resources Tariffs seek to allocate the costs of new generation, transmission, and distribution required to serve data center customers to those customers directly.[61] **New Jersey** Data Center Fair Share Act (S731/A796) creates a separate customer class for data centers, and requires take-or-pay contracts for power, and requires that data centers cover distribution, transmission, and capacity cost requirements.

7. Require mandatory reporting on energy and water use, and on-site fuel use

Utilities are required to report critically important data to state and federal regulators about the electric grid, including energy demand on their system and hourly reporting of generation and association pollution emissions, if applicable. However, very large customers like data centers face no equivalent requirements. States should require data centers to transparently report peak and monthly energy and water consumption and on-site fuel use, giving policymakers and the public the data needed to calibrate water, energy and air policy.

Examples: South Dakota SB 135 (2026) requires that data centers provide notice of projected water consumption to each local water provider in the area in which the data center is proposed to be located.[62] Wisconsin proposed SB 729 (2025) would have required data centers to report energy consumption by fuel type to the Public Service Commission.

Clean Air: Require Zero or Low Emissions On-Site to Protect Communities

States have several levers to cut on-site emissions from data centers: strict requirements for backup generators, mandated zero-emissions technology, protection from emissions "superclusters," and transparency and community engagement.

8. Require backup power from battery storage, instead of diesel, and require Tier 4 emission controls for any remaining on-site gas or diesel

States should require that data centers meet a share of emergency backup needs with on-site battery storage rather than diesel or gas-fired generation, and that any remaining on-site fossil generation be fully controlled to "Tier 4" standards, including selective catalytic reduction (SCR). Phasing in these requirements retroactively can also address emissions from existing data center superclusters.

Example: Delaware HB 445 (June 2026) requires that least 50 percent of the backup power needed by data centers must be supplied by battery storage or clean energy. The bill also prohibits a data center from being interconnected to the grid until at least 25 percent of its backup power comes from clean energy that is energized and interconnected.[63]

9. Require cumulative impacts analyses

A single large on-site gas fired data center, or a supercluster of data centers with on-site backup generation, can produce harmful emissions when assessed collectively, even if no individual source exceeds its permitted limit. States should require air agencies to conduct cumulative emissions assessments across multiple sources, including for synthetic minor source permits (permits where a facility agrees to a lower annual limit than its true potential emissions).

Example: Colorado's SB 102 proposed requiring data center developers to submit cumulative community impacts analyses for proposed data centers.[64]

10. Public participation in synthetic minor permits

States must give the public a real opportunity to know about, and weigh in on, synthetic minor permits: posting notice of applications, holding a public comment period, and responding to comments. Air permits for data centers should be readily accessible and clearly convey anticipated emissions, their impacts, and the facility's location.



STATES GET RESULTS WHEN THEY DEMAND BETTER OF DATA CENTERS.

Appendix 1: Emissions Methodology

Utility-Served Data Centers

We derive our estimate of new utility-served data center-driven emissions growth from both changes in utility projections of total demand, and the slate of energy resources expected to be online by 2030. We use an accounting methodology to back out likely emissions that would result from new demand by subtracting all expected new non-emitting generation between now and 2030.

$$E_{dc} = (D_{dc} - R_{2030}) \cdot e_{gas}$$

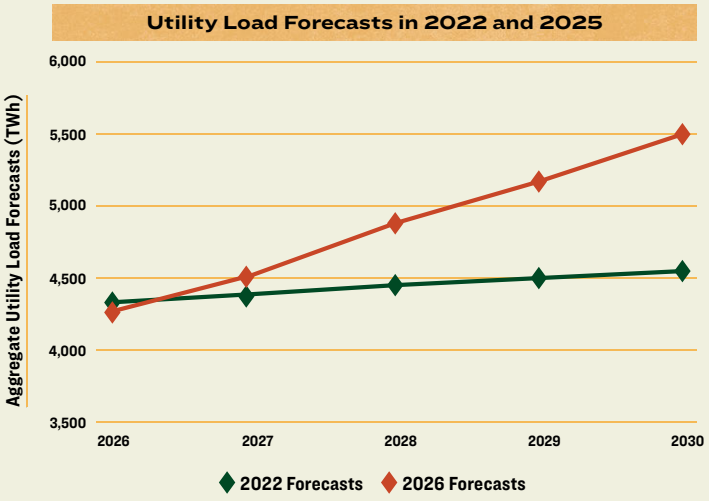
We assess that new emissions from data centers in 2030 (E_{dc}) are equal to the emissions rate of gas (e_{gas}), times the demand of new data centers by 2030 (D_{dc}) less energy provided by all new non-emitting energy built between now and 2030 (R_{2030}). The emissions rate for gas plants is set at 0.45 tCO_2/MWh, derived from EPA and EIA 2025 data.[65]

The demand from new data centers built by 2030 (D_{dc}) is calculated here as the difference between utility balancing authority projections of 2030 demand as estimated in reporting year 2022 and 2025, the most recent available.

$$D_{dc} = (D_{2030,fcst=2025} - D_{2030,fcst=2022}) \cdot f_{dc}$$

New data center demand from utility balancing authorities in 2030 (D_{dc}) is derived from utility balancing area forecasts 2022 ($D_{2030,fcst=2022}$) and 2025 ($D_{2030,fcst=2025}$), and multiplied by the fraction of the growth assumed attributable to data centers (f_{dc}). Utility forecasts for demand in 2022 and 2025 are derived from Federal Energy Regulatory Commission (FERC) Form 714 Part III, Schedule 2,[66] as compiled by the Public Utility Data Liberation (PUDL) project,[67] and adjusted for consistency to MWh. Balancing area forecasts are submitted to FERC by June of the following year, so the most recent projection available as of this publication in summer 2026 was accurate for calendar year 2025.

Between 2022 and 2025, the 66 utility balancing authorities, including the major ISO/RTOs, increased their projection of 2030 demand from 4.55 billion MWh as forecast in 2022 to 5.48 billion MWh as forecast in 2025, **an increase of 937.2 million MWh,** or a 20.6 percent net increase. Almost all of the increase is attributable to ERCOT (48.7%), PJM (22.2%), MISO (13.5%), SPP (9.9%) and Georgia Power (6.3%).



We assign a value of 0.75 to the fraction of new projected demand in 2030 assumed to be from new data centers (f_{dc}).[68] The utilities and RTOs that make up the vast majority of the projected load increase attribute their load growth increase to data centers,[69] a finding shared in a national assessment by NERC.[70] Assuming a utilization or demand factor of 85 percent,[71] the increased demand attributable to new data center demand by 2030 (703 TWh) is equivalent to approximately 94.4 GW, roughly consistent with a late 2025 report from Grid Strategies.[72]

The energy provided by new non-emitting generation projects built between now and 2030 (R_{2030}) is calculated from utility-scale renewable energy projects in active planning or construction, and expressed as:

$$R_{2030} = \sum_i (Q_i \cdot CF_i \cdot 8760)$$

where the total generation is the sum of all non-emitting generation types (i) reported to EIA Form 860M (monthly) as nameplate capacity (Q_i) times a capacity factor for that type of project (CF_i) and 8760 hours per year. EIA Form 860M,[73] reported monthly with a two month lag, compiles an inventory of planned utility-served generators in stages anywhere from "planned for installation, but regulatory approvals not initiated" to "construction complete, but not yet in commercial operation." For the purposes of this assessment, we assessed all generation types with no net CO_2 emissions, including solar, wind, geothermal, hydroelectric, and nuclear with online dates projected between today and 2030 (inclusive). Capacity factors for solar photovoltaics, solar thermal, onshore wind, geothermal, conventional hydroelectric, and nuclear were derived from EIA (2024),[74] while offshore wind was derived from the Annual Technology Baseline (ATB) from the National Laboratory of the Rockies.[75] We assumed 80 percent capacity factors for all other technologies. Overall, non-emitting generating technologies built between June 2026 and 2030 are expected to contribute 322.4 million MWh by 2030, leaving 380.5 million MWh of new load that we attribute to data centers and that will not be served by new renewable energy (or nuclear) projects by 2030.

The increased energy demand, to the extent it transpires, will have to be served either by the increased dispatch of existing gas and coal generators, or new gas-fired generators coming online. We conservatively assign the remaining generation to a gas emissions rate (0.455 tCO_2/MWh)[76] to estimate that increased utility-served data center demand will drive an **increase of 170 million tons of carbon dioxide in 2030.**

Our assessment is conservative in nature. While it assumes that the vast majority of new load growth projected by utilities between 2022 and 2025 is attributable to data centers (an assumption largely based on evidence provided by those utilities), the assessment also assumes that the 144 GW of new renewable energy in EIA Form 860M will be successfully energized by 2030, an optimistic assumption under current federal constraints and historic dropout rates. In addition, it assumes that all new renewable energy will be used to meet new data center demand growth, rather than displacing or replacing existing and retiring gas or coal generators. As of June 2026, EIA still shows 52.6 GW of fossil generation with retirement dates between 2026 and 2030; some of those generators will be replaced by new renewable energy, meaning less renewable energy would be available to meet data center demand growth. Additionally, many of the renewable energy projects expected to come online by 2030 have been in the development pipeline long before the data center boom, and attributing them as an offset to data centers may be inconsistent with their intent or purpose. Finally, the proposed 323 GW pipeline of gas plants being proposed by utilities and merchant generators affirms that the industry is working to meet technology company demand



AWS Cosgray Data Center in Hilliard, OH
Photo: VisualAviation, iStock

with gas.[77] Even if we assume that every new increment of non-emitting generation brought online between today and 2030 is used to offset load from new data centers, we can still expect at around 170 million tons of new carbon emissions from these loads.

On-site Gas-Fired Data Centers - Top 12 Polluting Data Centers

Our assessment of emissions from on-site gas-fired projects for data centers are derived from a comprehensive database of co-located data centers and gas-fired power plants maintained by Environmental Integrity Project's Oil and Gas Watch initiative.[78] As of September 3, 2026, the database listed 120 on-site or behind-the-meter gas-fired power plants with a "captive" data center customer that were not cancelled or shut down (i.e. planned, under construction, partially or fully operational, or on hold). From that list, we excluded 15 that are either projects to repower existing coal or gas plants, or were being built by vertically-integrated utilities and were likely counted in our Utility-Served category, and consolidated into four facilities 13 projects that would likely serve single data center campuses. From the resulting 96 facilities, we assessed source material from permits, announcements, and regulatory filings to adjust likely capacity and permitted emissions (where available), or likely emissions based on capacity, an assumed 90 percent demand factor, and a gas emissions rate of 0.445 tCO_2/MWh. The demand factor is consistent with industry assumptions.

We then sequentially worked through each data center to determine if there was a credible, name brand technology company or AI lab underwriting the project, relying on press releases from the data center developers, technology companies, or credible press sources. One exception to the criteria for listing is the Project Matador / Fermi America project, which has a non-name-brand sponsor, but broke ground in early 2026.

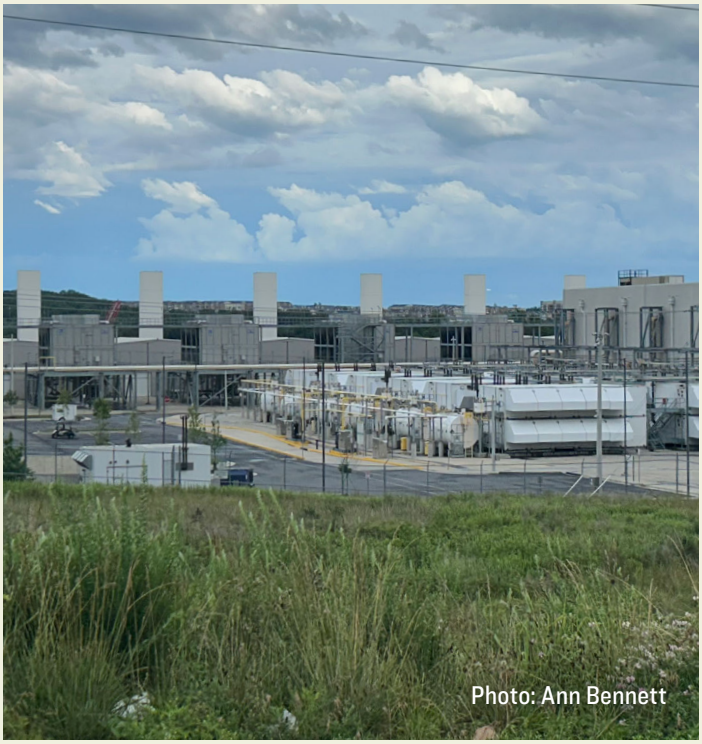


Photo: Ann Bennett

Assumptions, Uncertainty, and Divergent Pathways

The estimates in this paper are based on information that is fundamentally uncertain. In our utility-served data centers estimate we draw from utility projections of load in a future year. While we have sought to calibrate our assessment to best estimates of grid-connected data center load, our use of this projection may include non-data center projects, such as manufacturing, hydrogen, or oil and gas extraction. In addition, utility estimates may include speculative projects, redundant or duplicative requests for interconnection from data center developers, or inconsistent treatment of data center growth potential or projections.

Our methodology assumes that all non-emitting energy projects reported as "planned" in EIA Form 860M as of June 2026 (listed in August 2026) with online dates between 2026-2030 (inclusive) are successfully brought online, but does not assume incremental renewable energy from projects not currently listed. Assessing Form 860M from June 2021 for anticipated builds of renewable energy and gas from 2021-2026 (the same span as 2026-2030) shows rough correspondence between planned and actual builds for the first three years (2021-2023, inclusive) for solar (40 GW planned, 44.8 GW built), gas combined cycle (16.5 GW planned, 16.8 GW built), and gas combustion turbine (5.2 GW planned, 6.7 GW built), but underpredicts wind (20.7 GW planned, 30 GW built). For the period 2024-2026, EIA Form 860 planned dramatically underpredicts solar and wind build, which were spurred to record levels by the Inflation Reduction Act of 2022. EIA Form 860M from June 2024 shows a reasonable correspondence between planned and actual build for the period 2024-2026 for solar and onshore wind, slightly underpredicts gas combustion turbines (4.8 GW planned, 6.3 GW built), and far overpredicts gas combined cycle (6.3 GW planned, 2.9 GW built), a possible reorientation towards balancing resources and very high natural gas prices in 2022. It is entirely feasible that policies supportive of renewable energy could significantly increase future renewable energy build within the 2030 window.

Our 170 million tCO_2 from utility-served data centers by 2030 could be met with both increase in the utilization of existing gas and coal plants, as well as new utility gas build. If met entirely with new gas, it would imply approximately 48.2 GW of new utility gas by 2030, less than the 64 GW of utility-connected gas in EIA Form 860M as of June 2026.

Our analysis has sought to minimize double counting between projects characterized as utility-served and on-site gas powered data centers, but because there are few reporting requirements for utility-served data centers—and even fewer for data centers served by on-site gas power – we cannot guarantee that it has been entirely mitigated. For example, projects like the PORTS project will build private gas generation on site, but will also be connected to AEP Ohio's electric grid. It is unclear if the utility counted this project, announced March 2026, in 2025 utility forecasts. Other projects may have been disclosed to utilities prior to public announcement and may have been slated to be grid connected, only seeking behind-the-meter gas at a later date.

Finally, several credible studies have characterized the potential for emissions reduction even with aggressive load growth from data centers.[79] In these studies, renewable energy makes up a fairly large portion of near-term generation under base case conditions, continuing to displace or replace coal and gas, and a significant fraction of generation portfolios with new gas as well. Such pathways are feasible, but may require supportive state policies, restrictions on new gas buildout to meet data center load, the resumption of supportive national policies, and/or significant near-term investments by data center developers in robust clean energy portfolios to meet demand.



Appendix 2: The Top 12 Polluting Data Centers Profiles

Project Matador / Fermi America (Carson County, TX):

Also known as the President Donald J. Trump Advanced Energy and Intelligence Campus, Project Matador is a project of former Trump energy secretary Rick Perry. Located 15 miles northwest of Amarillo, Matador has sought air permits for two adjacent campuses with a hodge-podge of gas turbines, including three 45 MW turbines, 90x 56 MW turbines, 48x 88 MW turbines, and three 352 MW turbines - and 40.3 million tons of CO_2.[80] To date, Matador has only secured 222 MW of commitment from TensorWave,[81] an AI company founded in 2024. In June 2025, Fermi America submitted an environmental impact statement through the Nuclear Regulatory Commission for 1,100 MW of new nuclear power at the proposed Donald J. Trump Generating Plant.[82]

GW Ranch (Pecos County, TX):

The proposed site is 17 miles north of Fort Stockton, Texas. In August 2025, the developer, Pacifico, put forward an air permit application proposing 21x 62 MW turbines and 14x "large-frame" turbines of 386-453 MW each, although the permit disclosed that a supplier had not yet been determined. The air permit estimated that the facility would release 33.2 million tons CO_2, and 2,800 tons NOx.[83] In August 2026, it was confirmed that Amazon was backing the proposal.[84]

Nexus / Apex DFW HB1 (Hill County, TX):

Located 50 miles south of Dallas-Forth Worth, the Nexus - Apex HB1 facility is expected to be powered by a potpourri of six different GE turbine designs, ranging from 51 MW simple cycle to 438 MW combined cycle units, a total of nearly 7.7 GW.[85] As of February 2026, the company stated in its air application that it had "not yet finalized combustion turbine selection due to uncertainty in availability of gas fired turbines."[86] Nonetheless, the developer anticipated releasing nearly 1,300 tons PM and 22.7 million tons CO_2 annually. In late July 2026, it was reported that Anthropic was likely to provide $15 billion to use the campus, with financial support from Google.[87]

Project Kilby (Reeves County, TX):

Project Kilby is the flagship energy campus of Chevron subsidiary Energy Forge One, and one of the first projects to announce that it would use on-site gas exclusively to power a data center. Located 40 miles NW of Fort Stockton, TX in the center of the Permian Basin, one of the largest oil and gas regions in the world, the 2,600 MW Kilby plant would be pieced together from two large combined cycle turbines, three large combustion turbines and 12 smaller combustion turbines, and is permitted to release 11.5 million tons of CO_2 annually.[88] In June 2026, Chevron announced that the project would be backed by a 20-year agreement with Microsoft.[89]

Monarch Compute Campus (Mason County, WV):

Originally proposed in 2023 as a blue hydrogen facility on the western edge of West Virginia, the development was acquired by Nscale in 2026. Nscale proposed that the site would serve up to 8 GW of AI and compute demand by 2031. In March 2026, Nscale announced that Microsoft would serve as the first anchor tenant of the site, as well as a "collaboration" with Caterpillar to use small-scale gas turbines at the site.[90] The air permit application, filed April 2026, proposes 864 reciprocating internal combustion engines (RICE), 11 million tons CO_2 and over 600 tons of hazardous air pollutants, including nearly 300 tons of formaldehyde.[91] In late August, it was reported that Nscale had signed a $45 billion deal with Anthropic for capacity at the site.[92] In October 2026, it was reported that Anthropic had signed another similarly sized deal for capacity at the site.[93]

VoltaGrid ABI-1 (Shackleford County, TX):

The proposed site (a.k.a. Vantage Frontier TX3), 10 miles NW of Abilene, TX, is being developed by Vantage for Oracle and OpenAI. With 620 small gas-fired engines (3.2 to 4.8 MW each) on site, the 2,580 MW facility applied to emit over 460 tons of hazardous air pollutants (HAPs) and 10.6 million tons of CO_2 annually, making it potentially one of the largest emitters of toxic air emissions in the country.[94] When complete, the site will cover a tract of land two miles long and 1¼ miles wide.

Project Tembo / Project Jade (Laramie County, WY):

Sitting just five miles south of Cheyenne at the Colorado border, Project Jade (a.k.a. the Cheyenne Power Hub or Project Tembo), will have two permanent 664 MW combined cycle turbines, and 16x 35 MW combustion turbines, as well as a fleet of 24 "temporary" mid-sized turbines while the larger energy facilities are under construction.[95] The facility is permitted to emit 664 tons of PM and nearly 10.5 million tons of CO_2 annually. The project was launched by energy developer Crusoe, which started in the early 2020s as a wellhead gas to bitcoin mining firm; in June 2026, Crusoe pulled out of the project[96] and in early July 2026, it was revealed that Google would operate the data center and energy infrastructure at the facility.[97]

Project Jupiter (Dona Ana County, NM):

In September 2025, OpenAI and Oracle announced they were sponsoring the data center called Project Jupiter in Santa Theresa, New Mexico, just across the border from El Paso, Texas.[98] In the original proposal and permit application, the developer (Acoma) took the unusual step of submitting two different air permits, one for each gas plant on either side of the data center.[99] According to the air permits, the first gas plant (East) would be 11 large generators (1,223 MW total); the second gas plant (West) would be over 50 mid-sized generators (987 MW total). If it were built according to the original proposal, it would quickly become one of the largest single sources of air pollution in the state, with criteria (i.e. health-harming) pollution on par with one of the units at the aging Four Corners coal plant, as well as 13 million tons of CO_2 emissions annually. In July 2026, under legal pressure on the air permit, the developer submitted a new application proposing to build 2,275 small "fuel cells," (each 260-350 kW), which use an electrochemical process to turn methane into electricity and CO_2. According to the application, the site could emit over 8.8 million tons of CO_2.[100]

Project Roman (Deaf Smith County)

Originally structured as a cluster of solar and wind energy projects to generate green hydrogen in the Texas panhandle, Google's Project Roman[101] data center replaces the hydrogen production facility, and has added 1,474 MW of gas generation to power the site. According to project documents and federal records, the site will host 500 MW of solar and 670 MW of wind.[102] The project was introduced publicly in July 2026. The air permit for the on-site gas plant was filed in June 2026, prior to public meetings, and proposes operating 640 very small-scale (2.62 MW) RICE generators, 563 of which would be operational at any given time. The permit anticipates around-the-clock operation, resulting in 8.4 million tons CO_2e, and an extraordinary 618 tons of hazardous air pollutants (HAPS) annually.[103] On October 14, 2026, Intersect, a subsidiary of Google, announced that on-site renewables on site were "expected to reduce carbon [dioxide] emissions by at least half relative to the air permit application."[104] The ERCOT interconnection queue shows the developer seeking 2,015 MW of solar and 1,740 MW of wind at the site which, if developed, could substantially reduce the utilization of the gas on site.

Stargate 1 / Project Longhorn (Taylor County, TX):

First debuted as the Lancium Clean Campus and built by former cryptomining energy company Crusoe, this Abilene site has grown substantially to become OpenAI's 1.2 GW flagship campus, Stargate 1.[105] In January 2025, Crusoe received permits to build 360 MW in 12 gas combustion turbines;[106] in November 2025, the company submitted an application to construct another 1,760 MW in over 50 gas turbines.[107] In total, the facility is permitted to emit an estimated 8.3 million tons CO_2 and over 380 tons of fine particulate matter annually.

PORTS Technology Campus (Pike County, OH):

First announced as a partnership between SB Energy and the Department of Energy, the proposal aims to redevelop a cold war-era uranium enrichment facility with 9.2 GW of on-site gas. In March 2026, AEP Ohio announced that SB Energy would pay for a $4.2 billion high-capacity transmission line from the site to the Gavin coal plant on the West Virginia border, likely increasing the utilization of at least three large coal plants on the Ohio River. In August 2026, OpenAI announced that it had entered into an agreement with SB Energy to use 8 GW of power at the campus.[108] Because PORTS has not yet filed an air permit, it is not clear the extent to which this facility will be utility-served, but it is unlikely to have been accounted for in 2025 utility forecasts. We estimate CO2 at this facility from our assumed 90 percent demand factor and 0.445 tCO2/MWh emissions rate **(see Appendix 1)**. In late August 2026, the PORTS developer filed an application before the public utility commission that the first tranche would consist of 1.77 GW of on-site gas generation in 48 simple-cycle turbines.[109] In mid-October 2026, the developer filed an intention to file an application for another 5 GW of gas at the site.[110] The developer has not yet filed a public air permit application for the facility.

Colossus / Southhaven (DeSoto County, MS):

An already infamous site, Colossus straddles the Mississippi border on the south side of Memphis, TN. In July 2025, MZT Tech, a subsidiary of xAI (now SpaceX), had installed 17 gas turbines at the site without an air permit,[111] and then continued to expand the facility to 69 turbines by July 2026.[112] The on-site gas generators in Tennessee and Mississippi are the subject of ongoing legal action,[113] in which the Trump administration moved to dismiss the suit on SpaceX's behalf in June 2026.[114] In May 2026, SpaceX announced it had signed a deal for Anthropic to use the data center,[115] and in July 2026, the company announced that it had agreed to remove the unpermitted turbines,[116] and replace them with a 1.2 GW power plant, which would emit over 6.7 million tons CO_2 per year.[117] In September 2026, it was reported that the Colossus facility had installed over 700 battery storage units, or between 720 to 1,400 MW of capacity.[118]



Photo: Ann Bennett

Endnotes

1. Sierra Club analysis of data from Rhodium Group's 2026 Taking Stock Report finds that the decline in coal use for generating electricity accounts for 76% of total U.S. economy-wide greenhouse gas emissions reductions from 2010-2025. Independent research has shown that advocacy efforts from the Sierra Club's Beyond Coal Campaign have been the single most effective driver in terms of accelerating coal retirements, leading to this decline. Since 2010, Sierra Club advocacy has contributed to the retirement of over 330 coal plants; including 24 of the 25 plants identified by the NAACP as the most harmful to environmental justice communities.
2. See e.g. NAACP. April 26, 2026. NAACP Sues xAI for Illegal Pollution from Data Center Power Plant.
3. Sierra Club. February 5, 2026. New Sierra Club Map Shows Expensive U.S. Gas Buildout; see also Natural Gas Intelligence. May 18, 2026. AI's Natural Gas Boom Hits Reality Check as Data Center Builds Slip.; see also Latitude Media. May 11, 2026. Amazon and Google are paying a premium for coal capacity in Indiana.
4. Union of Concerned Scientists. January 21, 2026. Data Center Power Play: How Clean Energy Can Meet Rising Electricity Demand While Delivering Climate and Health Benefits.
5. RBC Capital. May 14, 2026. Natural gas powers the data center boom.
6. Desmog. December 12 2025. These 15 Coal Plants Would Have Retired. Then Came AI and Trump.
7. The White House. April 8, 2025. Reinvigorating America's Beautiful Clean Coal Industry and Amending Executive. Order 14241. "Our Nation's beautiful clean coal resources will be critical to meeting the rise in electricity demand due to the resurgence of domestic manufacturing and the construction of artificial intelligence data processing centers."
8. Sierra Club. Trump Coal Pollution Dashboard.
9. Sierra Club. Tracking the Planned Gas Power Plant Buildout in the US. As of September 30, 2026.
10. Author's calculation from EIA Form 860M, September 2026. As of September 2026, there are approximately 582 GW of gas-fired power plants operations in the US.
11. See Environmental Integrity Project, The Power Behind AI, July 1, 2026; see also Global Energy Monitor, Global Oil and Gas Plant Tracker, August 2026 release. Data sets modified to account for grid projects and changed capacity values.
12. Ground up calculation: ~117 GW of new gas from utility-served data centers + 138 GW of on-site gas-fired data centers (derived from Environmental Integrity Project data) = 255 GW, at an estimated 50% capacity factor = 1,116 TWh. Residential demand in 2024 = 1,483 TWh (EIA Form 861).
13. Author's calculation assuming data center demand factor of 90% and renewable energy capacity factors from EIA. Interconnection queue totals from interconnection.fyi as of November 3, 2026.
14. Author's calculation from EPA Clean Air Markets Program Data (CAMPD).
15. Note: All reporting here is in short tons and pounds, consistent with reporting from federal government sources. Reporting from other sources are converted to short tons as required.
16. Refer to supporting materials in Appendix 1.
17. Author's calculation, 322.7 million MWh of new non-emitting generation against 937.2 million MWh of projected demand growth. See Appendix 1.
18. See Clemmer, S., M. Chavez, S. Dotson, et al. January 2026. Data Center Power Play. Union of Concerned Scientists. The study assesses ~200 million short tons CO_2 2030 under a "mid" scenario (78 GW of data center load, about half of our 140 GW current estimate), and 377 million tons CO_2 by 2035 under a "high"scenario. See also Johnson, JX, C Wade, M Blackhurst, JF DeCarolis, et al. June 4, 2026. Power system costs and emissions from data center and cryptocurrency mining expansion in the United States. Environmental Research Letters, Volume 21, Number 11. The study projects 364 million short tons CO_2 by 2030 under a "mid" scenario or 463 million tons CO_2 by 2030 under a "high" scenario (equivalent to our best estimate).
19. Information supported by data from Environmental Integrity Project (EIP), Proposed behind-the-meter gas power plants for data centers, as of April 30, 2026. Available at https://oilandgaswatch.org/.
20. Author's calculation. EIA Form 861M, June 2026.
21. NERC. May 4, 2026. NERC Issues Level 3 Alert, Reliability Guideline Focused on Large Load Challenges.
22. Environmental Integrity Project. July 1, 2026. The Power Behind AI: Wave of Dirty Gas Power Plants Planned for Data Centers.
23. Global Energy Monitor. August 2026. Global Oil and Gas Plant Tracker.
24. Assuming that the entire slate of behind-the-meter gas plants are built to support new data centers, and adjusting emissions for proposals without public air permit applications to reflect a 90 percent demand (utilization) factor and a conservative 0.45 tCO_2/MWh emissions rate.
25. Curtis, L., Rea, W., Smith-Willis, P., Fenyves, E., & Pan, Y. 2006. Adverse health effects of outdoor air pollutants. Environment international, 32(6), 815–830. https://doi.org/10.1016/j.envint.2006.03.012.
26. For example, the Caterpillar 3516C diesel engine has a capacity of 2.75 MW and is rated at just over 4,000 brake horsepower (bhp), see e.g. VA DEQ permit 74338 for Vantage VA41. A Class 8 heavy-duty truck may have an engine rating of up to 600 bhp, or a little more than 1/7th the rating of the 3516C.
27. Permits for Cat 3516C at Vantage VA41 (VA DEQ permit 74338) represent uncontrolled emissions of 58.5 lbs/hr NOx and 0.83 lbs/hr PM, and operational limits of 500 hrs for a total of up to 26,760 lbs NOx/yr and 415 lbs PM/yr. Assuming Class 8 VMT of 58.9k miles, 6.5 mpg, and 4.28 gal / 100 bhp-hr for 211.5k bhp-hr/yr. 2010 NOx and PM standards require 0.2 g/bhp-hr NOx and 0.01 g/bhp-hr PM. Over a year, the proxy truck would emit 93.3 lbs NOx/yr (1/287th of the Cat unit) and 4.66 lbs PM/yr (1/89th of Cat unit).
28. Sierra Club. June 2026. A Secret Coal Plant in the DC Suburbs.
29. Author's calculation from EPA CAMPD. The two largest operational coal plants in the US as of June 2026 are Bowen (3,500 MW, GA) and Gibson (3,340 MW, IN). The plants had emissions in 2025 of 6,542 and 6,479 tons NOx, respectively.
30. Department of Energy. 2026 DOE 202(c) Orders. Accessed August 2026.
31. IAD-140/141/143 (Reg 74184), IAD-51/IAD-56/IAD-88/ IAD-89 (Reg 74063), IAD-144 /IAD-145 (Reg 74153), IAD-90/IAD-91/IAD-92 (Reg 74121), and IAD-12/IAD-15/IAD-16/IAD-76 (Reg 73860).
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33. 91 Federal Register 41591. July 7, 2026.
34. Fisher, J. May 26, 2026. VA Data Center Air Permits. As of April 14, 2026.
35. U.S. Energy Information Administration (EIA). May 5, 2026. Commercial electricity sales have soared in Virginia, driven by data centers. Winter peak demand in Dominion zone (Virginia) reached 25,413 MW in winter 2025-2026.
36. Caterpillar did $2.5 billion more in business in 2025 than 2024 for power generation, a 32 percent increase. See Caterpillar. February 16, 2026. 10-K Annual Report for 2025. Cummins increased power generation sales by nearly $1 billion, a 25 percent increase See Cummins. February 10, 2026. 10-K Annual Report for 2025. Both companies attribute the growth to data centers.
37. Reuters. July 14, 2026. Pollution from Musk's unpermitted xAI power project hits hardest in Black communities.
38. NAACP. April 14, 2026. NAACP Sues xAI for Illegal Pollution from Data Center Power Plant.
39. Utility Dive. June 18, 2026. DOJ intervenes on behalf of xAI in data center gas turbine lawsuit.
40. SpaceXAI. May 6, 2026. New Compute Partnership with Anthropic.
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