



# POLICY FOCUS

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## Data Centers and the Environment

By Gabriella Hoffman, Independent Women's Center for Energy and Conservation, Director

### HIGHLIGHT

The United States is in a race to stay the global artificial intelligence (AI) leader. To do this, we need sufficient energy to power data centers, as well as our growing economy.

Some oppose data centers due to concerns about water, land use, and other environmental concerns. However, development can be done sustainably while keeping energy prices low through energy abundance policies.

### INTRODUCTION

Data centers are **physical** facilities that store, process and deliver digital services and applications. The U.S. already has **5,000** operational data centers around the country, making up **45%** of the total global share. **3,000** new facilities are slated for construction.

Data centers aren't new, we're just building more for different uses like AI. Their origins trace back to 1945, when the first computer, the **Electrical Numerical Integrator and Computer (ENIAC)**, was built by the U.S. military at the University of Pennsylvania. ENIAC was so massive that it needed

specialized power and cooling infrastructure, foreshadowing modern data centers. As technology improved, especially with the advent of personal computers and smartphones, mainframe computers evolved into servers, specialized computers designed to meet other computers' requests, and server networks evolved into data centers. **Cloud computing** in the early 2000s invited further efficiency improvements with data centers.

**With increased technology usage, Americans are using more electricity to access digital applications and services with ease. A paradox emerges: It's not just data centers; all technology we use needs constant and reliable energy.**

Today, Americans are interacting with these facilities, often without realizing it. Whenever you send emails, use ChatGPT, stream your favorite TV show, or save videos and photos to iCloud storage, you're interacting with data centers. With increased technology usage, Americans are using more electricity to access digital applications and services with ease. A paradox emerges: It's not just data centers; all technology we use needs constant and reliable energy.

## **MORE INFORMATION**

### **Higher Electricity Demand Isn't Solely Driven by AI Data Centers**

The proliferation of resource-hungry AI data centers has invited fears about the environment—namely rising electricity rates and water consumption—here in the U.S. and abroad.

It's true that data centers, especially larger facilities, consume lots of electricity for servers and storage, along with water for cooling systems. AI data centers need reliable, baseload power—namely natural gas, coal, nuclear, or geothermal—to continuously operate 24/7. This power demand is balanced by temperature control with equally energy-consuming cooling systems. The Congressional Research Service (CRS) **explains**, “The operation of the IT equipment raises the temperature of the ambient room air, necessitating a cooling strategy” through heat removal.

This dual demand has invited fears about building new data centers in a time of rising electricity demand from **increased** electricity use, not only from technology but also from increased manufacturing and transportation (including electric vehicles). Air conditioning, for instance, is **expected** to drive more global energy demand than data centers, as people, especially **those in Europe**, purchase ACs to stay cool amid hotter summers.

As of 2025, AI data centers account for a mere **four percent** of total U.S. electricity consumption (total energy used over time). If expected growth in this space continues, it'll rise to between **6.7 and 12 percent** of total U.S. electricity consumption by 2028. This has made many Americans fearful about rising energy costs. But the majority of end-use consumption currently comes from other sources besides AI data centers.

The U.S. Energy Information Administration (EIA) **explains** the breakdown of U.S. electricity consumption as follows: residential (37%), commercial (36%), industrial (26%), and transportation (0.2%). AI falls within the commercial sector category, accounting for four percent of electricity consumption in the U.S.

It's debatable whether increased electricity demand from data centers is solely attributable to AI, because these facilities **handle** multiple kinds of workloads. Rising electricity demand, however, is greatly misunderstood, as it signals greater economic growth and societal progress.

### **Not All Data Centers Use Resources Equally**

Data centers vary in size and do not consume resources like energy, water, and land equally.

**Three popular designs** are hyperscale, colocation, and enterprise data centers. All three differ on how much electricity, water resources, and space they use and occupy.

#### **1. Hyperscale Data Centers**

Hyperscale data centers, or cloud data centers, are the largest data center facilities built in the U.S. today. Technology companies that specialize in cloud computing services, including Amazon, Google, IBM, and Microsoft, choose this design to optimize AI, automation, data analytics, storage, and processing services. The typical hyperscaler costs about **\$12 million per megawatt (MW)** to build and could potentially cost, in excess, of **\$3 billion** to build.

Due to their efficiency, these structures comprise **37%** of data center capacity today. However, they are very resource-intensive. Hyperscale data centers do **consume** water and reach millions of square feet of space. A hyperscale campus can power between 50,000 to 57,000 homes annually and **occupy** between 200 to 1,000 acres of land.

#### **2. Colocation Data Centers**

A colocation data center is a multi-tenant data center (MTDC), or third-party data center, owned by a company that rents out space to other peer companies for IT servers and hardware. The operator **covers** services like power, cooling, and security, whereas the customer brings their own hardware. IBM

**says** colocation “allows businesses to enjoy the benefits of hyperscale, without the major investment required to make it happen.” These data centers are typically located in **internet exchange points (IEP)**, such as Northern Virginia, with faster fiber optic networks. These facilities cost **between** \$7 million to \$12 million per megawatt (MW) to construct.

After hyperscale data centers, colocation data centers make up **36%** of capacity today. They use less energy, consuming between 5 to 50 MW of electricity. Colocation facilities **consume** water equivalent to 1,000 homes annually.

#### **3. Enterprise Data Centers**

Enterprise data centers are run by businesses or institutions for their own use. After hyperscale and colocation data centers, they comprise **28%** of data center capacity today. They're less efficient than hyperscale and colocation data centers, and **cost** between \$10 million to \$12 million per megawatt (MW) of IT load to construct.

These facilities typically use between one to 10MW of energy. For context, one MW can power up to 1,000 homes, depending on location. Their water usage is equivalent to the annual consumption of 1,000 to 5,000 homes.

#### **Data Center Innovation Will Mitigate Environmental Impact**

Before rising electricity demand brought more attention to data centers, operators were already exploring ways to reduce their environmental footprint and resource consumption. Market innovation, not heavy-handed government regulation, ensures these infrastructure projects become more energy-efficient even as they consume more resources.

The industry measures data center efficiency using two metrics: power usage effectiveness (PUE) and water usage effectiveness (WUE).

In the last two decades, data centers have reduced waste and improved efficiency of their operations.

### 1. Achieving Energy Efficiency

Data centers need reliable electricity for two purposes. The primary use is to **operate** IT equipment (servers, storage, and networking), which makes up about **60% of a data center's electricity**. The secondary use of electricity is for cooling, or about **40%** of a data center's total electricity usage. Hyperscale AI data centers have servers using powerful chips that **consume** "two to four times as many watts to run" compared to smaller facilities.

PUE measures all energy consumed by a data center, or total facility power divided by IT equipment power. In 2007, data centers typically had a PUE rating of 2.5, with 40% of energy consumed supporting IT infrastructure. 14 years later, in 2021, the industry, through innovation, **decreased** the value to 1.57, allowing facilities to dedicate "approximately 60% of their energy consumption to IT equipment"—a 20% increase in this time frame. Today, most data centers strive for a PUE rating of 1.0 with 100% of electricity dedicated to IT equipment. This is nearly impossible to achieve, but companies like Google have come close with a **PUE of 1.08**.

To lessen energy consumption, data center operators are using energy sources like geothermal and nuclear that are less energy intensive but reliable nearly 24/7. Tech companies like **Amazon** and **Microsoft** are also designing their own AI chips to be less energy hungry while meeting growing U.S. electricity demand.

### 2. Conserving Water Resources

Water consumption in data centers **occurs** in two ways: directly through cooling systems

and indirectly through power generation. Water is used for cooling systems in data centers to absorb and dissipate heat from IT infrastructure. This heated water is then moved elsewhere and is often released back into the environment after any necessary treatment. Water usage effectiveness (WUE) **measures** the total amount of water used at a data center against its energy consumption—so the lower the ratio, the more efficient its water use. The industry average WUE value is **1.8 liters per kilowatt hour (L/kWh)**. Water usage at data centers is equally **determined** by "location, climate, water availability, size, and IT rack chip densities."

To mitigate potential impact from direct and indirect water consumption, data center operators have evolved from evaporation-based cooling systems to closed-loop based cooling systems. This change reportedly reduces reliance on freshwater by 50 to **70%**. Amazon, for instance, **uses** a closed-loop liquid cooling system, the In-Row Heat Exchanger, in its data centers. **IRHX** is 20% more energy efficient and uses nine percent less water compared to rival cooling systems.

### 3. Data Centers Won't Destroy the Landscape

Data centers are physically constrained to few locations around the U.S. While some hyperscalers occupy hundreds of acres of land for operations, most areas in the United States **lack** the infrastructure to support data center operations.

The Goldwater Institute **reports** that a potential site must have "robust power capacity, dense fiber-optic lines, and geographic proximity to end users to minimize latency." Most U.S. states don't have these conditions. For instance, Northern Virginia is the U.S.'s top data center market where **70% of Internet traffic flows**, due to the **Metropolitan Area Exchange, East** (MAE-East) fiber optic network.

Project location is also determined by grid interconnection, power demand, and transmission lines. That's why red states like Montana, Nebraska, South Dakota, and Texas are equally being eyed for future AI server deployments for having sufficient water and diverse energy grids.

## RELIABLE, BASELOAD POWER WILL IMPROVE DATA CENTER RESOURCE CONSUMPTION

America is growing – which is great news. It is also why we will need increased energy resources not only to power our data centers, but everything else we do. That's why we need to embrace energy abundance, the policy approach that focuses on encouraging greater energy production from all potential reliable sources. The AI boom, unsurprisingly, exposed how net-zero climate policies pushing 100% renewable energy mandates invite energy insecurity and high prices.

Natural gas makes up 40% of net U.S. electricity generation by U.S. data centers—the largest share of any available source today. After natural gas, data centers run on electricity supplied by renewables like wind and solar (24%), nuclear (20%), and coal (15%). As with the electric grid, data centers must be undergirded by reliable, baseload power that works continuously and with few interruptions. It's no wonder natural gas, nuclear, geothermal, and coal—not wind and solar—are supplying most electricity to data center facilities, regardless of size, in the present day.

As with the U.S. electric grid, renewables like wind and solar aren't optimal for powering data centers due to “long wait times to connect solar and batteries to the grid.” The electricity generated by these sources is also

expensive, especially without subsidies. More concerning is that wind and solar plants, that run on part-time energy, occupy more land than comparable natural gas and coal plants. That's where new nuclear and geothermal power plants can play a role.

The International Energy Agency (IEA) reports that hyperscale data center operators plan to construct small modular reactors (SMRs) by 2030 since they “provide a source of baseload low-emissions electricity” and occupy a smaller land footprint – as low as 15 acres – compared to a conventional 1,000 MW nuclear power plant located on one square mile (or 640 acres). Another report found that next-generation geothermal energy technologies could supply 64% of electricity demand from data centers by the 2030s due to “high capacity factor output, wide geographic dispersion, and the sheer amount of subsurface energy available to harness.” But until 2030, natural gas and coal will help meet an additional 40% of data center electricity demand.

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Blue states are mulling legislation to mandate data centers dedicate a percentage of their power sources to renewables to preserve their 100% renewable energy mandates. This will only exacerbate an electricity crisis—not stop it. Therefore, energy abundance policies that

prioritize new projects supported by reliable baseload power can also result in **electricity abundance**.

**By aligning data center development with energy abundance, these infrastructure projects will minimize their environmental footprint.**

## **GRID INNOVATION WILL MAKE AI MORE ENVIRONMENTALLY-FRIENDLY**

By aligning data center development with energy abundance, these infrastructure projects will minimize their environmental footprint. The Trump administration is encouraging the private sector, in its new **Ratepayer Protection Pledge**, to “build, bring, or buy all of the energy needed for building and operating data centers, paying the full cost of their energy and infrastructure, no matter what.”

Private companies and states are already getting ahead of the White House here through efforts like “bring your own power” (BYOP) on existing or parallel grids and consumer regulated electricity (CRE) off-grid.

Companies are increasingly going “behind-the-meter” through Bring Your Own Power (BYOP) to lessen energy constraints from AI. BYOP **allows** power generation and energy consumption to occur simultaneously on-site or nearby. This method can help data centers reduce reliance on utilities and lower operational costs, compared to plugging into existing grids. Going “behind-the-meter” also helps **lessen** environmental impacts.

Private companies and states can innovate the grid further with market-driven solutions

like **consumer-regulated electricity (CRE)** to **address immediate infrastructure challenges and insulate existing ratepayers from possible impacts from new, large-scale loads**. CRE would create off-grid **utilities** that “generate, transmit, and sell electricity directly to customers under voluntary contracts, without interconnecting to the existing regulated grid or seeking permission from economic regulators at the state or federal level.” Proponents **argue** CRE will lower energy costs, relieve existing grid constraints, and help meet rising electricity demand without **bypassing** permitting, safety, and environmental standards applied to existing grids.

CRE utilities are likely to be **powered** by reliable, abundant, and cheap energy sources and technologies—including advanced natural gas turbines, SMRs, and next-generation geothermal—that produce fewer emissions, waste less water, and occupy less land.

This reform is gaining traction federally and in the states. New Hampshire became the first state to **adopt** this reform last summer, while Senator Tom Cotton **introduced** a federal companion bill, the DATA Act, in early 2026.

## **CONCLUSION**

The United States has the most data centers of any developed nation in the world. Under energy abundance policies, their continued development can be done sustainably without harming the economy or environment.

Lawmakers should be careful pushing blanket moratoriums on data center development and construction. This will not only hurt our competitiveness in the global AI race, but will also make us dependent on technology and energy imports from countries that have questionable environmental practices.

## WHAT YOU CAN DO!

### Get Informed

Learn more about AI data centers, visit:

- [WSJ: They're Coming for Our Data Centers](#)
- [Pew Research Center: What We Know about Energy Use at U.S. Data Centers Amid the AI Boom](#)
- [James Madison Institute: Digital Foundations: The Essential Guide to Data Centers and Their Growth](#)

### Talk to Your Friends:

Help your friends and family understand these important issues. Tell them about what's going on and encourage them to join you in getting involved.

### Become a Leader in the Community:

Join [Independent Women's Network](#) and get a group together each month to talk about a political/policy issue (it will be fun!). Write a letter to the editor. Show up at local government meetings and make your opinions known. Go to rallies. Better yet, organize rallies! A few motivated people can change the world.

### Remain Engaged Politically:

Too many good citizens see election time as the only time they need to pay attention to politics. We need everyone to pay attention and hold elected officials accountable. Let your Representatives know your opinions. After all, they are supposed to work for you!

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