

ENERGY & MANUFACTURING® — in Appalachia —

Energy Supply Chain Overviews

- | | |
|-----------|--|
| August 21 | Battery Storage |
| Sept 11 | AI Data Centers: Power & Electrical Infrastructure |
| Sept. 25 | Natural Gas: Upstream |
| Oct. 2 | AI Data Centers: Advanced Cooling |
| Nov. 6 | Geothermal |
| Nov. 20 | AI Data Centers: Steel Infrastructure |

www.wemakeithere.org/energy/



AI Data Centers Series

- ▶ Overview
- ▶ Power & Electrical Infrastructure Manufacturing
- ▶ Advanced Cooling & Thermal Management
- ▶ Structural Steel, Racking, and Enclosures





AI DATA CENTERS: OVERVIEW



INDUSTRY
OVERVIEW
SEGMENTS



ENERGY &
MANUFACTURING
In Appalachia



THE CAPITOL

Data center boom inspires flurry of bills from Pa. lawmakers hoping to make state an AI hub

by Abigail Hakas of Next Generation Newsroom | July 15, 2025

INDUSTRY SNAPSHOT

The U.S. Aims To Be An AI Data Center Powerhouse. Trump And Big Tech See This State As The Epicenter.

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KIT NORTON | 02:40 PM ET 07/22/2025

President Donald Trump and Big Tech intend to make Pennsylvania a major hub for artificial intelligence data centers, given a recent \$92 billion funding announcement. The move positions natural gas to be the fuel backing America's AI ambitions.

ENR

Engineering News-Record

Artificial Intelligence

Power Hungry: AI-Fueled Data Center Boom Sets Energy Delivery's New Course

By Debra K. Rubin, Johanna Knapschaefer

Aligned Data Centers unveils mega-scale AI campus in Ohio

Saf Malik July 24, 2025 03:15 PM



Aligned Data Centers has revealed plans to build a major data centre campus in Central Ohio, transforming a 197-acre brownfield site into a hyperscale and AI infrastructure hub.

Project Goal

- ▶ Provide support for small and medium-sized manufacturers interested in providing components for the potential market opportunity presented by AI data centers in the region, nationwide, and globally

Today's Agenda

What is an AI Data Center?

Seven Things to Know About Data Centers

AI Data Center Components (Computing, Energy, Building)

Emerging Technologies

Industry Resources

Questions & Answers



AI Data Center are specialized facilities designed to support the intensive computing and data storage needs of artificial intelligence applications.



At Amazon's Biggest Data Center, Everything Is Supersized for A.I.

On 1,200 acres of cornfield in Indiana, Amazon is building one of the largest computers ever for work with Anthropic, an artificial intelligence start-up.

Exterior

THE DATA CENTER LAYOUT

CONCRETE AND STEEL CONSTRUCTION

Built to protect servers in the event of natural disasters.

HEAT EXCHANGERS

Located on the roof, they release the hot air from inside the building.

SERVER ROOMS

House clusters of interconnected servers in a secure, climate-controlled room. Servers are essentially a computer without a monitor or keyboard. They store and process data and connect to a network for input/output.

AIR CONDITIONING

Controlling the temperature is vital to prevent equipment from overheating.

BACKUP GENERATORS

Run on diesel and automatically turn on in the event of a power outage.

UPS UNITS

Ensure an uninterruptible power supply (UPS) over battery charged power by bridging the gap until backup generators take over.

NETWORK OPERATIONS CENTER (NOC)

IT and security personnel monitor the data center 24/7.

24/7 COOLING UNITS

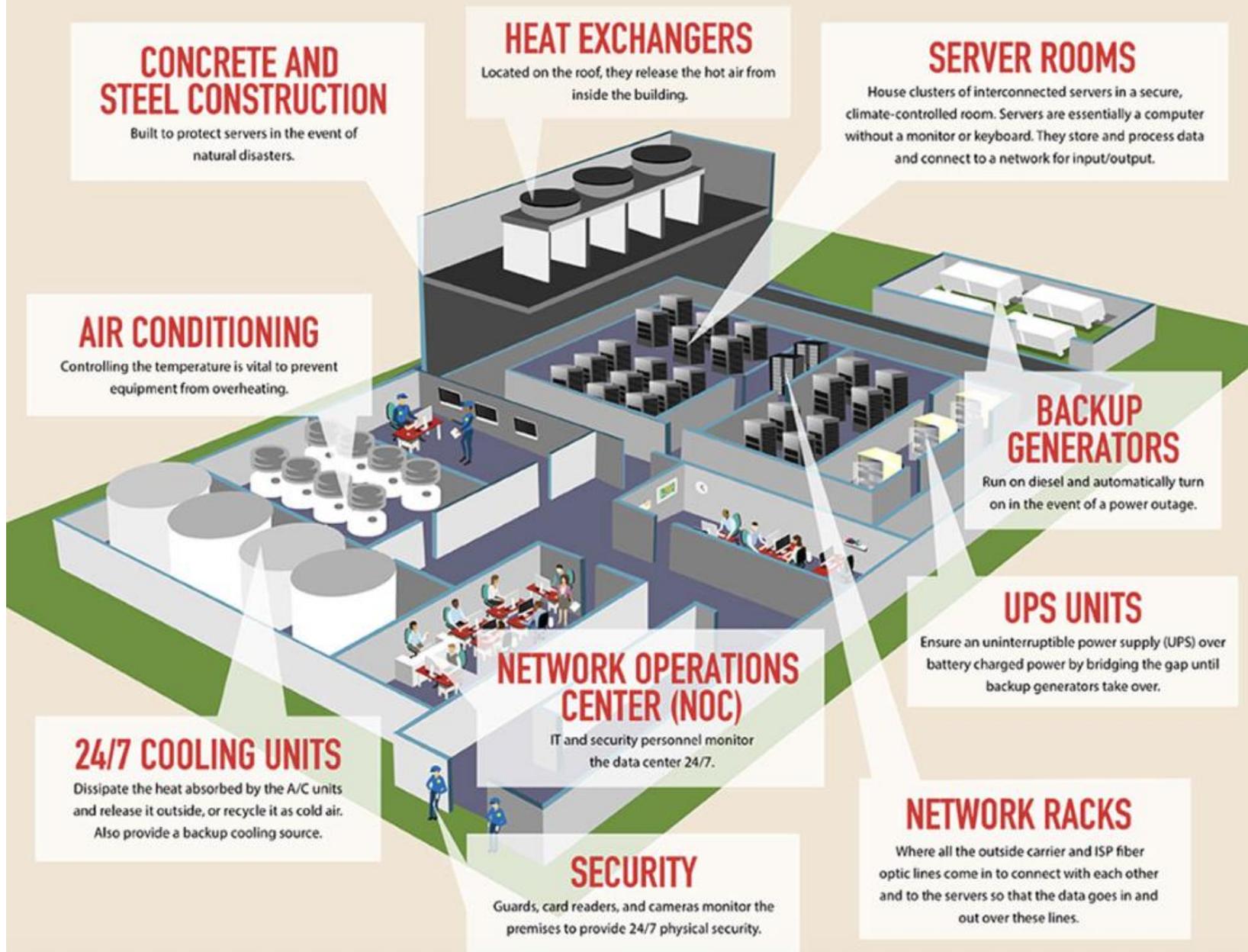
Dissipate the heat absorbed by the A/C units and release it outside, or recycle it as cold air. Also provide a backup cooling source.

NETWORK RACKS

Where all the outside carrier and ISP fiber optic lines come in to connect with each other and to the servers so that the data goes in and out over these lines.

SECURITY

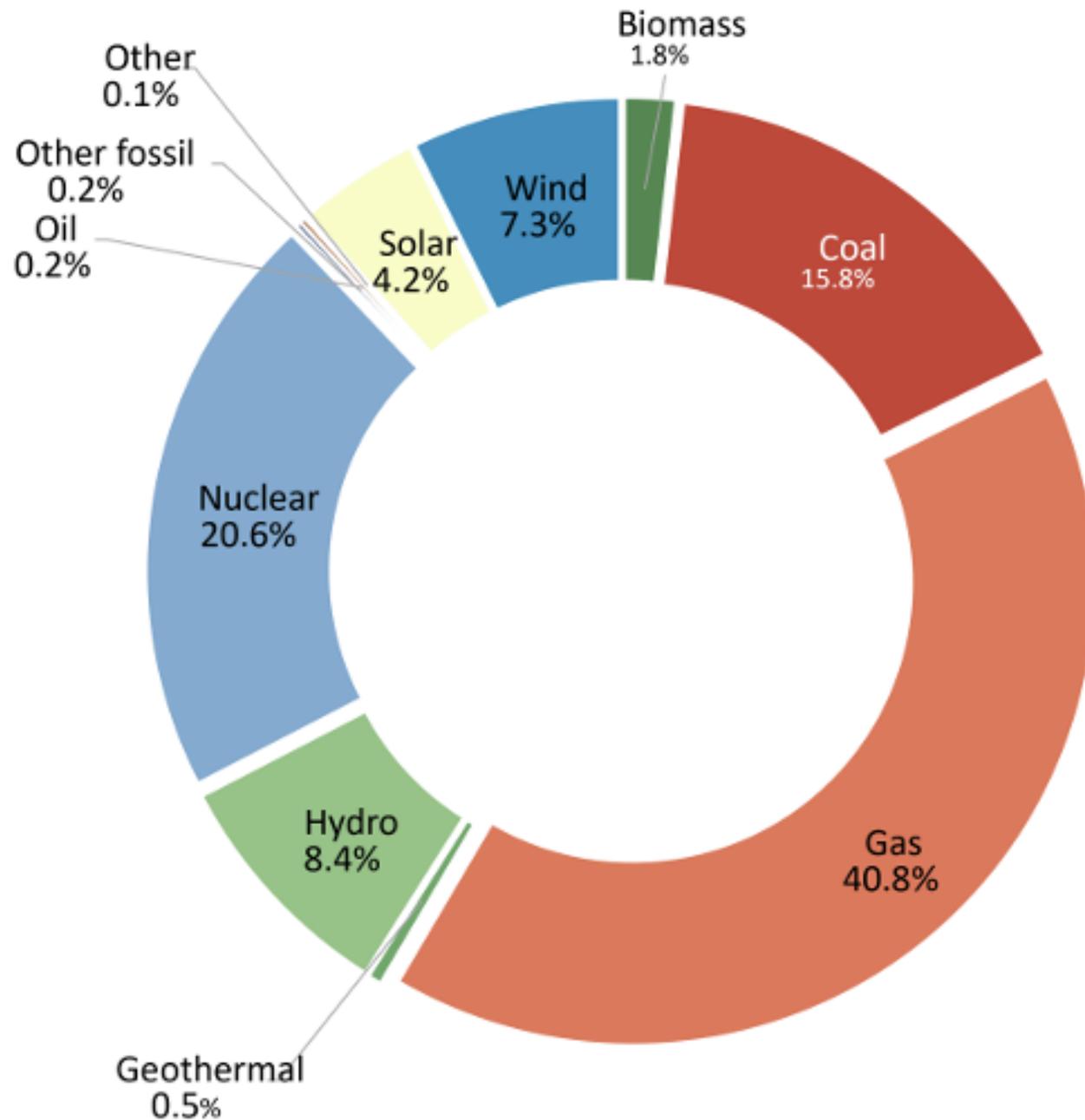
Guards, card readers, and cameras monitor the premises to provide 24/7 physical security.



Interior

Source: [Infogrades](https://www.infogrades.com)

Energy



Seven Things You Need to Know about AI Data Centers

1. Varying Scale and Function

2. Surging Demand

3. Emerging Geographies

4. Fast-tracking Sites

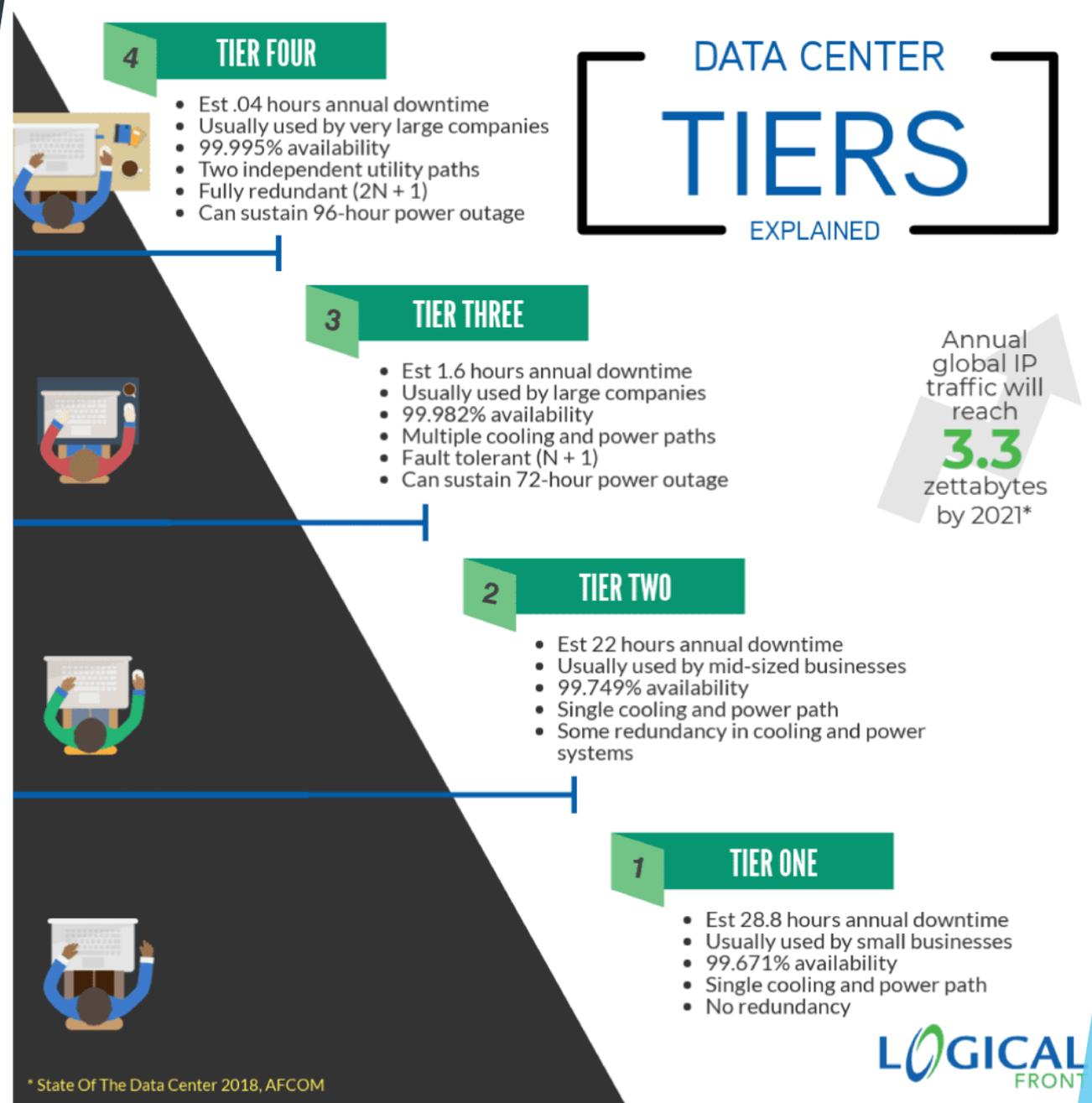
5. Straining Grid and Power Infrastructure

6. Facing Scrutiny

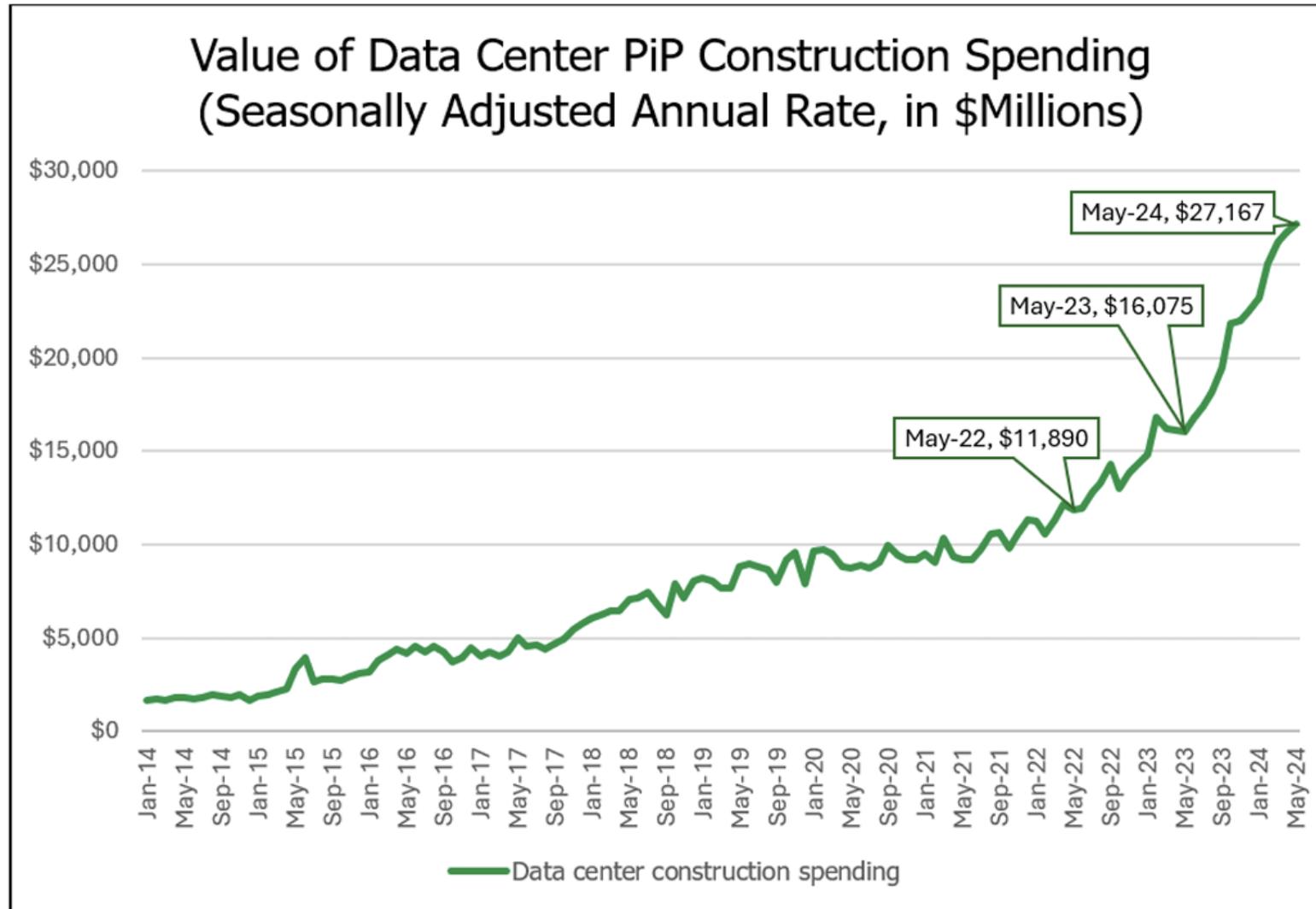
7. Expanding Supply Chain Needs

1. Varying Scale and Function

- ▶ Hyperscale
- ▶ Enterprise
- ▶ Colocation
- ▶ Edge
- ▶ Cloud



2. Surging Demand

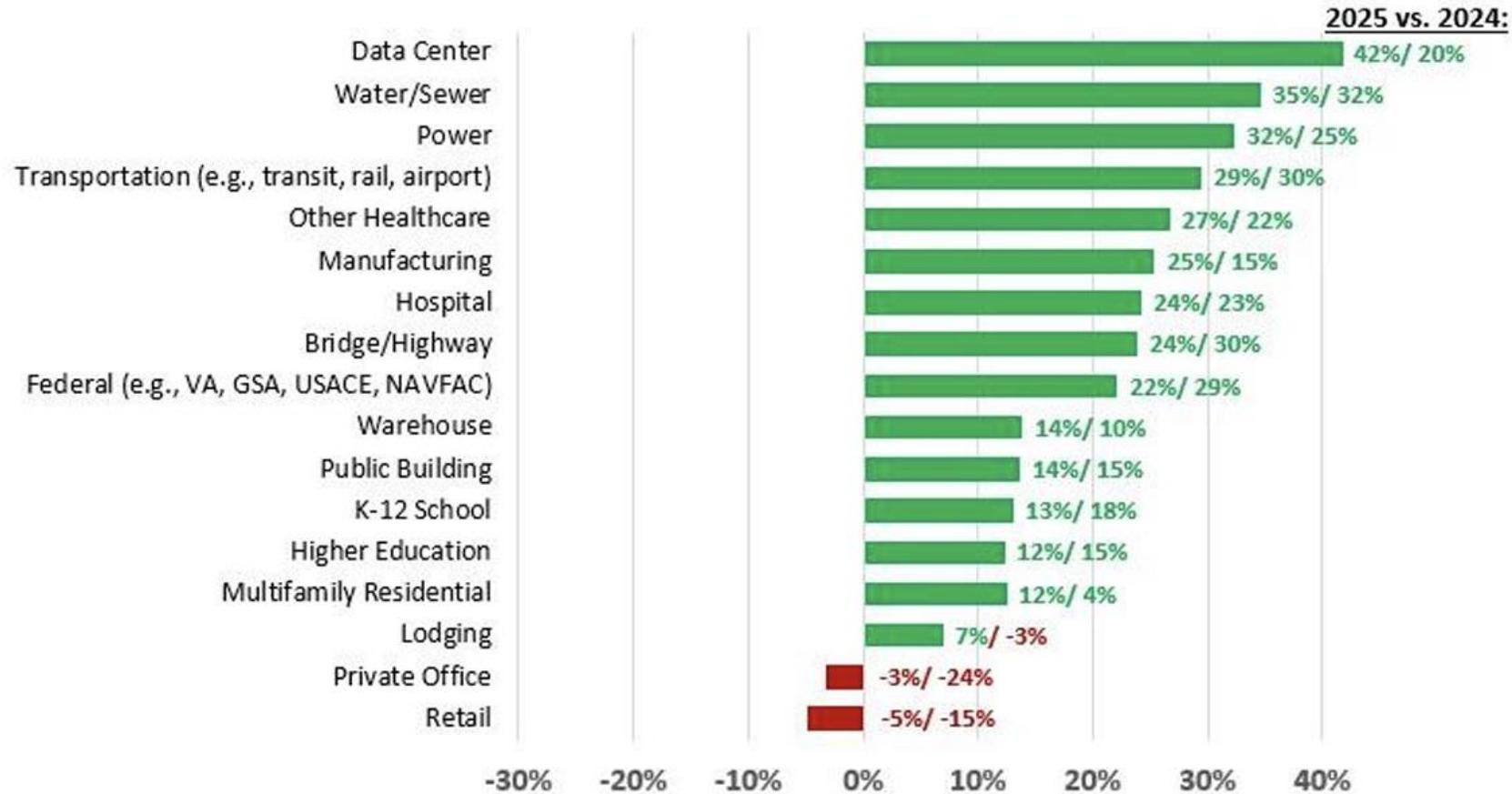


Source: U.S. Census Bureau Construction Spending Data: Historical Value of Private Construction Put in Place (PiP), May 2024

Survey of Contractors

Net* % who expect value of projects to be higher/lower than in previous year

* Net = % expecting higher value - % expecting lower value than in previous year

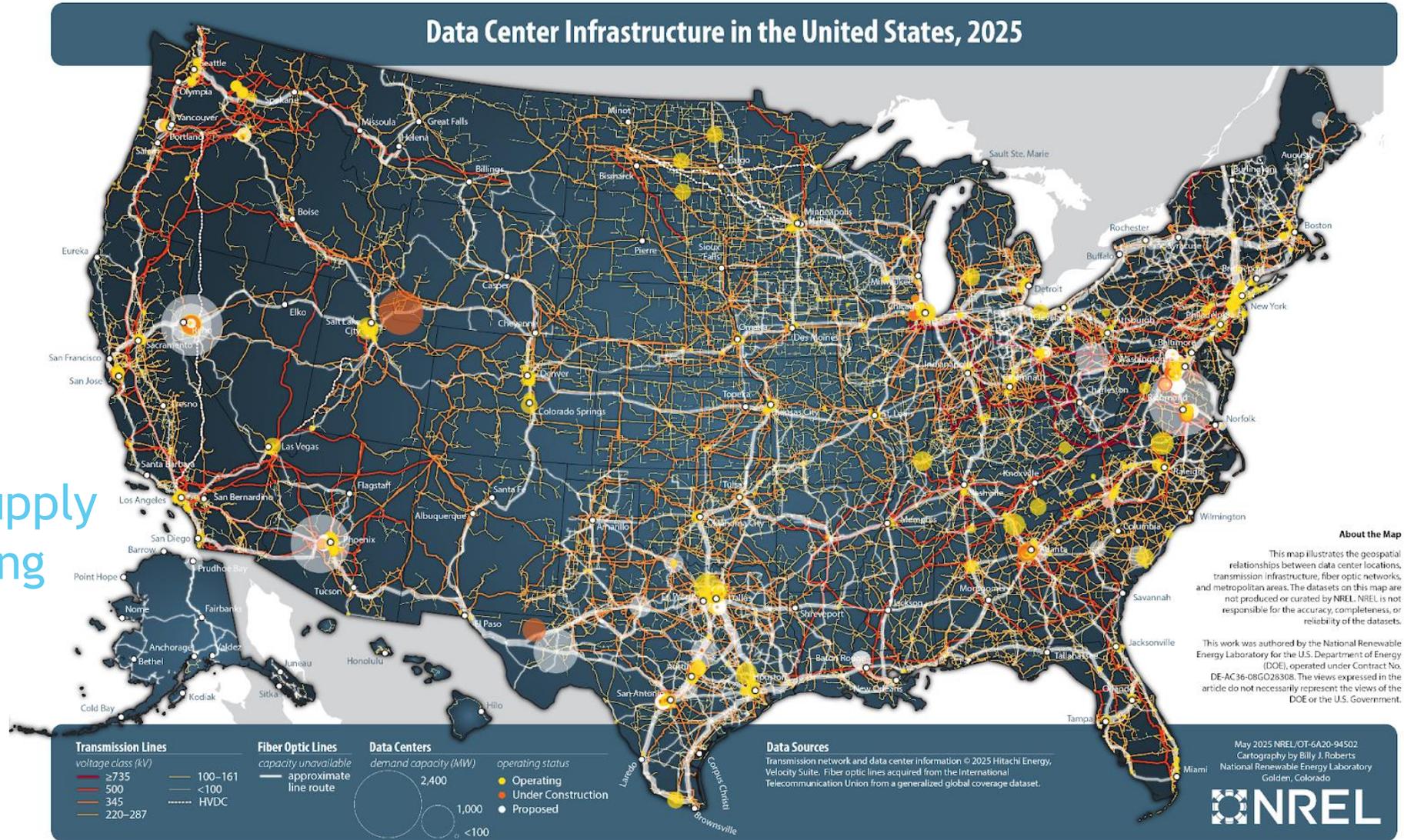


Source: AGC 2025 Outlook Survey; 1,109 total respondents

3. Emerging Geographies

New Sites Need:

- Primary Power Supply
- Fiber Optic Cabling
- Water Supply



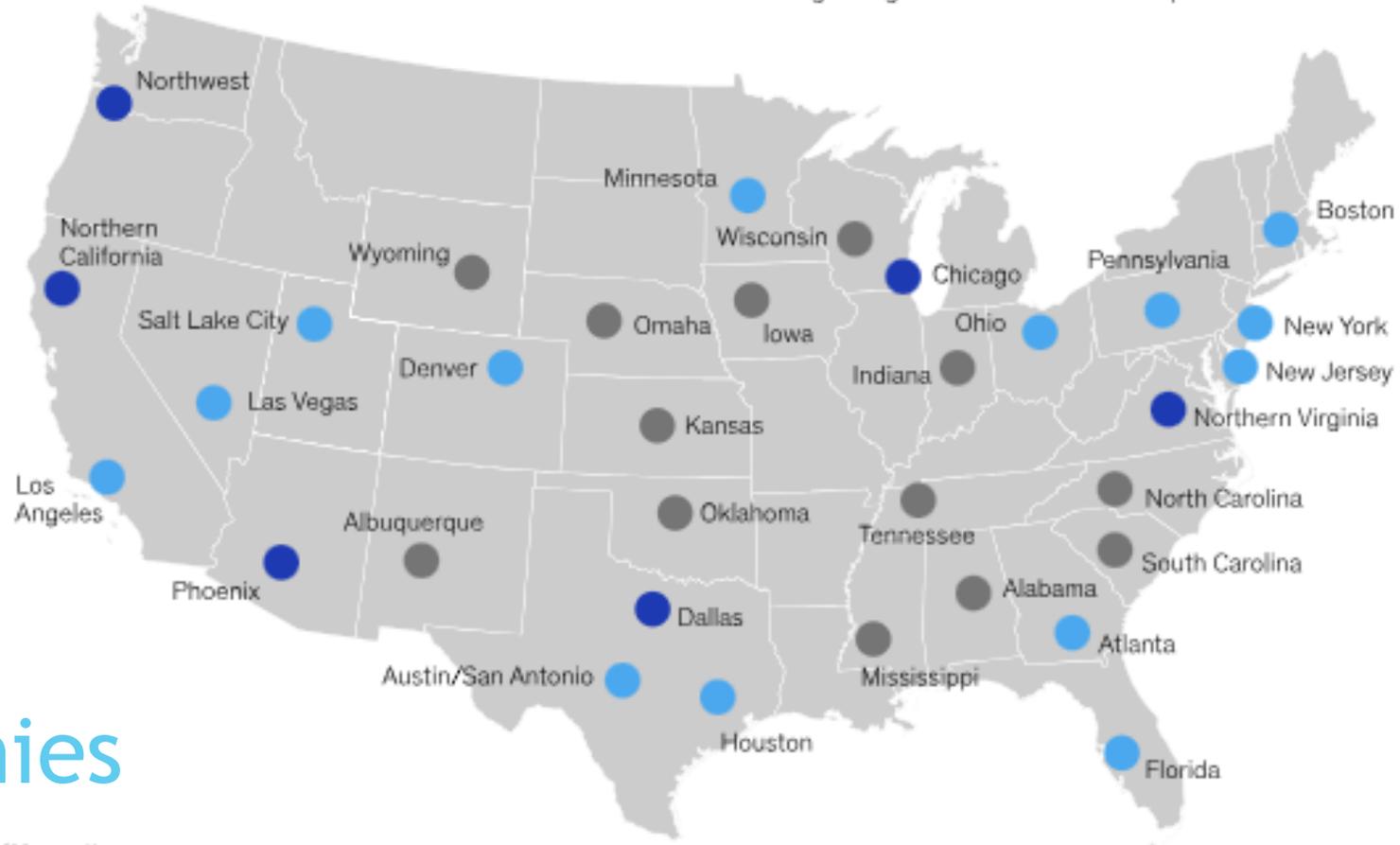
Data centers are emerging in more remote locations, where power is still abundant and grids less strained.

Data center presence in the US

● **Primary markets**
Existing demand of more than 800 MW¹

● **Secondary markets**
Lower but fast-growing demand

● **Emerging markets**
Emerging demand in markets where power is still abundant



¹Megawatt.

Source: Datacenters.com; S&P Global Market Intelligence 451 Research; McKinsey Data Center Demand model

Emerging Geographies

4. Fast-Tracking Sites

ENERGY

Trump wants coal to power AI data centers. The tech industry may need to make peace with that for now

PUBLISHED SAT, MAY 17 2025 • 8:47 AM EDT



Spencer Kimball
@SPENCEKIMBALL

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 **NBC NEWS**

Trump signs executive order to boost U.S. coal industry, in part to fuel artificial intelligence SHARE & SAVE      

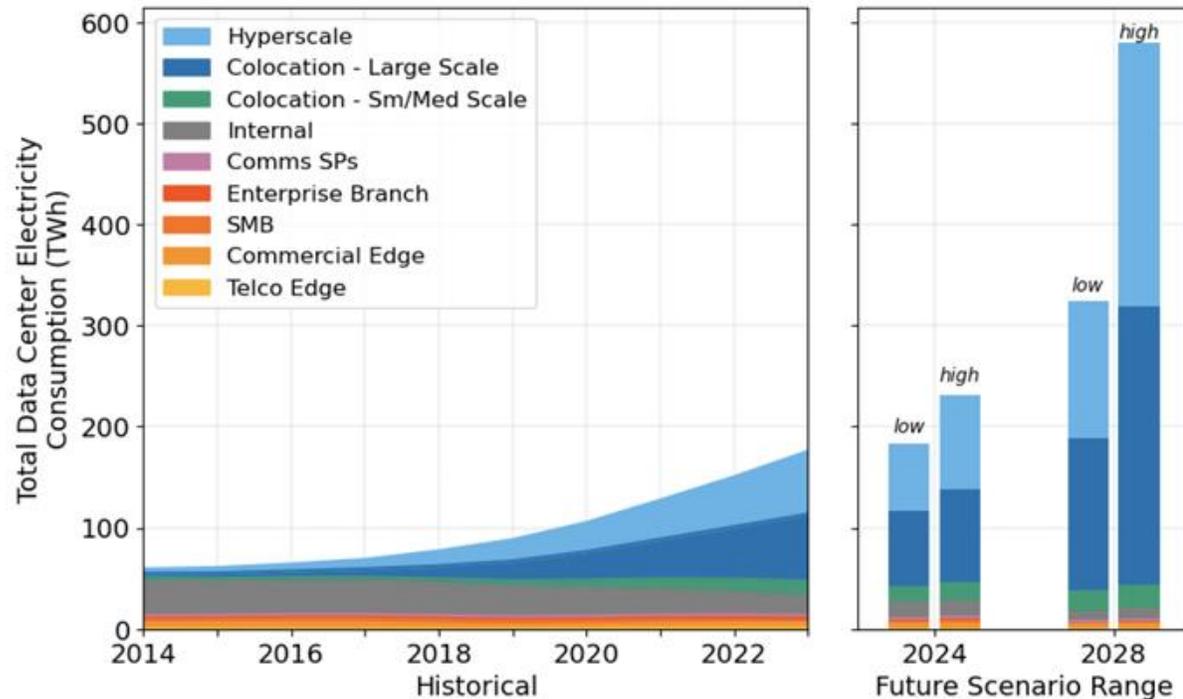
Trump signs executive order to boost U.S. coal industry, in part to fuel artificial intelligence

It's the latest move by the Trump administration that clashes with global aims to reduce coal power and cut harmful greenhouse gas emissions fueling climate change.

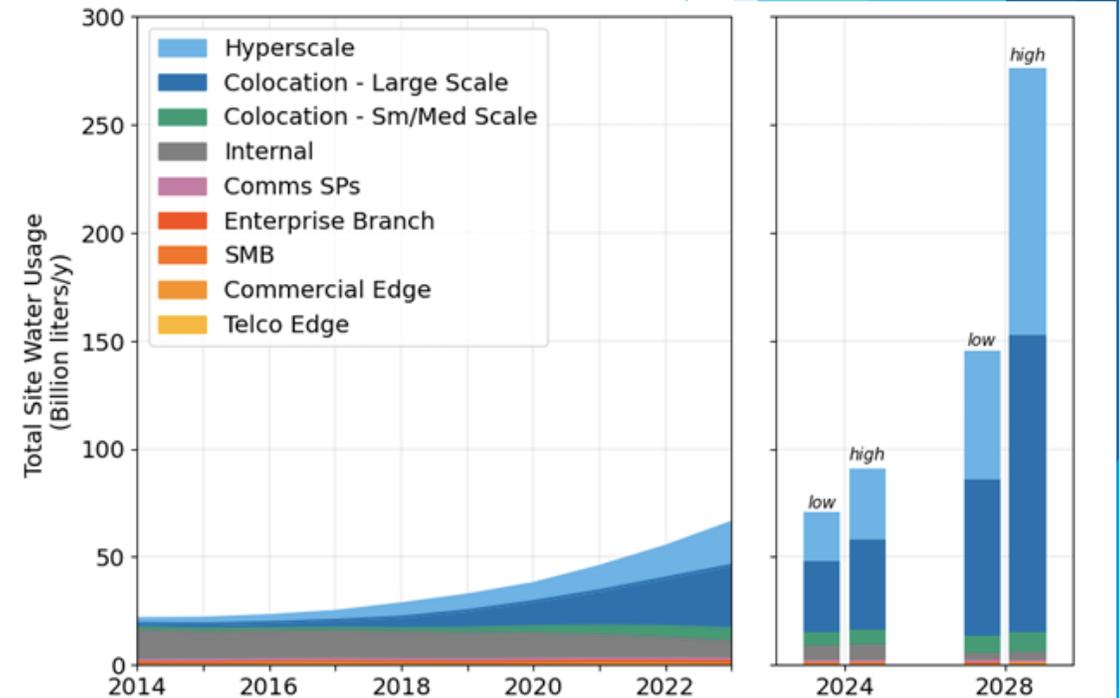


Source: [CNBC](#), 2025; [NBC](#), 2025

5. Straining Grid and Power Infrastructure



Total data center electricity use from 2014 through 2028 by space type

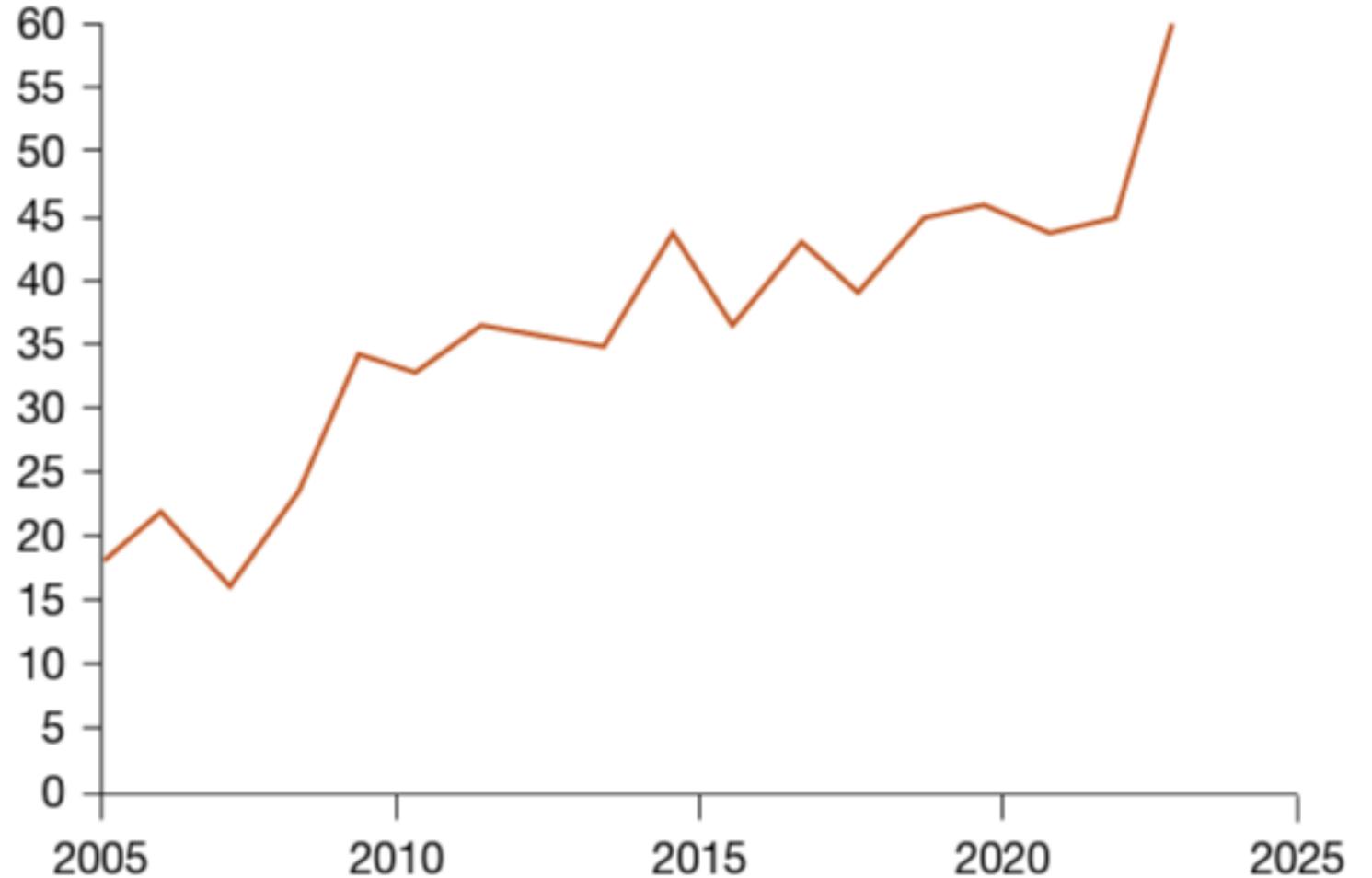


Direct water consumption by data center type.

Straining Grid and Power Infrastructure

US transmission interconnection delays

Median duration of months from request to operation, 2005-2022



Source: [PwC](#), 2025

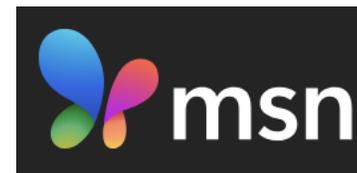
6. Facing Scrutiny

The Washington Post
Democracy Dies in Darkness

The AI explosion means millions are paying more for electricity

The data centers required for Big Tech are driving up electricity demand — and prices.

Yesterday at 6:00 a.m. EDT



The Data-Center Wars Arrive in Small-Town West Virginia

Story by Kris Maher • 2mo • 4 min read

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ENVIRONMENT

This Rural Community Fought One of Country's Biggest Gas-Powered Data Centers, and Won

Inside the grassroots opposition that fended off a 2,200-acre data center campus in southern Virginia, and why their struggle isn't over yet.

by Julia Tilton
June 17, 2025

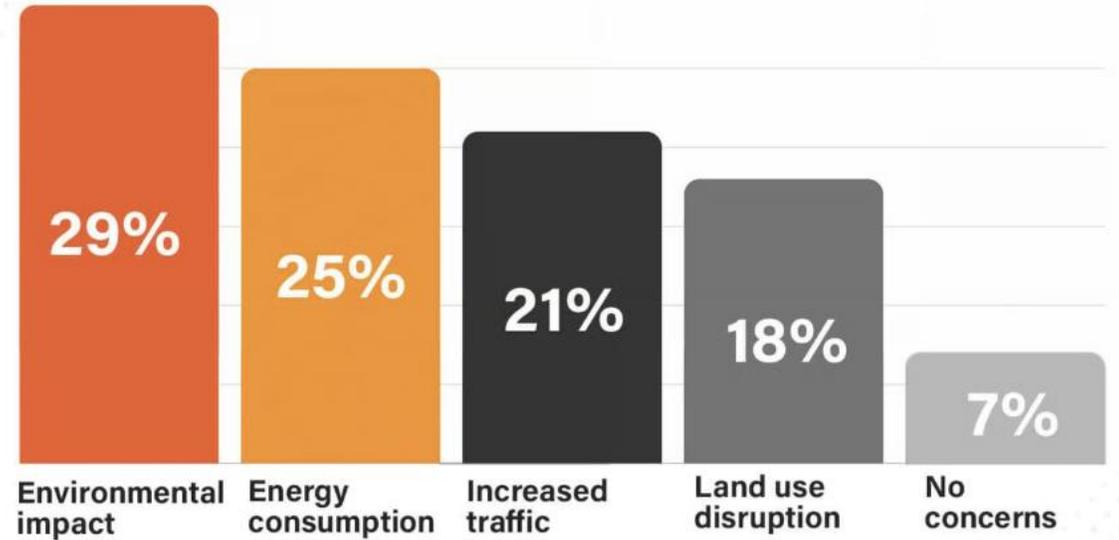


Sources: [Washington Post](#), 2025; [MSN](#), 2025; [Daily Yonder](#), 2025

Survey: 93% of Americans Support AI Data Center Development—Just Not Near Them



Key Concerns of AI Data Centers for Local Residents



 [HostingAdvice.com](https://www.HostingAdvice.com)

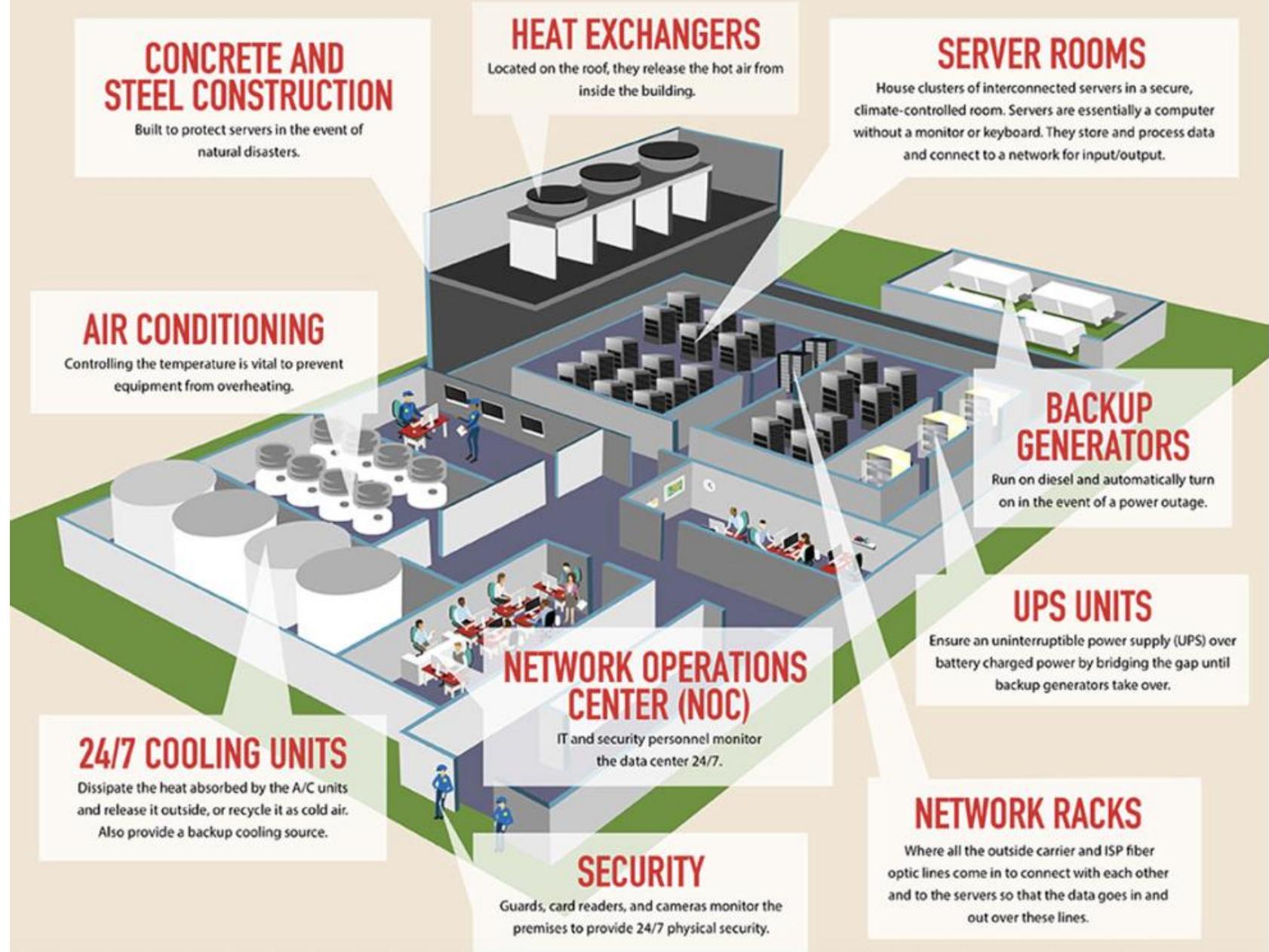
Source: [HostingAdvice.com](https://www.HostingAdvice.com), 2025



An 800-person general population survey was executed by Pollfish and commissioned by HostingAdvice. Ages fall between 18 and 85. 50% identified as male and 50% identified as female. The population was evenly spread across the 16 states of Arizona, California, Florida, Louisiana, Maryland, Nevada, New York, Ohio, Oregon, Pennsylvania, Utah, Texas, Virginia, Washington, Wisconsin, and West Virginia.

7. Expanding Supply Chain Needs

THE DATA CENTER LAYOUT

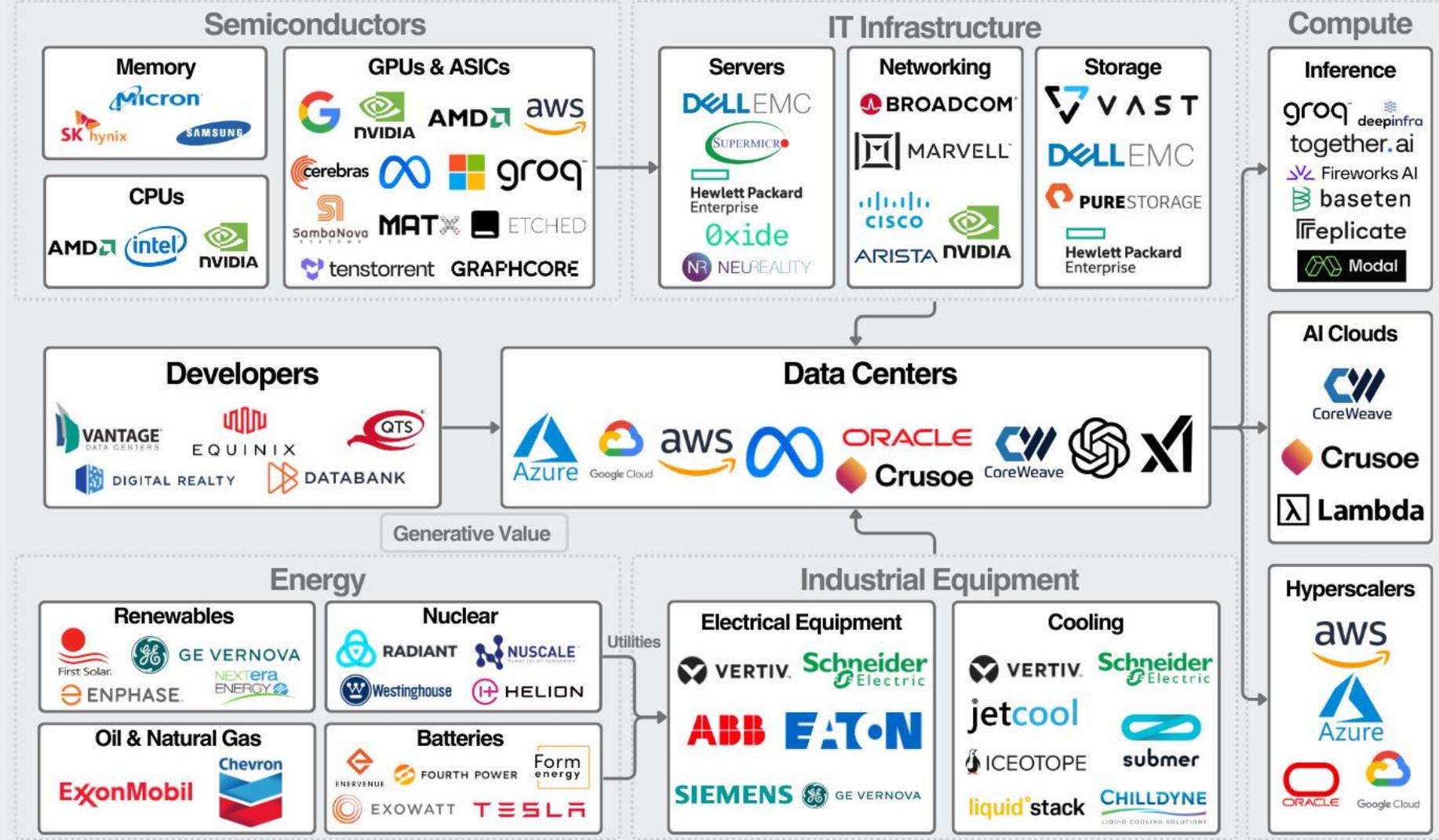


Source: [Infogrades](https://www.infogrades.com)



AI Data Center Value Chain

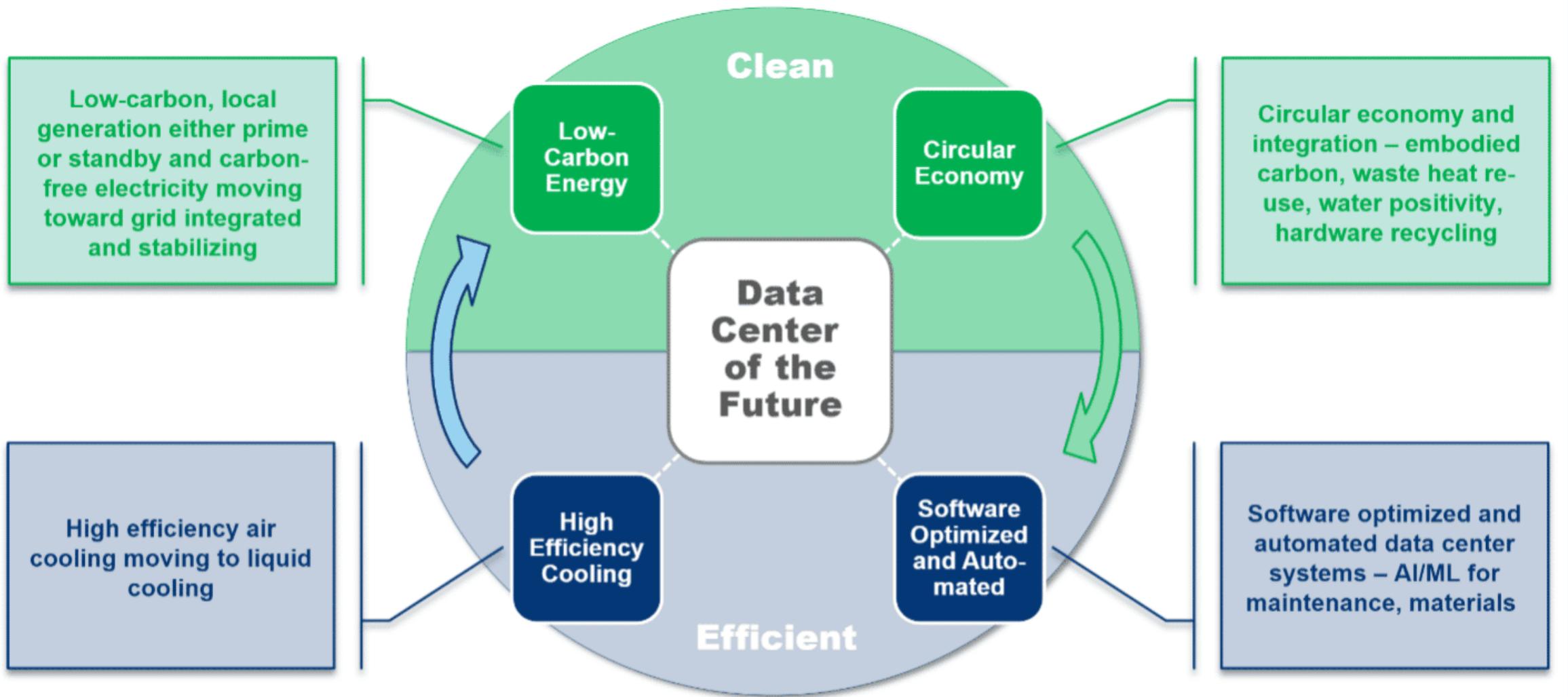
Expanding Supply Chain Needs





Component List of Typical AI Data Centers

COMPONENT	NAICS NUMBERS	NAICS NAME	DESCRIPTION	USE
Actuators	334512	Automatic Environmental Control Manufacturing	Devices that physically adjust HVAC or lighting components.	Enable automated adjustments to maintain optimal conditions.
Air distribution units	333415	Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing	Devices that distribute cooled air throughout the facility.	Ensures even cooling across all server racks.
Automatic transfer switches (ATS)	335313	Switchgear and Switchboard Apparatus Manufacturing	Switches that automatically transfer power source from the grid to the generator.	Ensures seamless transition to backup power during an outage.
Backup Power	335999	Electrical Equipment Manufacturing	Diesel/gas generators and fuel systems for emergency power.	Provides electricity during grid outages to maintain uptime for critical AI workloads.
Battery banks (lead-acid or lithium-ion)	335911	Storage Battery Manufacturing	Arrays of batteries store energy for UPS systems.	Supplies immediate power to critical loads during outages.
Biometric readers	334118	Computer Terminal and Other Computer Peripheral Equipment Manufacturing	Devices that authenticate identity via fingerprint, iris, etc.	Restricts facility access to authorized personnel only.
Building Automation	238220	Heating and Air-Conditioning Contractors	AI-driven software and IoT sensors for monitoring HVAC, lighting, and security.	Optimizes energy efficiency and environmental conditions via predictive analytics.
Busways	335311	Power, Distribution, and Specialty Transformer Mfg.	Modular metal bars for distributing power along a path.	Allows scalable and efficient power delivery to multiple racks.
Cable management arms	334419	Other Electronic Component Manufacturing	Hinged arms or trays for routing and organizing cables.	Maintains organized cabling and allows easy access for maintenance.
Cabling & Wiring	335929	Other Communication and Energy Wire Manufacturing	Conductive cables and wires for power and data transmission.	Connect and distribute power and data throughout data centers.



Emerging Technologies: Four Sustainable Design Principles

Industry Resources

Policy & Advocacy Organization

- ▶ Data Center Coalition
- ▶ The Green Grid
- ▶ Uptime Institute

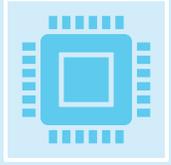
Resources & Funding Opportunities

- ▶ U.S. DOE Manufacturing and Energy Supply Chains (MESCC)
- ▶ ASHRAE Technical Committee 9.9, Mission Critical Facilities, Data Centers, Technology Spaces and Electronic Equipment



Office of Manufacturing and Energy Supply Chains

The frontline of America's energy manufacturing and supply chain security



AI Data Centers are a potential major emerging market for small and medium-sized manufacturers



Our region is a major focus of AI Data Center Investments today, but this will not last as feasible locations decline



Sprint is needed to capture market opportunity at the regional, national, and global level



Energy and environmental challenges are likely to increase though emerging technologies can mitigate the impact





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