POLSINELLI

Publications

January 27, 2025 • Updates

Energy Demand for AI Drives the Midwest's Focus on Resource Adequacy

As presidential administrations change and policy priorities shift, the steady hum of electricity demand from artificial intelligence (AI) and data centers presses forward. Last week, the President signed several executive orders to realign federal energy priorities. One recent executive order is crucial to data centers and artificial intelligence: Declaring a National Energy Emergency.

The executive order focuses on improving grid reliability and ensuring a reliable supply of energy (though not wind- or solar-powered energy). The impetus for declaring an emergency was, in part, "due to a high demand for energy and natural resources to power *the next generation of technology*." The emergency declaration unlocks several powers for the President. Executive agencies were directed to exercise those powers to facilitate the siting, production, transportation and generation of domestic energy resources on federal (or even private) lands. These resources include fossil fuels, uranium, geothermal heat, hydropower and certain critical minerals. Agency heads are permitted to recommend the use of federal eminent domain authority if necessary to achieve these objectives.

This order comes at a time when AI-driven technology is rapidly developing. Some of the most popular AI models require massive computational resources. Training these models involves processing enormous amounts of data across thousands of servers, each consuming significant amounts of electricity to keep their hardware cool. Data centers, which house these servers, are at the heart of the AI revolution. As the executive order notes, "the United States' ability to remain at the forefront of technological innovation depends on a reliable supply of energy and the integrity of our Nation's electrical grid."

Reliable, abundant, and affordable electricity is a critical reason why data centers are targeting the Midwest region for future development. The region has a diverse energy mix, including coal, natural gas, and nuclear, along with an increasing share of wind and solar. However, the boom in demand from AI and associated technology has complicated the region's reliability and affordability picture. As data centers proliferate across the plains, demand during peak periods is intensified.

Investor-owned utilities report on the present circumstances in their public statements.

Related People

- Frank A. Caro
- Spencer E. Culver

Related Capabilities

- Energy
- Privacy & Cybersecurity
- Executive Orders

The average project size in Ameren Missouri's service territory increased from 3.2 megawatts (MW) in 2019 to 181.2 MW in 2024. Oklahoma Gas & Electric expects over 20% growth in its energy forecast for the next five years. In Evergy's service territory in Missouri and Kansas, roughly 6 gigawatts (GW) of projects sit in its economic development queue. For context, the Wolf Creek nuclear plant in Kansas has a nameplate capacity of roughly 1.2 GW.

Increasing data center demand comes at a time when the region is also experiencing growth in other energy-intensive industries, such as electric vehicle manufacturing and semiconductor production. The electrical grid needs to be able to manage these surges in demand without compromising reliability, which poses a challenge for regulators and grid operators. More data centers operating in the region means that the peak demand could shift in new directions, with potential implications for the overall energy system.

Regulators, customers and developers must consider rate design and cost allocation to manage this new demand picture and ensure resource adequacy. While the federal government is staking out its position, state regulators, data center developers and utilities can also approach this task with several strategies:

1. **Effective Rate Design**: Managing increased demand will require significant investments in new energy infrastructure. State regulators should ensure developers can access reliable energy at a just and reasonable rate when data centers need it without expecting other customers to cover more than their fair share of new upgrades. Utilities and developers should craft tariffs that balance these needs.
2. **Investment in Grid Infrastructure**: Upgrading and modernizing the electrical grid will be essential to handle increased demand. Additional development of electric transmission infrastructure is vital to dispatch regional generation resources and meet growing demand. Smart grid technologies, which use digital communications to monitor and manage electricity flow, can also help improve efficiency and resilience.
3. **Energy Efficiency in Data Centers**: Data center operators can reduce their impact on peak demand by investing in energy-efficient technologies and practices. Many data center operators are already pursuing advanced cooling systems and optimizing server workloads to mitigate their electricity consumption. As the technology behind AI continues to evolve, the efficiency of the infrastructure supporting it will need to improve.
4. **Demand Response Programs**: Utilities can implement demand response programs, which incentivize consumers—including data centers—to reduce their electricity usage during peak periods. This could help balance the grid during times of high demand, ensuring that the system remains reliable.

The increasing demands placed on the electricity grid by AI and new data centers represent a significant challenge for resource adequacy in the Midwest region of the United States. However, with thoughtful planning, strategic investments in infrastructure and energy efficiency, the region can continue to support its technology-driven economy while ensuring the reliability and sustainability of its energy supply.