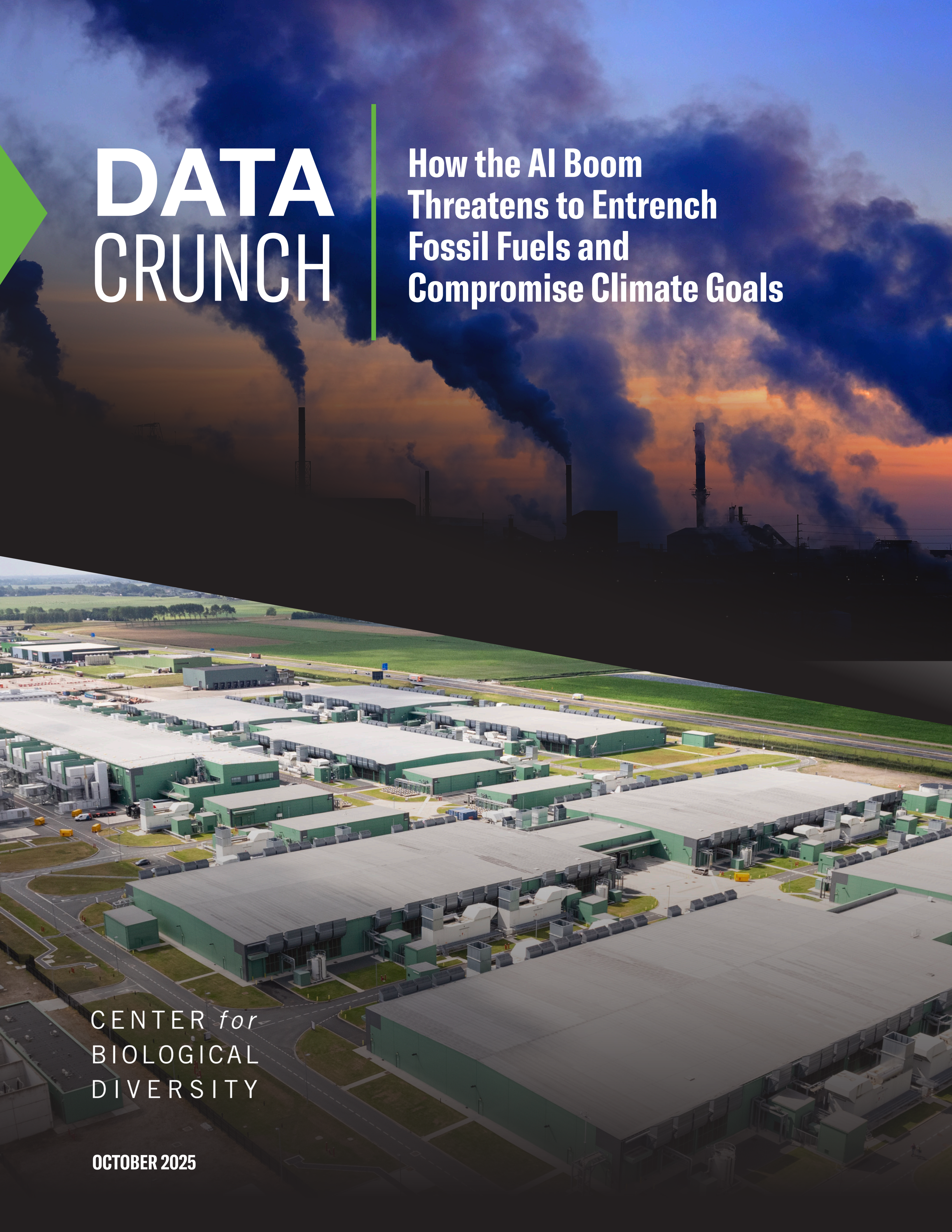

DATA CRUNCH

How the AI Boom Threatens to Entrench Fossil Fuels and Compromise Climate Goals

CENTER *for* BIOLOGICAL DIVERSITY

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How the AI Boom Threatens to Entrench Fossil Fuels and Compromise Climate Goals

Center for Biological Diversity | By John Fleming, Ph.D., and Jean Su

“In the face of [a] series of existential threats, posed by runaway climate chaos and the runaway development of artificial intelligence without guardrails, we seem powerless to act together. . . . The fossil fuel industry has just launched yet another multi-million-dollar campaign to kneecap progress and keep the oil and gas flowing indefinitely.”

—UN Secretary-General António Guterres, Davos 2024

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OVERVIEW

The United States' projected data center growth to serve the artificial intelligence (AI) industry, set to be powered primarily by fossil fuels, is threatening to sabotage the country's already faltering climate goals. Guardrails are needed around data centers to ensure they serve the public interest and curb their immense climate emissions with on-site and distributed renewable energy.

KEY FINDINGS

- The projected AI surge, set to be powered primarily by fracked gas, could account for 10% of the economy-wide emissions and 44% of the power sector emissions allowable to meet the U.S. 2035 climate target, or nationally determined contribution (NDC).

- If the projected AI surge were instead powered fully by renewables, it would account for only 4% of the power sector emissions and a negligible amount of the economy-wide emissions allowable to meet the United States' 2035 climate target.

- Because of expected fossil fuel-reliant AI data center growth, all other electricity-consuming sectors would need to increase their carbon-emissions cuts by 60% to keep pace with the U.S. 2035 NDC.

- The U.S. disproportionately holds the planet's highest concentration of data centers and is the greatest contributor of AI climate pollution. Without significant changes, U.S. data center expansion is completely incompatible with the 2035 U.S. climate goal, jeopardizing the world's chances of avoiding the worst consequences of climate change and staying within the Paris agreement target of 1.5 degrees Celsius of global warming.

- Powering data center development with gas and coal risks entrenching dirty energy and its attendant harms and retreats from the 2023 Dubai climate summit agreement to transition away from fossil fuels.

- Guardrails are needed at global and national levels to curb data centers' immense climate emissions, including adoption of a public-interest framework on permitting decisions and requiring on-site and distributed renewable energy and storage for power generation.

INTRODUCTION

Artificial intelligence is taking the world by storm, with rapidly expanding data center development demanding huge amounts of energy, water, and other resources to power it.

In the United States — the world leader in data center concentration — government and fossil fuel corporations alike are planning to feed AI's seemingly insatiable energy demand with plans for new gas and coal generation, spawning a new lifeline for the fossil fuel industry.

The AI data center boom risks entrenching fossil fuels even as extreme heat, intense wildfires, and superstorms all show we need to harness renewables to fight the climate emergency. In addition to social, technological, and economic impacts, AI data center expansion carries enormous risks for the climate, public health, and the natural world.

This report analyzed projected U.S. data center energy demand and finds that carbon emissions from the industry's massive growth, set to be powered primarily by fracked gas and coal, could triple by 2035, accounting for 44% of the power sector emissions allowable to meet the U.S. climate target.

That target only allows for economy-wide emissions of up to 3,400 million metric tons carbon dioxide equivalent and power sector-specific emissions of up to 800 million metric tons of carbon dioxide equivalent over the next decade.

Data centers' projected climate pollution in 2035 amounts to more than 350 million metric tons of carbon emissions (mmt CO_2e) — roughly equal to Italy's 2023 emissions.[1]

This outsized amount of power sector emissions would put an enormous burden on other electricity-use sectors to reduce their emissions to meet the U.S. climate target that the Biden administration submitted to the United Nations in 2024, which is still in effect under the terms of the Paris Agreement.

Because of projected AI data center growth, all other electricity-use sectors, such as industry and households, would need to *increase their carbon-emissions cuts by 60% to keep pace with and eventually meet that U.S. climate target by 2035.*

From a global perspective, the need to curb data center emissions is particularly acute for the United States, which alone consumed 45% of the world's data center electricity in 2024 and has the highest per-capita data center consumption on the planet.[2] And while data centers accounted for approximately 1.5% of the world's electricity consumption in 2024, they amounted to more than 4% of U.S. electricity consumption — greater than the state of New York — and are projected to grow to 12% by 2030.[3] A typical AI data center consumes as much electricity as 100,000 American households, but the largest ones under construction today will consume 20 times as much.[4]

Without careful regulation of data centers, pollution from their projected expansion threatens to block the world's pathway to avoiding the worst climate damage and staying within the Paris agreement target of 1.5 degrees Celsius of global warming. At base, powering the AI boom with fossil fuels is entirely incompatible with a safe climate future.

Powering data center development with gas and coal risks entrenching dirty energy and its attendant harms, while moving further from the 2023 Dubai climate summit to transition away from fossil fuels.

Guardrails, both global and domestic, are necessary to curb the projected devastating climate impacts of a currently unregulated industry. Applying public-interest frameworks on data center permitting and requiring on-site renewable energy generation paired with distributed energy resources to free up grid capacity can turn the tide against unfettered data center growth fueled by gas and coal. This report includes broad policy recommendations for national, Tribal, state and local decisionmakers, as well as international considerations.

Establishing guardrails now on AI data center infrastructure is critical to mitigating the fastest growing sector of electricity emissions and tackling its threat to the climate. Failure to do so risks extending decades of fossil fuel dependency and enriching fossil fuel and utility corporations at the expense of people and the planet.

METHODOLOGY

We determined the total expected emissions of data centers in 2035 and how that compares to the 2035 U.S. NDC, as pledged under the Paris Agreement. This section details how we calculated the building blocks for this analysis.

U.S. Nationally Determined Contribution For 2035

This analysis uses the 2035 U.S. NDC as a baseline climate target intended to align with the Paris Agreement's goals of limiting warming to 1.5 degrees Celsius above preindustrial levels. Before leaving office in December 2024, President Biden submitted a climate target to the U.N. for 2035, committing the U.S. to reducing greenhouse gas emissions by 61-66% below 2005 levels by 2035.[5] A month later President Trump withdrew the U.S. from the Paris Agreement; the withdrawal takes effect in January 2026.[6] Should the U.S. administration rejoin the Paris Agreement in the next 10 years, Biden's 2035 NDC could be reinstated.

According to Climate Action Tracker, the 2035 NDC target corresponds to a 54-62% emissions reduction by 2035 when excluding land use, land use change, and forestry.[7] Thus, from a U.S. gross emissions peak of about 7,500 mmt CO_2e in 2005,[8] emissions would have to reach 2,858-3,434 mmt CO_2e to meet the 2035 target.[9]

Total U.S. emissions in 2024 were 6,185 mmt CO_2e.[10] To achieve the 2035 goal of 3,434 mmt CO_2e, emissions would have to fall by nearly 45% between 2024 and 2035. It follows that, in alignment with the NDC goal, the power sector should likewise reduce its emissions by 45%. Power sector emissions would need to decline from 1,450 mmt CO_2e in 2024 to 804 mmt CO_2e in 2035.

Most data center emissions come from their power-sector energy demands, with the power sector alone currently accounting for almost a quarter of total U.S. emissions. Since reducing data center emissions is directly tied to reducing power sector emissions — namely by lowering energy demand and widescale phaseout of fossil fuels and adoption of renewables — we focus our analysis on data center emissions in the context of the power sector.

Scenarios for U.S. Data Center Energy Demand Growth

To characterize the risk AI data center growth poses to U.S. climate goals, we analyzed International Energy Agency (IEA) projections of data center energy demand through 2035 with emissions intensity data for the energy sources expected to satisfy that demand. We chose to use projections from the IEA because they generally agreed with others in the literature but had the added detail of including projections for 2035,[11] our year of interest, while having U.S.-specific and energy source-specific demand data.

The IEA establishes four scenarios for data center electricity consumption — Base Case, Lift-Off, Headwinds, and High Efficiency — which collectively are intended to capture uncertainties in efficiency improvements, AI adoption, and energy-sector buildout.[12]

- **Base Case:** Global electricity consumption rises to around 1,200 terawatt-hours (TWh) by 2035, based on the latest industry expectations for server shipments.

- **Lift-Off Case:** Global consumption rises to more than 1,700 TWh by 2035, based on an assumption of broader AI adoption and fewer constraints on data center development.

- **Headwinds Case:** Global energy consumption reaches about 700 TWh, in part based on slower-than-expected AI adoption.

- **High-Efficiency Case:** Global energy consumption reaches about 970 TWh, where the same level of demand for digital services and AI exists as in the Base Case, but with improved energy efficiency.[13]

In our analysis we focus on energy use in the Base Case and Lift-Off scenarios, drawing from them data specific to the United States, to estimate future greenhouse gas emissions from data center energy demand growth. Together they capture the expected trajectory of data center energy demand and the upper extreme, which should guide future planning.

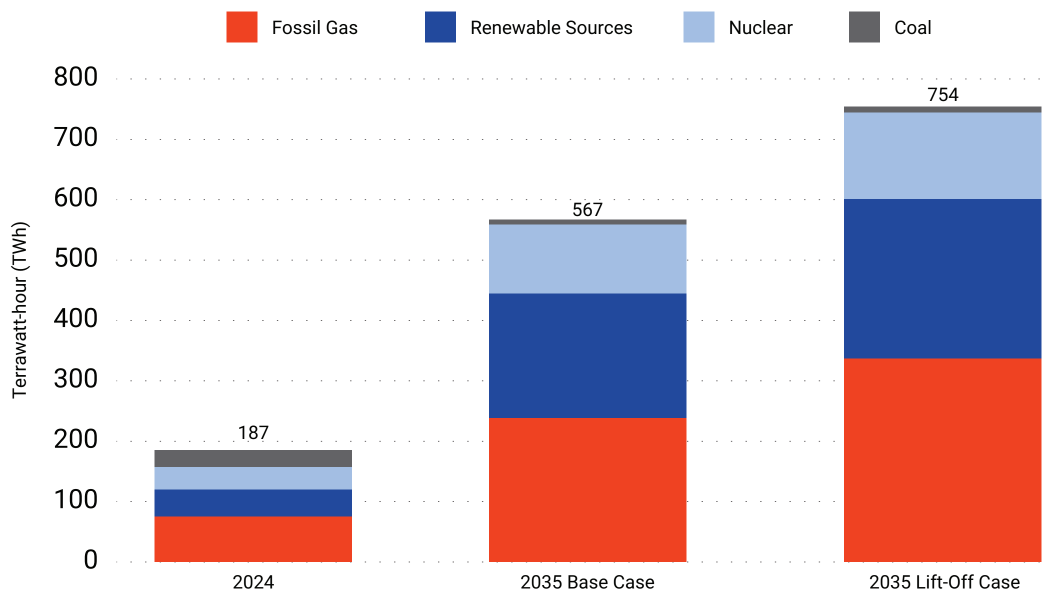
Projected Energy Sources to Supply U.S. Data Center Electricity Demand

The IEA has provided historical data and future projections on the fuel mix of powering U.S. data centers through 2035. According to the IEA, in 2024 U.S. data centers accounted for nearly 187 TWh of energy use,[14] with 40% sourced from fossil gas, 24% from renewable sources, 20% from nuclear, and 15% from coal.[15]

By 2035 U.S. data centers are expected to account for nearly 570 TWh of energy use in the Base Case scenario and more than 750 TWh in the Lift-Off scenario, or well over 40% of global data center energy use in both cases.[16] Of these amounts almost 240 and 340 TWh, or 42% and 45% of the total energy mix, respectively, would be sourced from fossil gas (Figure 1).[17]

FIGURE 1

Fuel Mix of Electricity Demand for U.S. Data Centers, 2024 v. 2035



U.S. data center energy use in 2024 and in IEA's Base Case and Lift-Off Case 2035 scenarios. For each scenario, total data center energy use is displayed as a label.

Because coal is expected to play a minor role in supplying U.S. data center energy through 2035, the reliance on fossil gas will constitute the primary source of greenhouse gas emissions from data centers. Renewable sources and nuclear energy also have lifecycle carbon emissions, but they are much lower.

Carbon Intensities of Energy Sources

To estimate greenhouse gas emissions from data center fossil gas energy generation, we use both 486 and 988 grams of CO_2 equivalent per kilowatt-hour. These represent a conservative and a high-end value, respectively, aligning with carbon intensity data reported in the National Renewable Energy Laboratory's (NREL) source material. The high-end value places the lifecycle carbon intensity of fossil gas on par with coal, in line with the findings of a 2023 study.[18] It likewise aligns with the maximum carbon intensity reported by the IEA for power generation using fossil gas.[19]

According to NREL's 2021 assessment, electricity generation from fossil gas has a carbon intensity of 486 grams of carbon dioxide equivalent per kilowatt-hour, while renewable sources come in at 30 grams, nuclear at 13, and coal tops out at 1,001 grams of CO_2 equivalent per kilowatt-hour.[20] However, in the years since NREL's 2021 assessment was published, as well as the 2014 study on which it relies regarding fossil gas,[21] we've learned more about rates of methane leakage during fossil gas production and their contribution to the lifecycle carbon intensity of fossil gas.

According to a 2023 study, a 2% to 5% methane leakage rate puts gas-fired power plants on par with coal power plants over a 20-year time frame.[22] Meanwhile the United States has a methane leakage rate between 2% and 3%, according to the same study. Thus, NREL likely underestimates the true lifecycle carbon intensity of fossil gas.

Furthermore, NREL's estimate is for conventionally produced fossil gas, whereas much of U.S. gas production is done unconventionally (e.g., via hydraulic fracturing). In some U.S. basins, methane leakage is near 10% or greater as a result, such as in New Mexico's Permian Basin.[23]

Using NREL data may lead to an underestimate of emissions from renewable sources as well, since bioenergy, which is often wrongly treated as carbon neutral, is included in the category. However, we use NREL's carbon intensity value for biomass, acknowledging that our final estimate of overall emissions from energy demand is potentially an underestimate as a result. As such, we find that only solar and wind energy meet a rigorous definition of "renewable sources" in minimizing climate, public and environmental harms.

FINDINGS

FINDING 1: Projected Carbon Emissions From U.S. Data Center Growth Could Triple by 2035

Projected carbon emissions from data centers in 2035 would be double or triple what they are today in the U.S. The estimated growth would result in up to 251 mmt CO_2e in the Base Case and up to 352 mmt CO_2e in the Lift-Off Case by 2035, with fossil gas emissions accounting for about 95% in both scenarios.

This compares to 104 mmt CO_2e estimated to come from energy use for data centers today.[24] That means double or triple the greenhouse gas emissions by 2035 — roughly equal to Italy's 2023 carbon emissions.

TABLE 1

U.S. GHG Emissions Associated with Data Center Energy Use in 2024 and in 2035 Based on IEA's Base Case and Lift-Off Case Scenarios

U.S. Data Center Energy Sources	2024 Emissions (mmt CO_2e)	2035 Base Case (mmt CO_2e)	2035 Lift-off Case (mmt CO_2e)
Fossil Gas	36 - 74	116 - 235	164 - 333
Renewable Sources	1	6	8
Nuclear	0.5	1	2
Coal	28	8	10
U.S. Total*	66 - 104	131 - 251	183 - 352

The emissions for fossil gas and U.S. totals are reported as ranges with the lower end of the ranges corresponding to the use of a conservative carbon intensity for fossil gas and the higher end corresponding to the use of a high-end estimate of fossil gas carbon intensity, 486 g CO_2e/kWh and 988 g CO_2e/kWh, respectively.
**Totals may not match category sums due to rounding.*

FINDING 2: If Data Centers Are Mostly Powered by Fossil Fuels as Projected, Data Center Emissions Will Amount to Nearly Half of Power Sector Emissions Allowable to Achieve the 2035 U.S. Climate Target

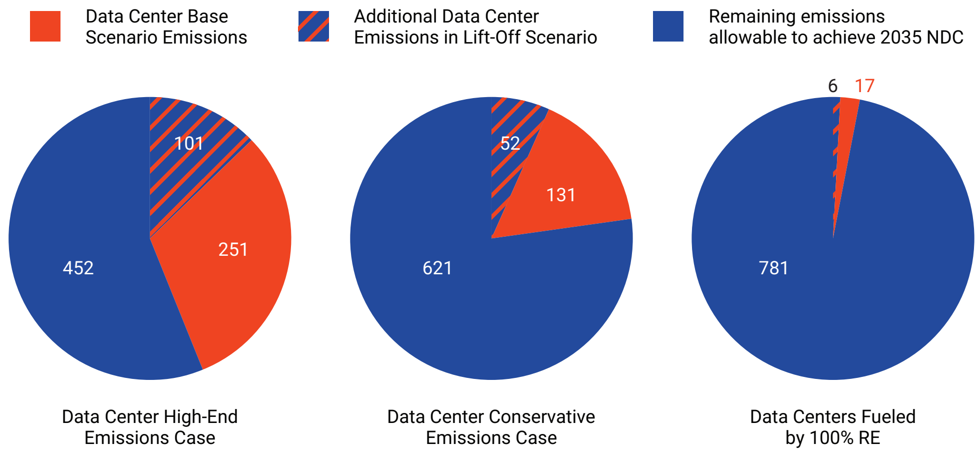
Assuming the least ambition in achieving the 2035 NDC target (61% below 2005 levels in 2035), emissions would have to fall from 2024 levels by 45% to meet the country's stated Paris Agreement goal. In alignment with this overarching goal, the power sector should reduce its emissions from 1,450 mmt in 2024 to 804 mmt CO_2e in 2035, or by 646 mmt CO_2e.

U.S. data center reliance on fossil gas could complicate the U.S.'s 2035 NDC given its projected outsized role in powering data centers. In 2035 the emissions from U.S. data centers in the **Base Case scenario would account for 31% of power sector emissions allowable to achieve the 2035 NDC, and nearly 44% in the Lift-Off scenario**, assuming our high-end estimate for the carbon intensity of fossil gas (Figure 2). Fossil gas alone would account for 29% and 41% of the emissions allowable under Base Case and Lift-Off scenarios, respectively.

In the context of the full NDC, emissions from U.S. data centers in the **Base Case scenario would account for 7% of economy-wide emissions allowable (61% below 2005 levels, or 3,434 mmt CO_2e) to achieve the 2035 NDC, and over 10% in the Lift-Off scenario**, assuming our high-end estimate for the carbon intensity of fossil gas.

FIGURE 2

Potential Contribution of Data Centers to 2035 NDC-Aligned Power Sector Emissions



2035 emissions from U.S. data center energy use under three scenarios are presented as a proportion of 2035 NDC-aligned power sector emissions (804 mmt CO_2e). Values displayed are in units of million metric tons carbon dioxide equivalent (mmt CO_2e). "Date Center High-End Emissions Case" captures data center emissions in 2035 assuming a high-end estimate of fossil gas carbon intensity (988 g CO_2e/kWh) while "Data Center Conservative Emissions Case" captures emissions using a conservative estimate (486 g CO_2e/kWh). "Data Centers Fueled by 100% RE" captures data center emissions if the energy demand expected in 2035 were all satisfied using renewable sources as defined by NREL,[25] thus excluding fossil gas, nuclear, and coal energy, while including solar, wind, geothermal, biomass and hydropower paired with storage. The "Base Case Scenario" is IEA's central estimate of data center buildout, while the "Lift-Off Scenario" assumes more ambitious data center buildout. As presented, red wedges are data center emissions in the Base Case Scenario, while the striped wedges are the emissions in addition to the Base Case Scenario emissions that would come from data centers in the Lift-Off scenario.

Even using the conservative estimate of fossil gas carbon intensity, the results are noteworthy. Conservatively, in 2035 emissions from U.S. data centers would account for 16% and 23% of power sectors emissions allowable to achieve the 2035 NDC in the Base Case and Lift-Off scenarios, respectively. In this case, fossil gas alone would account for 14% of power sector emissions allowable in the Base Case scenario and 20% in the Lift-Off scenario.

FINDING 3: If Data Centers Are Powered Only by Renewable Energy, Data Center Emissions Will Amount to Only 3% of Power Sector Emissions Allowable to Meet the 2035 U.S. Climate Target

The consequences of a heavy reliance on fossil gas become even clearer if we compare a scenario where fossil gas is replaced with renewable sources. By just replacing projected fossil gas use with renewable sources, expected emissions in 2035 drop to 23 mmt CO_2e equivalent in the Base Case scenario and 29 in the Lift-Off scenarios, or about 3-4% of the power sector emissions allowable to achieve the 2035 NDC.

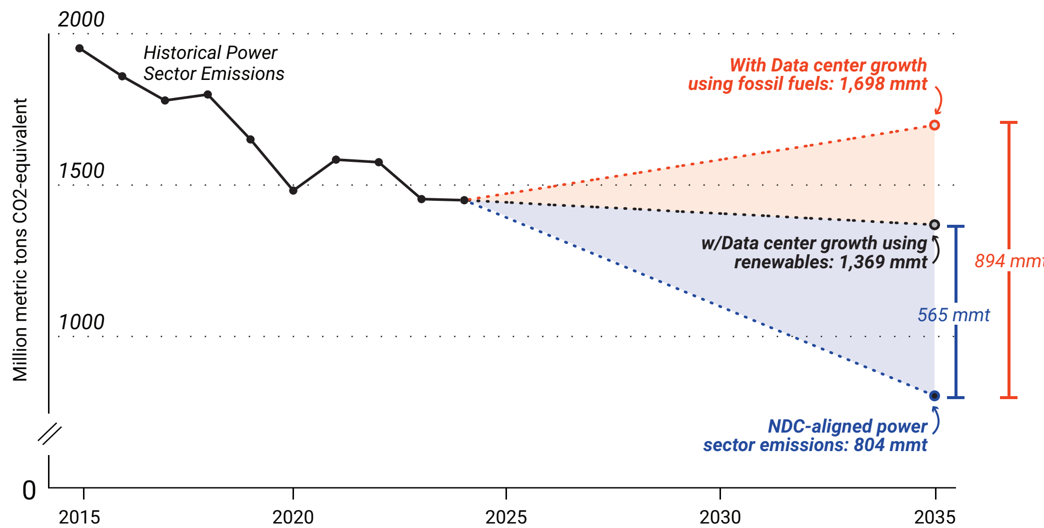
The emissions reductions are even greater (though relatively modest given the dominant role of fossil gas) if nuclear and coal are also replaced by renewable sources — falling to 17 and 23 mmt CO_2e in Base Case and Lift-Off scenarios, respectively, or to about 2-3% of the power sector emissions allowable to achieve the 2035 climate target. Meanwhile U.S. data center emissions would account for less than 1% of *economy-wide* emissions allowable.

FINDING 4: If Data Centers Are Powered Mostly by Fossil Fuels, Other Electricity-Consuming Sectors Will Have to Make Larger Emissions Cuts to Meet the 2035 U.S. Climate Target

Ultimately the trajectory of data center buildout will affect the reductions necessary from other electricity-consuming sectors to achieve the 2035 climate target. Without action to reduce emissions from other power consumers, the buildout from data centers would push power sector emissions from 1,450 mmt CO_2e in 2024 to nearly 1,700 mmt CO_2e in 2035 in the Lift-Off scenario (Figure 3). Thus, to achieve the 2035 NDC, other electricity-consuming sectors would have to reduce their emissions by nearly 900 mmt CO_2e. However, if data center buildout proceeded instead to be fully powered by renewables by 2035, then other electricity-consuming sectors would only have to reduce their emissions by 565 mmt CO_2e. In other words, if data center buildout proceeds with the fossil fuel-reliant energy mix rather than one fully utilizing renewables, then other electricity-consuming sectors would have to cut 60% more emissions to meet the climate target.

FIGURE 3

U.S. Power Sector Emissions Trajectories and Reductions Needed to Meet the 2035 U.S. Climate Target When Powering Data Centers With Majority Fossil Fuels Vs. Renewables



The solid black line (—) depicts historical U.S. power sector emissions from 2015 to 2024 as sourced from U.S. EPA;[26] the blue dotted line (•••) shows an idealized trajectory from 2024 to reaching power sector emissions in 2035 that align with the 2035 NDC; the red dotted line (•••) shows a linear trajectory from power sector emissions in 2024 to those in 2035 if data center buildout proceeds in accordance with the Lift-Off scenario and without action to reduce emissions by other electricity-consuming entities; the black dotted line (•••) shows a linear trajectory from power sector emissions in 2024 to those in 2035 if projected data center buildout is fueled fully by renewables and without action to reduce emissions by other energy-consuming entities; the blue wedge represents emissions reductions necessary to achieve the 2035 NDC by other electricity-consuming entities if data center buildout proceeds using renewables; the red wedge represents the additional reductions that would be necessary by other electricity-consuming entities to achieve the 2035 NDC if data center buildout proceeds with the fossil fuel-heavy energy mix described by IEA.

POLICY RECOMMENDATIONS

These recommendations propose a proactive approach to regulating the fast-growing AI data center industry. These policies focus on energy and climate emissions, understanding that other AI impacts — including water usage, wildlife harms, additional environmental effects, and societal, ethical and technological considerations — warrant additional policies. However, as a threshold matter, this policy framework opens with a public interest test that permitting jurisdictions can employ to assess whether data centers serve a net-beneficial need considering their myriad impacts.

U.S. Domestic Guardrails

The following policy recommendations provide a proactive three-step sequential regulatory framework that establishes guardrails on data center infrastructure in federal, state, Tribal and local jurisdictions, though they may also be relevant to jurisdictions outside the U.S. The framework should supplement existing regulatory and legal structures, including environmental and environmental justice protection laws.

1. Data centers must pass a public interest test, ensuring transparency about public impacts.

Every data center may be subject to a series of approvals at federal, state, Tribal or local levels. As a threshold matter, because of the massive public resources that data centers consume, any permitting process should involve a public interest test and needs assessment that weighs purported benefits and harms, and regulators should deny approval where projected harms outweigh the benefits. Factors of the test should include, but not be limited to:

a. The purpose of the data center, including the clients, services and industry it supports

b. The data center's projected environmental impacts, including electricity usage and impact to grid stability and electricity capacity; carbon and air pollutant emissions; water usage and impact to local water sources; species extinction and biodiversity loss

c. The data center's projected impact on electricity and water rates, including any rate increases associated with building new energy infrastructure to meet the data center's resource needs

d. The data center's projected harm to public health and safety

e. The data center's economic impacts to the state or local economy, including job creation and losses, property value effects, tax subsidies and other corporate giveaways

f. Any other impacts, including upstream and downstream considerations

The burden should be on the applicant to disclose accurate information detailing these factors to ensure transparency, often undisclosed under current practice. This regulatory process would be akin to applying for a Certificate of Public Convenience and Necessity, a permit routinely used by state and local governments to authorize private corporations to construct public utility projects. This permitting process seeks to ensure that projects are in the public's best interest and typically involve a needs evaluation, environmental and socioeconomic impact assessments, public testimony and public hearings.

The public interest test should also include a monitoring and enforceability mechanism, where regulators should regularly assess any permitted data center's actual impacts and deny a permit if it exceeds the original estimated projections upon which the permit relied.

2. If approved, data centers should be responsibly sited and use on-site renewable energy, storage, and micro-grids.

As a threshold matter, data centers should be responsibly sited. State and local governments should require companies to determine the availability of renewable resources like solar and wind, along with water availability so that local water resources are not depleted. The companies should be required to assess the potential site's effects on any nearby communities and wildlife, especially imperiled species. Companies should prioritize using degraded land to avoid environmental and environmental justice harms.

If approved, data centers provide the opportunity to generate electricity where it is consumed on-site or "on campus." Therefore, once sited, data centers should be constructed to maximize energy efficiency and be powered by on-site renewables like solar and wind, batteries and microgrids, eliminating the need for fossil and diesel generators for backup power.

Solar and wind energy co-location with data centers is not a new concept, as multiple companies have begun exploring this arrangement both in the U.S. and globally.[27] Powering data centers with renewable energy and storage instead of fossil fuels curbs greenhouse gas emissions, yields more resilience in climate disasters, and avoids environmental justice, public-health, and wildlife harms.

Moreover, powering data centers with on-site renewables bypasses the pitfalls of relying on the country's antiquated and fragile fossil-fueled grid. It avoids the risk of blackouts because of increased load demand, particularly from extreme heat, as well as longer development timelines due to cumbersome transmission buildout, interconnection and process delays, and greater infrastructure costs.

DATA CENTERS SHOULD BE POWERED BY TRULY RENEWABLE ENERGY, NOT FALSE SOLUTIONS

For minimizing climate and public health risks, only truly clean renewable energy — namely wind and solar paired with storage — is acceptable to power data centers. The following false solutions should play no role in powering AI data centers.

Carbon capture and storage (CCS). Importantly, if data center buildout is to proceed without jeopardizing global climate goals, there is no place for fossil fuels, even when paired with carbon capture and storage, or CCS. As tech companies make plans for massive data center buildout, many propose pairing gas-fired power plants with CCS to purportedly reduce CO_2 emissions.[28] CCS has, for decades, proved to be ineffective. Actual CO_2 capture rates are far lower than promised[29] and it relies on massive taxpayer subsidies.[30] CCS emits its own toxic air and climate pollution due to huge energy demand,[31] with the public-health harms from coal and fossil gas pollution well-documented.[32]

Bioenergy made from agricultural and forest biomass is polluting across the lifecycle. Bioenergy production using combustion, gasification, and pyrolysis of woody biomass emits significant amounts of carbon dioxide and air pollution that worsen climate change and harm public health, while depleting forests by incentivizing logging.[33] Woody bioenergy production is carbon-emitting, not carbon neutral as proponents contend. It leads to a net increase of carbon emissions to the atmosphere for decades to centuries.[34] Thus bioenergy is not a clean renewable source of energy like solar or wind energy, which offer far better climate benefits and minimize environmental harm.

Nuclear energy comes with numerous potential risks. These include storing radioactive nuclear waste with risk of leakage, harms to aquatic wildlife due to water discharge from nuclear plants, and accidents or meltdowns such as those seen in Chernobyl or Fukushima.[35]

3. For any additional energy demand, data centers must pay for all new energy infrastructure, instead of passing costs onto ratepayers, and deploy distributed energy to open grid capacity.

To the extent that on-site renewable energy and storage is insufficient to power AI data centers, companies may seek to use grid resources. In that case the costs of providing power to data centers should be borne entirely by the data center company or operators, not subsidized by captured residential and other commercial customers. State regulators should require that these corporations invest their own money in any new energy generation and related infrastructure as a portion of the company's overall investment. This rectifies the current practice, where ratepayers are subsidizing the data center industry by paying for new gas power plants and pipelines for data center infrastructure, some of which is eventually unused by technology companies.[36]

Any new energy infrastructure should start with the deployment of distributed energy resources for existing grid customers to free up grid capacity for data center needs. Specifically, data centers should pay for existing grid customers — prioritizing low-income and historically marginalized communities — to obtain rooftop solar, storage, microgrids and energy-conservation technologies like heat pumps and bi-directional electric vehicle charging. This will allow those customers to locally generate sufficient power to offset grid power consumed by the data center.[37] Grid-enhancing technologies and virtual power plants can also ensure that data center needs on the grid can be adaptable to serve new loads.

Global Guardrails

Make data centers part of international climate negotiations

AI sits at the intersection of climate chaos and global security. The United Nations recently launched two AI governance bodies: the Global Dialogue on AI Governance and the Independent International Scientific Panel on AI, both intended to usher in a more inclusive form of international governance of AI. Consequently, the U.N. Framework Convention on Climate Change (UNFCCC) and subsequent climate negotiations should address the potential climate harm from AI infrastructure and require countries to disclose how much AI infrastructure contributes to their greenhouse gas emissions. Specifically, countries should submit NDC commitments that include zeroing out the carbon emissions of the AI industry by using renewable energy and distributed energy resources. A mechanism should also be established to facilitate technology and financial transfers from wealthy to poor countries to ensure that any AI infrastructure is not powered by fossil fuels and is accessible to the Global South.

ENDNOTES

1 Ritchie, H. et al., *CO_2 and Greenhouse Gas Emissions* (accessed October 23, 2025), https://ourworldindata.org/co2-and-greenhouse-gas-emissions; Italy's emissions in 2023 were 362 mmt CO_2e in 2023.

2 International Energy Agency, *Energy and AI* (2025)("IEA (2025)") at 14, https://iea.blob.core.windows.net/assets/601eaec9-ba91-4623-819b-4ded331ec9e8/EnergyandAI.pdf.

3 *Id.*, at 14 (citing that U.S. data center energy usage in 2024 was 45% of a global 415 TWh); Energy Information Administration, *Short-Term Energy Outlook* (2025), at 11, https://www.eia.gov/outlooks/steo/pdf/steo_full.pdf (citing that total electricity generation in 2025 is likely to reach 4,400 TWh, a 2% year-over-year increase from 2024); Shebabi, A. *et al.*, U.S. Department of Energy, Lawrence Berkeley National Laboratory, 2024 U.S. *Data Center Energy Usage Report* (2024), https://doi.org/10.71468/P1WC7Q.

4 IEA (2025), at 13.

5 *United States of America Nationally Determined Contribution: 2035 Emissions Target*, December 2024, https://unfccc.int/sites/default/files/2024-12/United%20States%202035%20NDC.pdf. The authors support a more ambitious U.S. NDC that is the country's fair share that it owes to the world, amounting to a 70% reduction in 2005 greenhouse gas levels by 2030 (5 billion metric tons of CO_2 equivalent) and substantial financial and technological support to developing countries to cut another 9 billion metric tons of CO_2 equivalent. *See* U.S. Climate Action Network, *U.S. Climate Fair Share*, https://usfairshare.org/.

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14 *Id.* at 14.

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