



# Ten Things to Know about AI Data Centers

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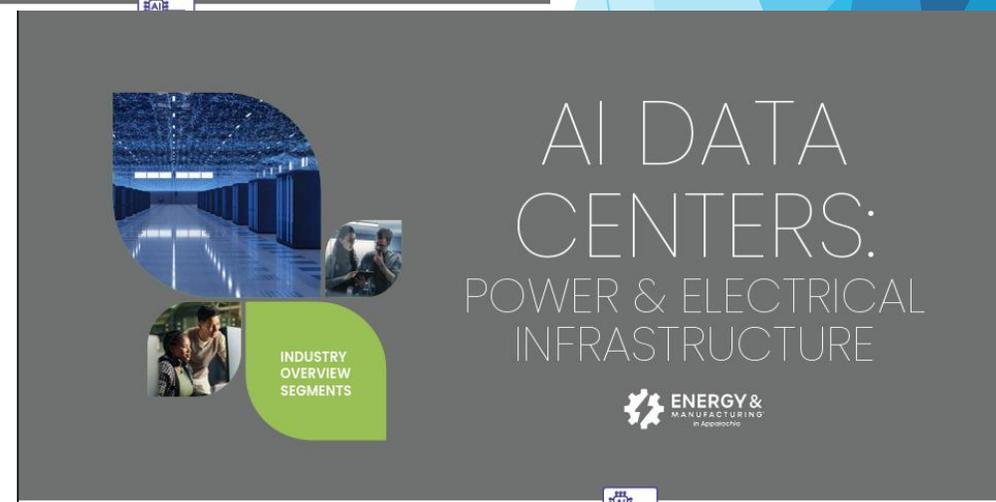
# ENERGY & MANUFACTURING®

— in Appalachia —

Project Goal: Provide support for small and medium-sized manufacturers interested in providing components for the potential market opportunity presented by AI data centers.



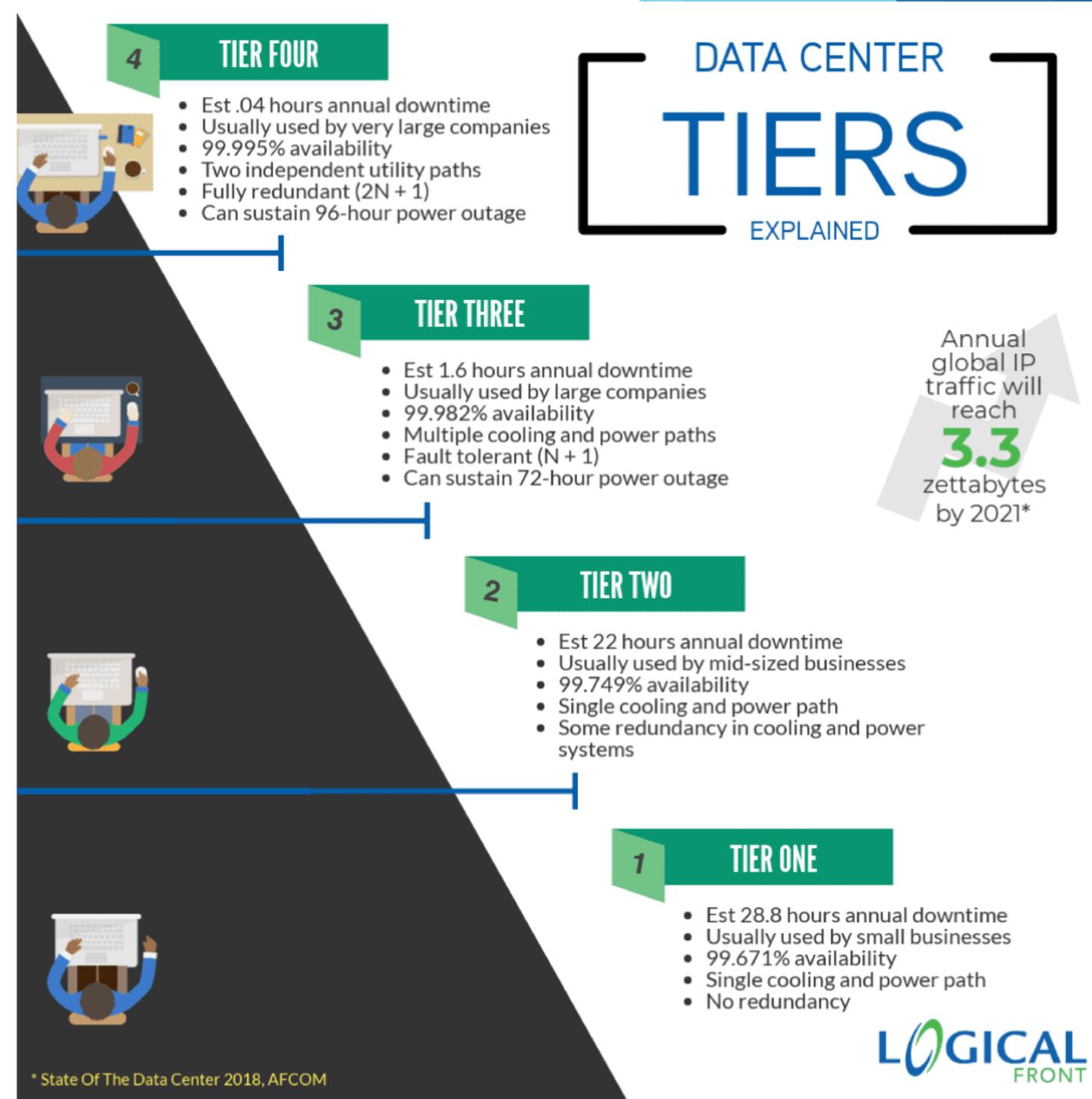
Forthcoming:  
Structural Steel,  
Racking, and  
Enclosures



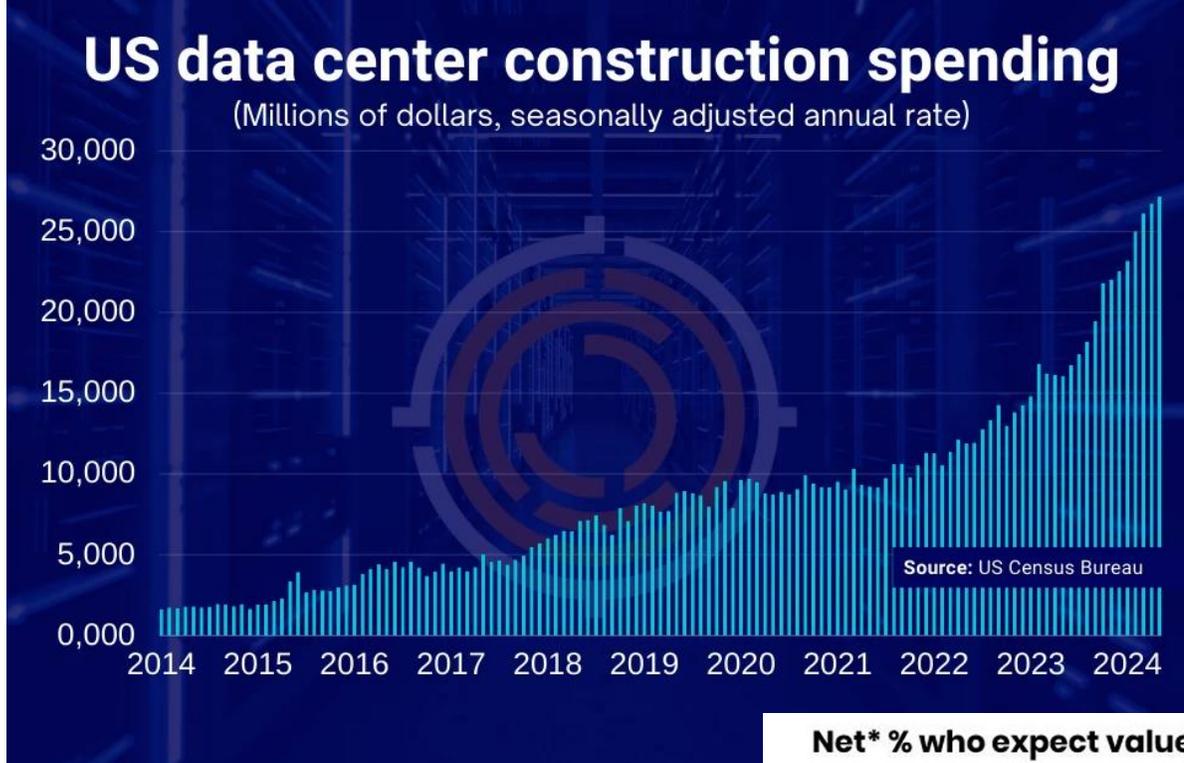
1. AI Data Centers are specialized facilities designed to support the intensive computing and data storage needs of artificial intelligence applications.

Data Centers vary by scale and function impacting their component needs.

- Hyperscale
- Enterprise
- Colocation
- Edge
- Cloud

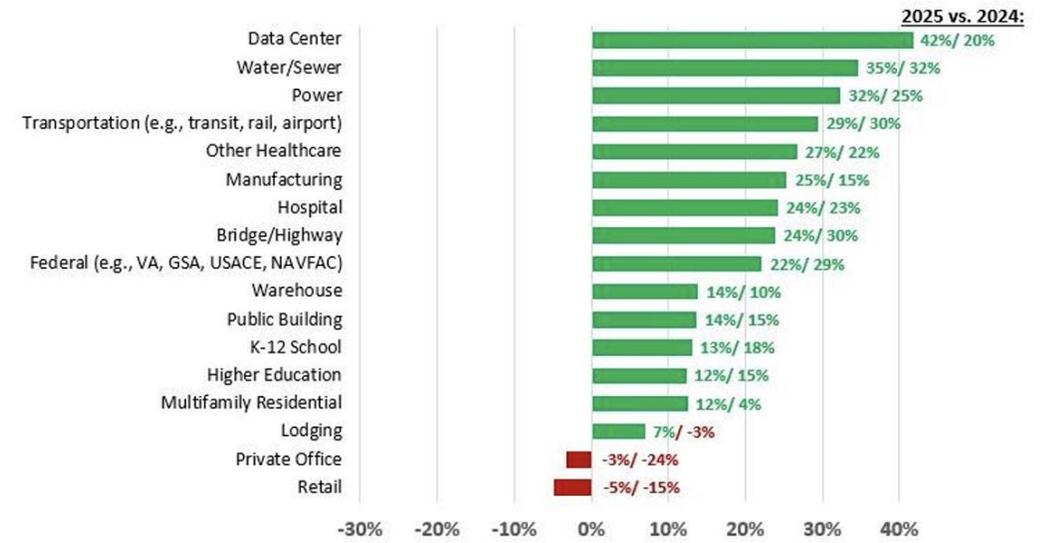


# 2. Demand for AI Data Centers is Surging.



## 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



## Survey of Contractors

Sources: [MEPS International](#), July 2025; [Associated General Contractors of America](#), 2025

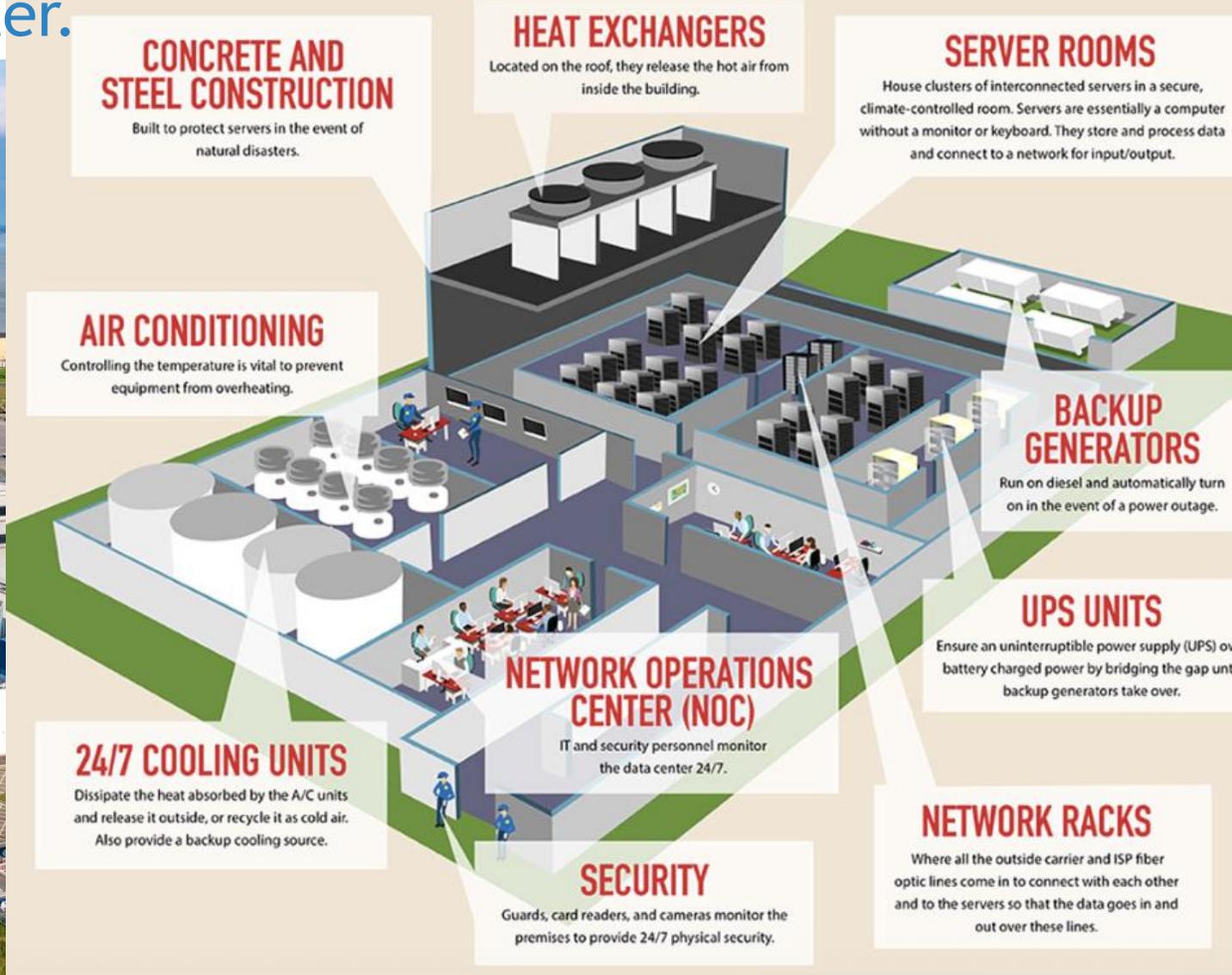


Source: AGC 2025 Outlook Survey; 1,109 total respondents

# 3. AI Data Centers Need Components Inside and Outside the Data Center.



## 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.

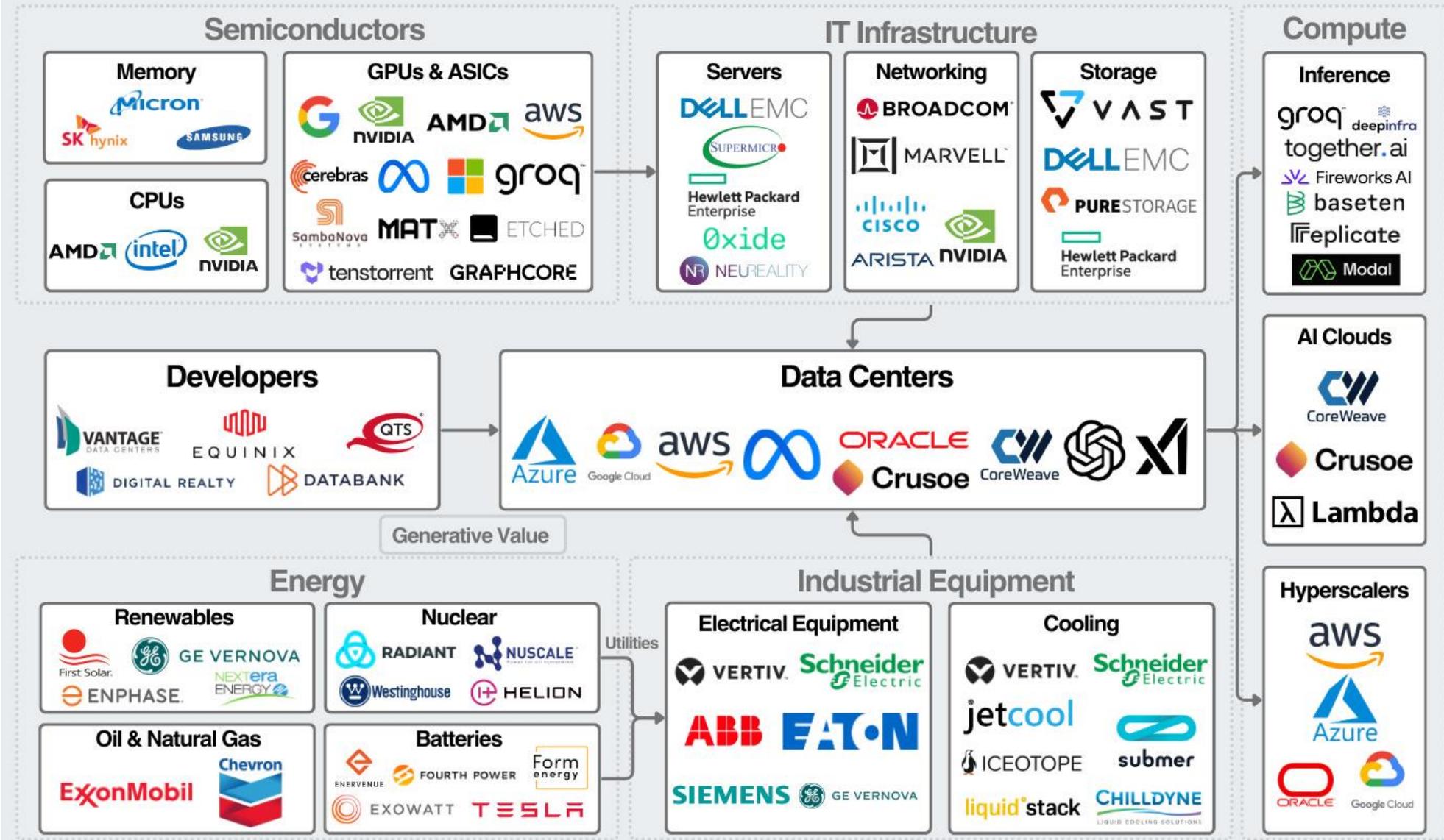
**24/7 COOLING UNITS**  
Dissipate the heat absorbed by the A/C units and release it outside, or recycle it as cold air. Also provide a backup cooling source.

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

**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.

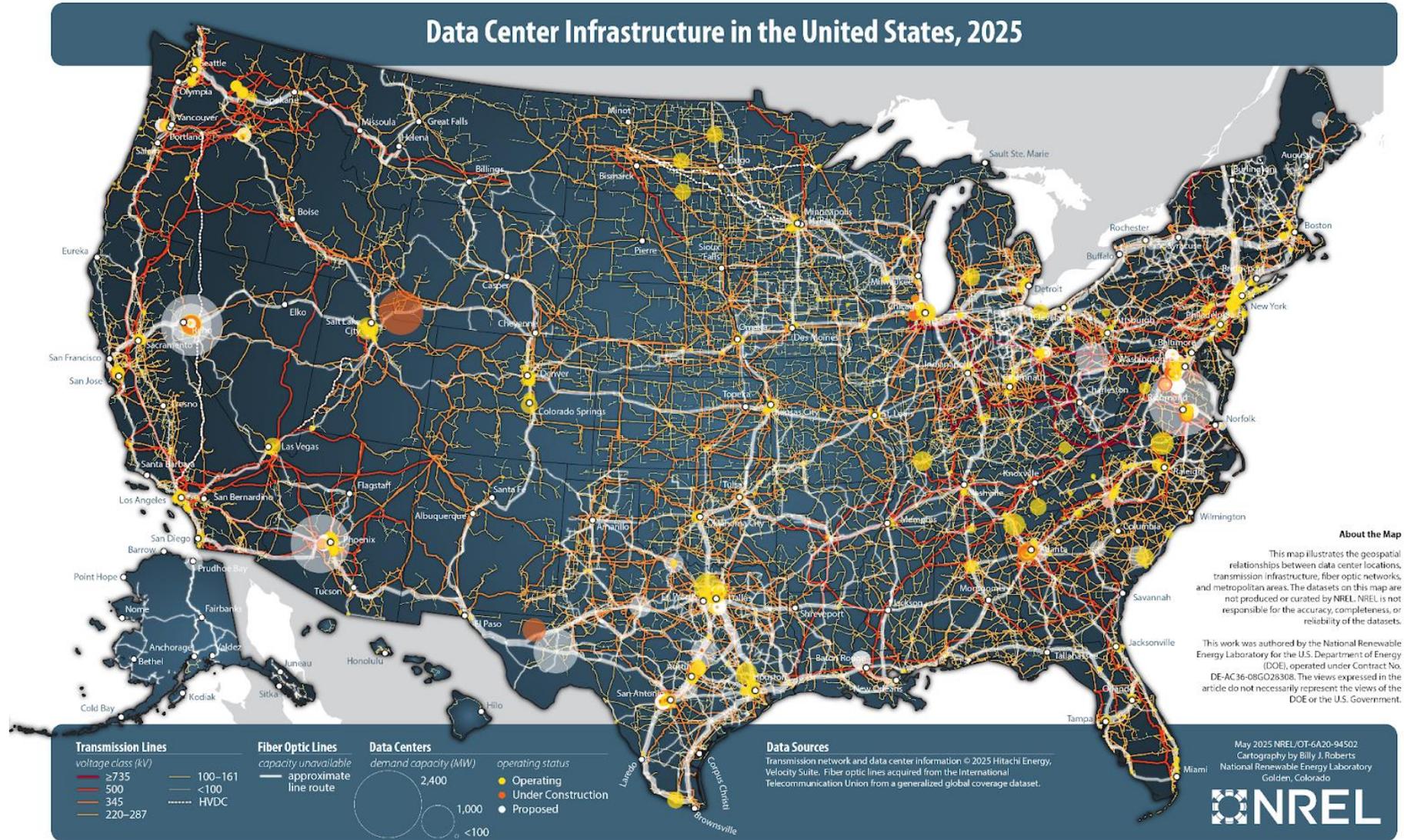
# AI Data Center Value Chain

4. AI Data Centers Supply Chain is Multifaceted and Expanding.

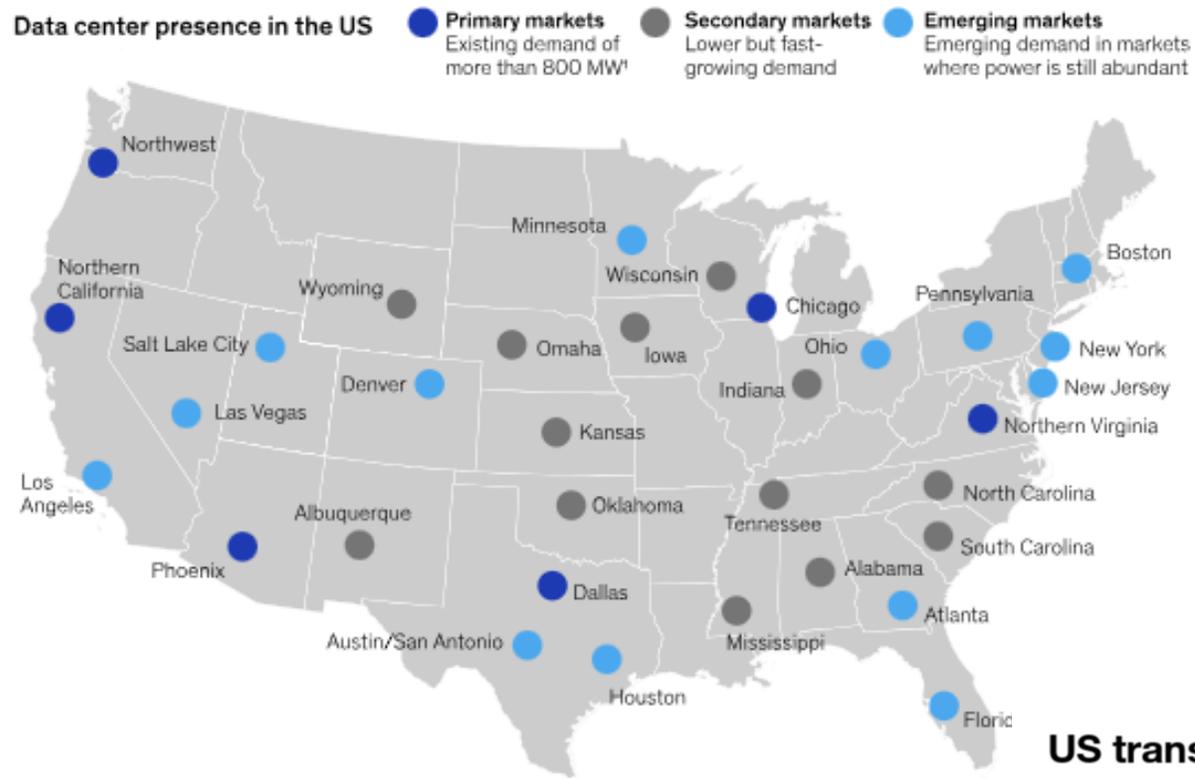


# 5. New AI Data Center Component shortages:

- ❑ Chips
- ❑ Generators
- ❑ Switchgears
- ❑ Transformers
- ❑ High-speed transceivers
- ❑ Concrete
- ❑ Copper

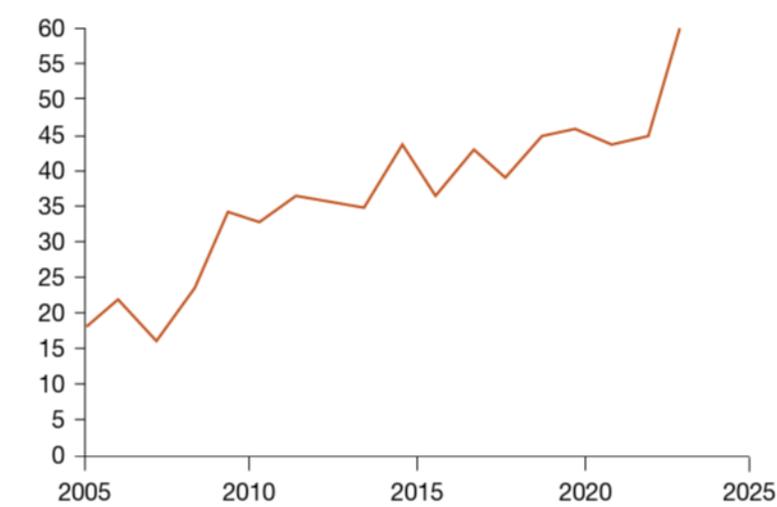


# 6. AI Data Centers Emerging in Remote Locations due to Energy Demands but Transmission Interconnection Delays are a Barrier.



<sup>1</sup>Megawatt.  
 Source: Datacenters.com; S&P Global Market Intelligence 451 Research; McKinsey Data Center Demand model  
 McKinsey & Company

**US transmission interconnection delays**  
 Median duration of months from request to operation, 2005-2022

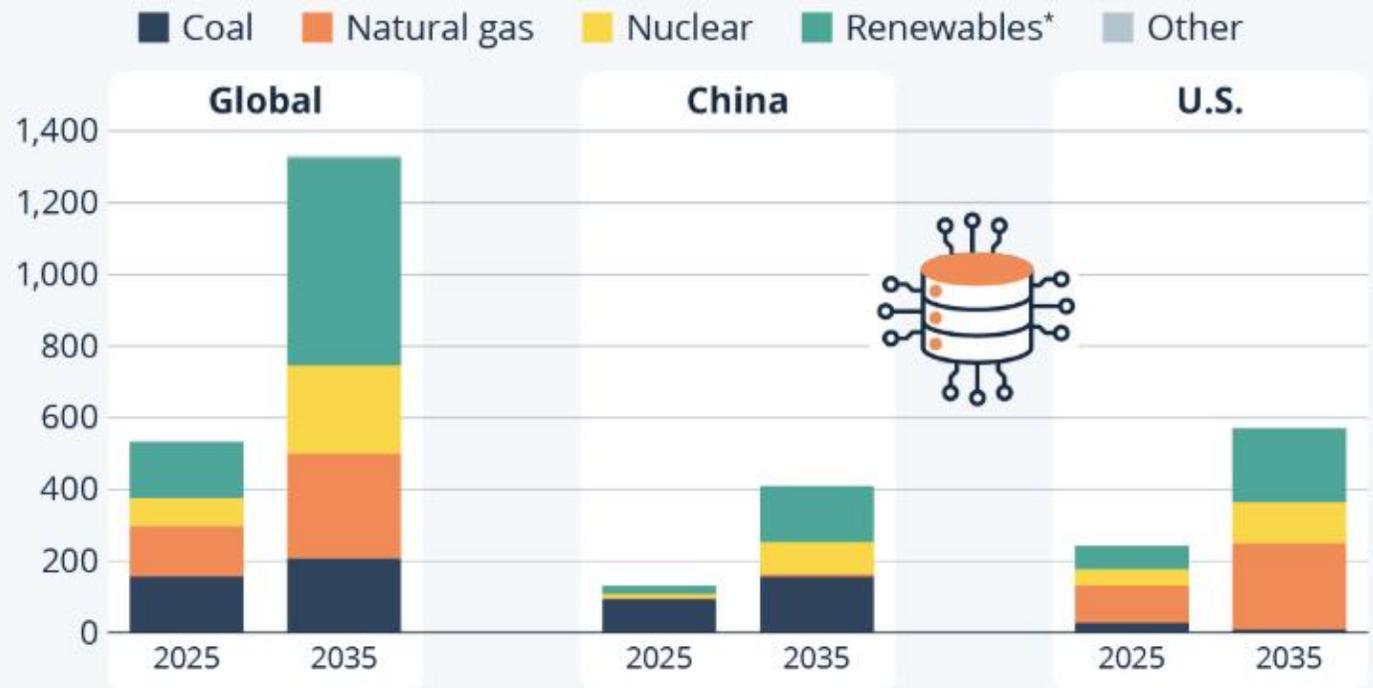


Source: Berkeley Lab, Utility Drive, PwC Strategy& Interviews and Analysis

## 7. Energy Sources Transitioning from Fossil to Renewable and Nuclear Energy from Industry Perspective

# Data Center Energy Consumption Surges Amid AI Boom

Electricity generation to supply data centers,  
by energy source (in TWh)



\* Solar PV, wind and other renewables

Based on the fuel mix of the electricity physically consumed by data centers rather than contractual mix of different data center operators.

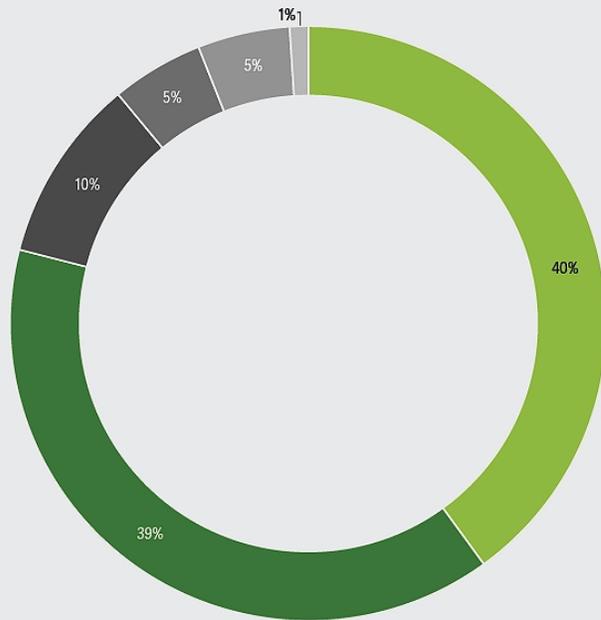
Source: IEA



# 8. Cooling systems drive much of energy consumption in AI data centers today, but new technologies are emerging.

## Computing power and cooling systems drive much of the energy consumption in AI data centers

- Computing power and server resources
- Cooling systems
- Internal power conditioning systems
- Network equipment
- Storage systems
- Lighting



Source: Deloitte analysis.

Deloitte Insights | deloitte.com/insights

### The Opportunity: Liquid-Cooled Data Centers

Liquid-cooling vastly reduces power costs compared to air-cooling, reducing customer TCO while minimizing environmental impacts.

Supernode Rack - Scalable Unit (Current design)

Supernode AI-GPU Servers

Suprachips

AI GPUs

CPUs

0.5kW 1kW 10kW 20kW 45kW 100kW+ 300kW+

Air Cooled

Liquid Cooled

Water has significantly higher thermal conductivity than air (molecules are closer together and have stronger bonds)

Up to **92%** Reduction of server cooling power

Up to **40%** reduction in electricity costs for entire data center

Up to **55%** reduction in data center server noise

8/23/2024

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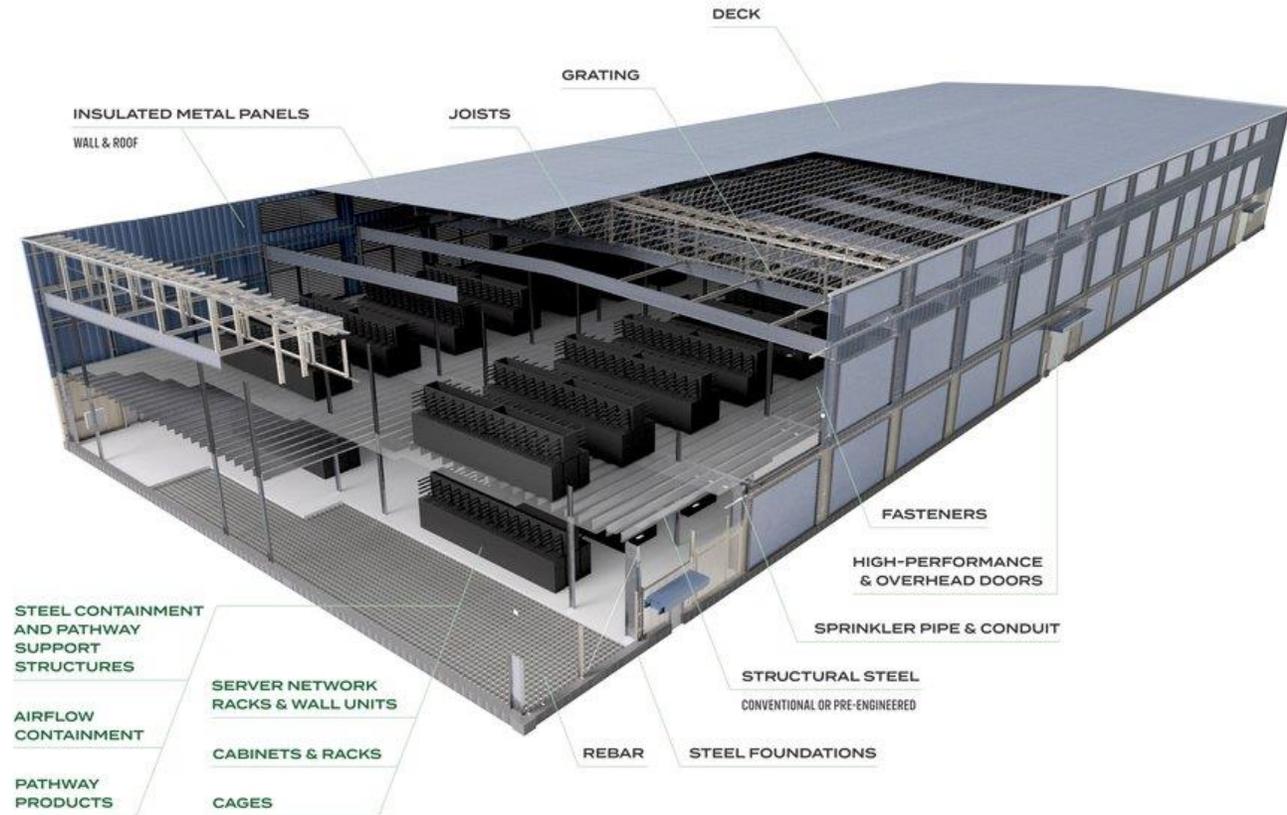
Source: Semiconductor Engineering, 2024

# 9. In Steel, the goal to build AI data centers quickly is leading to modular construction, but Environmental Product Declarations are a factor leading to sustainable steel use.



Modular Data Center Under Construction

Source: [Equinex](#)

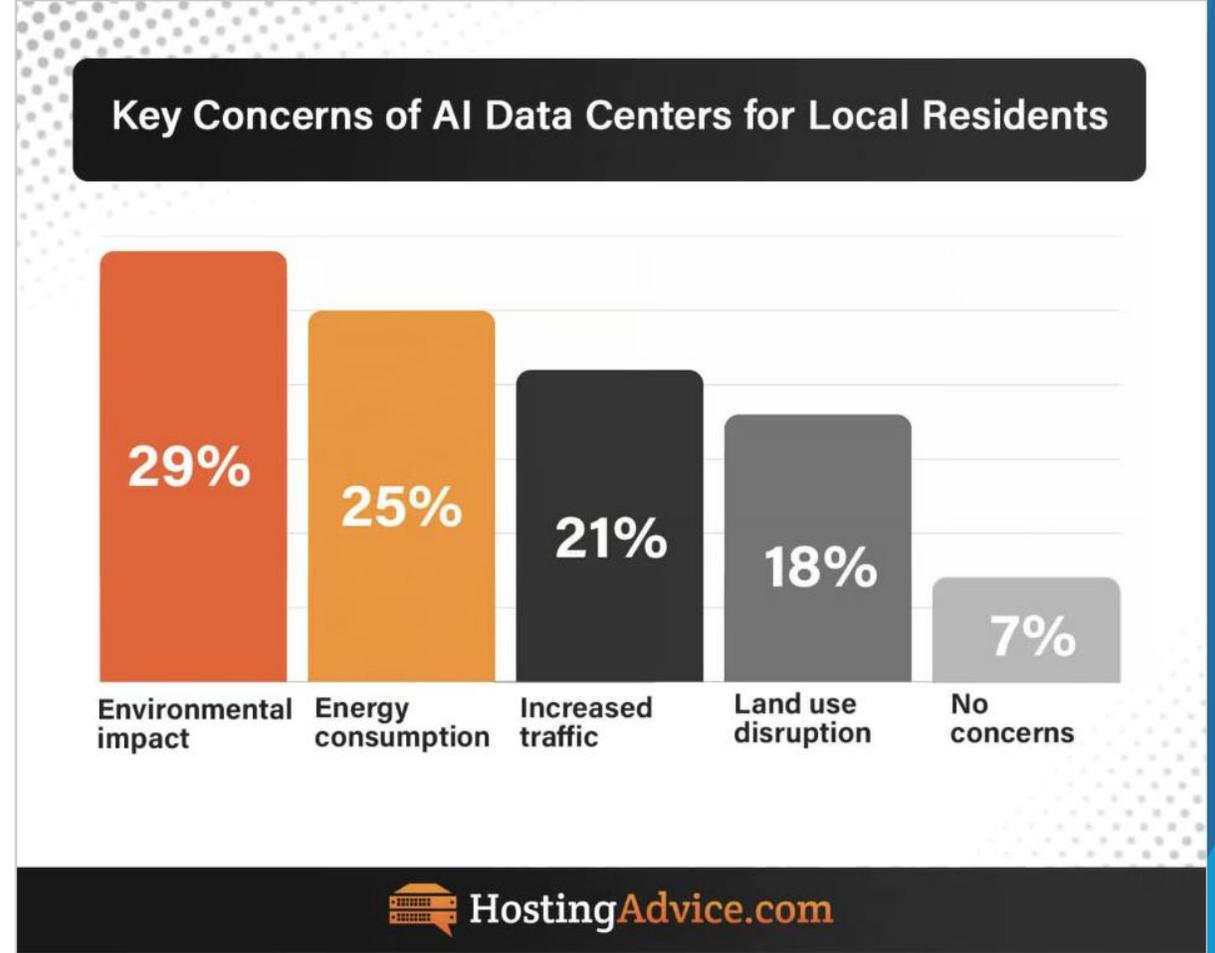


Data Center with Sustainable Steel

Source: [Nucor](#), Accessed August 2025

# 10. Public is Concerned About Environmental Impact, Energy Consumption and Electricity Price Impact

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

A graphic showing the letters 'AI' in a 3D, glowing blue font, set against a background of concentric circles and lines representing data or a network.

**As more data centers connect to Pennsylvania’s electric grid, some worry prices will spike**

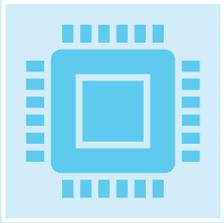
 RACHEL MCDEVITT · JULY 15, 2025

source: [hostingadvice.com](https://hostingadvice.com), 2025; [Allegany Front](https://www.alleganyfront.com), 2025; [Argus](https://www.argus.com), 2025



## US states make data centers pay up for power

Market: Electricity | 09/09/25



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



AI company sustainability policies will likely drive new equipment purchases, though Trump Administration fossil fuel policies may counteract.



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





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## AI Data Centers

AI Data Centers, specialized facilities designed to support the intensive computing and data storage needs of artificial intelligence applications, are rapidly becoming critical infrastructure as demand for high-performance computing continues to soar. As a result, they are a potential market opportunity for small and medium-sized manufacturers interested in providing components for AI data centers. The opportunity lies in agility: understanding specialized demand, aligning with environmental and regulatory shifts, and moving quickly to deliver next-generation components.

### Overview

- [Download](#) the free **AI Data Centers: Overview** report that identifies:
  - Market Size & Growth Forecasts
  - Market Drivers, Challenges & Concerns
  - The Data Center Layout
  - AI Data Center Components and NAICS Codes of Suppliers
  - Contact – Developers, Manufacturers, & Trade Associations
  - Map of where Data Centers are emerging
- [View the webinar](#) recording of AI Data Centers.
- [Click here](#) to view the PowerPoint slides presented in the web



### Power & Electrical Infrastructure

- [Download](#) the **AI Data Centers: Power & Electrical Infrastructure**
- [View the webinar](#) recording of AI Data Centers: Power & Electrical Infrastructure
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<https://www.wemakeithere.org/ai-data-centers-supply-chain/>