ASPEN ECONOMIC STRATEGY GROUP

aspen institute

EXECUTIVE SUMMARY

An Energy Strategy for National Renewal

by Joseph Majkut

OCTOBER 2025

Introduction

The United States' energy strategy must effectively bridge economic policy and geopolitical power, while also serving as a calibrated response to climate change. After two decades of relatively constant energy consumption, the country faces a surge in power demand driven by artificial intelligence, domestic manufacturing, and continued electrification—developments that challenge an already-constrained domestic electricity grid with limited spare capacity.

In "An Energy Strategy for National Renewal," Joseph Majkut outlines an energy strategy to boost energy generation, build transmission infrastructure, and approach greenhouse-gas emissions reductions through a lens of global economic competitiveness. His recommendations include increasing the use of nuclear energy, improving the interstate transmission system, equipping new natural-gas production facilities with carbon capture capability, and establishing rigorous carbon-accounting standards.

State of play, 2024–2025

Over the past 20 years, the United States has become the world's leading producer of oil and natural gas as the sensitivity of the economy to oil prices has decreased. Renewables became the fastest-growing source of new electricity generation in the US. America's vulnerability to swings in global energy supply, and rising pollution that shaped domestic energy policy, seem like they could soon be problems of the past. But today, as policymakers seek to cultivate specific industries to maintain US technological leadership and security in its supply of critical inputs, the power sector is poised for incredible growth in the coming decades: Forecasts for electricity demand growth between now and 2040 range from 16 to 105 percent.

AI data centers

Capital investment into AI data centers is booming—Majkut estimates that capital spending in the United States could grow from $125 billion in 2024 to nearly $2 trillion by 2030—but the success of these investments will hinge on the availability of power. Indeed, the data centers that large AI companies expect to build will require the largest electricity loads on the planet, each one comparable to that of a mid-sized city. In total, Majkut estimates that data centers used exclusively for generative AI will grow from

about 4 gigawatts (GW) of demand in 2024 to between 50 and 84 GW in 2030 (by comparison, peak demand for the entire US grid reached 745 GW in 2024). To match large data centers with new generation will require substantial additions of large energy infrastructure.

Strategic manufacturing

Efforts to boost domestic manufacturing capacity represent another major driver of electricity demand growth. Since 2020, spending on the construction of new manufacturing facilities has accelerated dramatically in the United States, driven primarily by two key sectors: semiconductors and electric vehicles. While future investments remain in question, these two sectors now represent a substantial fraction of new manufacturing investment in the United States.

The rapid growth of semiconductor and battery manufacturing in the US has created new demand for the energy system. Facilities such as TSMC's Arizona semiconductor plant, projected to require up to 1.2 GW of power, will strain regional grids that are already under pressure. EV battery production is particularly energy-intensive, with estimates that if all investments announced since 2018 were realized, approximately 6.6 GW of electricity generation capacity would be required. Importantly, the geographic concentration of manufacturing investments in states like Arizona, Georgia, Texas, and others means that the energy system impacts will be regionally concentrated.

Multisector demand growth on a constrained grid

The US met relatively constant power demand while reducing emissions over the past 20 years, as the country replaced coal plants with natural gas and renewables. But the country did not increase the ability to meet new (near-constant) load demand. The existing grid is unable to support the scale of new power demands, creating reliability problems, as the power sector operates on increasingly thin reserve margins during periods of peak demand. Majkut outlines the three components of the power system, each of which utilities will need to improve in order to provide enough energy to affordably and reliably meet the coming surge in demand: the generation of electricity, transmission between power plants and demand centers, and the local distribution network.

Generation costs account for 25 percent of capital expenses for utilities. Low-cost generation resources can drive low energy prices. Such resources can come in several forms, such as coal and natural gas in Utah or hydropower in Washington. While generation remains the largest single cost, the transmission and distribution of power have been rising as a proportion of cost in the power sector. The costs of transmission and distribution investment and maintenance also represent quite different geographical phenomena. Dense urban areas might require expensive upgrades for underground lines, higher labor costs, higher property costs, or lengthy legal and permitting challenges; while rural areas may have lower costs for installations but need more installations to serve small, far-flung populations.

Demand growth and climate

A key question for this new era of growth will be how to meet growing demand without reversing course on progress towards emissions reductions. This imperative is driven not only by climate concern but also by America's economic and strategic imperatives: As more countries implement carbon regulations and pricing mechanisms, the carbon intensity of products is becoming a key competitive differentiator in international markets.

Majkut notes that carbon pricing schemes have grown enormously in the last 20 years and are accelerating globally. As of 2025, 28 percent of global emissions are covered by some form of carbon pricing. In 2021, the European Union announced plans for a Carbon Border Adjustment Mechanism (CBAM) that charges importers based on their products' carbon intensity, set to take effect in 2026; the UK and Turkey are now both implementing carbon border measures to complement their carbon pricing programs; Japan is studying a border adjustment; and China is pursuing a national accounting standard for estimating the carbon intensity of manufactured goods.

The shift toward carbon-based trade policy creates significant opportunities for the United States. America already holds distinct carbon-intensity advantages in key production sectors, particularly compared to China, and this shift creates additional motivation for investing in ever-cleaner energy technologies and accelerating the continued deployment of today's clean-electricity portfolio to meet rising demand. It is through developing a cleaner and more accessible energy system that the US can build

an economic strategy that will be responsive to growing demand and competitive in the long term.

Policy proposals for strategic energy competition

Majkut lays out an energy strategy with a focus on policy measures that remove regulatory burdens and coordinate efforts of firms, states, and the federal government to make strategic investments.

Expand the development and deployment of nuclear energy. Expanding nuclear power would provide a complement to the existing portfolio of solar, storage, and natural gas by providing reliable, carbon-free power in large amounts. But the sheer size of capital investment necessary to build new nuclear capacity, along with cost-overrun risks, creates significant challenges for financing plants. A more direct procurement of new nuclear capacity by the federal government would help in the development of nuclear power. Majkut proposes an anchor tenancy model in which the Department of Energy is a contracted purchaser of power from a project under development, so that private developers can secure funding from capital markets and attract other potential offtakes, enabling financing and the start of construction.

Invest in transmission enhancements. Investing in high-voltage interstate transmission infrastructure is one of the most strategic long-term moves that the federal government can make. Unlike evolving generation technologies, investing in transmission provides a durable foundation for economic growth. Because individual states tend to underinvest in interregional transmission lines, focusing instead on lower-value local projects, federal investment is essential. Increased federal funding should focus on projects that increase the grid's capacity to transfer power across states, particularly to areas that are hosting strategic industries and data centers. Such funding can be paired with enhanced federal authority to site and promote these projects, allowing for faster buildout of a truly national-scale grid.

Build new natural-gas plants ready for later retrofit with carbon capture and storage equipment. While natural gas will be necessary to meet rising demand, future emissions-reduction goals will require retrofitting many of these facilities. Designing plants today with future carbon capture and storage (CCS) in mind is a low-cost hedge that helps

prioritize long-term emissions-reduction progress. Federal and state policy should encourage CCS readiness as a condition of accelerated permitting and incentives for new gas generation.

Establish rigorous carbon-accounting standards. As the EU, Japan, China, and others establish their own systems for carbon accounting, American exporters will start to face markets sensitive to emissions intensity without a credible domestic-emissions accounting system. US-led standards for carbon accounting, leveraging expertise in the Department of Energy and the Commerce Department, could guide strategic investment in emissions reductions. Further, a credible and US-based carbon accounting system could be designed with learning mechanisms to build political and industry trust and support for broader climate policies.

ABOUT THE AUTHOR

Joseph Majkut

Director, Energy Security and Climate Change Program, Center for Strategic and International Studies

Joseph Majkut is director of the Energy Security and Climate Change Program at the Center for Strategic and International Studies (CSIS). In this role, he leads the program's work understanding the geopolitics of energy and climate change and working to ensure a global energy transition that is responsive to the risks of climate change and the economic and strategic priorities of the United States and the world. Joseph is an expert in climate science, climate policy, and risk and uncertainty analysis for decision-making. He is frequently cited in trade and national media on the politics of climate change and has testified before Congress on climate change and science. Before CSIS, Majkut worked as the director of climate policy at the Niskanen Center, where he led that group's efforts to research and promote carbon pricing, low-carbon innovation, regulatory reform, and other market reforms to speed decarbonization. From 2014 to 2015, he worked in the U.S. Senate as a congressional science fellow, supported by the American Association for the Advancement of Science and the American Geosciences Institute. He holds a PhD from Princeton University in atmospheric and oceanic sciences, a master's degree in applied mathematics from the Delft University of Technology, and a bachelor's degree in mathematics from Harvey Mudd College.

About the Aspen Economic Strategy Group

The Aspen Economic Strategy Group (AESG), a program of the Aspen Institute, is composed of a diverse, bipartisan group of distinguished leaders and thinkers with the goal of promoting evidence- based solutions to significant U.S. economic challenges. Co-chaired by Henry M. Paulson, Jr. and Timothy F. Geithner, the AESG fosters the exchange of economic policy ideas and seeks to clarify the lines of debate on emerging economic issues while promoting bipartisan relationship-building among current and future generations of policy leaders in Washington.