Chapter 4

Achieving Energy Dominance to Power American Prosperity

The United States has vast energy resources and the extensive technical expertise to produce the energy needed by its increasingly high-tech economy. But prior policies have prevented the United States from capitalizing on these comparative advantages. For much of the last two decades, U.S. energy policy has been driven by the climate agenda, with a strong focus on transitioning from conventional energy sources on which the country has relied for over a century—petroleum, natural gas, and coal—to new, less-carbon-intensive energy sources that are at this point less reliable—most notably, solar and wind power (U.S Energy Information Administration 2011, 2014).

This focus on renewables has exposed Americans to higher energy costs and has created national security threats from adversarial suppliers of key energy commodities and equipment. The reality is that the United States—and the world—will continue to rely on conventional energy sources for decades to come and that policy makers need a better framework within which to address U.S. energy needs (Yergin, Orszag, and Arya 2025; International Energy Agency 2020).

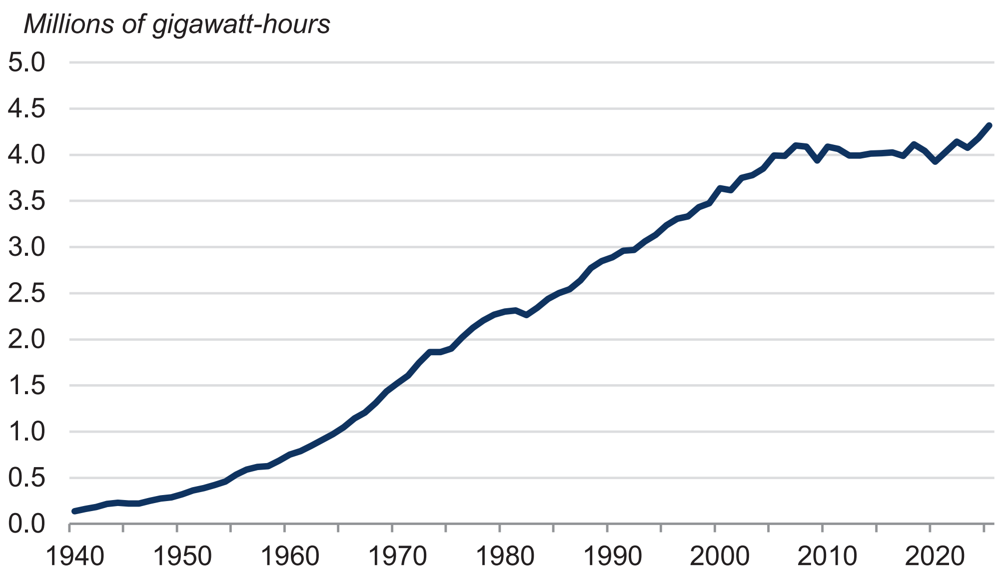
The United States has already achieved global dominance in oil and gas production, thanks to domestic technological advances facilitated by a favorable regulatory environment (MacAvoy 2000; Council of Economic Advisers 2019, 5). It became a net exporter of natural gas and petroleum in 2017 and 2020, respectively, and is the top global producer of these commodities as of the end of 2023 (U.S. Energy Information Administration 2023a, 2023b). As a result, the United States is now more integrated into global energy markets and wields more geopolitical leverage.[1] The United States can achieve a similar dominance in electricity supply by investing in domestic supply chains for energy technologies and high-value manufactured goods, including nuclear reactors, geothermal equipment, and energy storage. As the United States enters the artificial intelligence era, the Trump Administration is implementing policies that will enable the country to provide American businesses and households with secure access to affordable energy at the scale and reliability the U.S. economy needs.

A New Era of Energy Growth

After more than a decade of near-zero growth (figure 4-1), United States' demand for electricity is projected to increase by 2 percent or more a year over the next decade (Bank of America Institute 2025; International Energy Agency 2025) as the economy continues to reindustrialize, electrify, and scale up artificial intelligence (AI) integration. Demand for data center capacity and AI is already contributing meaningfully to electricity demand and economic activity in the nation. In 2025 alone, electricity demand is on track to grow by almost 3 percent (data from the Edison Electric Institute), and some analyst

[1] E.g., European countries are beginning to replace natural gas imported from Russia with U.S. liquefied natural gas (Abnett 2025).

Figure 4-1. Annual U.S. Electricity Output, 1940–2025



Sources: EEI weekly electric output data; CEA calculations.
Note: 2025 output is projected based on actual output through September 13, 2025.

estimates suggest that capital expenditures related to data centers accounted for as much as 0.5 percent of quarterly growth in gross domestic product during the first half of 2025 (Weisenthal and Alloway 2025). Table 4-1 lists over $3 trillion in recently announced investments with a component of a data center or AI.

The United States will need a substantial amount of energy to meet this growth in demand. Consider the recent growth in power demand from computing. Data center power consumption is often expressed in terms of energy per server rack—a metal frame that holds computer chips and other processing equipment. Before AI, computer chips used in traditional cloud applications consumed 3–5 kilowatts (kW) of energy per rack—the equivalent of about 3–5 homes (Greenstone 2025). Modern, high-density AI chips are substantially more power intensive and require as much as 120 kW per rack. Advanced, AI-capable chips slated for release toward the end of 2027 will consume as much as 600 kW per rack (Moss 2025). That is a 120-fold increase over simple cloud racks. Without a sufficient (and sufficiently reliable) energy supply, the U.S. economy will not be able to fully benefit from AI-induced productivity gains and other socially beneficial innovations that may follow. More importantly, if data centers become a burden on the energy grid, Americans will face higher electricity bills and lower disposable income, resulting in a drag on the economy.

The U.S. Department of Energy estimates that by 2030, electricity load will grow by about 100 gigawatts (GW), with 50 GW coming from data centers and the rest of the economy contributing the balance (U.S. Department of Energy 2025). At the end of 2024, over 2,000 GW of new generation capacity was waiting to connect to the grid (Rand et al. 2024), with about 1,600 GW anticipated to be online by 2030. However, actual completion rates of projects in the queue have been low—only 14 percent of capacity across all projects, and even lower for solar and storage projects (Rand et al. 2024, 3, 28). At historic completion rates, the current interconnection queue would result in just over 200 GW of new generation by 2030. Importantly, only about 25 GW of this would be dispatchable natural gas capacity—enough to cover only a quarter of the anticipated demand growth. The remainder would be made up of solar (96 GW), wind (32 GW), and storage (45 GW). This presents several challenges.

The first challenge is that intermittent solar and wind power need to be backed up by dispatchable sources in order for electricity to be supplied reliably. Existing grid-scale storage is limited by its scale and duration. It can complement, but cannot replace, thermal generation. The second challenge is that intermittent resources produce substantially less electricity than dispatchable generators of the same capacity because there are times when the sun does not shine and the wind does not blow. In 2024, the U.S. wind turbine fleet produced at 34.3 percent of its capacity, while solar photovoltaic panels produced at 23.2 percent (U.S. Energy Information Administration 2025b). By contrast, combined-cycle natural gas plants produced at 60.5 percent of capacity (U.S. Energy Information Administration 2025a) and nuclear plants at 90.8 percent

Table 4-1. Data Center Projects Announced Since the Start of the Second Trump Administration

Investor	Investor country	Announcement date	Products	Type of energy	Investment horizon (years)	Announced investment (billions of dollars)
OpenAI, Oracle, Softbank	United States, Japan	January 21, 2025	AI data centers and infrastructure		4	500
ADQ, Energy Capital Partners	United Arab Emirates, United States (50-50)	March 19, 2025	Energy infrastructure and power generation for data centers		-	25
United Arab Emirates	United Arab Emirates	March 21, 2025	AI infrastructure, semiconductors, energy, and manufacturing		10	1,400
NVIDIA	United States	April 14, 2025	AI chips and supercomputers		4	500
Saudi Arabia	Saudi Arabia	May 13, 2025	AI data centers, energy solutions and fund		4	600
Amazon	United States	June 4-9, 2025	Data center infrastructure	Nuclear	27	30
Blackstone, QTS	United States	July 15, 2025	Data center and energy infrastructure	Natural gas	10	25
CoreWeave	United States	July 15, 2025	Data center expansion		-	6
Google	United States	July 15, 2025	Data center and energy infrastructure		2	25
Google	United States	July 15, 2025	Hydropower repowering and new projects for data centers	Hydroelectric	20	3
Total						3,114

Sources: White House (2025b); Talen Energy (2025).

(U.S. Energy Information Administration 2025b). At these capacity factors, 200 GW of anticipated capacity additions would yield only 58 GW of actual energy.[2]

The second challenge is that the average renewable project is smaller than the average dispatchable project, which increases the logistical complexity of meeting growing energy demand. Data center developers have been approaching utilities with requests for more than 1 GW of power (see Skidmore 2025). The average solar project that entered the interconnection queue in 2024 had a nameplate capacity of 169 MW; the average storage project, 181 MW; the average onshore wind project, 242 MW; and the average natural gas project, 431 MW (Rand et al. 2024, table 11). Even if they could produce power at 100 percent of their capacity, wind and solar would be unable to provide uninterruptible power to data centers and they would still need to backed up by dispatchable resources. Given the state of current technology, the United States would not be able to sustain the growing demand for power—and certainly not the energy-intensive data center industry—without additional dispatchable thermal generation.

Since entering office in January, the Trump Administration has shifted energy priorities to ensure that the United States can meet rising power demand in a manner that does not jeopardize U.S. economic growth or national security because of dependence on imports of critical energy equipment.

The Shortcomings of Previous Policy

For the last two decades, U.S. energy policy has focused on making the nation more energy independent and addressing climate change. The former focus dates back to at least the 1970s. In 1973, in response to the Arab oil embargo and the ensuing energy crisis, President Nixon launched Project Independence, vowing by 1980 to “meet America’s energy needs from America’s own energy resources” (Nixon Foundation 2016).[3] After the September 11, 2001, terrorist attacks, President George W. Bush signed the Energy Policy Act of 2005, which made energy security synonymous with national security and highlighted the need to diversify the country’s energy base to include renewables (Bipartisan Policy Center 2012, 14–15).

The latter focus—climate change—came to the forefront of U.S. energy policy in about 2015, when the United States and 194 other parties entered into the Paris Agreement, pledging to reduce greenhouse gas (GHG) emissions in efforts to limit global warming (United Nations 2015). Since then, the U.S. government has spent hundreds of billions of dollars incentivizing investment

[2] Battery systems are assumed to provide one discharge cycle per day. Thus, the capacity factor of a 4-hour grid-scale battery would be 4/24 = 16.7 percent; see National Laboratory of the Rockies (2024).

[3] The Watergate scandal distracted policymakers from the energy agenda, and Project Independence was abandoned.

in wind and solar generation. This has led to an influx of wind and solar generation capacity (U.S. Energy Information Administration 2025c), and to a widescale proliferation of Chinese-made equipment, including solar panels and lithium grid-scale batteries (U.S. Energy Information Administration 2025g; International Energy Agency 2022, 2024; Institute for Energy Research 2024). Relying on imported energy components jeopardizes the energy independence agenda, while relying on Chinese energy equipment creates a national security threat. Today, the United States is more dependent on intermittent power than it has been in at least a century, and this has exacerbated higher energy costs and led to reliability challenges for the U.S. power grid (U.S. Energy Information Administration 2024b; Wolverton, Shadbegian, and Gray 2022).

The Cost of the Energy Transition

Despite the fact that the United States has spent hundreds of billions of dollars incentivizing renewable energy investment (Lazzari 2008, 10, 18), electricity has not become more affordable for Americans. The average residential electricity price rose at the rate of inflation between 2013 and 2022, and faster since then (U.S. Energy Information Administration 2024a, 2025d). Behind the average, however, is a large amount of State- and sector-level variation. Residential prices have grown the most (Wiser, Barbose, et al. 2025, 15, 16). Real (inflation-adjusted) prices increased substantially in some States and declined in others (Wiser, Barbose, et al. 2025, 21). The messaging about renewables has consistently been that more renewables will lead to lower electricity prices because wind and sunlight are free. In theory, zero fuel costs should translate into lower generation costs and pass through to consumers in the form of lower electricity prices. But there are two problems with this argument.

First, a renewable generator does not produce as much electricity as a dispatchable generator of the same capacity because, in addition to maintenance-related downtime, solar and wind generators produce no energy when there is no sun or wind. Because renewables operate at lower capacity factors than dispatchable generation (see above), an increasing share of intermittent renewables means that fewer actual MWs are available to the grid, increasing the need for redundancies like grid-scale storage and dispatchable backup generation. This duplicates costs.

Second, "zero cost of fuel" is a generation-side argument that ignores the transmission-and-distribution (T&D) side of power markets. To understand why electricity prices have been rising, we need to understand how electricity markets function.

The U.S. grid was originally designed to generate electricity at large, dispatchable power plants and to carry it along wires to consumers. Most generators in the United States operate in a competitive environment (Borenstein and Bushnell 2015), with the lowest-cost generators being dispatched ahead of higher-cost ones.[4] T&D utilities buy electricity from generators and send it via power lines to consumers. They also invest in maintaining and modernizing power lines and other grid components and in building new transmission and distribution infrastructure. Power lines and other supporting grid infrastructure are considered to be a natural monopoly and regulators guarantee T&D companies a certain rate of return on the capital that these companies invest in the grid. In a competitive generation market, firms increase revenues by reducing costs. But in a regulated T&D market, revenues are dictated by the policies of regulators. Since regulators guarantee T&D companies a return on their grid investment, companies face incentives to "empire-build"—that is, invest as much as possible without necessarily considering the cost-effectiveness of the money spent (e.g., Dunkle Werner and Jarvis 2025).

Now consider what happens when renewables start to make up a larger share of generation. Since wind and sunlight are indeed free, generation costs fall. However, much of the existing (aging) grid infrastructure was designed to efficiently handle one-way power flows. Adding renewables and batteries to the grid introduces multidirectional electricity flows and requires modern grid infrastructure that is able to handle such flows. Renewables also increase supply volatility (e.g., from changing wind patterns or cloud cover) and fluctuations in frequency and voltage, making it more challenging to keep the grid balanced at all times.[5] All this means that, on average, more aggressive renewable integration results in particularly large increases in grid costs (U.S. Energy Information Administration 2024c). And higher grid costs result in higher T&D expenses, which regulators pass down to consumers in the form of higher electricity prices. Other idiosyncratic factors have also played an important role in rising electricity costs, including recovery costs from wildfires in California and hurricanes in Florida, scarcity of important components like gas turbines and power transformers, and global geopolitics, like the upward pressure that the Russia-Ukraine war has put on natural gas prices. These factors have caused electricity prices to change at different rates in different parts of the country, with Californians seeing by far the largest price increases (Wiser, O'Shaughnessy, et al. 2025, 4).

Research shows that on average, T&D costs in the United States have been rising faster than generation costs have been falling, leaving consumers with higher electricity bills (Wolverton, Shadbegian, and Gray 2022). Utilities'

[4] Some parts of the country still have vertically integrated power markets with limited or no competition among generators, but the vast majority of the U.S. population lives in regions where generators compete on price.

[5] Investigations revealed that the widespread power outage that occurred on the on the Iberian Peninsula on April 18, 2025, was caused by unusually large voltage oscillations (North American Electric Reliability Corp. 2025b). Although the investigations did not directly blame renewable energy for the blackout, having a high share of renewables online increases the chance of voltage and frequency imbalances. See, e.g., Barth et al. 2024, 5–6, table 3, 17.

spending on T&D has increased more than 2.5 times since 2003, from less than $30 billion a year to nearly $80 billion (U.S. Energy Information Administration 2024b), and this spending is being passed on to consumers through rate increases. Electric utilities requested $13 billion in rate increases between 2013 and 2015, and $39 billion between 2022 and 2024 (U.S. Energy Information Administration 2024b). Recent academic research shows that, across most of the United States, residential electricity prices are higher than the social marginal cost (SMC) of electricity (Borenstein and Bushnell 2022, 80).[6] The SMC is the cost that includes the negative effects of pollution and other environmental externalities associated with electricity generation, and represents the socially optimal price of electricity. Prices above or below the SMC distort consumption decisions, resulting in lost economic benefits. In California—the nation's leader in solar power generation—retail electricity prices are several times higher than their SMC (Borenstein, Fowlie, and Sallee 2022, 4).

Market and Regulatory Challenges and Solutions

In order to restore the security, reliability, and affordability of the U.S. energy supply, the Trump Administration has taken executive and legislative actions to incentivize investment in reliable, dispatchable generation; eliminate burdensome regulations; streamline permitting and approvals for energy infrastructure projects; and invest in domestic supply chains to reduce import dependence and the national security concerns that come with that dependence (White House 2025a; U.S. Congress 2025). Since the start of the Administration, companies and governments have pledged over $1 trillion in U.S. energy-related spending (see table 4-2) (White House 2025b). What follows is a discussion of specific energy market challenges and the Administration's formulated solutions to these challenges.

Project Approvals Are Cumbersome and Slow

Most energy infrastructure projects face long permitting and approval timelines. All projects with a Federal nexus (those located on Federal lands, receiving Federal funds, etc.) must go through a review mandated by the National Environmental Policy Act (NEPA). This review assesses the scope of a project's environmental damage and creates a mitigation and remediation plan (U.S. Environmental Protection Agency 2025a). In 2024, a NEPA review took more than two years to complete, prolonging the completion times of many energy and infrastructure projects (Council on Environmental Quality 2025, 1,3,5).

[6] The research discussed here is based on data from 2014 to 2016. Electricity prices have increased since then, and so has renewable integration. More renewable generation should have lowered the SMC, which suggests that the gap between the SMC and prices has only grown.

Table 4-2. Energy-Specific Investment Pledged Since the Start of the Second Trump Administration

Investor	Investing country	Announcement date	Products	Investment horizon (years)	Investment (billions of dollars)
GE Vernova	United States	January 29, 2025	Grid equipment manufacturing expansion	2	0.10
Clarios	United States	March 3, 2025	Energy storage and battery production	10	6.00
VentureGlobal	United States	March 6, 2025	Expansion of LNG export facility		18.00
ADQ, Energy Capital Partners	United Arab Emirates/United States	March 19, 2025	Energy infrastructure and power generation for data centers		25.00
Schneider Electric	France	March 25, 2025	Energy infrastructure	2	0.70
Saudi Arabia	Saudi Arabia	May 13, 2025	AI data centers, energy solutions and fund		20.50
Qatar Investment Authority	Qatar	May 14, 2025	Golden Pass LNG and other energy projects	10	-
Amazon	United States	June 4-9, 2025	Data center infrastructure, in part powered by nuclear	27	-
JERA	Japan	June 12, 2025	LNG purchases	20	200.00
Mitsubishi	Japan	June 20, 2025	Solar power generation	3	3.90
Blackstone, QTS	United States	July 15, 2025	Data center and energy infrastructure		-
Google	United States	July 15, 2025	Hydropower repowering and new projects for data centers	20	3.00
Anthropic	United States	July 15, 2025	Crypto cybersecurity and energy research funding		0.00
Capital Power	Canada	July 15, 2025	Gas facility upgrade and expansion	10	3.00
FirstEnergy	United States	July 15, 2025	Grid expansion and apprenticeship program	4	28.00
TC Energy	Canada	July 15, 2025	Natural gas pipeline modernization and maintenance	5	0.40
PPL	United States	July 15, 2025	Expanding grid capacity and modernizing transmission	3	6.80
Energy Innovation Center Infrastructure Academy	United States	July 15, 2025	Regional energy worker training facility and microgrid (natural gas)		2.10
Westinghouse	United States	July 15, 2025	10 new nuclear reactors	5	-
Homer City Redevelopment	United States	July 16, 2025	Buying natural gas for power plant	0	15.00
European Union	European Union	July 28, 2025	Purchases of US energy	3	750.00
South Korean Government	South Korea	July 31, 2025	US energy products	3.5	100.00+
Hitachi Energy	Japan	August 4, 2025	Grid infrastructure and manufacturing facilities	1	0.01
Total					1182.51

Sources: White House (2025b, 2025i); Talen Energy (2025); Open Access Government (2025); TC Energy (2025); Marcellus Drilling News (2025); PR Newswire (2025).
Note: Unless specified in source document, energy-specific portion of investment for data center projects is estimated as the average spending on power generation and transmission. Averages based on analysis by McKinsey & Company (see Noffsinger 2025, Exhibit 2).

The Trump Administration has carried out a substantial overhaul of NEPA. It put Federal agencies in charge of streamlining and coordinating reviews, and expediting approvals (*Federal Register* 2025, 10613). Under the national energy emergency declaration, the Administration has compressed the timeline for NEPA reviews from two years to 28 days and 14 days for projects with and without a significant environmental impact, respectively (U.S. Environmental Protection Agency 2025b). Larger and more complex energy infrastructure projects, like pipelines and power grids, face particularly long approval timelines because they may fall under the jurisdiction of multiple agencies or require more rigorous studies (Council on Environmental Quality 2025, 5–6).

Regulatory overhaul will make it easier to construct needed infrastructure and solve the "trapped energy" problem. In Texas' Permian Basin, for example, natural gas prices at the Waha hub often turn negative because a lack of pipelines keeps produced gas from getting to market (Disavino 2025). At the same time, during extreme winter weather, New York and New England resort to using old coal- and oil-based peaking plants to meet electricity demand because the lack of pipeline capacity does not allow enough natural gas to reach the regions' gas generators (North American Electric Reliability Corp. 2025a; U.S. Energy Information Administration 2025e). Better connecting natural gas production sites with large power demand markets will benefit both producers and consumers by helping to keep gas production profitable while reducing electricity costs.

The Nuclear Energy Industry Needs a Reboot

The Trump Administration has overhauled the Nuclear Regulatory Commission and has reduced approval times for new nuclear reactors from over one decade to one year (White House 2025c, 2025d, 2025e, 2025f). This overhaul, in combination with executive actions that have reprioritized baseload generation, has led utilities to embark on restarting nuclear reactors that were in early stages of the decommissioning process (Crownhart 2024; Talen Energy 2025). Increased interest in nuclear power from data center developers and other large loads is already helping to increase the amount of clean baseload generation on (and off) the grid and to ensure that the United States remains at the forefront of the global AI race. Further technological and commercial developments in small modular reactor designs may also help advance the U.S. nuclear industry, both at home and abroad.

Connecting a New Generation to the Grid Is Slow

The process of connecting new electricity generation projects to the grid is another area in which projects are experiencing long waiting times and which the Trump Administration is streamlining. To connect to the grid, all new power generation projects must follow an interconnection queue. While in the queue, projects undergo impact studies to figure out what grid upgrades or transmission equipment is needed before connecting a new project to power lines, and how much the needed upgrades and equipment will cost.

The queue is long, with a median wait of three years (Rand et al. 2024). Generous renewable tax credits have substantially extended the length of the queue in recent years. The Inflation Reduction Act of 2022 (IRA), for example, led to a massive influx of solar projects into the queue. At the end of 2024, over 80 percent of all generation projects in the queue were solar and storage, compared with about 14 percent in 2014 (Rand et al. 2024). As noted earlier in this chapter, renewable energy and hybrid projects (renewables + storage) are typically smaller and more complex than conventional generation (Rand et al. 2024, table 11). They require more advanced studies and costly grid upgrades, which delays interconnection. Because the queue is long, and all new projects have to wait in line, project developers get in line as soon as they think they have a project. This overwhelms the resources that grid operators have to process projects, further adding to the backlog. Most projects end up not being built. The historic completion rate has been about 14 percent in terms of capacity.

The Biden Administration sought to reduce the interconnection queue in 2023 by issuing Federal Energy Regulatory Commission (FERC) Order 2023. The order requires projects to be at a more advanced stage before entering the queue; pay larger deposits to enter the queue; and pay penalties for not meeting study deadlines or withdrawing from the queue (FERC 2023). It also reorders the queue based on readiness status, rather than entrance date (FERC 2023). These regulatory changes should prevent the most speculative projects from queueing and expedite approvals. The bigger impact on the backlog, however, will come from the exit of renewable projects that are no longer economically feasible under the provisions of the One Big Beautiful Bill Act of 2025 (OBBBA), which President Trump signed into law on July 4, 2025. The OBBBA phases out renewable energy tax credits by 2028, thereby disincentivizing renewable developers from pursuing marginally economic projects and reducing taxpayers' costs of subsidizing renewable electricity (FERC 2023).

To further speed up capacity additions, the U.S. House of Representatives has passed a bill instructing FERC to prioritize dispatchable projects that are already in the interconnection queue (FERC 2023). Several regions are either already doing this or are revising processes and introducing legislation that would do this (New York ISO 2025, 14–15). For example, in May 2025 PJM identified 51 existing and new projects to prioritize in the queue, all of which are dispatchable technologies (PJM 2025).

Domestic Production Capacity of Critical Equipment Is Insufficient to Meet Demand

The long wait for necessary equipment is also limiting near-term investment in generation capacity and grid infrastructure. Dispatchable power plants planned to be constructed before 2030 are nearly all natural gas plants (U.S. Energy Information Administration 2025h), but delivery timelines for natural gas turbines are currently between three and five years because limited global manufacturing capacity is unable to keep up with a recent spike in demand. For voltage transformers, the bulk of which are imported (Thomas, Boucher, and Medrek-Laske 2025), the wait is between two and four years (Norton Rose Fulbright 2025; Anderson 2025). To maintain sufficient generation in the short term, the Trump Administration has delayed the retirement of existing power plants in regions that are particularly vulnerable to generation shortfalls (White House 2025g). To address the longer-term need for domestic component availability, the Trump Administration has called on industry participants to expand manufacturing capacity, reduce the backlog of orders, and speed up deliveries. The industry's response has been notable. For example, at the end of January 2025, GE Vernova committed to invest $600 million to expand its manufacturing of natural gas turbines and electrical components (GE Vernova 2025); and in September 2025, Hitachi announced a $1 billion investment in manufacturing capacity for critical grid components (Hitachi 2025), while ABB announced a $110 investment to expand manufacturing of circuit breakers and switching devices (ABB 2025).

State Policies Often Conflict with Federal Priorities

Another challenge is posed by State policies, which sometimes conflict with Federal policy priorities. U.S. States can put in place their own environmental laws, as long as the protections they provide are at least as strict as Federal protections. Some States have put in place strict rules that were intended to improve environmental outcomes, but that have also meaningfully increased the cost of living for residents. President Trump's Executive Order on State overreach put a spotlight on burdensome State-level policies with the intention of mitigating their worst effects (White House 2025h).

New York and California are two examples of States with burdensome energy policies. California's environmental laws and regulations—the strictest in the nation—have raised the State's housing construction costs, along with gasoline, electricity, and food prices. For example, retail electricity prices in California "are two to three times higher than social marginal cost (SMC), which is defined as the going-forward cost to the utility of providing additional electricity to an existing customer, inclusive of pollution costs" (Borenstein, Fowlie, and Sallee 2022, 4) Since the start of this century, California has achieved sizable reductions in power sector GHG emissions (about 40 percent), but the transportation sector remains the State's top polluter (California Air Resources Board 2024, 11). To address transportation emissions, California recently attempted to ban auto dealerships from selling new gasoline vehicles (see box 4-1 for a detailed discussion)—a move that President Trump, along with the U.S. Congress, subsequently blocked via the Congressional Review Act.[7] The ban on new gasoline vehicles would have reduced consumer choice and substantially increased the price of car ownership for its residents. Also see box 4-2 on California.

Lawmakers in the State of New York have also put in place costly environmental regulations, including a ban on fossil fuels in all new buildings (the All-Electric Buildings Law) that was set to take effect on January 1, 2026 (New York Assembly). The State also has a history of denying approvals to build new natural gas pipelines (New York Public Interest Group 2025; Maldonado 2025), which have left the State with insufficient fuel for power generation during peak winter cold (North American Electric Reliability Corp. 2025a). Governor Hochul recently reversed stance on both of these policies, approving an undersea natural gas pipeline and pausing implementation of the All-Electric Buildings Law (Zanger 2025). Examples like this highlight the costs that policymakers inadvertently impose on their constituents when they ignore the constituents' preferences and the underlying structural parameters in the market they are trying to regulate (Holland, Mansur, and Yates 2021, 338).

Conclusion

Since the start of his second Administration, President Trump has brought the focus of energy policy back to domestic resources, technologies, and expertise. Without a sufficient, reliable, and affordable energy supply, Americans will not be able to benefit from economic growth and an improved standard of living. However, policymakers must also consider other important constraints, including national security, when crafting policies for a sector that underpins the U.S. economy. Implementing policies that reduce market distortions and regulatory burdens, as the OBBBA and many of the Trump Administration's executive actions have done, is already attracting investment to the energy sector's highest-value commodities and technologies. Pairing such policies with supply chain and human capital development will help shield the United States from certain foreign threats and dependencies, and ensure that the United States can deliver its energy needs in a safe and secure manner.

[7] For California's Advanced Clean Cars II (ACCII) regulations, see California Air Resources Board, n.d. Sixteen other States and Washington, DC, have adopted some variation of ACCII. See U.S. Department of Energy, n.d.

Box 4-1. Local Policies Do Not Solve Global Problems

The early focus of U.S. environmental policy was on reducing air and water pollution that caused hazards to human health (Nixon 1970). As time went on, and the most serious pollution-related health hazards were eliminated, U.S. policy shifted focus to reducing global greenhouse gas (GHG) emissions. The inherent challenge with this approach is that the United States cannot meaningfully alter global GHG emissions. As a result, the United States bears heavy costs through government-driven decarbonization efforts without being able to capture a meaningful share of the potential benefits of such actions. Canada and Mexico also benefit from the United States' decarbonization efforts, regardless of whether they reduce their own carbon emissions. So do other countries. The United States and the European Union have been spending large sums subsidizing low-carbon electricity technologies in order to reduce GHG emissions. The EU, for example, projected spending €662 billion on climate goals between 2021 and 2027 (European Commission n.d.), while the United States' Inflation Reduction Act (IRA) devoted an estimated $1 trillion to climate projects between 2023 and 2032 (University of Pennsylvania 2023). Yet, emissions in other parts of the world have been growing faster, and annual global energy-related emissions in 2024 set a record high (International Energy Agency 2025b).

Over the last 20 years, the United States has achieved sizable emissions reductions (Gaffney, King, and Larsen 2025). In large part, these reductions are due to the shift toward natural gas use in power generation, with renewables playing a smaller role (U.S. Energy Information Administration 2021). Because of diminishing returns, it is becoming more costly and challenging to reduce emissions beyond what the United States has already achieved. The cost of marginal abatement in the United States is high relative to much of the rest of the world.

At the end of 2023, U.S. GHG emissions were 16 percent lower than in 2005 (EDGAR 2024). China's emissions, by contrast, increased by 95 percent over the same period. Cumulatively, since 2005, the United States has decreased its emissions by 1,163 million tons of CO_2 equivalent (Mt CO_2eq) while China has increased its emissions by 7,753 Mt CO_2eq. China's increase in emissions over this time has been three times larger than the aggregate emissions reductions in the United States and the 27 EU member countries, and Chinese emissions continue to rise. Although China pledged that its CO_2 emissions will peak before 2030 (Ministry of Ecology and Environment 2022), it is not clear when the peak will actually occur. Assuming China's emissions do peak by 2030 and that the subsequent emissions decline will mirror that of the United States, it would take about 6 years for China to offset 25 years of U.S. efforts to get to net-zero.

These calculations do not account for rising emissions in other parts of the world. In India, where coal fuels nearly three-quarters of all electricity needs, CO_2 emissions have more than doubled since 2005, making the country the world's third-largest emitter (International Energy Agency n.d.). India now has the largest population in the world, and it is young (Silver, Huang, and Clancy 2023). India's economy is also outpacing China's, which means that India's emissions will continue to rise.

Thus, in the context of voluntary climate commitments, unilateral domestic efforts by the United States and other Western nations have fallen far short of their stated goal. By using domestic policy levers to address the global climate problem, policymakers have been ignoring both the free-riding challenges embedded in GHG abatement and the concept of diminishing returns, resulting in energy and environmental policies that increase the cost of energy, and the cost of living more broadly, for Americans.

Consider the cost of reducing emissions under the Inflation Reduction Act. The IRA made an estimated $1.045 trillion in Federal funding available to climate-related projects (University of Pennsylvania 2023), but, despite all the money involved, it was set to deliver relatively modest incremental reductions in GHG emissions (Larsen et al. 2022, figures 1 and 3). Researchers estimated that U.S. GHG emissions in 2030 would be 7–8 percentage points lower under the IRA than they would have been under pre-IRA policy—a reduction of 439-660 million metric tons of CO_2-equivalent (Larsen et al. 2022, figures 1 and 3). This translates into an emissions reduction cost of roughly $1,600 to $2,400 per ton of emissions—an order of magnitude larger than the Biden Administration's adopted social cost of carbon of $204 per metric ton of CO_2 (for 2023).

To an average American, the cost of not being able to keep the lights on is arguably greater than the negative externality from an extra ton of CO_2 emissions. A recent study estimates the cost of a one-day electricity outage for a household in Illinois to be between $458 and $648 (Wing et al. 2025, table 2), with region-wide losses in gross domestic product amounting to as much as $2.2 billion (Wing et al. 2025, table 4). Because no electricity is generated during an outage, there are no associated emissions—an outage is a forced emissions reduction. Given the average emissions intensity of U.S. electricity generation, reducing emissions by denying people access to electricity comes at an implicit average cost per unit of abatement of over $50,000 per metric ton of CO_2 for households and over $60,000 per ton of CO_2 for the regional economy. This makes the importance of energy to Americans and the U.S. economy patently clear.

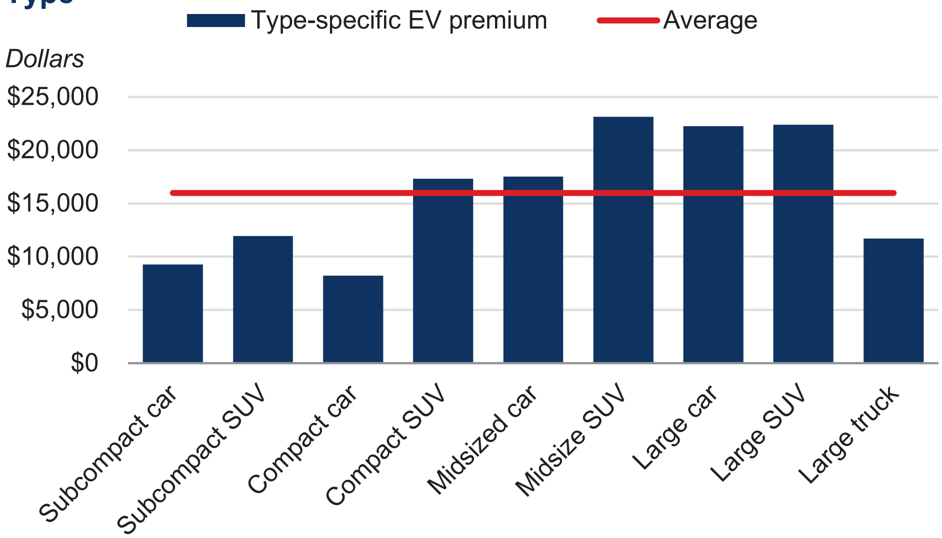
Box 4-2. The Costs of California's Green Mandates

In June 2025, President Trump, along with the U.S. Congress, ended California's effort to phase out gasoline vehicles by revoking three waivers granted to the State by the U.S. EPA under the Biden Administration (Yamashita and Wholf 2025). The waivers allowed California to implement these three rules:

- The Advanced Clean Cars II (ACCII) rule, which required all new passenger vehicles sold in California to be zero-emission—electric, plug-in hybrid, and fuel cell—by 2035 (California Air Resources Board n.d.).
- The Advanced Clean Trucks rule, which required an increasing share of all medium- and heavy-duty trucks sold in California to be zero-emission (California Air Resources Board 2023).
- The Heavy-Duty Low NOx (Omnibus) regulation, which required heavy-duty vehicles to comply with strict nitrogen oxide (NOx) emissions standards. These rules would have raised the cost of vehicle ownership for California residents by reducing available vehicle choice and raising the price of options that remained available. They would have also put added stress to California's power grid, and increased the cost of doing business for California's firms by raising fleet ownership and transportation costs. To the extent that manufacturers impose uniform standards, like NOx regulations, across all their vehicles because it can be cheaper than varying production standards across States, these costs would have risen not only for Californians but all Americans.

Electric vehicles, on average, sell for higher prices than their internal combustion engine counterparts across all vehicle classes (see figure 4-i). In 2024, the average electric vehicle (EV) premium across

Figure 4-i. Average Premium for Electric Vehicles, by Vehicle Type



Sources: Edmunds.com; CEA calculations.
Note: EV = electric vehicle; SUV = sport-utility vehicle.

all vehicle types exceeded $15,000. Requiring all new vehicle sales to be zero-emissions, therefore, creates a tax on new vehicles. The CEA's analysis shows that between 2026 and 2035, California's ACCII rule would have substantially increased upfront vehicle purchase costs for Californians, resulting in a $70 billion loss in consumer surpluses (or more than $5,000 per household). It would have also made cars less affordable and prevented some car purchases from taking place altogether. Using existing estimates of cross-price elasticity of demand between electric and internal combustion vehicles (an elasticity of 1.6–2.0; Sheldon and Dua 2019) and adjusting by California's share of the U.S. auto market (12–12.6 percent, for both total sales and new vehicle registrations; National Automobile Dealers Association 2024a, 2024b), the resulting deadweight loss to California is estimated to be $21.6 billion.

There are benefits from alleviating excess strain on the grid. A higher share of electric vehicles requires a more resilient grid with more dispatchable baseload generation. Since 2021, California's power generation capacity has increased by 60 percent. Dispatchable generation, however, has risen by only 11 percent (California Energy Commission n.d.) The largest increase in capacity has come from solar photovoltaic panels. As Spain and Portugal's recent blackout showed, a high share of intermittent renewables creates operational challenges for the grid, increasing the potential for grid failure (Jopson 2025). California's intent to ban the sale of new gasoline vehicles and to power a higher share of electric vehicles with solar energy would have increased the potential for unstable grid conditions and would have required costly redundancies. The cost of putting these redundancies in place would, in turn, have raised the price of electricity for California residents, who already face some of the highest residential electricity prices in the continental United States (U.S. Energy Information Administration 2025f).

The Public Advocate's Office of California estimated in 2023 that it would cost the State $26 billion to upgrade its power distribution system "to meet California's transportation electrification goals" (Public Advocate's Office 2023). Not all this investment is avoided by revoking ACCII. After all, EV sales have been strong in California (California New Car Dealers Association 2025, 2). But, by forcing a faster EV penetration rate, ACCII requirements would have undoubtedly led to higher grid investment requirements. The $26 billion in estimated distribution upgrades does not include the cost of taxation or addressing potential challenges associated with a high share of intermittent supply. If grid upgrades are paid for by tax revenues, raising $26 billion in taxes could cost consumer $35.9 billion because of the distortionary effect that taxes have on behavior (Saez, Slemrod, and Giertz 2012, 8–9). Even assuming that only half the estimated distribution investment is attributed to ACCII, total investment requirements to make California's grid sufficiently well-supplied and resilient to high EV charging loads would likely have been in the tens of billions of dollars (table 4-i).

Table 4-i. Annual Costs of California's Advanced Clean Cars II Rule

		Assuming EV premium declines linearly to zero by 2035			Assuming EV premium declines consistent with historic trend		
Model year	*ZEV/PHEV requirement (%)*	*Average EV premium (dollars)*	*Annual cost to consumers (millions of dollars)*	*Cost per household (dollars)*	*Average EV premium (dollars)*	*Annual cost to consumers (millions of dollars)*	*Cost per household (dollars)*
2026	35	15,970	9,610	715	15,970	9,610	715
2027	43	14,196	10,494	779	12,900	9,537	708
2028	51	12,421	10,891	806	10,420	9,136	676
2029	59	10,647	10,799	797	8,417	8,538	630
2030	68	8,872	10,372	763	6,799	7,948	585
2031	76	7,098	9,274	680	5,492	7,176	526
2032	82	5,323	7,505	549	4,436	6,254	457
2033	88	3,549	5,369	391	3,583	5,421	395
2034	94	1,774	2,868	208	2,894	4,678	340
2035	100	0	0	0	2,338	4,020	291
Total			77,183	5,690		72,317	5,324

Sources: California Air Resources Board; Edmunds.com; Census.gov; California Department of Finance; CEA calculations.
Note: Totals may differ due to rounding. EV = electric vehicle; ZEV = zero-emissions vehicle; PHEV = plug-in hybrid electric vehicle.