



Data center energy storage podgorica

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The last time the United States experienced rising electricity demand was before the early 2000s due to a growing economy, a growing population, and a corresponding change in consumer adoption of electric products such as air conditioners, computers, and incandescent lighting. During that time, we experienced electricity demand increases of up to 30%. However, that time of intense growth was followed by years of flat electricity demand, primarily due to innovations in and implementation of energy efficiency improvements, and because of economic headwinds and a decline in domestic manufacturing.¹

Now, in response to transformations in technologies like artificial intelligence (AI), data center expansion, new domestic manufacturing, and electrification in different sectors, the United States is returning to a period of rising electricity demand, with total energy demand potentially growing ~15-20% in the next decade (See Figure 1).

The U.S. Department of Energy (DOE) has been anticipating and planning for rising electricity demand underscored by the nationwide goal to reach net-zero emissions economy-wide by 2050. To reach this goal, we expect at least a doubling in current electricity demand.² Addressing rising electricity demand requires a portfolio approach to meet near-term growth with commercially available technologies, while also paving the way to support long-term growth.

Data center deployment, partly driven by the need to power new AI applications, is a significant factor of near-term electricity demand growth. The Electric Power Research Institute (EPRI) estimates that data centers could grow to consume up to 9% of U.S. electricity generation annually by 2030, up from 4% of total load in 2023.³ At a national level, data centers are critical to supporting America's economic growth by powering businesses and enabling continued leadership in innovation, including for AI applications.

This blog outlines DOE resources available to help data center developers meet electricity demands with clean energy solutions that can improve flexibility and modernize the grid while maintaining reliability and affordability.

Figure 1: U.S. Electricity Demand (1970-2035)

Meeting Data Center Electricity Demand

Data center electricity demand has specific characteristics. It is growing rapidly and varies regionally. Data centers can impact regional grids given the steep increases in load size, may be geographically constrained due to latency requirements, and often require firm power sources to operate continuously. Projections of data center electricity demand growth continue to evolve due to developing use cases and demand for AI and the speed of improvements in energy efficiency. Building on a series of congressionally mandated reports on data center energy use and efficiencies, DOE's Lawrence Berkeley National Laboratory (LBNL) is assessing current and near-future data center energy consumption and water use. The report is scheduled to be released at the end of 2024.

Figure 2: Examples of Tools to Address Growing Electricity Demand from Data Centers

While the pace and characteristics of data center electricity demand can present challenges in an evolving power system, targeted actions can help the United States maintain a reliable, affordable, secure, and resilient power system. State policymakers, regulators, utilities, data center owners and operators, energy developers, technology providers, grid planners, communities, and the broader grid stakeholder ecosystem all have critical roles to play in accelerating deployments of the solutions needed to support demand growth alongside decarbonization and grid security.

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