The Environmental Footprint of Emerging Technology and Artificial Intelligence

Data Centers, Community Health and Policy Responses

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Table of Contents

Executive Summary 4

Policy Landscape 5

Path Forward for Public Health 5

Introduction 6

Changing Data Center Scale for Emerging Technologies 6

Not Just AI: Technologies Driving Data Center Development 6

Energy Demand, Grid Pressures and Air Quality Implications 8

Data Center Growth Impacting Electricity Costs 8

Transparency and Reporting Gaps 8

Where Data Centers Are Built and Who Is Affected 9

Water Usage 10

Policy Responses at the State and Local Level 11

Local Policy Examples 11

State Policy Examples 11

A Path Forward for Public Health 14

Appendix A. Methodology 16

Sources 18

Executive Summary

The rapid growth and use of artificial intelligence (AI) is transforming many sectors, but it also has environmental implications that are complex and multifaceted. AI infrastructure drives increased demand for significant water use, greater energy consumption and expanded grid infrastructure, all of which require careful management to avoid environmental and community harm.

Energy and Emissions

U.S. data centers consumed 183 terawatt-hours (TWh) of electricity in 2024, more than 4 percent of the country's total energy usage, and that figure is projected to grow by 133 percent to 426 TWh by 2030.[1]

Virginia, Texas and Oregon had the highest emissions attributable to data centers.[2]

Typical AI research pipelines involve training thousands of models, resulting in cumulative emissions of tens of thousands of pounds of carbon dioxide (CO2) equivalent over several months.[3] Training a single AI model can emit more than 626,000 pounds of CO_2 equivalent, nearly five times the lifetime emissions, including manufacturing, of an average American car.[4]

Water

Data centers consumed an estimated 17 billion gallons of water directly in 2023, with projections suggesting that use could double or quadruple by 2028. In 2021, 1 in 5 U.S. data centers was already located in an area experiencing water stress.[5,6]

Data center water use occurs both directly through cooling and indirectly through electricity consumption. Cooling alone can account for as much as 40 percent of a data center's total electricity consumption.[7] Some facilities draw more than half of their water from potable sources and increasing data center capacity means water demand is likely to rise as computing infrastructure expands.[8]

Grid Impact

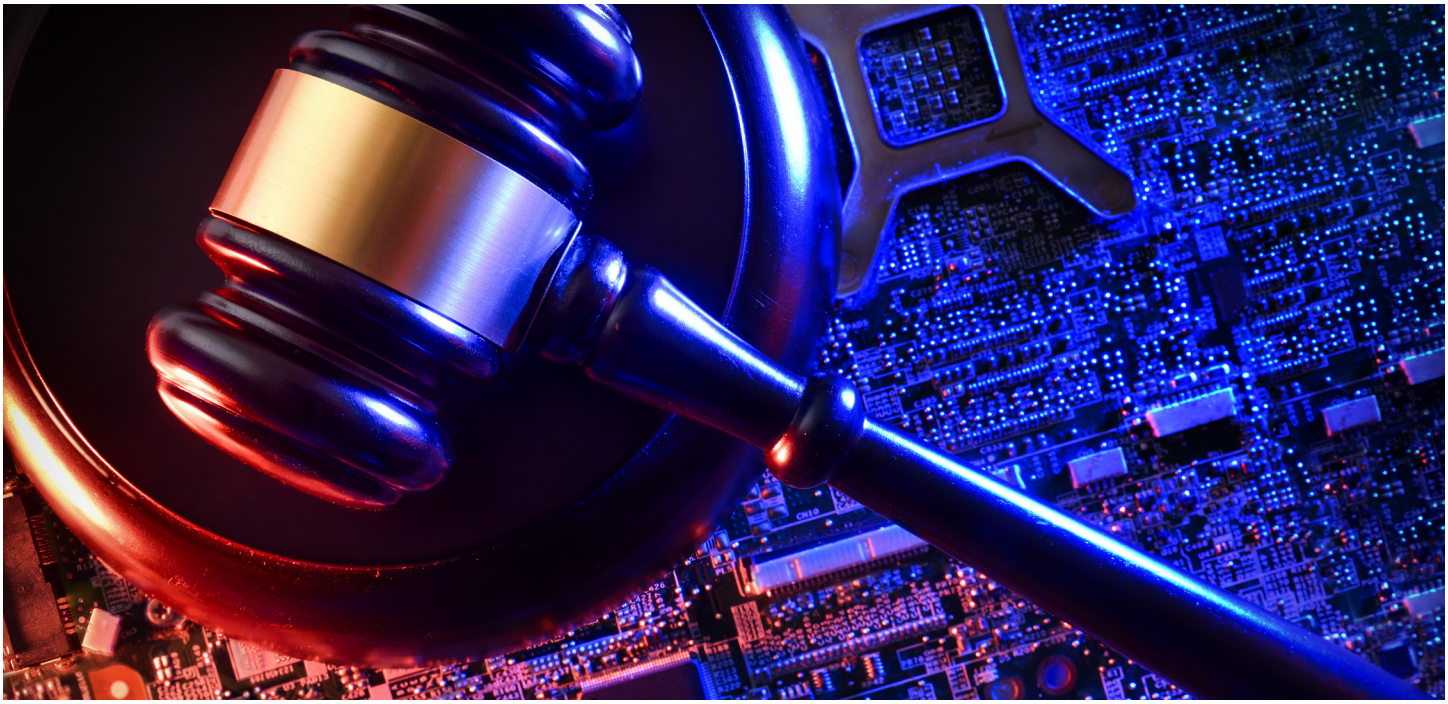
In the United States, fossil fuel dominated all electricity generated for data centers (56 percent), followed by renewable energy (22 percent) and nuclear power (21 percent).[9]

The growth of data centers is delaying coal plant closures, slowing or preventing national, state and local priorities to transition to clean energy, as renewable sources are insufficient to meet both hyperscale data centers and existing users' needs.[10]

AI Task Intensity

Emerging technologies, like AI, often require larger, more energy-intensive data centers to meet computational demand. Searches driven by generative AI use four to five times the energy of a conventional web search.[11]

Generative AI tasks such as text generation, summarization, image captioning and image generation tend to be more energy- and carbon-intensive than discriminative (predictive) use cases,[12] such as using existing data in machine learning models to identify patterns, anticipate user behaviors and forecast upcoming events.[13]



Policy Landscape

Policy responses vary and often reflect a tension between furthering state-level economic development interests and balancing local community health and environmental concerns. States are primarily addressing energy reporting, ratepayer protection and environmental assessment. Local governments have tended to act more directly on land use, zoning and permitting, driven by community opposition and the immediacy of local resource impacts.

Select local actions include:

- Loudoun County, Virginia, ended by-right zoning for data centers, requiring all new applications to undergo public hearings (2025).
- Kansas City, Missouri, classified data centers as industrial, requiring council approval and mandatory impact studies on water and electricity rates (2026).
- Marana, Arizona, prohibited potable water use for cooling and required water source disclosure (2024).

Path Forward for Public Health

Public health practitioners are well-positioned to help navigate the tension between economic development and community health. The three core functions of public health, policy development, assessment and assurance, provide a concrete structure for that work:

- **Policy development:** Advocate for health impact assessments in permitting, transparency requirements and community notification standards; contribute public health expertise to state and local rulemaking.
- **Assessment:** Track and analyze cumulative environmental exposures, air quality near diesel generators, water availability in stressed regions and electricity cost burdens on low-income households; push for systematic, mandatory data collection from operators.
- **Assurance:** Monitor health outcomes in affected communities over time, hold operators and regulators accountable to environmental standards and ensure vulnerable populations have meaningful access to decision-making processes.

The most consequential recommendation is also the most foundational, communities need the information, access and standing to participate in decisions about AI infrastructure that will affect their health for decades to come. Public health can serve as a valuable partner in shaping the ethical rollout of AI and emerging technologies in our increasingly digital society.

Introduction

The rapid growth and use of artificial intelligence (AI) is transforming many sectors, but it also has environmental implications. These implications are complex and multifaceted. AI infrastructure drives increased demand for significant water use in data centers and creates growing pressures on energy and grid infrastructure, all of which require careful management to avoid environmental and community harm.[14] This report aims to explore the intersection of AI, environmental health and policy to better understand and communicate the environmental impacts of AI and its associated infrastructure and the implications for public health. The report synthesizes evidence related to environmental and public health considerations rather than providing a comprehensive assessment of all costs and benefits associated with AI or data center development.

This report assessed these issues through a literature review of research articles examining energy use, water consumption, emissions and infrastructure demand; an analysis of emerging state legislation and local ordinances addressing AI use and related infrastructure, including data centers and energy and water use; and an identification of strategies and roles to guide ethical AI adoption and infrastructure expansion in ways that promote sustainability, environmental justice and community health. For detailed methodology, see *Appendix A*.

Changing Data Center Scale for Emerging Technologies

Data centers, in some form or another, have been around for decades and have changed over time in size, scale and by function.[15] Data centers are facilities that house computer servers, data storage and networking equipment, along with the power and cooling systems needed to operate them for daily digital life.[16]

Not Just AI: Technologies Driving Data Center Development

Data centers provide the physical infrastructure behind the digital services most people use every day, such as email, streaming, online banking, cloud storage, social media, smart in-home devices and increasingly, AI systems.

Artificial intelligence and Machine Learning

Computer systems designed to perform tasks that typically require human intelligence, such as recognizing patterns, generating text or images, and making predictions. Training and running these systems require substantial computing power and, by extension, significant data center infrastructure. Amazon, Alphabet (Google's parent company), Meta and Microsoft invested $240 billion on AI infrastructure alone in 2024, $410 billion in 2025 and have committed an estimated $650 billion for 2026.[17]

5G Networks

The fifth generation of wireless network technology, designed to deliver faster data speeds and support a greater number of connected devices simultaneously. 5G infrastructure relies on data centers to process and route the increased volume of data it transmits.

Cloud Computing and Storage

The delivery of computing services, including storage, processing and software, over the internet rather than through local hardware. Cloud services are hosted in data centers and have grown significantly as businesses and individuals shift from on-site servers to remotely accessed infrastructure.

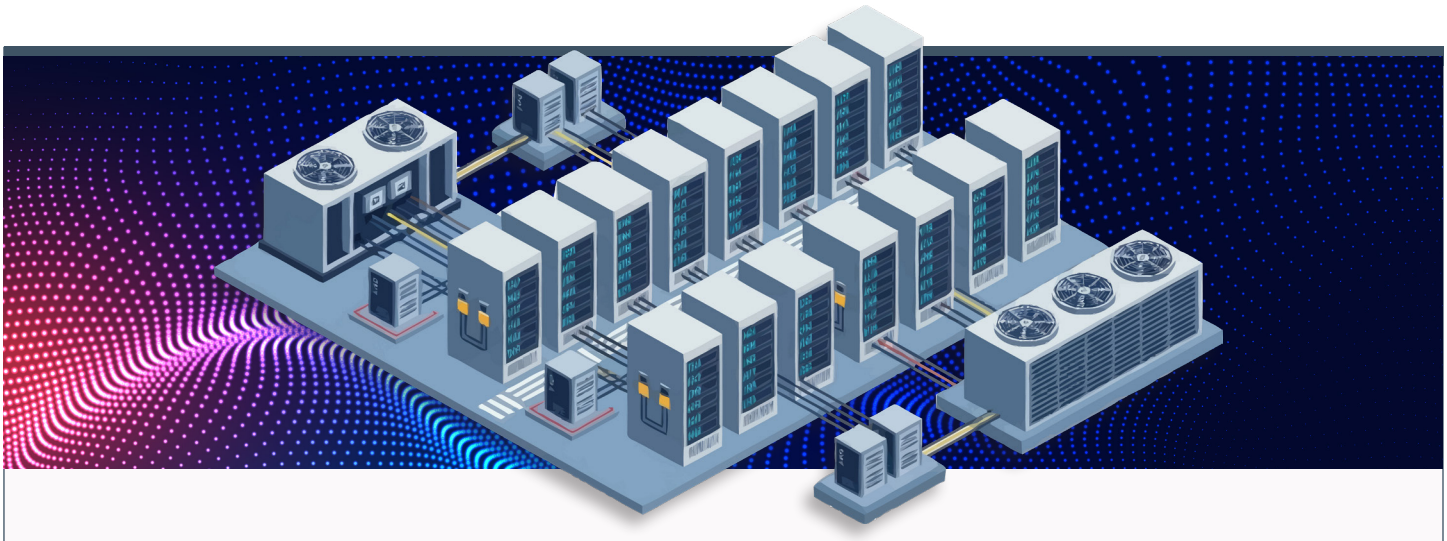
Cryptocurrency Mining

The process by which transactions involving digital currencies are verified and recorded, requiring large amounts of continuous computing power.

Internet of Things (IoT)

The network of physical devices, such as smart home appliances, thermostats, wearables and industrial sensors, that collect and exchange data over the internet.

Before examining the health and environmental impacts of data centers, it helps to understand how they differ in resource demands, because energy and water use vary significantly based on the type and scale of workload a facility supports:



Types of Data Centers

Varies Based on Ownership or Intended Purpose[18]

Edge

Small facilities placed close to where people live and work. Supports 5G and smart devices.

Enterprise

Facilities owned and operated by a single organization for its own use. Used for email, file storage, and internal business systems.

Colocation

Shared building where multiple organizations rent space. Provides shared computing resources for businesses of all sizes.

Cloud

Digital services delivered remotely over the internet. Includes online storage, software, video streaming, and banking and financial transactions.

Hyperscale

Massive buildings or campuses operated by major technology companies. Supports AI systems and large-scale cloud computing. Hyperscale facilities are those with a power draw, which is the rate at which a facility uses electricity at a given moment, exceeding 100 megawatts (MW), enough electricity to support approximately 80,000 U.S. households. The largest reported facilities can reach 1,000 MW, roughly equivalent to the electricity needs of 800,000 U.S. households.

Ultimately, facility size still varies within the above categories. The rapid expansion of AI has intensified the need for larger facilities to meet demands considerably, but data centers were already a significant and growing source of energy and water consumption before AI. Infrastructure decisions made to accommodate AI growth and other emerging technologies over time will shape resource use and community health impacts well beyond the AI sector alone. This range, from small, distributed facilities to massive hyperscale campuses, is one reason resource demands can look very different from one project to the next. As facility scale and AI-driven demand continue to grow, energy use in particular has emerged as a central concern for grid capacity and air quality.

Energy Demand, Grid Pressures and Air Quality Implications

The energy demands brought forth from data centers to meet the demand of AI and other technologies are substantial and accelerating. As technology advances, the infrastructure required to store and process data is expanding. U.S. data centers consumed 183 terawatt-hours (TWh) of electricity in 2024, more than 4 percent of the country's total electricity consumption, and that figure is projected to grow by 133 percent to 426 TWh by 2030.[19]

Electricity demand in data centers is driven mainly by computing (40 percent) and cooling (40 percent), with the remaining 20 percent from other IT equipment.[20] The cooling share is expected to grow as AI chips become denser and more power-intensive. The average rack power density is projected to increase from 36 kilowatts (kW) in 2023 to 50 kW by 2027 and some next-generation AI rack designs may reach 600 kW per rack, placing increased thermal demands on cooling systems.[21]

This growth in electricity consumption places pressure on regional power grids and has led grid operators and utilities to delay or cancel the retirements of many older fossil fuel power plants, often referred to as peaker plants, which are meant to run only in short bursts during periods of spiking electricity demand, to avert energy shortages and to meet demand.[22] These facilities emit more pollution when running and cost more to produce electricity than continuous power plants.

To maintain operations during grid disruptions, data centers rely on diesel backup generators,[23] which emit hazardous pollutants such as nitrogen oxides and fine particulate matter. Research has associated these emissions with increased rates of respiratory diseases, certain cardiovascular conditions and elevated cancer risk in nearby communities. Research has noted that facilities managing high thermal loads may increase reliance on these backup systems, which are associated with intermittent increases in air pollutant emissions.[24]

Data Center Growth Impacting Electricity Costs

Rising energy costs add another layer of harm. One study from Carnegie Mellon University estimated that data centers and cryptocurrency mining could lead to an 8 percent increase in the average U.S. electricity bill by 2030, potentially exceeding 25 percent in the highest-demand markets of central and northern Virginia, likely disproportionately burdening lower-income households.[25] For example, in Virginia — where Northern Virginia alone houses the largest concentration of data centers in the world and has been estimated to handle 70 percent of global internet traffic[26] — residential electricity costs are already rising as new hyperscale data centers draw increasing power from the grid.[27]

Data center expansion is documented to increase consumer electricity bills, but the impacts extend beyond utility rates.[28] Researchers and communities have also identified environmental and public health consequences, including changes to air quality, noise levels, strain on local water supplies, impacts to the grid and proximity to diesel backup generators. The impacts vary in intensity depending on facility size, grid resilience, location and operational practices.

Transparency and Reporting Gaps

Current corporate emissions reporting practices present a related challenge. One analysis found that some large technology companies' data centers may emit substantially more CO_2 than publicly reported, in part due to the use of purchased renewable energy credits that reflect contracted energy sources rather than actual local grid emissions.[29] Despite existing policy frameworks including the U.S. Energy Act of 2020, which mandates studies on data center energy and water use and development of efficiency metrics,[30] voluntary disclosure of energy and water use by data center operators remains inconsistent, limiting the ability of researchers, regulators and public health professionals to fully assess the sector's environmental footprint.[31] Since publicly available facility-level data is not available, researchers must rely on modeled estimates rather than measured figures to approximate AI's water footprint. Because of this, standardized, facility-level reporting has been identified by researchers as important for enabling accurate assessment of cumulative environmental exposures from AI and data centers at-large.

Construction of a new hyperscale data center building in Hutto, Texas.

Where Data Centers Are Built and Who Is Affected

Decisions about where to build data centers carry significant environmental and public health consequences for nearby communities. Site selection, zoning approval, environmental permitting and construction each involve tradeoffs that affect local residents, and the process has grown more complex as community awareness of these impacts has increased.[32] Permitting requirements commonly include building, electrical, fire safety and environmental compliance reviews; some jurisdictions now also require public hearings and special-use permits.

A lack of transparency in the development process has compounded concern. In several cases, including in Tucson, Arizona, and Indianapolis, Indiana, proposals collapsed after residents discovered that nondisclosure agreements (NDAs) had been signed by local officials, preventing any public discussion of the project's details.[33] NDAs between developers and county officials are a common industry practice for all types of economic development, as information about the development can be classified as proprietary or trade secret. However, due to the documented impact larger data centers have on local and regional resources, communities may feel at odds with proposed projects and their local government officials. In communities where projects have moved forward without public input, residents have reported feeling that the process was designed to exclude them. In Lancaster, Pennsylvania, for example, a data center's first phase required only administrative approval, with no public hearing required.[34]

> In response to public backlash around the use of NDAs in Wisconsin and proposed legislation that would ban local governments from signing NDAs with data center developers, Microsoft recently made the decision to stop using NDAs with local governments for data center development.[35]

A national review of roughly 700 U.S. data centers found that nearly half are located in census tracts that already experience elevated environmental burdens and many are in areas with elevated social vulnerability indicators such as poverty and lower educational attainment.[36] Siting decisions are a particular focus in communities. Data centers are increasingly proposed near residential areas or on agricultural and rural land that was never planned for industrial use, creating friction between existing zoning codes and community expectations.[37] Siting a data center involves several considerations to determine whether a site is suitable. To optimize facility performance and improve community-based outcomes, holistic models for siting data centers must incorporate water access, power needs, workforce availability, use-appropriate land and community health effects.[38]

Water Usage

Community concerns about data centers span several dimensions with direct public health relevance. Water demand is among the most acute. A large data center can use up to 5 million gallons of water daily for cooling and data centers as a sector consumed an estimated 17 billion gallons of water directly in 2023 with projections suggesting that figure could double or quadruple by 2028.[39] In August 2025, Tucson's city council unanimously rejected an Amazon-linked data center specifically because it would have become the city's single largest water consumer.[40] In water-scarce regions, this competition with residential and agricultural water needs is acute; 1 in 5 U.S. data centers in 2021 was already located in an area experiencing water stress.[41]

Water resource impacts are measured in part through Water Usage Effectiveness (WUE) and Water Usage Impact (WUI). WUE measures operational water use per unit of computing work. WUI goes further by incorporating regional water stress, where the same volume of water withdrawn can have a greater environmental impact in a drought-affected area than in a water-abundant one.[42] WUE does not differentiate between potable water drawn from municipal drinking water supplies and reclaimed or gray water, nor does it account for the large volumes of water consumed indirectly through electricity generation at offsite power plants, which represents the largest share of a data center's total water footprint.[43] These distinctions are especially relevant to siting decisions and environmental review processes.

Quantifying the full environmental footprint of AI systems also requires Life Cycle Assessment (LCA), a method for evaluating environmental costs across the supply chain, development and operational phases. Data limitations and inconsistent corporate disclosure practices complicate these assessments.[44] Estimates suggest the total water footprint of AI systems alone could reach between 312 billion and 764 billion liters in 2025, comparable to the annual water consumption of a city of two to five million people, while associated CO_2 emissions could range from 32.6 to 79.7 million metric tons (equivalent to the annual emissions of roughly 7 to 17 million average passenger vehicles), figures that carry significant uncertainty due to incomplete disclosure.[45]

Data centers also draw from potable municipal water supplies for cooling, which can reduce accessibility to drinking water and compound inequities in communities already experiencing what researchers call "plumbing poverty."[46] The energy systems powering AI, which remain predominantly fossil fuel-dependent in many regions, contribute to air pollution, greenhouse gas emissions and climate-related health risks. Research indicates these impacts are not evenly distributed, with low-income communities and communities already experiencing elevated environmental exposures more likely to be affected.

Policy Responses at the State and Local Level

Local governments have begun responding by updating their regulatory frameworks (*Figure 1*, page 12). Cities like Atlanta enacted ordinances requiring special-use permits and restricting data center construction in certain neighborhoods. Loudoun County, Virginia, which has the highest concentration of data centers in the world, voted in 2025 to end by-right zoning for data centers, subjecting all new applications to public hearings.[47]

Local Policy Examples

As demand for energy and water for data center developments increase, so does the pushback from communities. This resistance has become a significant national force. As of 2025, at least 142 grassroots advocacy groups across 24 states were actively mobilizing to block, delay or impose stricter regulations on proposed data center projects and a report covering May 2024 through March 2025 estimated that roughly $18 billion in projects had been blocked and another $46 billion delayed due to local opposition.[48]

Between April and May of 2025 alone, opponents slowed or thwarted projects totaling an estimated $100 billion.[49]

State Policy Examples

State legislatures across the country are increasingly grappling with how to govern the rapid expansion of AI-related infrastructure, producing a diverse and often competing set of policy responses (*Figure 2*, page 12).

State and local policy responses vary considerably in focus and approach. At the state level, legislatures are primarily addressing energy reporting, ratepayer protection and environmental assessment, with some states moving toward stronger environmental accountability requirements and others prioritizing grid reliability or economic development incentives. Local governments, by contrast, have tended to act more directly on land use, zoning and permitting, driven by community opposition and the immediacy of local resource impacts. In some states, such as West Virginia, state law has moved to limit local zoning authority over certified data center developments, creating tension between state and local priorities. Overall, states appear to be taking a broader policy development role, while local governments are often the first to respond to community concerns, though the pace, scope and direction of action vary widely.

Figure 1: Select Local Policies Related to Data Center Development

Jurisdiction	Policy Action	Select Key Provisions
Atlanta, Georgia (2025)	Special-Use Permits	Requires a special use permit for all new data centers; applicants must submit a water consumption plan, water conservation and sustainability plan, energy consumption plan, transmission line impact assessment and if trees are needed to be removed, a tree preservation and reforestation plan
Jefferson County, Missouri (2026)	Proposed Performance Standards	Requires 40 percent of power from on-site renewable energy; 500-foot setback from residential property; mandatory noise and buffer standards; and a community benefit agreement reserving at least 50 percent of full-time jobs for county residents
Kansas City, Missouri (2026)	Zoning Amendment	Classifies data centers as industrial; requires city council approval and mandatory impact study on water/electricity rates
Lancaster, Pennsylvania (2025)	Community Benefit Agreement	Caps municipal water use at 20,000 gallons per day per campus; requires 100 percent clean energy with financial penalties up to $10 million per building for noncompliance; mandates closed-loop cooling; requires emissions-reducing technology for backup generators; commits $20 million to city economic development and clean energy funds
Loudoun County, Virginia (2025)	End By-Right Zoning	All new applications for data center projects are subject to public hearings; phase two of policy development will develop detailed operational standards
Marana, Arizona (2024)	Water Use Ordinance	Prohibits potable water use for cooling; requires water consumption estimates and source identification ID
St. Charles, Missouri (2025)	Moratorium	Six-month pause on large-scale data centers (5+ MW or 100,000+ sq ft); directs public health and community development departments to jointly study impacts on water resources, electric infrastructure, environmental quality, noise and public health

Source: Local ordinances, zoning amendments and resolutions were identified through targeted online searches conducted in April 2026. Local policy examples are illustrative rather than exhaustive and reflect the most current information available at the time of review. Policy status may have changed since publication.

Figure 2: Select State Policies Related to Data Center Development and AI Environmental Impacts (2025-2026)

State	Bill	Focus Area	Bill Status	Key Provisions
California	Assembly Bill (AB) 222 (2025)	Energy Reporting	Pending	Would require data center operators to submit Power Usage Effectiveness (PUE) metrics to the state energy commission; directs assessment of data center electricity demand
Colorado	House Bill (HB) 1030 (2026)	Energy / Environment	Pending	Would advance grid modernization and environmental safeguards alongside data center development; links development to clean energy and greenhouse gas reduction goals

Figure 2 (continued)

State	Bill	Focus Area	Bill Status	Key Provisions
Connecticut	HB 5076 (2025)	Energy / Water	Failed	Would have required 50 percent renewable energy sourcing, water conservation measures and annual reporting of energy, water and emissions
Delaware	HB 233 (2025-26)	Ratepayer Protection	Pending	Would require separate rate class for large energy-use facilities (20+ MW) to prevent infrastructure costs from shifting to residential customers
Delaware	Senate Concurrent Resolution (SCR) 18 (2025)	Energy Supply	Enacted	Establishes task force to examine feasibility of small modular nuclear reactors to strengthen energy infrastructure
Massachusetts	HB 495 (2025)	Emissions / Studies	Pending	Would direct state study of AI's environmental impacts, including lifecycle energy and water use, grid stress and disparate community impacts
Minnesota	Senate File (SF) 1117 (2025)	Environment / Studies	Pending	Would require state pollution control agency to study AI's environmental impacts, including energy and water use, grid stress and water withdrawals
Missouri	HB 2239 (2026)	Environment / Public Health	Pending	Would create the AI Data Center Environmental Accountability Act; requires annual reporting on water use, emissions, backup generator use, air and water quality monitoring and public health complaints
New Jersey	Senate Bill (SB) 680 (2026)	Energy / Electricity	Pending	Would require data centers to derive all electricity from new renewable or nuclear sources; mandates energy usage plans and Board of Public Utilities approval prior to grid connection
New Jersey	Assembly Bill (A) 5892 (2025)	Water	Pending	Would direct state environmental agency to evaluate short- and long-term impacts of data center water use on drinking water systems and wastewater infrastructure
North Carolina	HB 1002 (2025)	Ratepayer Protection	Pending	Would prohibit utilities from recovering data center infrastructure costs through general ratepayer charges for facilities with peak demand of 100 MW or greater

Figure 2 (continued)

State	Bill	Focus Area	Bill Status	Key Provisions
Tennessee	SB 1999 (2026)	Energy / Rates	Pending	Would establish clean transition tariff requiring large energy users to fund incremental grid infrastructure and procure new clean power; prevents cost-shifting to residential customers
Washington	HB 2515 (2026)	Energy / Reporting	Failed	Would have required utilities to report large energy load forecasts and facilities to publicly reported water, energy, emissions and discharge data
West Virginia	HB 2014 (2025)	Grid / Local Authority	Enacted	Establishes certified microgrid program for data center development; limits local zoning restrictions on certified microgrid districts
Wisconsin	SB 969	Transparency	Failed	Would have prohibited local governments from signing NDAs with data center developers that conceal project details from the public

Note: State legislation examples are illustrative rather than exhaustive and reflect the most current information available at the time of review. Bill status may have changed since publication.
Source: National Conference of State Legislatures. (2025). Artificial intelligence legislation database (updated monthly) at https://www.ncsl.org/financial-services/artificial-intelligence-legislation-database. Bills retrieved from database in April 2026.

A Path Forward for Public Health

Addressing the environmental and public health implications of AI infrastructure calls for a balanced, evidence-based approach, one that neither overstates nor dismisses emerging risks, and that prioritizes equity in how those risks and benefits are distributed (*Figure 3*, page 15).

Policy responses to data centers vary and often reflect a tension between furthering state-level economic development interests and balancing local community health and environmental concerns. This tension calls for an emerging role to balance stakeholder interests, and public health practitioners are well-positioned to help navigate this process. Public health practitioners bring established tools to this conversation, including health impact assessments, environmental monitoring and community engagement frameworks. From a public health perspective, the most consequential recommendation is also the most foundational: Communities need information, access and standing to participate in decisions about AI infrastructure that will affect their health and the health of their communities as technology grows more complex and requires more natural resources.

Three select core functions of public health: assessment, policy development and assurance provide a concrete structure for how that work can begin to happen in practice.

Assessment

In the assessment function, public health, funded and empowered through policy, law or mandate, must collaborate and coordinate with private entities to track and analyze the cumulative environmental exposures associated with data center development. These include air quality concerns near diesel backup generators, water availability and usage in water-stressed regions, and electricity cost burdens on low-income households.

Establishing new pathways for systematic data collection, or building on existing ones, is critical, given the inconsistency in voluntary corporate disclosure. Similar to how water usage and other

Figure 3: **A Balanced Public Health Approach to AI Infrastructure**

Risks to Avoid	Equity Imperative	Principles for Action
• Overstating or understating data center impacts in the absence of adequate supporting evidence. • Treating all AI uses as equivalent (energy intensity varies significantly by function). • Conducting unnecessary model runs and redundant AI experimentation.	• Consider how unequal access to AI may widen existing disparities; those without access are at risk of not benefiting from emerging technologies. • Account for the burden data center siting can place on rural and/or low-income communities. • Recognize the potential for disproportionate pollution exposure among populations least able to cope.	• Reject hype that exaggerates or downplays AI's environmental impacts in favor of a balanced approach. • Support independent academic and scientific monitoring of AI infrastructure. • Enable ethical, considerate development and use of AI — not excess.

Source: Summary of Kansas Health Institute literature review and environmental scan findings.

public utility data are reported, information on environmental exposures from data centers can and should be made available from operators and companies to inform local communities about potential impacts.

Policy Development

To act meaningfully in the policy development function, public health must be empowered and funded by state and local governments and must collaborate and coordinate with private entities. This foundation, established through policy, law or mandate, is what enables public health to address and monitor the environmental exposures and hazards that can occur from data centers.

In practice, this means public health should stay informed on potential negative community impacts and work with policymakers to address them. Public health professionals can attend county commission meetings to inform discussions about data centers.

Before data centers are operational, public health can:

- Use health impact assessments (HIAs) to evaluate proposed data center projects.
- Advocate for transparency requirements and community notification standards in permitting processes.
- Contribute public health expertise to state and local rulemaking.

Assurance

Assurance is a key function of public health, where departments ensure that what was promised is delivered. Health departments can monitor outcomes to adhere to different compliance standards, hold operators and regulators accountable when compliance is compromised and protect communities throughout the life of a data center's operation. In the assurance function, health departments can:

- Monitor for health outcomes in affected communities over time.
- Hold operators and regulators accountable to applicable environmental standards.
- Ensure that vulnerable populations have meaningful access to the decision-making processes that shape their local environments.
- Evaluate the effectiveness of policy interventions and track environmental outcomes brought forth by data centers.

Public health can serve as a valuable partner in shaping the ethical rollout of AI and emerging technologies in our increasingly digital society. Taken together, these three functions position public health not merely as a passive observer or responder to harm already done, but as an active participant in shaping how AI infrastructure is planned and governed.

Appendix A. Methodology

This report draws on evidence obtained through a peer-reviewed and grey literature review and a state and local policy scan, conducted in parallel, to assess the environmental and public health implications of AI infrastructure and to identify how governance frameworks are responding. The report synthesizes evidence related to environmental and public health considerations rather than providing a comprehensive assessment of all costs and benefits associated with AI or data center development.

Central Research Question: What is known from the existing literature about the environmental impacts of artificial intelligence use and infrastructure (e.g., energy use, water consumption, greenhouse gas emissions and demands on energy infrastructure) and how are state and local policies responding to address or mitigate these impacts?

Literature Review

This literature review was conducted to inform stakeholder engagement and planning related to the environmental and public health implications of AI systems and infrastructure. The approach was designed to synthesize current evidence on the environmental impacts of AI and related infrastructure (e.g., data centers), including energy use, water consumption, greenhouse gas emissions and infrastructure demand, to assess the impacts for public and environmental health practice.

Review Period and Scope

The review draws on U.S.-focused, English-language sources published primarily within the past three years to reflect the rapid evolution of AI technologies and their associated infrastructure. Limited earlier foundational sources were included where necessary to establish baseline concepts or methodologies. International studies were excluded to ensure relevance to U.S. public health systems, regulatory environments and infrastructure contexts, though international policy information and development-specific innovations were included where relevant.

Sources

Sources include peer-reviewed journal articles, federal government reports, policy analyses and reputable grey literature. Source types specifically included: peer-reviewed journal articles and academic conference proceedings; preprints and working papers from established research institutions; federal government and national laboratory reports; grey literature from universities and research initiatives; reports from international bodies (e.g., International Energy Agency, International Science Council); public health and advocacy organization publications; industry and legal publications; and policy and legislative sources.

Volume of Sources Reviewed

In total, the review identified and analyzed 45 unique sources across peer-reviewed literature and grey literature. Not all sources were included in this final report. These included peer-reviewed journal articles, academic conference proceedings and preprints, as well as grey literature sources spanning federal government and national laboratory reports, policy analyses, industry publications, public health organization publications and other research institution publications.

State and Local Policy Scan

This policy review was conducted to support stakeholder engagement and planning related to the environmental health implications of AI infrastructure and systems. The approach was designed to synthesize relevant policy activity at the state and local levels to inform discussions about how environmental, energy and infrastructure considerations are being incorporated into emerging AI governance frameworks and where gaps or opportunities may exist for public health engagement.

Review Period and Scope

The review draws on publicly available U.S. policy sources from 2025 and 2026. Geographically, the review includes an examination of state-level legislation that directly references AI or addresses environmental, energy, or infrastructure

issues applicable to AI systems; a review of local ordinances and other substate policies adopted by cities and counties addressing environmental or sustainability considerations related to AI use or infrastructure. State and local policy examples are illustrative rather than exhaustive and reflect the most current information available at the time of review, with a final update completed in April 2026. Policy status may have changed at the time of publication.

Sources

State legislation was identified through the National Conference of State Legislatures (NCSL) database. Local ordinances, executive orders, guidelines and organizational policies were identified through targeted online searches and literature review references. Policies were selected based on their explicit relevance to AI systems and associated environmental considerations, including energy use, water consumption, greenhouse gas emissions and infrastructure demand.

Volume of Policies Reviewed

In total, the review identified and analyzed 27 state bills across 13 states and one U.S. territory (California, Colorado, Connecticut, Delaware, Massachusetts, Minnesota, Missouri, New Jersey, North Carolina, Puerto Rico, Tennessee, Washington, West Virginia and Wisconsin), spanning the 2025 and 2026 legislative sessions. At the local level, the review identified and analyzed 12 local policies across eight states (Virginia, Arizona, Iowa, Illinois, Missouri, Oklahoma, Pennsylvania, Nebraska), including ordinances, resolutions, zoning amendments and preliminary planning frameworks adopted or under consideration by cities and counties.

Limitations

This report has several limitations that should be acknowledged. The literature review and policy scan were not conducted as systematic or exhaustive legal reviews; this approach may have led to the omission of relevant sources or policies. The state and local policy scan reflects publicly available information current as of April 2026 and is illustrative rather than exhaustive; policy status may have changed by the time of publication. Finally, because major technology companies are not required to disclose facility-level environmental data in a standardized way, some figures and estimates cited in this report carry inherent uncertainty, a limitation noted throughout the text where relevant.

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