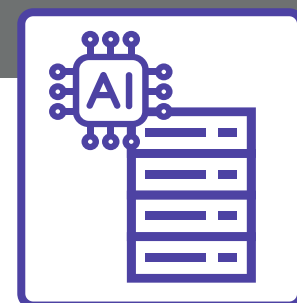
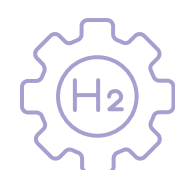
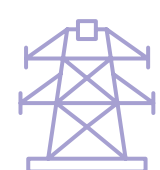




**INDUSTRY
OVERVIEW
SEGMENTS**

AI DATA CENTERS: OVERVIEW



AI DATA CENTERS: OVERVIEW

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Executive Summary

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.

Here's some information you should know if you are a manufacturer considering this market:

- **Varying Scale and Function:** AI data centers vary by scale and function, ranging from hyperscale and enterprise facilities run by tech giants and large firms to colocation, edge, and cloud centers.
- **Surging Demand:** For the United States alone, there is approximately 92 GW of data center capacity in the pipeline. At the end of 2024, the monthly pipeline additions were 7 GW.

- **Emerging Geographies:** As traditional data center hubs become saturated, growth is shifting toward rural regions in Pennsylvania, West Virginia, and elsewhere, providing regional manufacturers with a competitive advantage.
- **Fast-tracking Sites:** Sites with coal-powered infrastructure are expedited via a Presidential executive order for AI data center construction.
- **Straining Grid and Power Infrastructure:** AI centers demand 10x more energy per query than traditional data queries, creating infrastructure bottlenecks—and new markets—for power systems and energy-efficient components.
- **Facing Scrutiny:** Permitting delays, zoning restrictions, and public backlash against water and power use can slow construction. Firms that offer solutions addressing these community concerns may have a market opportunity.
- **Expanding Supply Chain Needs:** The components list for the interior of AI Data Centers includes server cabinets, power distribution units, and chillers. External energy supply and distribution components will also be in demand.

Small and mid-sized manufacturers have a strategic opening to serve this expanding sector. The opportunity lies in agility: understanding specialized demand, aligning with environmental and regulatory shifts, and moving quickly to deliver next-generation components.

What is an AI Data Center?

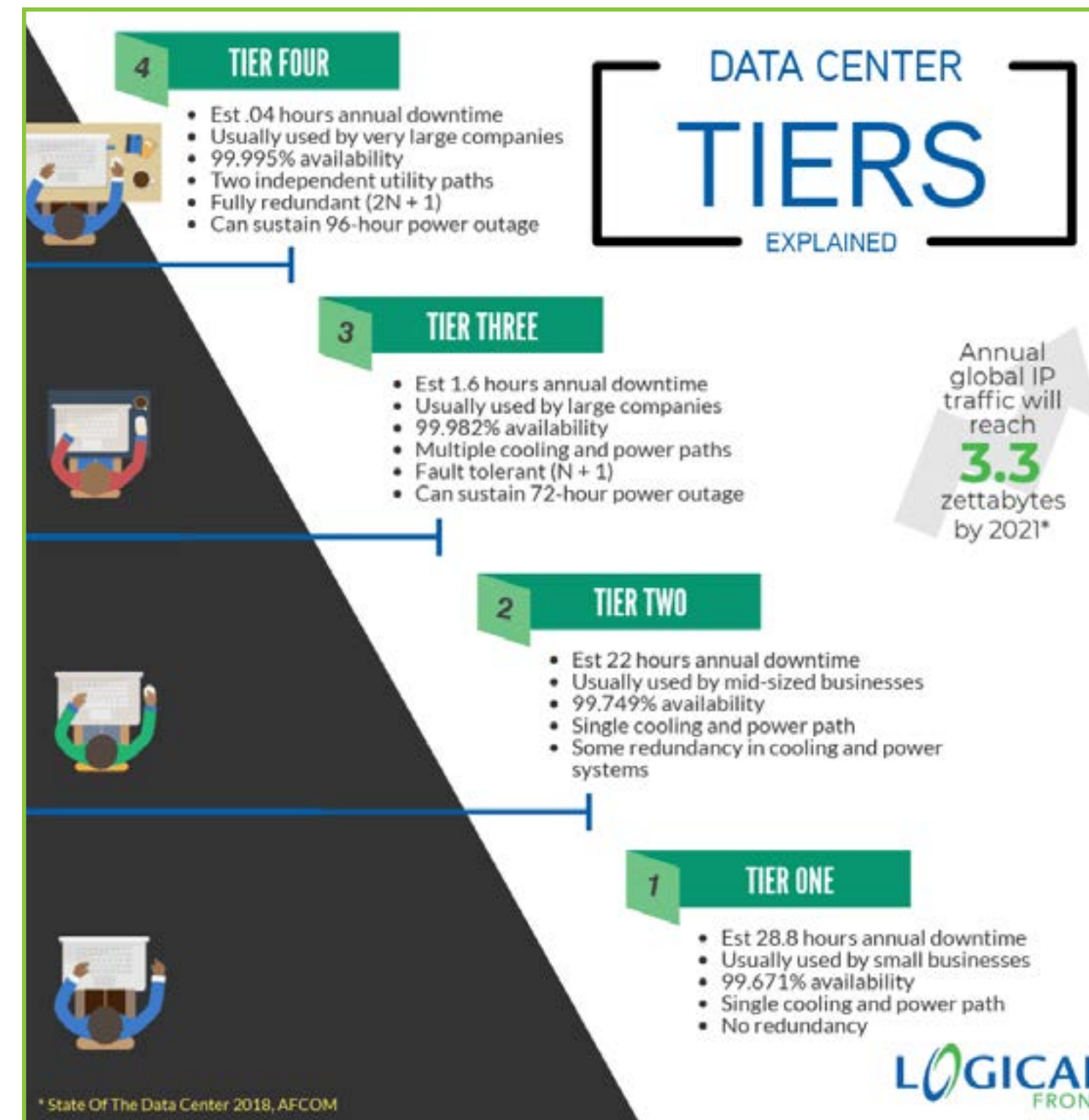
An AI Data Center is a specialized facility designed to support the intensive computing and data storage needs of artificial intelligence applications.

These facilities house powerful hardware, including GPUs (Graphics Processing Units) and TPUs (Tensor Processing Units), which are crucial for processing large AI models and datasets.

The Uptime Institute defines specific tiers based on (1) maintenance, power, cooling, and fault capabilities; (2) operational sustainability; and (3) business function needs.

AI Data Centers come in various forms, each designed to meet the specific needs and requirements of different AI applications.

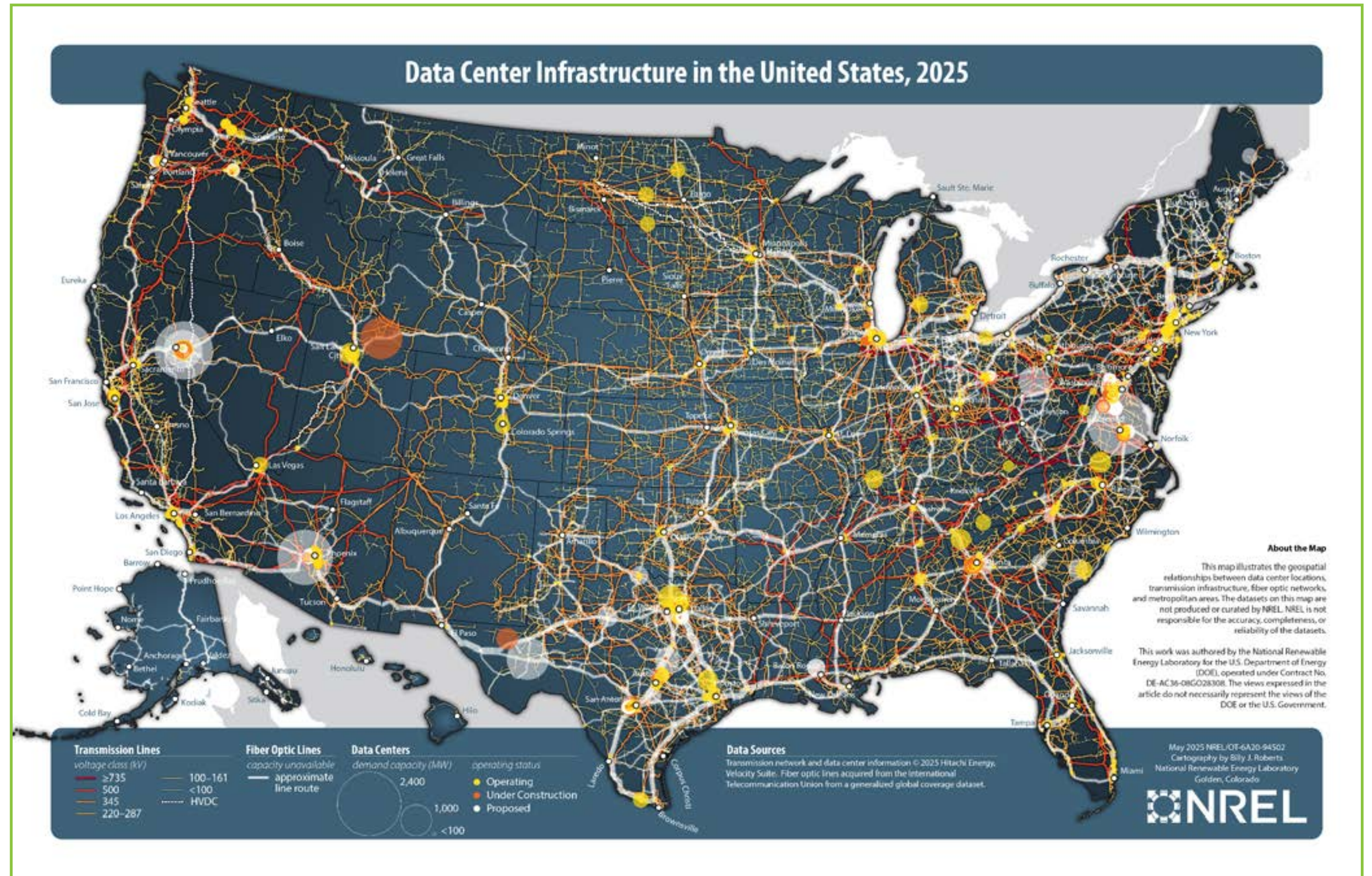
- **Hyperscale Data Centers** are massive facilities capable of supporting extensive AI workloads. Tech giants like Google, Amazon, and Microsoft typically own them.
- **Enterprise Data Centers** are usually smaller than hyperscale centers, tailored to meet the specific AI and IT needs of the business. Large organizations typically operate these centers. They still provide significant resources.
- **Colocation Data Centers** are for companies that want more control over their data, but without the expense of building their own center. They instead rent physical space for their own servers and networking equipment from another facility.
- **Edge Data Centers** are smaller data centers that reduce the time it takes for data to travel for processing, which is crucial when real-time data processing is required, such as for autonomous vehicles.
- **Cloud Data Centers:** are flexible and scalable data centers provided by cloudservice providers.



Source: Source: [Logical Front](#), 2025, based on [Uptime Institute Tier Levels](#)

What is an AI Data Center?

As illustrated in the map, these data centers require robust, multi-layered infrastructure to connect effectively to their users and applications. The infrastructure described below, a key criterion in site selection, ensures reliable power delivery, high-speed data transmission, and efficient cooling.

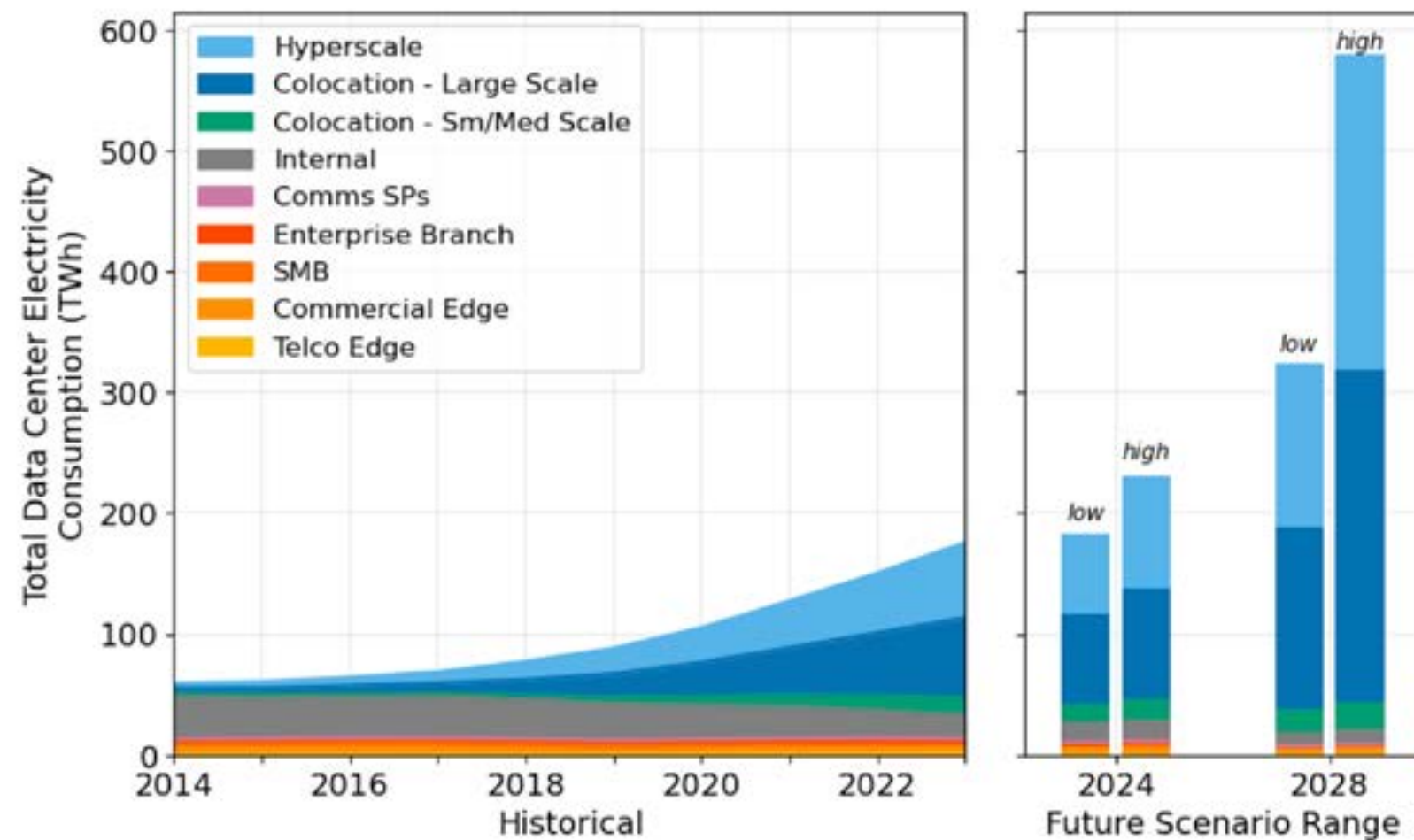


Source: National Renewable Energy Laboratory, 2025



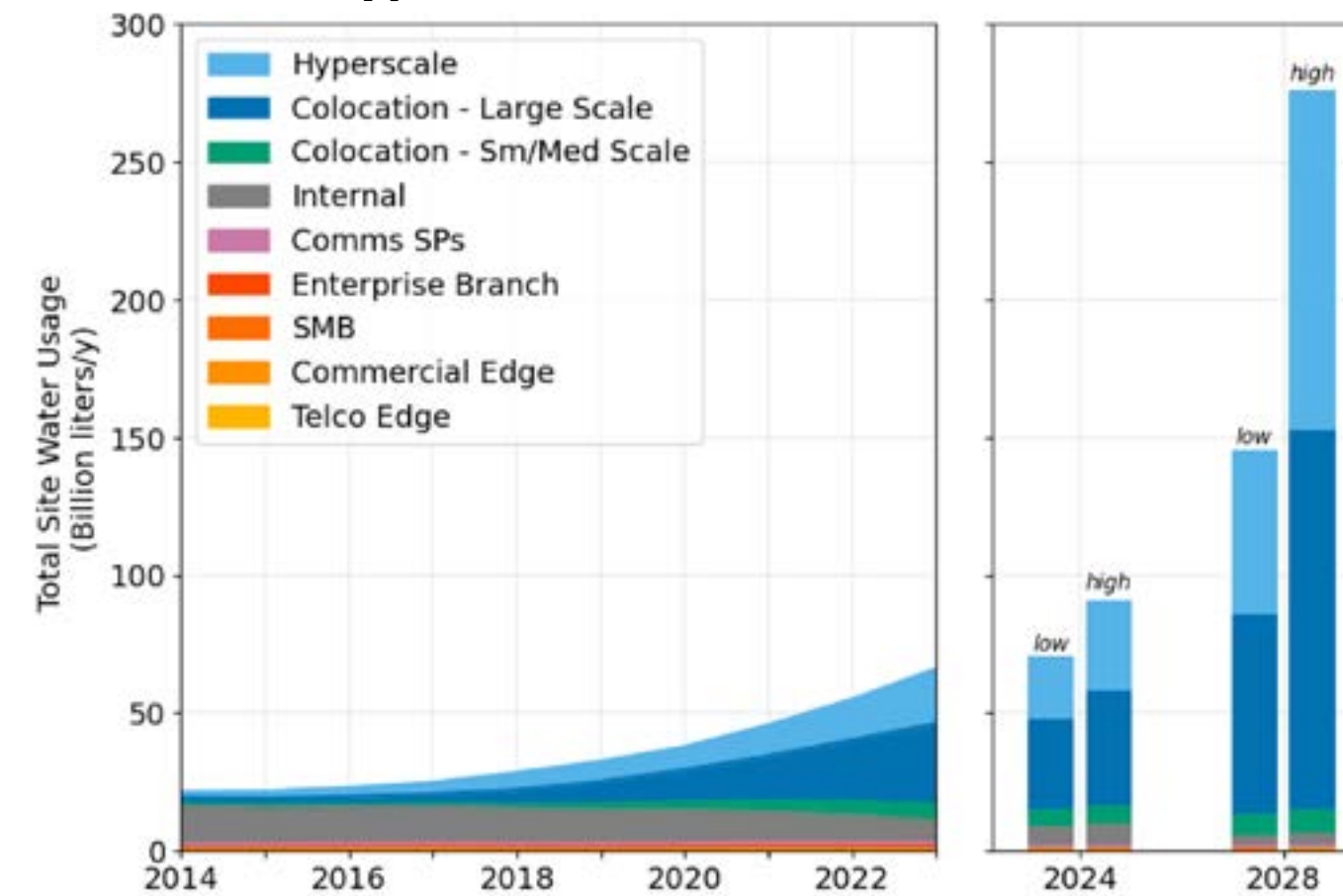
What is an AI Data Center?

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



Source: [Lawrence Berkeley National Laboratory, 2024](#)

Direct water consumption by data center type



- **Primary Power Supply:** Data centers require access to significant and reliable electrical power, often necessitating direct connections to the local utility grid and, for larger sites, dedicated substations
- **Fiber Optic Cabling:** High-capacity fiber optic cables are the backbone of data center connectivity, enabling low-latency, high-bandwidth data transmission both within the center and to external networks.
- **Water Supply:** For certain cooling systems, access to water is also a key consideration.

Industry Overview

MARKET SIZE & GROWTH FORECASTS

Installed Capacity: As of early 2025, the global data center market has about [40 gigawatts \(GW\)](#) of installed power capacity in 97 markets, according to Cushman Wakefield.

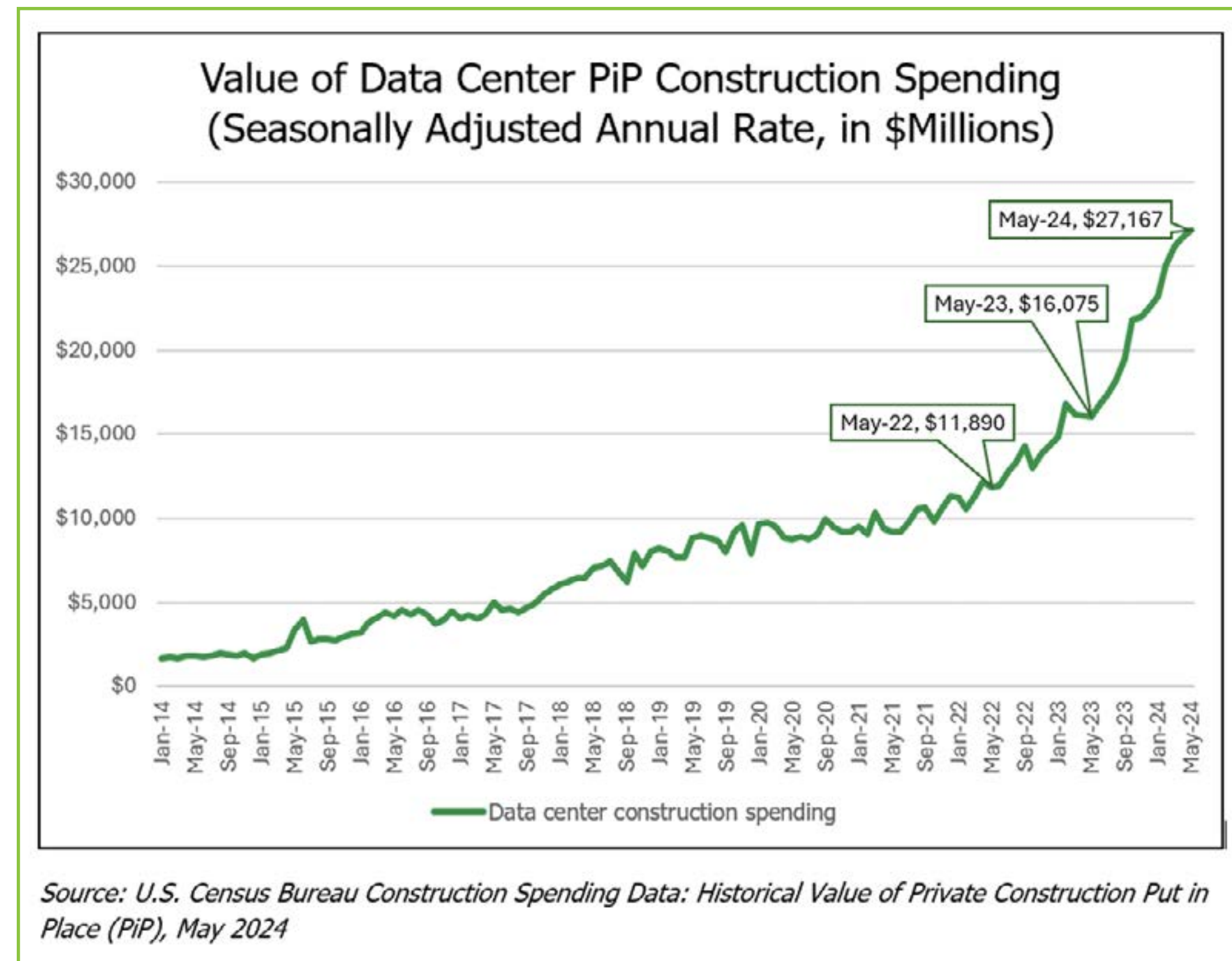
Growth is accelerating rapidly, however, and as a result, estimates can vary substantially. Complicating the picture is that estimates are based on power consumption, but as efforts are underway to make data centers more energy efficient, this is not necessarily an optimal measure.

[Goldman Sachs Research](#) estimates, for example, that the 55 GW of power usage by the global data center market consists of cloud computing at 54%, traditional uses (e.g., email) at 32%, and AI at 14%. For the United States alone, there is approximately [92 GW](#) of data center capacity in the pipeline. At the end of 2024, the monthly pipeline additions were [7 GW](#).

Market Value: [Polaris Market Research](#) estimates that the global market value will be \$19.66 billion in 2025, with an expected compound annual growth rate (CAGR) of 25.6%, reaching \$153.23 billion by 2034. Estimates do vary by about a billion dollars, with Polaris' estimate on the higher end.

Another perspective is to look at construction costs. An analysis conducted by [PwC](#) on behalf of the Data Center Coalition, a trade association, found that between May 2023 and May 2024, construction spending increased from \$16 billion to \$27 billion (69%).

Future Expansion: A [McKinsey](#) mid-range analysis projects, based on current trends, that global demand for data capacity will increase by 19-22% (171-219 GW) from 2023 to 2030. In the United States, their estimate of the data center supply deficit is 15% by 2030.



Source: Written Testimony of Josh Levi, President, [Data Center Coalition](#) Before the U.S. House of Representatives Oversight and Government Reform Subcommittee on Economic Growth, Energy Policy, and Regulatory Affairs.

Industry Overview

Additional AI data center related [investments](#) were made by Energy Capital Partners (\$5 billion plan to develop a data center) and FirstEnergy (\$15 billion to expand power distribution, strengthen grid infrastructure to support data centers).

Other actions include [identifying 16 federal sites for rapid AI data center construction](#) and establishing the [“Stargate” partnership](#) that would invest [\\$100-500 billion by 2029 in 20 large AI data centers](#).

There are also plans to streamline and consolidate environmental permitting for AI infrastructure, carried over by a [Biden Executive Order](#) (not revoked at the time of this writing).

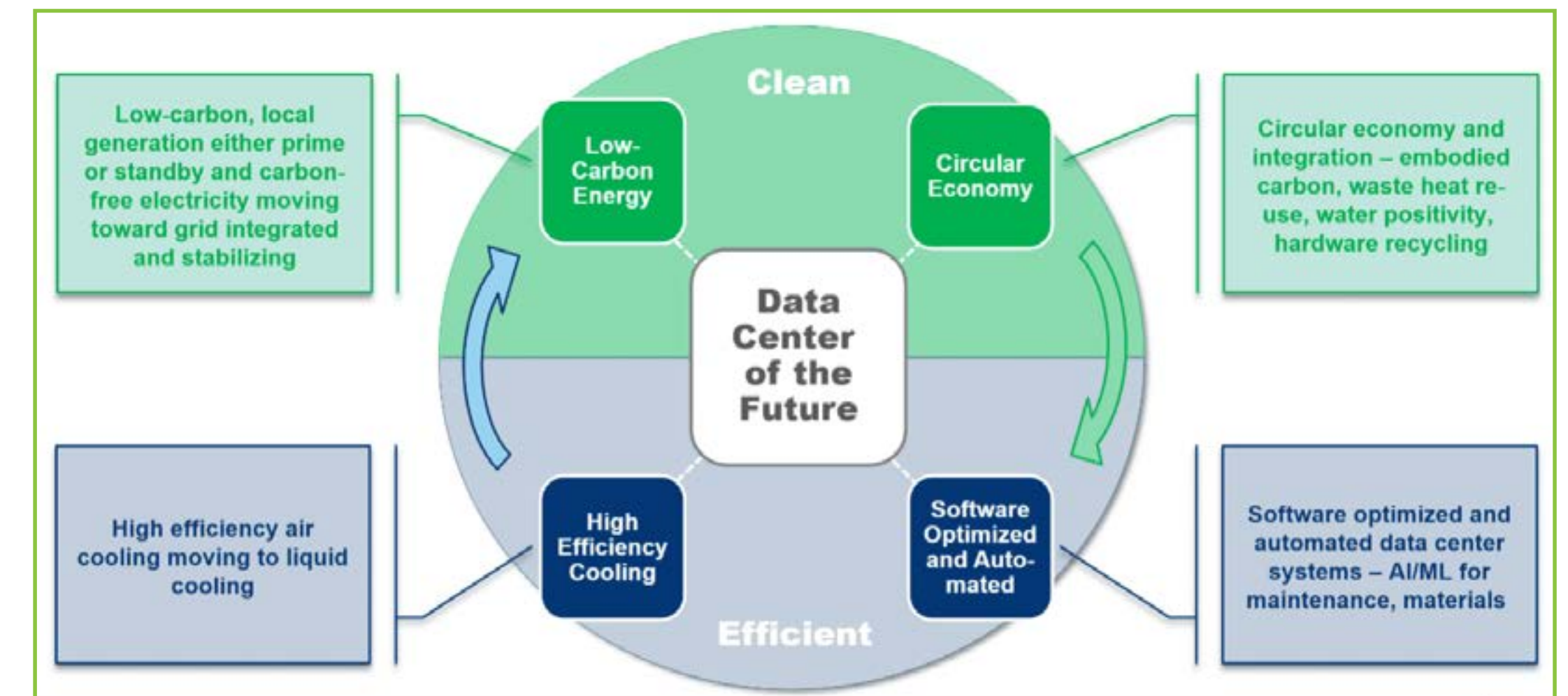
Environmental Goals: AI data centers have [two major environmental challenges](#) that the industry is attempting to address: energy consumption and water use. For example, when someone asks a question of ChatGPT, the electricity consumption is [five times](#) greater than asking the same question of Google. Data centers generate a great deal of heat and traditional cooling systems use large amounts of water – [a 16 ounce bottle for every 10-15 responses](#).

To reduce energy consumption and increase energy efficiency, data centers are trying to optimize hardware and software and be more aware of the source of energy in the grid they are accessing (e.g., is the energy source a renewable resource, nuclear, or a fossil fuel).

To minimize the amount of water the data center uses for cooling, centers are adopting advanced cooling technologies and publicly tracking their water withdrawals.

Other actions include [setting net-zero targets for greenhouse gas emissions](#), promoting sustainable site selection, and engaging communities to address their concerns about noise and light pollution, as well as resource use.

Four principles of sustainable data center design



Source: [Equinix](#), 2022

AI can also [help the environment](#). Examples include its ability to enhance the modeling of climate scenarios, expedite the development of energy-efficient materials, optimize operations by forecasting demand, and facilitate the development of product life cycle assessments.

Industry Overview

Technological Advancements: AI data centers are rapidly evolving as their number increases. Advancements include server racks with higher density (e.g., 8-30 kW in the past to 120-250 kW today), specialized chips optimized for AI use, moving from traditional air cooling to liquid cooling systems focused on the chip itself, and bringing AI data centers closer to users (called microdata centers) that reduce time delays in computing.

AI can also help optimize data center operations and monitor them to enhance their reliability, efficiency, and sustainability.

CHALLENGES AND CONCERNS

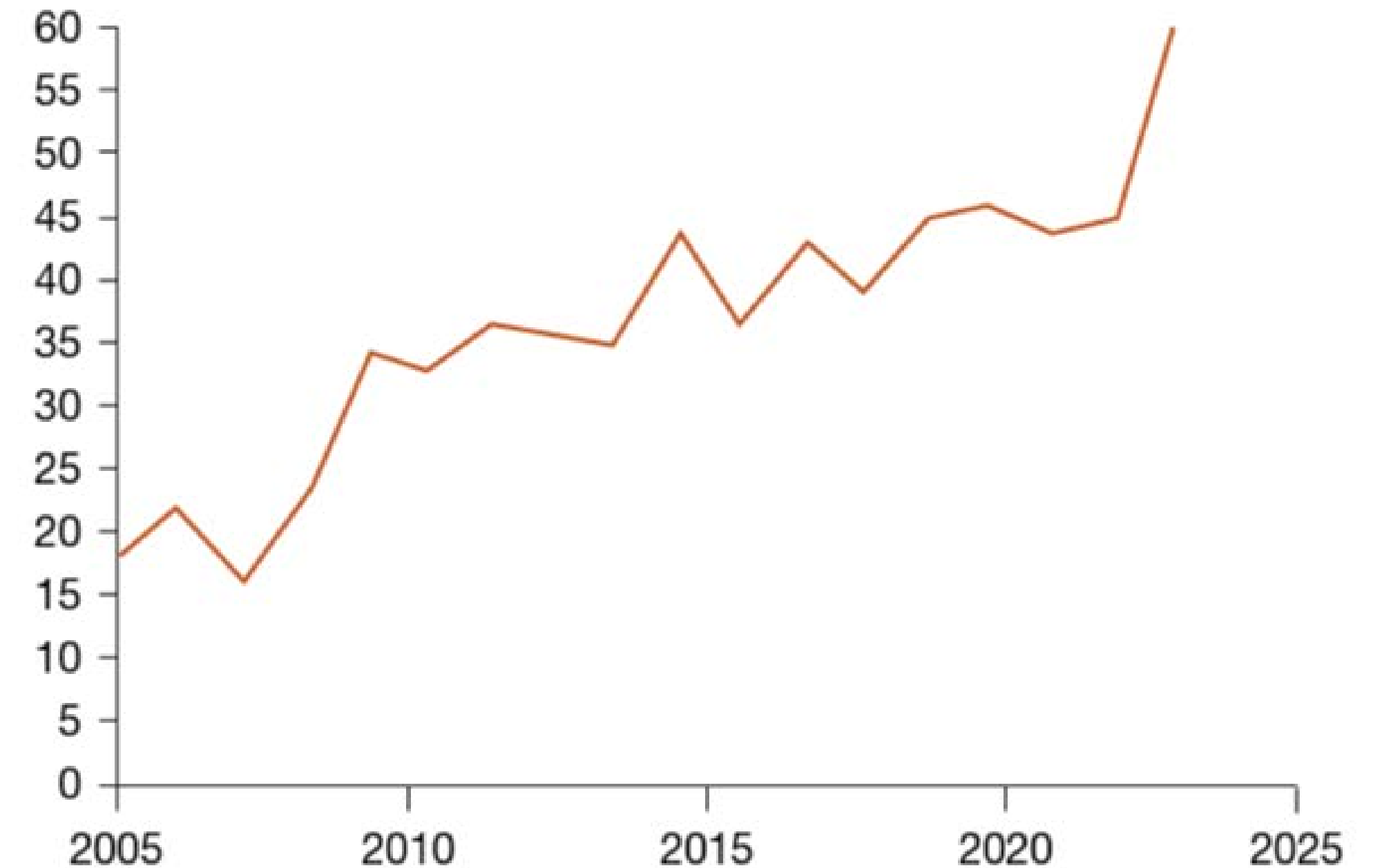
Electricity Grid Impact: AI Data Centers' power needs exceed those of other data centers, which were already [impacting the electricity grid](#). The increased use of AI by businesses and consumers is expected to further strain power grids.

According to the [Electric Power Research Institute](#) (EPRI), a query to an AI model like ChatGPT requires 10x the power of a traditional Google query. Efforts are underway to develop AI data centers that consume less energy, and AI is being utilized within data centers to identify ongoing steps to reduce energy consumption.

Regulatory Hurdles: The primary barrier to building more AI data centers is the time required to obtain [permits](#) for new power generation or transmission lines, which can take years (see figure above). Issues at the [local level](#) include zoning, land use, siting restrictions, height restrictions, visual impact assessments, and noise ordinances. Other regulatory hurdles that vary by jurisdiction include requirements for renewable energy and water use, energy efficiency targets, and limitations on greenhouse gas emissions.

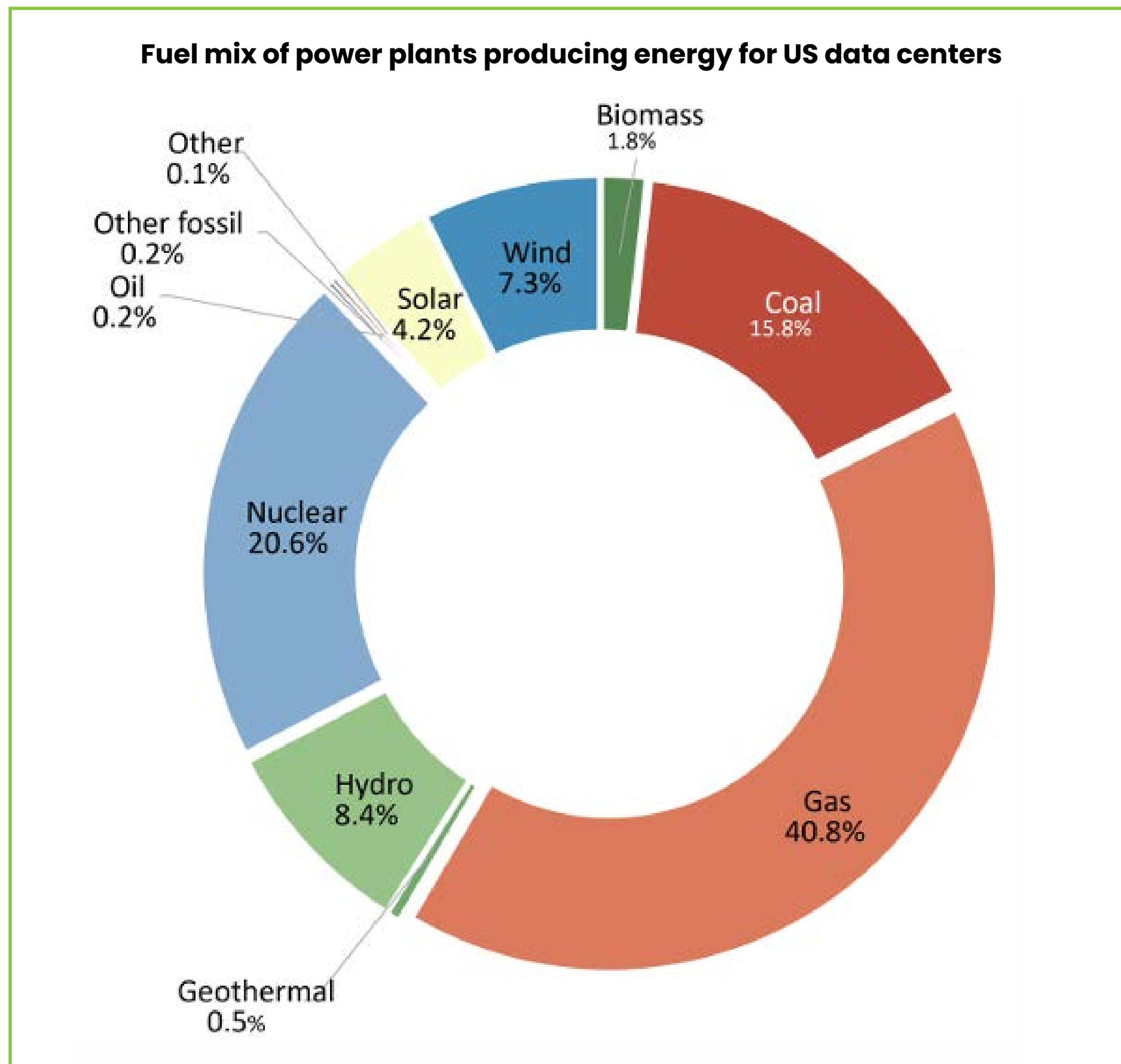
US transmission interconnection delays

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



Source: [PwC](#), 2025

Industry Overview



Source: [Environmental Burden of United States Data Centers in the Artificial Intelligence Era, 2024](#)

Social license to operate: Public concerns about AI data centers include the impact on the local electricity grid and water sources (including the potential impact on [utility rates](#)), as well as noise, light, and [environmental pollution](#). Some are also concerned that AI will take away employment opportunities, particularly for white-collar workers, and that the data centers themselves do not create many long-term, local jobs.

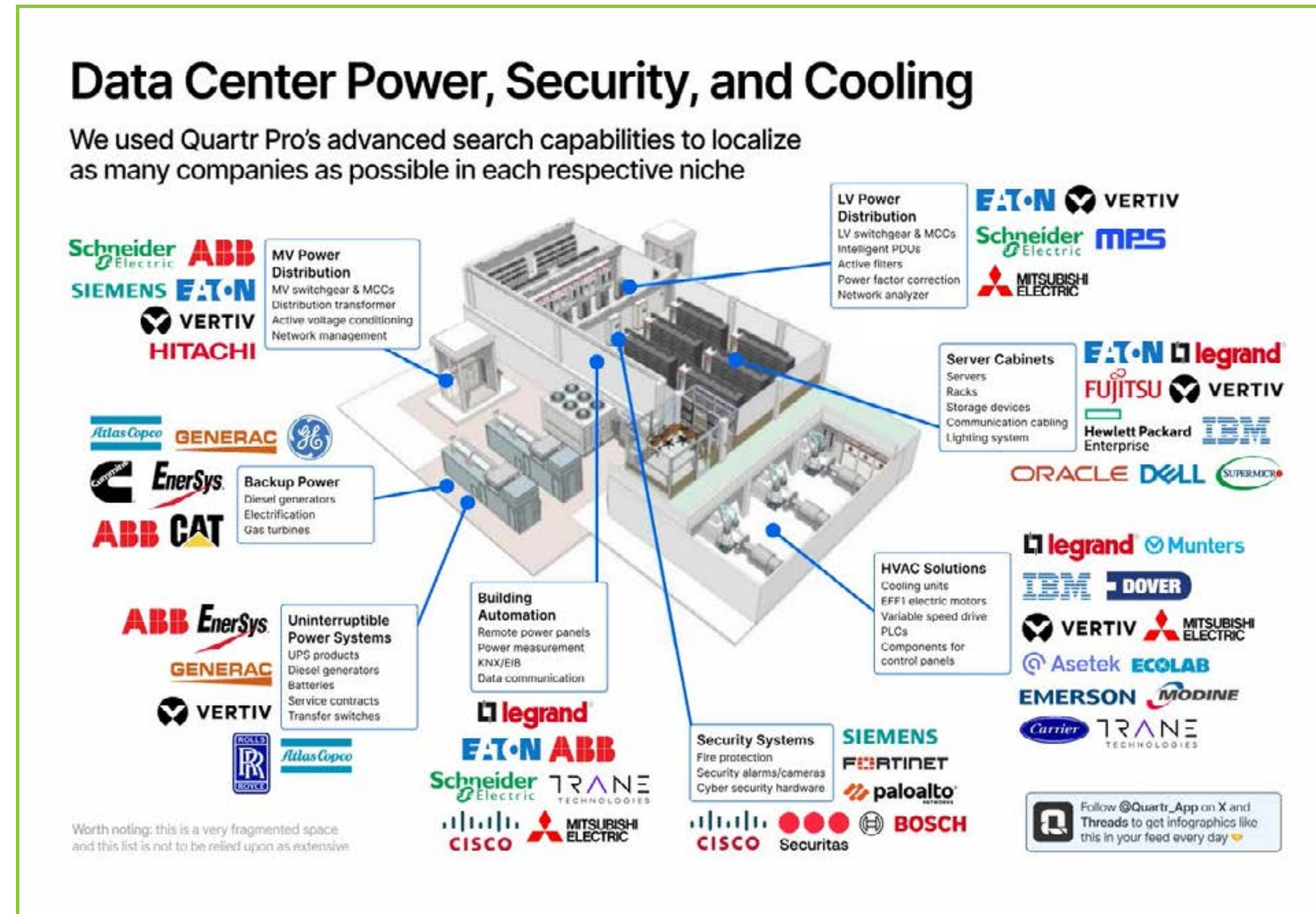
Environmental concerns: The need for AI data centers to consume clean water and electricity, particularly when the source of that energy is a fossil fuel such as coal or natural gas, raises [environmental concerns](#). The local environmental impact can [vary](#) by region, depending on the specific regulatory requirements in each geographic area. In addition to local environmental pollution concerns, AI data centers also raise [global environmental concerns](#), particularly related to the mining of rare earth materials and increased greenhouse gas emissions, as well as the disposal of electronic waste at the end of its life, which can lead to mercury and lead pollution.

AI data centers are making progress as technologies advance, leading to a [50% reduction](#) in power use effectiveness (PUE) and the development of new technologies to reduce water consumption.

Land use: While some [municipalities](#) treat data centers as industrial facilities during zoning, others are creating [specific land use regulations](#) for data centers. Some, for example, limit the ability to build a data center near residential or mixed-use areas, or require buffer zones.

Data Center Power, Security, and Cooling

We used Quartr Pro's advanced search capabilities to localize as many companies as possible in each respective niche



Source: [Quartr](#), January 10, 2024



AI Data Center Components

COMPUTING

Server Cabinets: Server cabinets, also known as racks, are the physical enclosures that house and organize servers, networking equipment, and power distribution units in an AI data center. Modern AI server cabinets are designed to support high-density configurations with reinforced frames, enhanced airflow management, and integrated cable routing to accommodate heavy, power-hungry GPU servers and clustering setups. Subcomponents include mounting rails, cable management arms, power distribution units (PDUs), and, in some cases, integrated cooling features.

ENERGY

Energy Sources: The mix of energy sources used to power data centers typically reflects the mix of sources used to produce electricity in the states where the data centers are located. Some data centers, however, use energy sources that are located on the same property as where they reside. As illustrated in the [figure](#) earlier, the primary energy source is natural gas. Other sources include nuclear, hydropower, coal, wind, solar, and biomass.

LV Power Distribution: Low Voltage (LV) power distribution manages the delivery of electrical power at voltages typically below 1,000V (often 415V or 480V in North America) from transformers to IT equipment and facility systems within the data center. Key subcomponents are LV switchboards, circuit breakers, PDUs, remote power panels (RPPs), and busways, all designed to ensure reliable, efficient, and safe power delivery to server racks and auxiliary systems.

MV Power Distribution: Medium Voltage (MV) power distribution handles the transfer of electrical power at voltages usually between 1kV and 35kV from the utility grid or on-site substations to transformers that step down the voltage for internal use. MV systems include MV switchgear, transformers, distribution panels, and protective relays, providing efficient bulk power transfer, redundancy, and resilience for large-scale AI data centers.

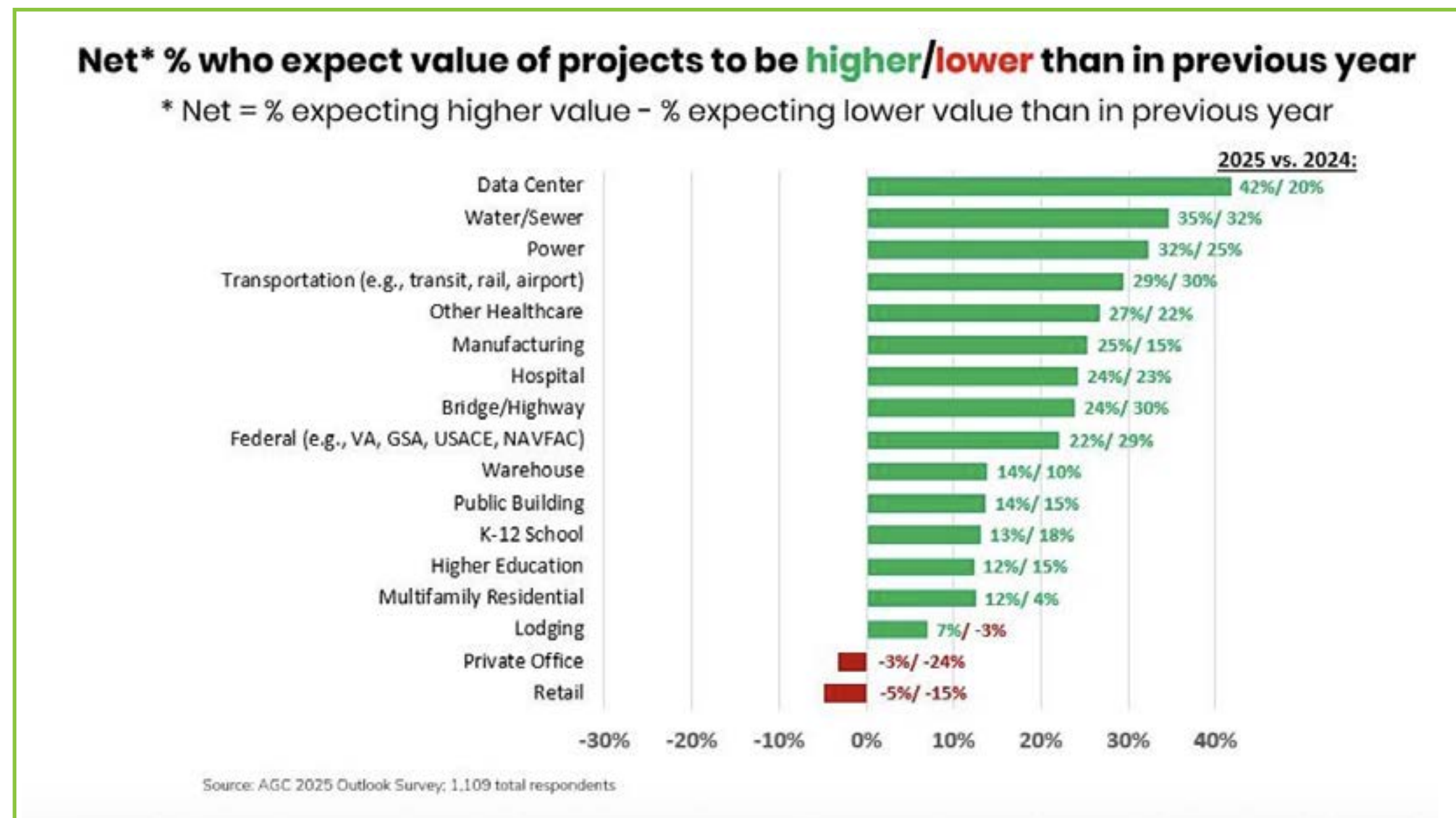
Backup Power: Backup power systems ensure continuous operation during utility outages and typically consist of diesel or gas-powered generators, automatic transfer switches (ATS), and fuel storage tanks. These systems activate when the main power supply fails, providing electricity to critical loads until normal power is restored or batteries or Uninterruptible Power Supply (UPS) systems are depleted.

Uninterruptible Power Supply: UPS units provide instantaneous, short-term power to data center equipment during power interruptions, bridging the gap between utility failure and generator startup. They utilize batteries (lead-acid or lithium-ion) or flywheels, incorporating inverters, rectifiers, and control electronics to deliver clean, stable power, thereby protecting sensitive AI hardware from surges and outages. Subcomponents are battery banks, power converters, and monitoring/control systems.



AI Data Center Components

Survey of Contractors



Source: [Associated General Contractors of America](#), 2025

BUILDING

HVAC Solutions: HVAC (Heating, Ventilation, and Air Conditioning) solutions in AI data centers are engineered for high heat loads and precise environmental control. Systems include chillers, cooling towers, Computer Room Air Conditioners (CRAC), Computer Room Air Handlers (CRAH), and air distribution units, all working together to maintain optimal temperature and humidity for dense server deployments. Subcomponents are compressors, heat exchangers, pumps, ducts, and control systems.

Security Systems: Security systems in AI data centers integrate physical and cyber protection measures, including access control, surveillance cameras, intrusion detection systems, and alarm systems. Increasingly, AI-driven security platforms provide real-time monitoring, automated threat detection, and predictive analytics to safeguard both physical infrastructure and digital assets. Subcomponents include biometric readers, card access panels, video analytics servers, and integrated monitoring software.

Building Automation: Building automation systems (BAS) integrate and control various building functions—such as HVAC, lighting, power, and security—using centralized software and Internet of Things (IoT) sensors. In AI data centers, BAS leverages AI and machine learning for predictive maintenance, energy optimization, and real-time environmental monitoring, often interfacing with Data Center Infrastructure Management (DCIM) platforms. Subcomponents include controllers, sensors, actuators, and user interfaces.



Component List of Typical AI Data Centers

A comprehensive overview of the key components, systems, and technologies that make up modern AI data centers, organized by their respective NAICS codes, is provided in the following table. Each entry details the component name, its associated NAICS number and industry classification, a concise description, and its primary use within a data center environment.

Components listed in the table range from building automation and HVAC solutions to high-performance computing hardware, power distribution, security, and backup power systems.

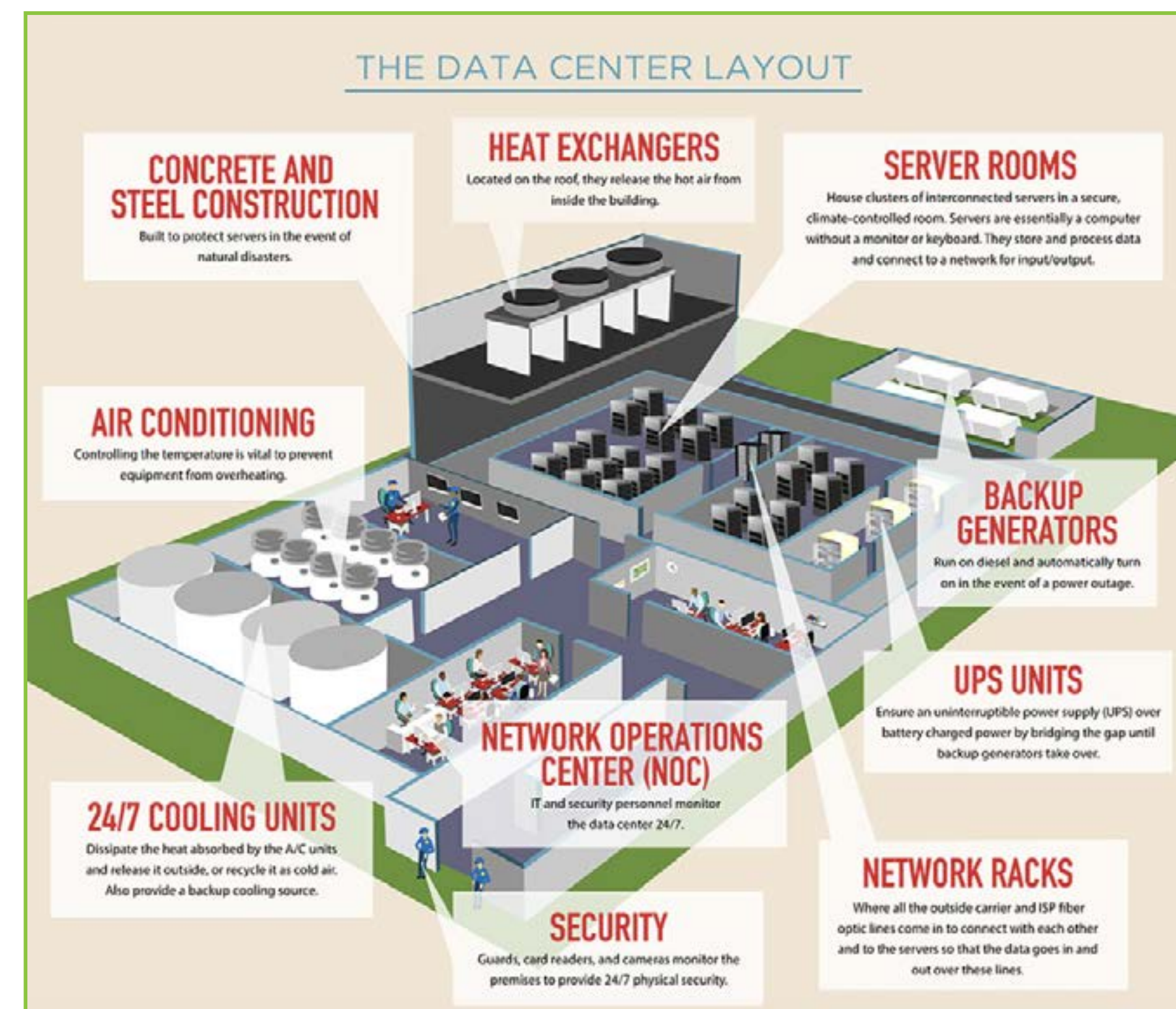
Cooling and environmental management are prominently featured, with components such as chillers, computer room air conditioning and handling (CRAC/CRAH) units, cooling towers, and air distribution units all designed to maintain optimal operating temperatures and prevent overheating of sensitive IT equipment.

Power infrastructure is another critical focus, encompassing everything from transmission structures and transformers to uninterruptible power supplies, generators, switchgear, and utility-scale batteries—ensuring continuous, stable, and safe power delivery even in the event of grid failures.

Advanced monitoring, control, and automation systems, such as SCADA, sensors, controllers, and building automation, collectively optimize energy efficiency, security, and operational reliability for AI data centers.

On the IT and security side, the table lists essential computing and networking hardware like servers, CPUs, GPUs, storage devices, and networking equipment, as well as security systems, surveillance cameras, and biometric readers for physical and logical access control. Supporting infrastructure, including metal racks, cable management arms, and server

cabinets, is also included, ensuring organized, scalable, and accessible installations. Overall, the table underscores the complexity and integration of multiple disciplines—mechanical, electrical, electronic, and IT—required to build and operate robust, efficient, and secure AI data centers.



Source: [Infogrades](#)



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.

Component List of Typical AI Data Centers

COMPONENT	NAICS NUMBERS	NAICS NAME	DESCRIPTION	USE
Card access panels	334118	Computer Terminal and Other Computer Peripheral Equipment Manufacturing	Panels for electronic keycard entry.	Controls and logs entry to secure areas.
Chillers	333415	Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing	Machines that remove heat from the data center air or liquid.	Provides cooling for large-scale heat rejection.
Circuit breakers	335311	Power, Distribution, and Specialty Transformer Mfg.	Safety devices that interrupt power during overloads or faults.	Protects equipment and wiring from damage due to electrical faults.
Compressors	333415	Air-Conditioning Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing	Machines that compress refrigerant for cooling cycles.	Drives the refrigeration process in chillers and CRAC units.
Control systems	334512	Automatic Environmental Control Manufacturing	Electronic systems for managing HVAC operation.	Automates and optimizes HVAC performance.
Control Systems / SCADA (Supervisory control and data acquisition)	334512	Automatic Environmental Control Manufacturing	Automated systems for monitoring and controlling operations.	Manage, monitor, and optimize data center environments and processes.
Controllers	334512	Automatic Environmental Control Manufacturing	Devices that manage and automate building systems.	Centralized control of HVAC, lighting, and security operations.
Cooling towers	333415	Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing	Structures that dissipate heat from water-cooled systems.	Expels heat from the data center to the atmosphere.
CRAC/CRAH units (Computer Room Air Conditioning/Handling)	333415	Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing	Computer Room Air Conditioners/Air Handlers for precise climate control.	Maintains temperature and humidity in server rooms.

Component List of Typical AI Data Centers

COMPONENT	NAICS NUMBERS	NAICS NAME	DESCRIPTION	USE
Diesel/gas generators	335312	Motor and Generator Manufacturing	Engines that produce electricity during power outages.	Supplies backup power to the entire data center when the grid fails.
Distribution panels	335311	Power, Distribution, and Specialty Transformer Mfg.	Panels that distribute power to various facility sections.	Organizes and manages power delivery to different data center zones.
Ducts	332322	Sheet Metal Work Manufacturing	Channels for directing airflow.	Distributes conditioned air to and from server rooms.
Electric Generators & Turbines	333611	Turbine and Turbine Generator Set Units Manufacturing	Converts mechanical energy into electrical power.	Provides backup or primary power for data centers.
Electric Motors & Generators	335312	Motor and Generator Manufacturing	Machines converting electrical and mechanical energy.	Power HVAC, pumps, fans, and backup systems in data centers.
Electrical Insulation Devices	335932	Noncurrent-Carrying Wiring Device Manufacturing	Non-conductive devices preventing unwanted electrical flow.	Protect equipment and personnel by insulating electrical connections.
Fuel storage tanks	332420	Metal Tank (Heavy Gauge) Manufacturing	Containers for storing fuel for generators.	Provides necessary fuel supply for extended generator operation.
Heat exchangers	333415	Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing	Devices that transfer heat between fluids.	Facilitates efficient cooling and heat removal.
HVAC / Cooling Systems	333415	Air-Conditioning and Warm Air Heating Equipment and Commercial/Industrial Refrigeration	Regulates temperature and airflow in data centers.	Maintains optimal equipment temperature; prevents overheating.
HVAC Solutions	238220	Heating and Air-Conditioning Contractors	Chillers, CRAC units, and liquid cooling systems for heat dissipation.	Manages extreme heat loads from AI servers to prevent thermal throttling.



Component List of Typical AI Data Centers

COMPONENT	NAICS NUMBERS	NAICS NAME	DESCRIPTION	USE
Integrated cooling features	334419	Other Electronic Component Manufacturing	Built-in cooling solutions, such as fans or liquid cooling channels.	Enhances airflow and heat dissipation within the cabinet.
Inverters	335999	All Other Miscellaneous Electrical Equipment and Component Manufacturing	Devices that convert DC battery power to AC.	Provides usable AC power to IT equipment during a power interruption.
LV Power Distribution	335311	Power, Distribution, and Specialty Transformer Mfg.	Systems distributing low-voltage power (e.g., 480V) to racks and cooling systems.	Delivers stable power from transformers to IT equipment and facility systems.
LV switchboards	335311	Power, Distribution, and Specialty Transformer Mfg.	Panels that distribute and control low-voltage power.	Central point for managing power to various circuits in the data center.
Metal Racks & Frames	332999	All Other Miscellaneous Fabricated Metal Product Manufacturing	Structural frames and racks for mounting servers and equipment.	Supports and organizes servers and hardware in data centers.
Monitoring software	541513	Computer Facilities Management Services	Software for managing and analyzing security system data.	Centralized security management and incident response.
Monitoring/control systems	541513	Computer Facilities Management Services	Software for managing and analyzing security system data.	Ensures UPS systems function correctly and alerts staff to issues.
Mounting rails	337215	Showcase, Partition, Shelving, and Locker Manufacturing	Structural supports for mounting servers and equipment in racks.	Securely holds servers and hardware in place within the cabinet.
MV Power Distribution	335311	Power, Distribution, and Specialty Transformer Mfg.	Infrastructure transferring medium-voltage power (1kV–35kV) from grids.	Steps down utility-scale power for internal data center use via transformers.
MV switchgear	335311	Power, Distribution, and Specialty Transformer Mfg.	Equipment for switching, controlling, and protecting medium-voltage circuits.	Ensures safe and reliable operation of medium-voltage power systems.



Component List of Typical AI Data Centers

COMPONENT	NAICS NUMBERS	NAICS NAME	DESCRIPTION	USE
Networking Equipment	334210	Telephone Apparatus Manufacturing	Devices enabling data communication and connectivity.	Connects servers and devices; manages network traffic in data centers.
PDUs, Switchboards	335931	Current-Carrying Wiring Device Manufacturing	Devices for distributing and managing electrical power loads.	Deliver and control power to racks and equipment in data centers.
Power Control Equipment	335912	Power, Distribution, and Specialty Transformer Manufacturing	Devices that regulate and transform electrical power levels.	Manage voltage and distribute power safely in data centers.
Power distribution units (PDUs)	335311	Power, Distribution, and Specialty Transformer Mfg.	Devices that distribute electrical power to servers within the cabinet.	Delivers power to each server and monitors energy consumption.
Power Supplies (UPS)	335999	All Other Misc. Electrical Equipment and Component Manufacturing	Devices providing uninterrupted backup power to equipment.	Prevent downtime; protect data and hardware during power disturbances.
Protective relays	335311	Power, Distribution, and Specialty Transformer Mfg.	Devices that detect faults and trigger circuit breakers.	Protects electrical systems from damage due to faults or abnormal conditions.
Pumps	333911	Pump and Pumping Equipment Manufacturing	Devices that circulate water or coolant.	Moves chilled water or coolant through HVAC systems.
Rectifiers	335999	All Other Miscellaneous Electrical Equipment and Component Manufacturing	Devices that convert AC to DC for battery charging.	Charges UPS batteries from the main power supply.
Remote power panels (RPPs)	335311	Power, Distribution, and Specialty Transformer Mfg.	Panels that extend power distribution to remote locations in the facility.	Provides flexible power distribution closer to server racks.
Security Systems	334290	Security Systems Services	Access control, surveillance, and intrusion detection systems.	Safeguards physical infrastructure and data against breaches or unauthorized access.



Component List of Typical AI Data Centers

COMPONENT	NAICS NUMBERS	NAICS NAME	DESCRIPTION	USE
Semiconductors	334413	Semiconductor and Related Device Manufacturing	Electronic components enabling processing and memory functions.	Power CPUs, GPUs, memory, and manage data center operations.
Sensors	334512	Automatic Environmental Control Manufacturing	Devices that detect environmental conditions (e.g., temperature, humidity).	Provide real-time data for intelligent building management.
Sensors & IoT Devices	334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System Manufacturing	Devices that monitor and collect real-time data.	Enable real-time monitoring, automation, and optimization in data centers.
Server Cabinets	337215	Showcase, Partition, Shelving, and Locker Manufacturing	Reinforced enclosures for organizing servers, PDUs, and cooling systems.	Houses and secures high-density AI servers while optimizing airflow and cable management.
Servers, CPUs, GPUs	334111	Electronic Computer Manufacturing	High-performance computers housing CPUs/GPUs.	Host, process, and manage AI workloads; cluster for scalability.
Solar Panels & Inverters	334413	Semiconductor and Related Device Manufacturing	Convert sunlight to electricity; inverters manage power flow.	Provide renewable energy and backup power for data centers.
Storage Devices	334112	Computer Storage Device Manufacturing	Devices for storing and retrieving digital data.	Store, access, and manage massive datasets for AI workloads.
Surveillance cameras	334310	Audio and Video Equipment Manufacturing	Cameras that monitor and record activity.	Provides real-time and recorded visual security coverage.
Switchgear & Circuit Breakers	335313	Switchgear and Switchboard Apparatus Manufacturing	Devices that control, protect, and isolate power systems.	Distribute, manage, and safeguard electrical power in data centers.
Transformers	335311	Power, Distribution, and Specialty Transformer Mfg.	Devices that step down voltage from medium to low for data center use.	Converts incoming utility power to usable levels for IT and facility equipment.
Transmission Structures	332312	Fabricated Structural Metal Manufacturing	Metal frameworks supporting high-voltage power lines.	Deliver electricity across long distances on the grid.



Component List of Typical AI Data Centers

COMPONENT	NAICS NUMBERS	NAICS NAME	DESCRIPTION	USE
Uninterruptible Power Supply (UPS)	335311	Power, Distribution, and Specialty Transformer Mfg.	Battery/flywheel systems with inverters for seamless power during interruptions.	Protects hardware from surges and bridges gaps until backup generators activate.
User interfaces	541513	Computer Facilities Management Services	Panels or software for human interaction with building systems.	Allow operators to monitor and control building automation systems.
Utility-Scale Batteries	335911	Storage Battery Manufacturing	Large batteries for storing and supplying electrical energy.	Provide backup and load balancing power for data centers.
Video analytics servers	334111	Electronic Computer Manufacturing	Servers that process and analyze surveillance footage.	Enables automated threat detection and security alerts.

AI Data Center Developers and Manufacturers

The major organizations constructing AI data centers in the United States include:

Microsoft: Investing heavily in next-generation AI data centers, often powered by custom silicon (e.g., Azure Maia AI chip).

Google (Alphabet): Expanding AI-optimized data centers across the U.S., with its Tensor Processing Units (TPUs) driving much of the AI workload, particularly for services integrated with Gemini and DeepMind research.

Amazon Web Services (AWS): Uses custom Trainium and Inferentia chips for AI/ML workloads and supports the growing demand from enterprises integrating AI into cloud architectures.

Meta (Facebook): Building large-scale facilities designed around AI workloads, emphasizing high-bandwidth networking and optimized compute clusters.

NVIDIA: Co-developing AI “supercomputing centers” with partners and investing in AI infrastructure for training foundation models.

Oracle: Increasingly used in enterprise applications and through partnerships with NVIDIA and Cohere.

Tesla: Building Dojo supercomputing clusters for AI model training related to autonomous driving.

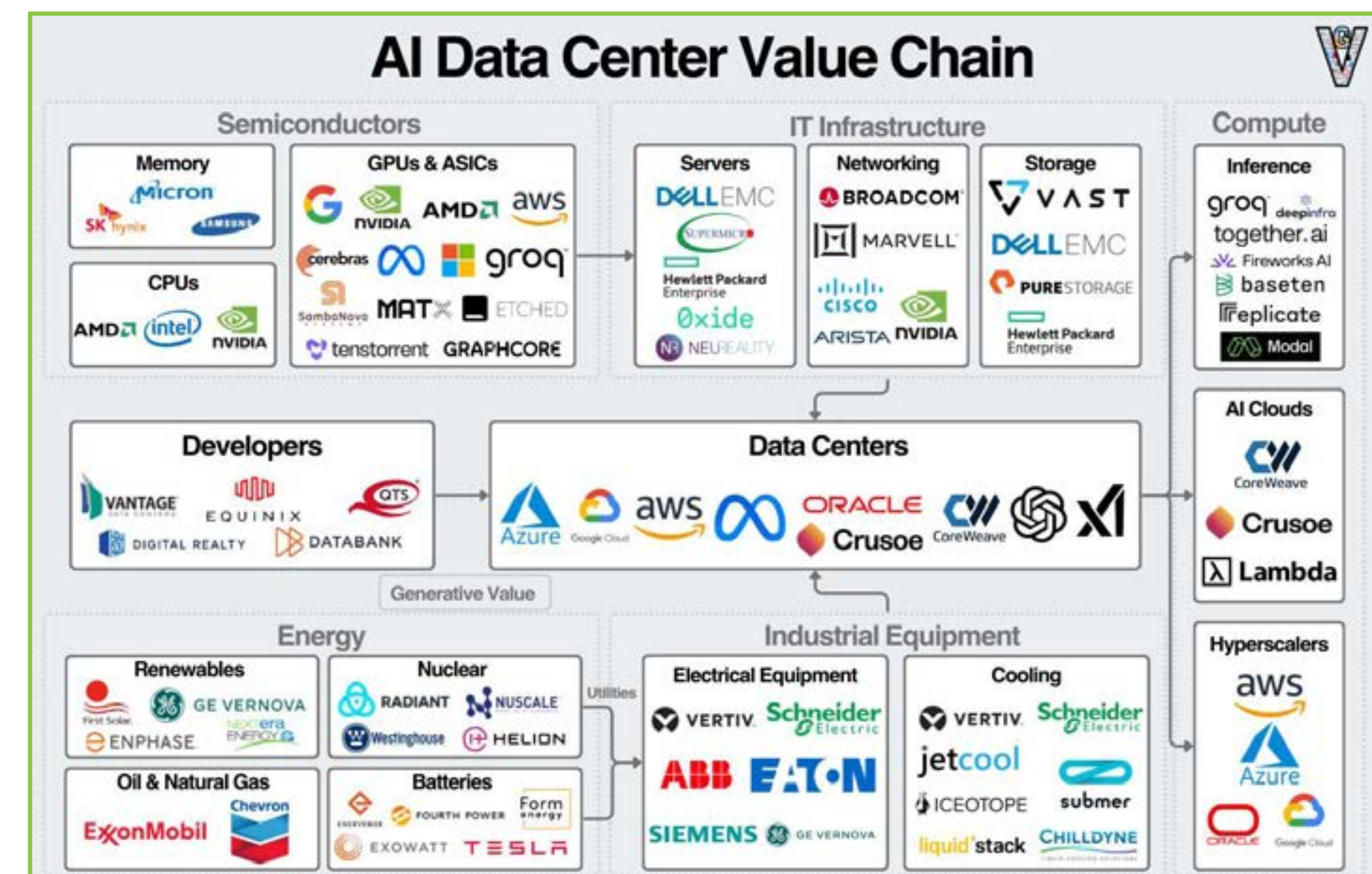
OpenAI: Co-develops AI infrastructure with Microsoft, with much of its workload running on specialized clusters in U.S.-based Azure data centers.

Apple: Building out U.S. data centers to support more machine learning workloads behind Siri and Vision Pro.

CoreWeave: A rising GPU cloud company focused on AI workloads, building hyperscale AI data centers, using NVIDIA GPUs to support everything from startups to enterprise clients.

Equinix and Digital Realty: Provide colocation space increasingly tailored to AI tenants, retrofitting facilities with high-density power and cooling for GPU clusters.

Crusoe Energy Systems: Operates carbon-reducing AI data centers focused on sustainable computing, including using repurposed energy sources that would otherwise be wasted.



Source: Eric Flanagan, October 13, 2024



AI Data Center Trade Associations & Resources

TRADE ASSOCIATIONS

[Associated General Contractors of America](#): The Associated General Contractors of America (AGC) represents a broad range of construction firms, including those specializing in data center construction.

[Data Center Coalition](#): The Data Center Coalition (DCC) serves as the membership association for the data center industry, advocating for favorable business climates, policies, and investments that support the sector's growth and success. DCC engages in public policy advocacy, thought leadership, and community outreach to promote the economic and community-building impacts of data centers.

[The Green Grid](#): The Green Grid (TGG) is a global consortium founded in 2007, uniting data center industry stakeholders—including end-users, policymakers, technology providers, facility architects, utility companies, and academia—to promote energy efficiency and sustainability in data centers. Now an affiliate of the Information Technology Industry Council (ITI), it develops tools, provides technical expertise, and advocates for optimizing energy and resource efficiency in data center ecosystems, aiming to enable a low-carbon economy.

[Uptime Institute](#): Uptime Institute (UI) is an independent advisory organization dedicated to enhancing the performance, efficiency, and reliability of business-critical infrastructure through innovation, collaboration, and impartial performance certifications. It is globally recognized for establishing and administering the Tier Standards & Certifications for data center design, construction, and operational sustainability.

RESOURCES

[ASHRAE Technical Committee 9.9, Mission Critical Facilities, Data Centers, Technology Spaces and Electronic Equipment](#): ASHRAE is an international society of heating, refrigerating, and air-conditioning (HVAC) professionals. ASHRAE TC 9.9 focuses on the design and operation of data centers, particularly in areas related to HVAC and energy efficiency. It provides technical guidance and standards for maintaining optimal environmental conditions in data centers.

FUNDING OPPORTUNITIES

[DOE Manufacturing and Energy Supply Chains](#) (MESC): The US Department of Energy's Manufacturing and Energy Supply Chains (MESC) office serves as the frontline of America's energy manufacturing deployment and supply chain security. Their mission is to enhance economic and national security by eliminating vulnerabilities in the United States' energy supply chains.

The MESC offers competitive grant opportunities for small to medium-sized manufacturers that focus on manufacturing expansion and workforce training. Efforts span battery storage, grid components, critical minerals processing and recycling, energy generation, nuclear power, buildings and energy efficiency, transportation, and industrial materials. Funding opportunities are announced periodically throughout the year. The office also publishes reports on supply chain needs, market opportunities, guidance documents, and factsheets.



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AI Data Centers: Overview

This AI Data Center: Overview report was created under the [Energy & Manufacturing in Appalachia](#) (EMA) program made possible with grant funding from the [Appalachian Regional Commission](#). EMA provides technical assistance and business support to small and medium manufacturers and enterprises seeking to expand business, production and jobs in the energy supply chains. Energy is a big expense for manufacturing companies. EMA helps companies save money with energy efficiency and emissions reductions.

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The EMA program supports Appalachia in 156 counties of Maryland, New York, Ohio, Pennsylvania, and West Virginia. This program was established to help small and medium manufacturers be a part of this Energy Economy. This program is managed by Manufacturing Extension Partnership (MEP) organizations from five Appalachian states. The activities and intended outcomes of EMA align with the National Institute of Standards and Technology (NIST) MEP and its mission to enhance the productivity and technological performance of U.S. manufacturing.

Learn more about the Energy & Manufacturing in Appalachia program by visiting: <https://www.wemakeithere.org/energy/> and join the [EMA LinkedIn group](#).

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