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Powering Intelligence

Meeting AI's energy needs in a changing electricity landscape

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March 2025

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Introduction

The electric grid is one of the most critical pieces of infrastructure underpinning modern life, yet it faces growing threats from increased demand, regulatory constraints, and changing energy sources. In recent years, regulatory mandates have hastened the shutdown of reliable on-demand power sources, particularly coal and nuclear plants, in favor of intermittent renewable energy sources like wind and solar. Overreliance on these variable resources has left the grid vulnerable to instability and potential blackouts. This challenge is compounded by aging infrastructure and surging electricity demand from industrial growth, electrification, and energy-intensive technologies such as artificial intelligence (AI).

The North American Electric Reliability Corporation's (NERC) 2024 Long-Term Reliability Assessment underscores the urgency of these reliability risks. It warns that resource adequacy challenges are mounting, with reserve margins projected to fall below required levels in 18 of 20 regions by 2034.[1] Dispatchable resources that can be turned on or off to meet electricity demand—chiefly coal, natural gas, and nuclear power—are being retired, putting the reliability of the grid increasingly at risk. According to that report, "The lack of dispatchable resources and diverse generator fuel types in the interconnection processes makes the future resource mix look alarmingly unreliable."[2]

Unlike coal and natural gas plants, solar and wind resources are weather-dependent. This variability increases the likelihood of supply shortfalls during critical periods. Another challenge to grid stability is the closure of power plants. Since 2023, over 8 gigawatts (GW) of coal-fired generation has been retired[3] and a further 79 GW of fossil-fired and nuclear generators are anticipated to retire through 2034.[4] Contributing to closures are regulations, such as those from the Environmental Protection Agency.[5] Natural gas plants, another key source of dispatchable power, face hurdles from insufficient pipeline capacity and permitting challenges. The lack of necessary infrastructure to deliver fuel during peak periods exacerbates reliability risks, particularly in areas like New England, where natural gas delivery constraints are acute.[6]

The challenges posed by regulatory pressures on power sources are compounded by surging electricity demand. One projection from Bain Capital in October of 2024 suggests that annual energy generation will need to increase by between 7 percent and 26 percent above 2023 levels by 2028.[7] To put this in context, the largest 5-year increase in electricity generation since 2005 was 5 percent. So, the more conservative estimate of 7 percent is still significantly higher than the largest same-period jump this century.[8] In the more extreme case, a 26 percent jump would be more than 5 times larger.

Increased adoption of electric vehicles and electrified heating and cooling is one factor behind demand increases. Peak summer demand throughout much of North America is forecasted to rise by 15 percent over the next decade, with an increase of 18 percent projected in the winters.[9] AI and other data-driven technologies are another significant driver of this growth. An April 2024 estimate from Goldman Sachs projected a 15 percent compound annual growth rate rise in power demand from data centers between 2023 and 2030. This would contribute to a growth rate of about 2.4 percent compound annual growth in US power demand overall, with data centers making up about 8 percent of total US power demand by 2030.[10] The report projected that 47 GW of increased power generation capacity will be needed by 2030 to meet projections.

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1 North American Electric Reliability Corporation, "2024 Long-Term Reliability Assessment," December 2024, p. 19, https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_Long%20Term%20Reliability%20Assessment_2024.pdf.

2 North American Electric Reliability Corporation, "2024 Long-Term Reliability Assessment," p. 19.

3 North American Electric Reliability Corporation, "2024 Long-Term Reliability Assessment," p. 22.

4 North American Electric Reliability Corporation, "2024 Long-Term Reliability Assessment," p. 19.

5 Travis Fisher and Joshua Loucks, "SCOTUS Stumbles: EPA's Power Plant Rule Is Inflicting Irreparable Harm," Cato At Liberty Blog, October 24, 2024, https://www.cato.org/blog/scotus-stumbles-epas-power-plant-rule-inflicting-irreparable-harm.

6 North American Electric Reliability Corporation, "2024 Long-Term Reliability Assessment," p. 15.

7 Maeghan Rouch et al., "Utilities Must Reinvent Themselves to Harness the AI-Driven Data Center Boom," Bain & Company, October 10, 2024, https://www.bain.com/insights/utilities-must-reinvent-themselves-to-harness-the-ai-driven-data-center-boom/.

8 Maeghan Rouch et al., "Utilities Must Reinvent Themselves to Harness the AI-Driven Data Center Boom."

9 North American Electric Reliability Corporation, "2024 Long-Term Reliability Assessment," pp. 8-9.

10 Carly Davenport et al., "Generational Growth: AI, data centers and the coming US power demand surge," April 2024, p. 3, https://www.goldmansachs.com/pdfs/insights/pages/generational-growth-ai-data-centers-and-the-coming-us-power-surge/report.pdf.

Another estimate from the Electric Power Research Institute predicts electricity demand linked to AI growth in the US will lead data centers to consume up to 9 percent of the nation's total electricity generation by the decade's end. That's up from 4 percent in 2023.[11] Likewise, according to the Lawrence Berkeley National Laboratory, data centers' share of electricity use is projected to rise to approximately 6.7 percent to 12 percent by 2028.[12] Behind these increases are developments at the state level. In the Carolinas, for example, utility companies project that AI-driven demand will cause electricity load growth to be eight times higher by 2030. To meet this demand, the state is considering additional natural gas plants.[13]

This growing demand is pushing the grid to its limits, particularly during extreme weather events. States like Texas and California are increasingly reliant on variable energy resources, leaving them exposed to the danger of prolonged power outages during winter storms or summer heat waves. In Texas, peak winter load periods lasting up to 48 hours present significant challenges for a resource mix increasingly weighted toward solar and wind.[14] Without sufficient on-demand power sources to provide backup during these critical periods, the risk of blackouts and grid failures continues to rise.

Data center growth

Upon taking office, President Donald Trump declared a national energy emergency.[15] In a subsequent speech, he linked the energy emergency with the need to build power plants to support AI.[16] A clear implication is that the nation's emergency is tied to the stability of its electric grid.

Since the early 2000s, US power demand has grown only very gradually year over year and has even decreased in some years.[17] For example, the US used 4,094 Terawatt hours (TWh) of electricity in 2014, but only 4,078 TWh in 2015.[18] This trend is no longer expected to continue. The energy demands of AI are expected to be large, necessitating major increases in US energy production. In the next several years, demand is projected to rise rapidly in large part because of this. Estimates of the magnitude of the increase vary. But much of the increase will come from data centers.

There are a significant number of data centers already planned and under construction in the United States right now. According to analysis by the Energy Policy Research Foundation, there are 139 data centers under construction and a further 268 planned. The data centers that are already under construction are projected to require 7,543 megawatts (MWs) of power and the planned data centers will require another 11,727 MWs. (see tables 1 and 2).[19]

[11] Electric Power Research Institute, "Powering Intelligence: Analyzing Artificial Intelligence and Data Center Energy Consumption," 2024, p. 5, https://www.epri.com/research/products/000000003002028905.

[12] Arman Shehabi et al., "2024 United States Data Center Energy Usage Report," Lawrence Berkeley National Laboratory, December 2024, pp. 5-6, https://eta-publications.lbl.gov/sites/default/files/2024-12/lbnl-2024-united-states-data-center-energy-usage-report.pdf.

[13] Jeff Young, "Is AI a Climate Hero or a Climate Villain?," *Newsweek*, September 25, 2024, https://www.newsweek.com/2024/10/04/artificial-intelligence-climate-change-environment-fossil-fuels-chatgpt-1957990.html.

[14] North American Electric Reliability Corporation, "2024 Long-Term Reliability Assessment," p. 17.

[15] President Donald J. Trump, "Declaring a National Energy Emergency," Executive Order, January 20, 2025, https://www.whitehouse.gov/presidential-actions/2025/01/declaring-a-national-energy-emergency/.

[16] Spencer Kimball, "Trump says he will approve power plants for AI through emergency declaration," CNBC, January 23, 2025, https://www.cnbc.com/2025/01/23/trump-says-he-will-approve-ai-power-plants-using-emergency-declaration.html.

[17] "Electricity end use in the United States from 1975 to 2023," Statista, accessed December 6, 2024, https://www.statista.com/statistics/201794/us-electricity-consumption-since-1975/.

[18] "Electricity explained: Electricity generation, capacity, and sales in the United States," Energy Information Administration, accessed December 6, 2024, https://www.eia.gov/energyexplained/electricity/electricity-in-the-us-generation-capacity-and-sales.php.

[19] Max Pyziur, "Chart of the Week #2024-45 US Data Centers: A Provisional Summary in Two Tables," Energy Policy Research Foundation, November 13, 2024, https://eprinc.org/wp-content/uploads/2024/11/EPRINC-Chart2024-45-DataCenterDevelopmentSummary.pdf.

Table. 1: US data centers by state

	Operational	Under construction	Planned	Total
Virginia	341	43	93	477
Texas	251	14	24	289
California	269	5	11	285
Ohio	125	14	25	164
Illinois	129	6	21	156
New York	128	1	0	129
Florida	118	2	1	121
Oregon	97	7	8	112
Arizona	77	4	14	95
Washington	88	2	1	91
Georgia	72	12	6	90
Pennsylvania	70	1	0	71
New Jersey	68	1	1	70
North Carolina	59	3	2	64
Connecticut	28	3	29	60
Minnesota	44	1	14	59
Rest of US	638	20	18	676
Total US	2602	139	268	3009

Source: Max Pyziur, "Chart of the Week #2024-45 US Data Centers: A Provisional Summary in Two Tables," November 13, 2024.
Based on analysis of data center company data.

Table. 2: Power requirements of US data centers: under construction and planned

	Under construction	Projected power needs (MWs)	Planned	Projected power needs (MWs)	Total projected power needs (MWs)
Virginia	43	1,643	93	4,701	6,344
Texas	14	2,324	24	790	3,114
Arizona	4	72	14	2,418	2,490
Georgia	12	1,196	6	300	1,496
Nevada	4	1,075	1	1,200	2,275
Connecticut	3	96	29	640	736
Illinois	6	157	21	1,032	1,189
California	5	89	11	135	224
Colorado	1	177	1	18	195
Minnesota	1	75	14	180	255
Rest of US	46	639	54	313	952
Total US	139	7,543	268	11,727	19,270

Source: Max Pyziur, "Chart of the Week #2024-45 US Data Centers: A Provisional Summary in Two Tables," November 13, 2024.
Based on analysis of data center company data.

Figure 1 shows the rise in data center investment over the last decade.[20] Investment begins to rise significantly between 2022 and 2023 and rises much more dramatically from 2023 through the beginning of 2024. These investments come largely from major technology companies as well as from investment firms. The largest tech companies, Amazon Web Services, Google, Microsoft, and Meta, are spending a combined $50 billion per quarter on investments in digital infrastructure to improve AI computing power and data center capacity.[21] In January 2025, shortly after taking office, President Trump revealed that Oracle, OpenAI, and Softbank will invest up to $500 billion over four years to bolster US AI infrastructure, with Oracle CEO Larry Ellison confirming the construction of 10 data centers in Texas under the joint "Stargate" project. OpenAI CEO Sam Altman called it "the most important project of this era."[22]

Investment in data centers is increasing rapidly in part because chips used in most AI systems are becoming more powerful and power intensive.[23] Absent significant improvements in energy efficiency, the combination of these trends will create increasing power demand from data centers in the coming years. That said, even significant energy efficiency savings might not dent the long-term energy use from AI if efficiency gains are offset by increased demand for AI.[24]

At the same time, there remains considerable uncertainty surrounding projections of AI energy use. In early 2025, Chinese company DeepSeek released its R1 model that rivals some of the most-advanced US AI models. Because the model may have been trained (essentially developed and taught) at a fraction of the cost and using far less computing power compared to some cutting-edge US models, and because it was made freely available as an open weights model (an AI model whose underlying parameters are publicly accessible), this raises questions about AI energy demand overall, as well as the ability of leading AI companies to cover their high fixed costs.[25] However, the cost of building the R1 model remains disputed.[26]

There are additional concerns about intellectual property. For example, there is a danger that foreign companies may appropriate American innovations without bearing any of the financial burden of their development, effectively benefiting from US investments in AI research and infrastructure without contributing to their costs.[27] This kind of unpredictability reinforces the need for an electricity supply system that is flexible and responsive to market signals rather than one burdened by rigid regulatory structures. If technological breakthroughs continue to shift demand patterns in unexpected ways, a market-driven approach ensures that supply can adjust dynamically, rather than being locked into outdated projections or centralized planning assumptions.

[20] "Investment in data centres in the United States, January 2014 to August 2024," International Energy Agency, updated October 18, 2024, https://www.iea.org/data-and-statistics/charts/investment-in-data-centres-in-the-united-states-january-2014-to-august-2024.

[21] Rich Miller, "In AI Arms Race, Data Centers Are the Table Stakes for Hyperscale Players," Data Center Frontier, August 8, 2024, https://www.datacenterfrontier.com/hyperscale/article/55131851/in-ai-arms-race-data-centers-are-the-table-stakes-for-hyperscale-players.

[22] Jennifer Jacobs, "Trump announces up to $500 billion in private sector AI infrastructure investment," CBS News, January 22, 2025, https://www.cbsnews.com/news/trump-announces-private-sector-ai-infrastructure-investment.

[23] Beth Kindig, "AI Power Consumption: Rapidly Becoming Mission-Critical." *Forbes*, June 20, 2024, https://www.forbes.com/sites/bethkindig/2024/06/20/ai-power-consumption-rapidly-becoming-mission-critical/.

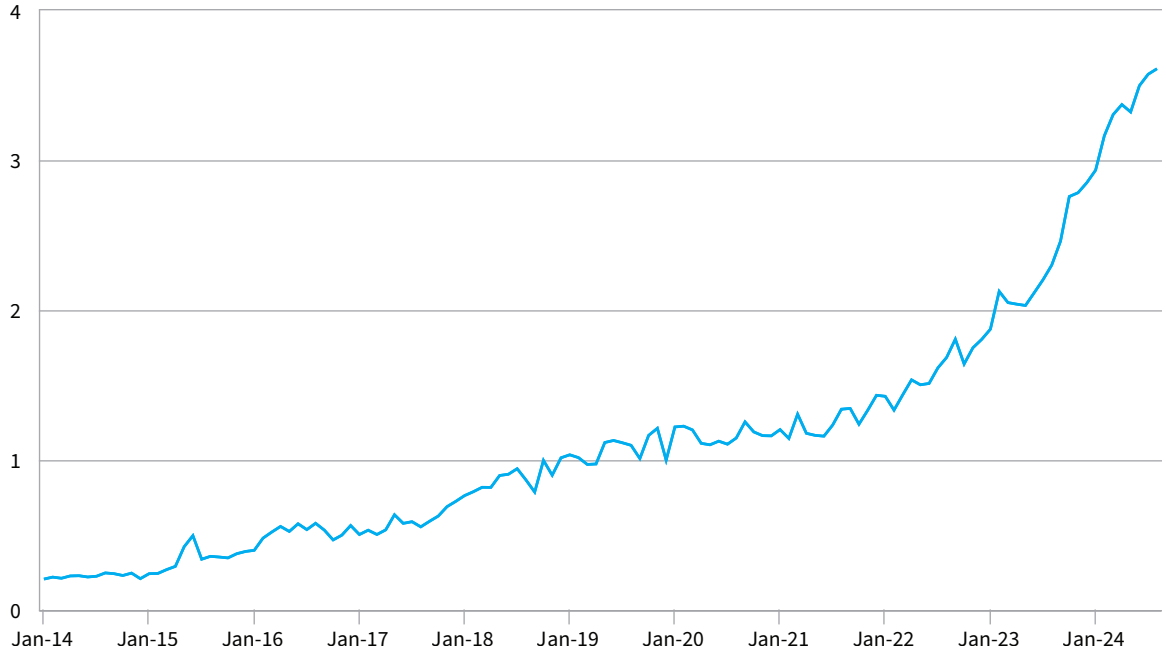
[24] The idea that efficiency improvements in resource use can lead to an overall increase in demand for that resource, rather than a decrease, is known as the Jevons Paradox.

[25] J. Robinson, "Interactive: DeepSeek AI bursts the bubble for US gas-fired power growth," S&P Global, February 3, 2025, https://www.spglobal.com/commodity-insights/en/news-research/latest-news/natural-gas/020325-interactive-us-ai-datacenters-power-natural-gas-demand; James O'Donnell, "AI's energy obsession just got a reality check," MIT Technology Review, January 28, 2025, https://www.technologyreview.com/2025/01/28/1110599/ais-energy-obsession-gets-a-reality-check/.

[26] Keoni Everington, "SemiAnalysis says DeepSeek spent more than it claims," *Taiwan News*, February 5, 2025, https://www.taiwannews.com.tw/news/6030380.

[27] Cristina Criddle and Eleanor Olcott, "OpenAI says it has evidence China's DeepSeek used its model to train competitor," *Financial Times*, January 29, 2024, https://www.ft.com/content/a0dfedd1-5255-4fa9-8ccc-1fe01de87ea6.

Fig. 1 Investment in data centers in the US, January 2014-August 2024



Note: Index, December 2019 = 1. Source: International Energy Agency: https://www.iea.org/data-and-statistics/charts/investment-in-data-centres-in-the-united-states-january-2014-to-august-2024.

The case for meeting AI energy needs

As the energy demands of AI grow, it is natural to encounter skepticism about prioritizing those needs, especially when weighed against potential environmental impacts. However, the role of the grid is not to dictate which industries deserve energy, but to efficiently supply power based on market demand, ensuring that innovation and economic growth are not constrained by artificial limitations. In short, the grid should meet consumer needs, not predetermine them.

Like AI, the crypto mining industry is one that has been criticized for its perceived high energy use.[28] Ultimately, it will be up to markets to determine which AI investments make sense and which do not. However, meeting AI's energy requirements is not just a question of profitability—it is an imperative to safeguard American security and maintain global leadership.

Fulfilling AI's energy needs is ultimately essential. There are tangible benefits AI delivers to consumers, such as faster economic growth, advancements in healthcare, smarter transportation systems, and enhanced personal convenience. Also, AI supports cybersecurity and military strategies in a national security context. There are numerous ways in which AI can benefit the environment as well. Taken together, these factors make a compelling case for building the infrastructure and energy supply necessary to fuel AI's continued development.

[28] James Broughel, John Berlau, and Ari Patinkin, *Don't Depower Crypto: Biden's Electricity Tax Would Harm Conservation, Innovation* (Competitive Enterprise Institute, January 2024), https://cei.org/wp-content/uploads/2024/01/Crypto_Energy_Use_3.pdf; Travis Fisher, "Don't Let Electricity Become the New Front in the Culture Wars," Cato At Liberty Blog, April 5, 2024, https://www.cato.org/blog/dont-let-electricity-become-new-front-culture-wars.

Consumer benefits: Generative AI has the potential to deliver transformative economic benefits,[29] adding $2.6 trillion to $4.4 trillion annually to the global economy, with even greater gains if integrated into existing software systems.[30] Key value areas include customer operations, marketing, sales, software engineering, and R&D, which collectively account for 75 percent of its impact. Industries like banking, high tech, and life sciences could see the largest benefits, with banking alone gaining up to $340 billion annually. Additionally, generative AI could significantly boost labor productivity by 0.1 percent to 0.6 percent per year through 2040, helping to offset global workforce declines and drive long-term economic growth.

AI is already increasingly embedded in everyday life, offering never-before-seen personal convenience. AI-powered language models and virtual assistants streamline everyday tasks, from managing schedules to providing instant answers to complex questions. Wearable technologies and AI assistants enable proactive health monitoring, allowing individuals to track fitness and detect potential health issues early.[31]

Autonomous vehicles (AVs) have the potential to offer numerous advantages, including significant reductions in transportation costs and increased efficiency by providing an alternative to human drivers.[32] AVs will improve safety by reducing accidents caused by human error, and optimize traffic flow to decrease congestion and travel times. AVs also expand mobility for individuals who face transportation barriers, such as older adults or those with disabilities, and can improve accessibility in underserved regions. Additionally, their integration with electric and hybrid technologies supports fuel efficiency and carbon emission reductions.

Relatedly, AI-based navigation apps optimize travel routes, helping users save time and reduce fuel consumption during commutes. AI is even helping tackle traffic jams. The city of Pittsburgh reduced travel time by 25 percent and idling time by 40 percent at locations where AI-powered traffic lights were installed.[33] In London's bus system, AI adjusts routes based on passenger demand and traffic conditions,[34] reducing emissions and empty buses on the road while improving service frequency where it's needed most.

AI is also revolutionizing healthcare by improving diagnostics and treatment. AI systems enable earlier detection of diseases such as cancer and heart conditions. For example, AI tools have been developed to identify coronary plaque buildup,[35] reducing the time before life-saving interventions can be administered. AI-driven drug discovery is accelerating the development of novel therapies, with estimates suggesting that AI could lead to the creation of 50 groundbreaking treatments over the next decade.[36] These examples represent just a small glimpse of the many transformative benefits AI is poised to deliver for the public.[37]

National security benefits: Meeting AI energy needs is not just about granting consumers access to more and better chatbots and self-driving cars. Development of AI technology brings vital security benefits that touch everything from our cyber defenses to our military preparedness. These national security benefits make AI energy use different in some respects from other types of energy use. Meeting the needs of all energy users is important, but ensuring this technology receives adequate power will be especially vital to American interests.

[29] Generative AI refers to artificial intelligence systems that can create new content, including text, images, code, music, or other media.

[30] Michael Chui et al., "The economic potential of generative AI: The next productivity frontier," McKinsey & Company, June 2023, p. 3., https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/the-economic-potential-of-generative-ai-the-next-productivity-frontier?os=icxa75gdubczxcfkgd14LVPa6h&ref=app.

[31] Adam Thierer, "AI and Public Health Series: How AI can advance medical knowledge and improve the patient experience," R Street Institute, July 9, 2024, https://www.rstreet.org/commentary/ai-and-public-health-series-how-ai-can-advance-medical-knowledge-and-improve-the-patient-experience/.

[32] Larissa Marioni, "What might be the economic implications of autonomous vehicles?" Economics Observatory, August 29, 2024, https://www.economicsobservatory.com/what-might-be-the-economic-implications-of-autonomous-vehicles.

[33] Jackie Snow, "This AI traffic system in Pittsburgh has reduced travel time by 25%," Smart Cities Dive, July 20, 2017, https://www.smartcitiesdive.com/news/this-ai-traffic-system-in-pittsburgh-has-reduced-travel-time-by-25/447494/.

[34] Fredrik Filipsson, "The Role of AI in Autonomous Public Transport," August 18, 2024, https://redresscompliance.com/ai-in-autonomous-public-transport/.

[35] Adam Thierer, "AI and Public Health Series: Part 2: How AI Can Help Tackle Major Causes of Suffering and Death," R Street Institute, August 6, 2024, https://www.rstreet.org/commentary/ai-and-public-health-series-part-2/.

[36] Adam Thierer, "AI and Public Health, Part 3: How AI Can Revolutionize Drug Discover," R Street Institute, October 15, 2024, https://www.rstreet.org/commentary/ai-and-public-health-part-3-how-ai-can-revolutionize-drug-discovery/.

[37] Nestor Maslej et al., "The AI Index 2024 Annual Report," AI Index Steering Committee, Institute for Human-Centered AI, Stanford University, Stanford, CA, April 2024. https://aiindex.stanford.edu/wp-content/uploads/2024/05/HAI_AI-Index-Report-2024.pdf.

AI systems have the potential to be both a tool for launching cyberattacks as well as a critical safeguard against them. The devastating cyberattack on the Colonial Pipeline in 2021 underscored the urgent need for stronger infrastructure protection.[38] Whether the threats originate from foreign adversaries or rogue agents, AI can play a role in scanning for cyber vulnerabilities, identifying threats to the US power grid, financial systems, or defense networks, and providing crucial advance warnings to mitigate potential harm.

AI gives our military and intelligence services a significant edge over our adversaries. AI-powered drones can now perform reconnaissance missions in dangerous territories without risking human lives.[39] AI systems can analyze satellite images in minutes that might take human analysts days to process.[40] AI helps military maintenance crews predict when aircraft parts might fail before they actually do.[41]

The cultural dimension of AI innovation is equally significant. If US-based AI language models become the foundation for global innovation, American values embedded in those models will be widely exported.[42] On the other hand, if Chinese models dominate, their values will spread, making AI a powerful tool for cultural influence, with national security implications. This competitive threat from China is made apparent by the recently released R1 model from DeepSeek AI.[43] R1 appears to have benefited from the use of ChatGPT during its training process,[44] highlighting the fragility of the US tech sector's competitive edge.

Considerable attention has been given to job displacement when it comes to AI debates, but AI development also creates thousands of high-skilled jobs in fields like cybersecurity, data science, and defense technology.[45] Building massive data centers and new sources of energy will also be major job creators, many of them blue collar. When a major AI research lab or a data center opens in an American city, it directly creates tech jobs. It also creates an ecosystem of supporting roles,[46] from security specialists to compliance experts to local businesses that serve the growing workforce. This talent pool itself becomes a national security asset, ready to tackle new threats as they emerge. These are careers that strengthen US national security by keeping critical knowledge and skills at home.

Environmental benefits: While energy use can be associated with increased emissions, AI promises some substantial benefits to the environment that often go overlooked in discussions surrounding its energy use. These benefits are worth noting because technological innovation can offset some or even most of the environmental costs associated with increased energy consumption.

AI-powered systems can monitor everything from forest fire risk to ocean temperatures. In California's redwood forests AI systems analyze data from ground sensors and satellite imagery to detect early signs of fire risk.[47] When a problem is spotted or smoke is detected, forest managers can respond before it becomes a crisis. When a fire does start, AI can be used to predict where it will spread.[48]

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[38] US Government Accountability Office, "Colonial Pipeline Cyberattack Highlights Need for Better Federal and Private-Sector Preparedness (infographic)," May 18, 2021, https://www.gao.gov/blog/colonial-pipeline-cyberattack-highlights-need-better-federal-and-private-sector-preparedness-infographic.

[39] Audrey Decker, "Meet the Air Force's secretive long-range drone that flies for days," *Defense One*, July 2, 2024, https://www.defenseone.com/technology/2024/07/meet-air-forces-secretive-long-range-drone-flies-days/397816/.

[40] Sandra Erwin, "NGA to launch $700 million program to help AI make sense of satellite images," *Space News*, September 3, 2024, https://spacenews.com/nga-to-launch-700-million-program-to-help-ai-make-sense-of-satellite-images/.

[41] Liz Martin, "The US Air Force improves aircraft readiness with AI and predictive maintenance solutions," Amazon Web Services blog, December 14, 2023, https://aws.amazon.com/blogs/publicsector/the-us-air-force-improves-aircraft-readiness-with-ai-and-predictive-maintenance-solutions/.

[42] For example, AI models trained on predominantly American text data might learn to favor individualistic over collectivist perspectives, reflecting the cultural values expressed in their training corpus.

[43] Hayden Field, "China's DeepSeek AI dethrones ChatGPT on App Store: Here's what you should know," CNCB, January 27, 2025, https://www.cnbc.com/2025/01/27/chinas-deepseek-ai-tops-chatgpt-app-store-what-you-should-know.html.

[44] Cristina Criddle and Eleanor Olcott, "OpenAI says it has evidence China's DeepSeek used its model to train competitor."

[45] Rebecca Stropoli, "A.I. Is Going to Disrupt the Labor Market. It Doesn't Have to Destroy It," *Chicago Booth Review*, November 14, 2023, https://www.chicagobooth.edu/review/ai-is-going-disrupt-labor-market-it-doesnt-have-destroy-it.

[46] Governor Gavin Newsom, "California, NVIDIA launch first-of-its-kind AI collaboration," press release, August 9, 2024, https://www.gov.ca.gov/2024/08/09/california-nvidia-launch-first-of-its-kind-ai-collaboration/.

[47] Stephanie Kanowitz, "As wildfires burn throughout the West, officials are turning to AI," *Route Fifty*, September 16, 2024, https://www.route-fifty.com/emerging-tech/2024/09/wildfires-burn-throughout-west-officials-are-turning-ai/399566/.

[48] Nina Raffio, "USC scientists use AI to predict a wildfire's next move," USC Today, July 22, 2024, https://today.usc.edu/using-ai-to-predict-wildfires/.

AI systems have other uses in forest health. They can play a role in detecting invasive species. By studying data and using sophisticated analysis methods, AI models can identify patterns associated with bark beetle infestations.[49] In our oceans and rivers, AI systems also track factors like coral reef health and changes in water quality.[50] Off the coast of Australia's Great Barrier Reef, AI-powered underwater robots help scientists identify which areas need immediate protection or restoration.[51]

AI farming systems combine data from soil sensors and improved weather prediction ability to deliver precisely the right amount of water and nutrients for each section of a field, reducing water waste while improving crop yields.[52] By improving agricultural yields, this could lead to another green revolution that saves millions from going hungry.[53] In addition, automated robots can be leveraged to plant seeds, remove weeds, or perform sorting tasks previously conducted by humans, in some cases replacing the blunt application of chemical herbicides that have environmental impacts.

In manufacturing, AI can serve the role of a highly-skilled technician, optimizing production processes. At a Tesla factory in Nevada, AI-based dynamic control systems monitor equipment, automatically adjusting heating and cooling of production spaces and equipment.[54] The system also predicts when equipment needs maintenance, preventing energy-wasting breakdowns before they occur.[55] A study by the Boston Consulting Group found that already proven uses of AI could reduce greenhouse gas emissions by 5 to 10 percent by 2030.[56] These reductions come from efficiencies AI systems uncover at each step in the production value chain.[57] Beyond this, AI is expected to speed improvements in lab-grown meat production that will reduce industrial farming emissions. And AI will facilitate improvements in carbon capture technology, as well as geoengineering solutions that draw carbon dioxide from the atmosphere.[58]

Improvements to industrial efficiency have safety implications as well. "Digital twins" are models of nuclear plant systems that can be run for the purposes of preemptively identifying safety issues.[59] Live video at nuclear plants can be evaluated using AI to find errors or address maintenance problems.[60]

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[49] Patrick Hedin, "Pest control from space with AI," Combitech, n.d., https://www.combitech.com/cases/swedish-forest-agency/; "Technological Innovations for Forest Health: AI-powered Detection of Bark Beetle Outbreaks," Collective Crunch, accessed November 1, 2024, https://www.collectivecrunch.com/news/blog-ai-powered-bark-beetle-detection/.

[50] Steve Simpson and Ben Williams, "A new AI tool to help monitor coral reef health," Google Blog, June 06, 2024, https://blog.google/outreach-initiatives/arts-culture/a-new-ai-tool-to-help-monitor-coral-reef-health/; "Monitoring ocean health with autonomous technology," Monterey Bay Aquarium Research Institute, accessed October 30, 2024, https://annualreport.mbari.org/2022/story/monitoring-ocean-health-with-autonomous-technology; Amy Jones, "Eyes on the Water – Thousands of citizen photos train AI to monitor river pollution," WRc, July 17, 2024, https://www.wrcgroup.com/headlines/corporate/thousands-of-citizen-photos-train-ai-to-monitor-river-pollution/.

[51] "Drones, AI and e-DNA keeping tabs on Great Barrier Reef and animal health," Great Barrier Reef Foundation, Media release, September 13, 2022, https://www.barrierreef.org/news/media-release/drones-ai-and-edna-keeping-tabs-on-great-barrier-reef-and-animal-health.

[52] Sam Becker, "US farms are making an urgent push into AI. It could help feed the world," BBC, March 27, 2024, https://www.bbc.com/worklife/article/20240325-artificial-intelligence-ai-us-agriculture-farming.

[53] Dario Amodei, "Machines of Loving Grace," blog post, October 2024, https://darioamodei.com/machines-of-loving-grace?s=09.

[54] Tesla, "Impact Report 2023," accessed October 30, 2024, https://www.tesla.com/impact.

[55] Teslam, "Tesla Gigafactories: Pioneering the Future of Sustainable Manufacturing," Tesla Mag, September 3, 2024, https://www.tesla-mag.com/en/tesla-gigafactories-pioneering-the-future-of-sustainable-manufacturing/.

[56] Amane Dannouni et al., "Accelerating Climate Action with AI," Boston Consulting Group, November 2023, p. 8, https://www.bcg.com/publications/2023/how-ai-can-speedup-climate-action.

[57] Charlotte Degot et al., "Reduce Carbon and Costs with the Power of AI," Boston Consulting Group, January 26, 2021, https://www.bcg.com/publications/2021/ai-to-reduce-carbon-emissions.

[58] Dario Amodei, "Machines of Loving Grace."

[59] Matthew Mittelsteadt, "AI as a Tool for Energy Abundance and Safety," Digital Spirits Newsletter, November 25, 2024, https://digitalspirits.substack.com/p/ai-as-a-tool-for-energy-abundance?publication_id=1490510&utm_campaign=email-post-title&r=3o9&utm_medium=email.

[60] John Nieman, "Can AI Keep Nuclear Plants Safe?" EE Power, September 4, 2024, https://eepower.com/tech-insights/can-ai-keep-nuclear-plants-safe/.

AI also offers benefits in terms of energy efficiency. One example is The Edge building in Amsterdam, nicknamed the "computer with a roof."[61] Its AI system manages 28,000 sensors that control everything from lighting to coffee machines. The system remembers individual employees' preferred temperature and light levels, adjusting workspace conditions for them automatically when they arrive. The lighting system features Power-over-Ethernet technology, which can reduce energy use by 80 percent relative to conventional systems.[62]

Denmark utilizes advanced AI and machine learning to manage its electricity grid. The country's transmission system operator, Energinet, employs AI tools for tasks like load forecasting and grid optimization that balance supply and demand efficiently.[63] Smart charging solutions like IntelliCharge.AI further improve energy management by adapting consumption patterns in response to energy trends and prices.[64]

AI-enabled energy distribution systems, sometimes called "virtual power plants," already manage around 4 to 8 percent of US energy capacity.[65] This is likely to grow in the future, especially in places like Texas due to the use of smart thermostats and other energy-saving devices. These will help customers and businesses save on utility bills and help utilities manage the challenges of balancing supply and demand for electricity.[66]

Businesses address changing energy needs

AI relies on data centers because training and running AI models require massive computational power, which is provided by specialized servers housed in these facilities. The largest tech companies—Microsoft, Amazon, Google, and Meta—are deeply involved in AI, both as developers of AI models and as providers of cloud computing infrastructure that powers AI applications. These companies are rapidly expanding their data centers to meet the growing energy and computing demands of AI, making them central players in both AI development and the infrastructure supporting it.

These tech companies are not sitting idly by, waiting for problems to emerge with the electricity grid as their energy use skyrockets. Rather, tech companies are well aware that their energy needs are changing and are actively doing a great deal to ensure adequate energy supply exists to serve their growing needs. Several of the largest tech companies have made deals to secure power for future data center buildouts, including by making agreements with utilities as well as with companies that are bringing new power sources online.

Many of these deals are with providers of low-carbon energy. This likely reflects both genuine concern amongst tech companies about climate change, as well as pragmatism given that public policy and regulations are forcing them in the direction of sourcing power from sources with fewer carbon dioxide emissions.

[61] Richard van Hooijdonk, "The smartest, greenest office building on earth – The Edge – is like a computer with a roof," Richard van Hooijdonk blog, n.d., https://blog.richardvanhooijdonk.com/en/the-smartest-greenest-office-building-on-earth-the-edge-is-like-a-computer-with-a-roof/.

[62] "Philips shines light on opening of the office of the future – the Edge in Amsterdam," Signify, June 25, 2015, https://www.signify.com/global/our-company/news/press-release-archive/2015/20150625-philips-shines-light-on-opening-of-the-office-of-the-future-the-edge-in-amsterdam.

[63] "Energinet + IBM: Harnessing renewable energy using AI," IBM, accessed October 30, 2024, https://mediacenter.ibm.com/media/Energinet+++IBMA+Harnessing+renewable+energy+using+AI/1_poi51i0x; Swapnil Bhartiya, "Energinet harnesses data and open source to drive the Green Energy transition," TFiR, March 28, 2024, https://tfir.io/energinet-harnesses-data-and-open-source-to-drive-the-green-energy-transition/.

[64] "About IntelliCharge.AI," IntelliCharge.AI, accessed October 30, 2024, https://www.intellicharge.ai/about.

[65] June Kim, "How virtual power plants are shaping tomorrow's energy system," MIT Technology Review, February 7, 2024, https://www.technologyreview.com/2024/02/07/1087836/how-virtual-power-plants-are-shaping-tomorrows-energy-system/; Matthew Mittelsteadt, "AI as a Tool for Energy Abundance and Safety," Digital Spirits, November 25, 2024, https://digitalspirits.substack.com/p/ai-as-a-tool-for-energy-abundance.

[66] Jeff St. John, "Google Nest spinout picks Texas for 1GW virtual power plant," Canary Media, November 19, 2024, https://www.canarymedia.com/articles/virtual-power-plants/google-nest-spinout-picks-texas-for-1gw-virtual-power-plant.

Microsoft deal: Microsoft signed a deal with Constellation Energy to reopen Unit One of the Three Mile Island Nuclear Generating Station.[67] No reactor has ever been restarted in the United States before. (Palisades is currently planned to restart before Three Mile Island.)[68] Unit one of Three Mile Island closed prematurely in 2019 after its operations were deemed uneconomical.[69] But now, with AI power demand surging, the need for that capacity is clear.

If all goes according to plan, the agreement between Microsoft and Constellation will reopen the Unit One reactor under a new name, the Crane Clean Energy Center.[70] The reactor will provide 835 megawatts of reliable power when it is brought back online in 2028.[71] Constellation Energy is unfortunately seeking federal loan guarantees for the projected $1.6 billion dollar project.[72] Although the loans will need to be repaid, the guarantees are still a form of government support for the industry. Moreover, as part of the Inflation Reduction Act of 2022, nuclear power also benefits from two tax credits that should be repealed, the production tax credit and the investment tax credit.[73] Even with this support however, Microsoft will still pay a premium for the power (likely as a way to hedge against rising prices). Over the 20 years of the fixed price agreement, Microsoft is expected to pay between $110-115 per megawatt hour (depending on the company's actual power use).[74]

This deal will bring back online a significant source of reliable power. Unfortunately, most reactors that have closed in the United States have been decommissioned to a degree that they cannot be similarly restarted.

Google/Kairos deal: Google recently signed a deal with Kairos Power. Under the agreement, Google will buy power from Kairos's first small modular reactor (SMR) expected to be online by 2030, as well as from additional reactors that are expected to come online by 2035.[75] In total, this is expected to be 500 MW of power. The Kairos SMR, called Hermes, is a molten salt cooled reactor design.[76] The demonstration reactor is currently under construction in Oak Ridge, Tennessee. Google is looking at the Kairos SMR due to nuclear power's reliability and round-the-clock availability, as well as because it produces electricity without carbon emissions.[77]

Meta deals: Meta, the parent company of Facebook, is also in the early stages of striking deals with nuclear power companies. The company has announced plans to source 1 to 4 gigawatts of nuclear power for its data centers by the early 2030s. Rather than seek out deals, Meta is asking nuclear companies to come to it, issuing nuclear energy developers a request for proposals.[78]

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67 Paige Lambermont, "Microsoft Deal to Restart Three Mile Island Could Be a Game-Changer," Real Clear Energy, October 7, 2024, https://www.realclearenergy.org/articles/2024/10/07/microsoft_deal_to_restart_three_mile_island_could_signal_a_major_change_in_energy_policy_1063507.html.

68 Paige Lambermont, "Microsoft Deal to Restart Three Mile Island Could Be a Game-Changer;" Brian Martucci, "Palisades nuclear plant restart on track for October 2025 despite NRC petition: Holtec International," Utility Dive, September 23, 2024, https://www.utilitydive.com/news/palisades-nuclear-plant-restart-on-track-for-october-2025-despite-nrc-petit/727780/.

69 "Constellation to restart Three Mile Island unit, powering Microsoft," World Nuclear News, September 20, 2024, https://www.world-nuclear-news.org/articles/constellation-to-restart-three-mile-island-unit-powering-microsoft#:~:text=The%20unit%2C%20which%20had%20enough,than%20600%20full%2Dtime%20workers.

70 Constellation Energy, "Constellation to Launch Crane Clean Energy Center, Restoring Jobs and Carbon-Free Power to The Grid," press release, September 20, 2024, https://www.constellationenergy.com/newsroom/2024/Constellation-to-Launch-Crane-Clean-Energy-Center-Restoring-Jobs-and-Carbon-Free-Power-to-The-Grid.html.

71 Constellation Energy, "Constellation to Launch Crane Clean Energy Center, Restoring Jobs and Carbon-Free Power to The Grid."

72 Evan Halper and Lisa Rein, "Three Mile Island owner seeks taxpayer backing for Microsoft AI deal," *Washington Post*, October 3, 2024, https://www.washingtonpost.com/business/2024/10/03/nuclear-microsoft-ai-constellation/.

73 Joseph C. Unger, "The Inflation Reduction Act's Investment in Nuclear Energy," Energy and Mineral Law Foundation, n.d., https://emlf.org/the-inflation-reduction-acts-investment-in-nuclear-energy/.

74 Reuters, "Microsoft may pay Constellation premium in Three Mile Island power agreement, Jefferies says," September 23, 2024, https://www.reuters.com/markets/deals/microsoft-may-pay-constellation-premium-three-mile-island-power-agreement-2024-09-23/.

75 Michael Terrell, "New nuclear clean energy agreement with Kairos Power," Google, October 14, 2024, https://blog.google/outreach-initiatives/sustainability/google-kairos-power-nuclear-energy-agreement/.

76 Neuron Bytes, "Kairos Breaks Ground for GEN IV Demonstration Reactor," August 3, 2024, https://neutronbytes.com/2024/08/03/kairos-breaks-ground-for-gen-iv-demonstration-reactor/.

77 Michael Terrell, "New nuclear clean energy agreement with Kairos Power."

78 Francisco "A.J." Camacho, "Meta joins Big Tech push for nuclear-powered data centers," *E&E News*, December 5, 2024, https://www.eenews.net/articles/meta-joins-big-tech-push-for-nuclear-powered-data-centers/.

Amazon deals: Amazon has also made several deals in the nuclear space with the goal of powering its data centers. Amazon signed a memorandum of understanding with Dominion Energy Virginia to explore developing a SMR near the North Anna Power Station, a nuclear power plant in Louisa County, Virginia.[79] This project would bring 300 MW of added power to the state.[80] Dominion estimates that demand for its power will increase by 85 percent over the course of the next 15 years.[81] This massive increase will inevitably require additional capacity to meet it.

Amazon also signed a deal with Energy Northwest, a Washington state-based utility, to develop X-energy's SMRs near the utility's Columbia Generating Station nuclear power plant. The deal would give Amazon the right to purchase power from the first four modules with a 320 MW capacity, but the site will be able to host 12 total modules.[82] The additional eight modules will produce power that both Amazon and other Northwest customers will be able to purchase.[83]

Amazon is also investing directly in X-energy, the company developing these reactors. Their investment will boost manufacturing capacity for the company to help develop its SMR equipment, with hopes of eventually developing five gigawatts of nuclear energy projects including the Dominion and Energy Northwest projects.[84]

It is worth mentioning that a colocation agreement between Talen Energy and Amazon was rejected by the Federal Energy Regulatory Commission (FERC) in a 2-1 vote in November of 2024.[85] This agreement would have increased the power available to an Amazon data center co-located with the Susquehanna nuclear power plant from 300 MW to 480 MW. It is not clear whether other colocation agreements would have similar outcomes because each involves different legal arrangements and because the power market situation varies as well.

Then-commissioner Mark Christie, who is now Chairman of FERC, said in his concurrence, "Co-location arrangements of the type presented here present an array of complicated, nuanced and multifaceted issues, which collectively could have huge ramifications for both grid reliability and consumer costs."[86] Christie has suggested FERC may view co-location agreements differently depending on whether agreements involve currently operating power sources versus power sources that are new or retiring.[87]

It is unclear as of now what FERC's decision in the Amazon/Talen Energy deal will mean for other similar planned and future projects. One clear takeaway, however, is that projects will face less regulatory risk if they bring new generation online, instead of cordoning off existing power plants for "on-site" or "behind-the-meter" use. Behind-the-meter colocation arrangements exist when technology companies arrange for power before it flows into the wider grid by building next to existing power plants and sharing their grid connection. These arrangements are somewhat controversial because putting existing power behind the meter makes less capacity available elsewhere. Regardless of how such arrangements end up being treated by regulators, it is important that policymakers do not stand in the way of productive steps to bring new power online.

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79 Courtney Mabeus-Brown, "Amazon, Dominion agree to explore nuclear development," *Virginia Business*, October 30, 2024, https://virginiabusiness.com/amazon-dominion-agree-to-explore-nuclear-development/.

80 Amazon, "Amazon signs agreements for innovative nuclear energy projects to address growing energy demands," October 16, 2024, https://www.aboutamazon.com/news/sustainability/amazon-nuclear-small-modular-reactor-net-carbon-zero.

81 Amazon, "Amazon signs agreements for innovative nuclear energy projects to address growing energy demands."

82 Energy Northwest, "Amazon and Energy Northwest announce plans to develop advanced nuclear technology in Washington," October 16, 2024, https://www.energy-northwest.com/whoweare/news-and-info/Pages/Amazon-and-Energy-Northwest-announce-plans-to-develop--advanced-nuclear-technology-in-Washington.aspx.

83 Energy Northwest, "Amazon and Energy Northwest announce plans to develop advanced nuclear technology in Washington."

84 Amazon, "Amazon signs agreements for innovative nuclear energy projects to address growing energy demands."

85 Ethan Howland, "FERC rejects interconnection pact for Talen-Amazon data center deal at nuclear plant," Utility Dive, November 4, 2024, https://www.utilitydive.com/news/ferc-interconnection-isa-talen-amazon-data-center-susquehanna-exelon/731841/.

86 Ethan Howland, "FERC rejects interconnection pact for Talen-Amazon data center deal at nuclear plant."

87 Francisco "A.J." Camacho, "What the FERC Amazon data center slapdown means for nuclear," *E&E News*, November 8, 2024, https://www.eenews.net/articles/what-the-ferc-amazon-data-center-slapdown-means-for-nuclear/.

How to meet growing energy demand

The benefits of domestic AI development are clear, and the private sector is taking action on its own to ensure adequate energy will be available to help realize those benefits in the future. There is also a strong role for public policy in ensuring grid reliability going forward. The status quo can be improved, given many existing laws already make it difficult to bring the new energy sources online that will be needed to power this technology of the future, along with America's other growing energy needs. Congress and the administration should take steps to further enable domestic energy production.

Reform the permitting process: The dramatic rise in AI-related energy demand necessitates comprehensive permitting reform to facilitate the rapid development of new energy infrastructure. While some have called for reforms focused solely on renewable energy projects or transmission lines, ideal reforms would be broad-based and technology-neutral to ensure the most efficient and reliable power continues to be available in response to increased demand for energy from all sources, including from AI.

While National Environmental Policy Act (NEPA) reform is essential to any such reform, other environmental statutes like the Clean Air Act, the Clean Water Act and the Endangered Species Act also create significant delays and regulatory uncertainty that hinder energy infrastructure development.[88] These statutes can trigger NEPA reviews themselves, creating multiple, overlapping layers of regulatory barriers. Reforming these statutes in parallel would substantially reduce the bureaucratic obstacles currently stifling energy development.

The massive scale of projected AI energy demand will likely require a variety of available generation technologies. However, given the 24-7 uninterrupted power demands of data centers, reliable baseload generation will be of most assistance. Permit streamlining for natural gas facilities, as well as gas infrastructure like pipelines, could prove especially beneficial. Even so, to the extent possible, permitting reform should avoid picking winners and losers among energy sources. Creating special permitting pathways only for certain energy sources will distort the market and potentially compromise grid reliability. In this sense, while creating narrow permitting carveouts via categorical exclusions can prove beneficial along some margins, it is no substitute for comprehensive reform, especially from Congress.

This is particularly important given the current imbalance created by the Inflation Reduction Act (IRA),[89] which heavily subsidizes renewable energy projects. Allowing federal transmission policy changes to advance without addressing these distortions, or without putting safeguards in place to protect consumers from the costs of excessive transmission build-out, or without implementing parallel reforms for nuclear energy projects and other infrastructure, would create an unbalanced system that may fail to meet AI's energy needs.

Given that lawsuits are often the biggest obstacle to development, litigation reform must be central to any permitting overhaul. Key elements of litigation reform should include:

- Clear standards for when environmental reviews are considered complete;
- Reasonable time limits for filing challenges;
- Requirements that plaintiffs demonstrate they have personally suffered direct, tangible harm, rather than merely identified procedural violations; and
- Time limits on injunctive relief that stops project development during litigation.

These judicial reforms fall broadly into two categories: restricting who can sue under NEPA and limiting the judicial remedies available.[90] These reforms would help prevent endless legal challenges over minor technical details while preserving appropriate environmental protections.

In addition, Congress and the Trump administration have an opportunity to enact other substantive reforms, given the recent repeal of a long-

[88] Daren Bakst, "Four Principles for Real Permitting Reform," Competitive Enterprise Institute, *OnPoint*, No. 287 (July 27, 2023), https://cei.org/studies/four-principles-for-real-permitting-reform/.

[89] H.R.5376 - Inflation Reduction Act of 2022, 117th Congress (2021-2022), https://www.congress.gov/bill/117th-congress/house-bill/5376/text.

[90] Mark C. Rutzick, "A Long and Winding Road: How the National Environmental Policy Act Has Become the Most Expensive and Least Effective Environmental Law in the History of the United States, and How to Fix It," Regulatory Transparency Project, October 16, 2018, https://rtp.fedsoc.org/paper/national-environmental-policy-act/.

standing executive order that governed the NEPA implementation process.[91] NEPA implementing regulations from the Council on Environmental Quality are being rescinded,[92] creating an opportunity to limit the number of projects that undergo NEPA review as well as the scope of NEPA environmental analyses. The current state of uncertainty means there is an urgent need for Congress to address NEPA reform, even beyond the usual problems with federal permitting processes causing delays to infrastructure and energy projects.

Abandon climate targets, etc.: AI's enormous energy needs promise higher emissions to the extent these are met by burning fossil fuels. As a result, AI is straining climate goals corporations and governments have set to curb greenhouse gas emissions and reduce global warming. This is triggering a reconsideration of net-zero and similar climate commitments, as well as action by companies to source electricity from low-carbon sources. This rethinking should be viewed as a welcome development.

AI energy demands, coupled with slow integration of renewable and nuclear energy into the power mix, will make achieving climate targets like those set under the United Nations' Paris Agreement more challenging and in some cases impossible. That agreement aims to limit global warming to 1.5°C above pre-industrial levels, but AI's power consumption may push nations further from this goal.[93] Not surprisingly, countries like Canada are abandoning target dates for creating a net-zero electricity grid, pushing timelines years into the future.[94] Likewise, the US is withdrawing from the Paris Agreement.[95]

Many corporations are following suit and quietly abandoning past climate commitments.[96] For example, Amazon was removed from the Science Based Targets initiative's list of companies acting on climate goals.[97] Amazon also retracted its sustainability goal of delivering half its packages with zero carbon by 2030. Microsoft's emissions have grown by 29 percent since 2020, making it unlikely the company will achieve its goal of becoming carbon negative by 2030.[98] Google emissions have grown by 67 percent during this time period,[99] and Alphabet Inc. ended its carbon neutrality program in 2024 due to the rapid expansion of AI data centers.[100]

In the banking sector, JPMorgan has become the latest major US bank to exit the Net-Zero Banking Alliance, a coalition aimed at achieving climate goals. This decision marks a significant shift in attitudes, as all six of the largest US banks, including Goldman Sachs, Wells Fargo, and Bank of America, have now left the alliance.[101] Asset managers like BlackRock are similarly abandoning their own net zero commitments.[102] These departures underscore the challenges financial institutions face in achieving climate targets in the midst of competing priorities. Though there are a variety of reasons companies are making these changes, accelerating technological change from AI is undoubtedly a contributing factor.

State and local governments should follow these businesses' lead. Rather than cling to unrealistic and arbitrary climate targets, a better approach is to ensure that sufficient energy is produced to support our nation's growing energy needs. State renewable portfolio standards (RPS) should be

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91 President Donald J. Trump, "Executive Order: Unleashing American Energy," January 20, 2025, https://www.whitehouse.gov/presidential-actions/2025/01/unleashing-american-energy/.

92 Council on Environmental Quality, "Removal of National Environmental Policy Act Implementing Regulations," *Federal Register,* Vol. 90, No. 36 (February 25, 2025), https://www.federalregister.gov/documents/2025/02/25/2025-03014/removal-of-national-environmental-policy-act-implementing-regulations.

93 "The Paris Agreement," United Nations, accessed October 31, 2024, https://unfccc.int/process-and-meetings/the-paris-agreement.

94 Nia Williams, "Canada Pushes Out Target for Net-Zero Electricity Grid by 15 Years," Reuters, December 18, 2024, https://www.reuters.com/sustainability/climate-energy/canada-pushes-out-target-net-zero-electricity-grid-by-15-years-2024-12-17/.

95 Donald J. Trump, "Executive Order: Putting America First in International Environmental Agreements," January 20, 2025, https://www.whitehouse.gov/presidential-actions/2025/01/putting-america-first-in-international-environmental-agreements/.

96 Jemma Green, "Why Big Corporations Are Quietly Abandoning Their Climate Commitments," *Forbes*, September 3, 2024, https://www.forbes.com/sites/jemmagreen/2024/08/29/why-big-corporations-are-quietly-abandoning-their-climate-commitments/.

97 Natasha White and Matt Day, "Amazon is removed from key list of climate-conscious companies," *Los Angeles Times*, August 14, 2023, https://www.latimes.com/business/story/2023-08-14/amazon-carbon-emissions-climate-change.

98 Jemma Green, "Why Big Corporations Are Quietly Abandoning Their Climate Commitments?"

99 Corbin Hiar, "How Trump silenced tech giants on his Paris withdrawal," E&E News, January 24, 2025, https://www.eenews.net/articles/how-trump-silenced-tech-giants-on-his-paris-withdrawal/.

100 Jemma Green, "Why Big Corporations Are Quietly Abandoning Their Climate Commitments?"

101 Simon Jessop, "JPMorgan becomes latest US lender to quit Net-Zero Banking Alliance," Reuters, January 7, 2025, https://www.reuters.com/business/environment/jpmorgan-says-leave-net-zero-banking-alliance-2025-01-07/.

102 Ross Kerber, "BlackRock quits climate group as Wall Street lowers environmental profile," Reuters, January 9, 2025, https://www.reuters.com/sustainability/blackrock-quits-climate-group-wall-streets-latest-environmental-step-back-2025-01-09/.

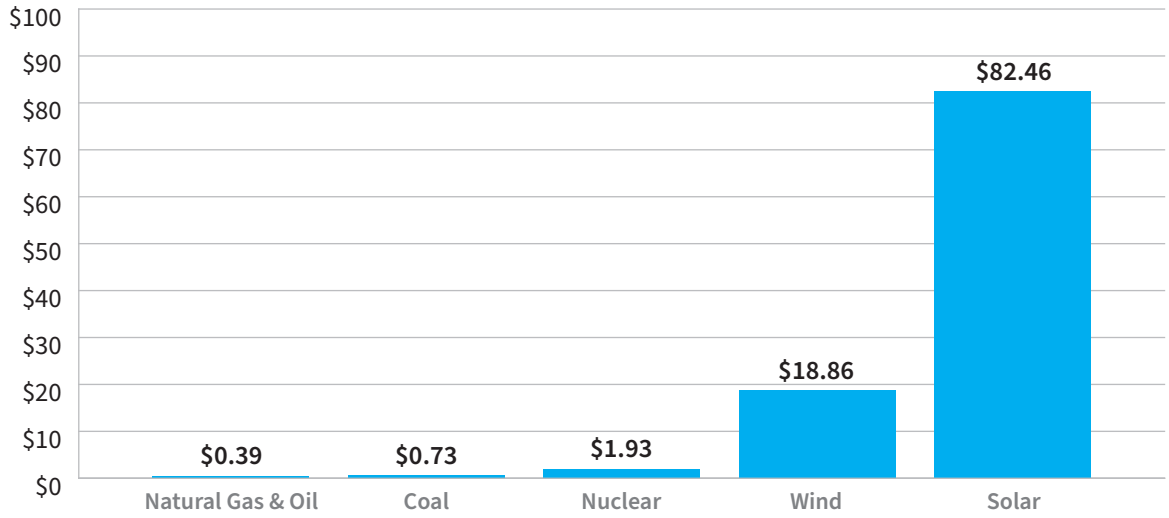
repealed. RPS standards strain grid stability by prioritizing intermittent energy sources. This forces some parts of the grid, particularly those reliant on fossil fuels or nuclear power, to bear the burden of supporting others during periods of low renewable generation. The resulting imbalance adds to the grid's vulnerability.

Eliminate subsidies and price controls: At the top of the priority list should be removing distortive subsidies from the energy market. This is an essential step for preparing to meet the coming power demand spike. Current subsidies in the power market are heavily weighted in favor of wind and solar and against thermal sources like natural gas, nuclear, and coal. From 2010 to 2019, federal subsidies were $36.7 billion for wind and $34.3 billion for solar. Subsidies for oil and natural gas combined were $25 billion, with $15.4 billion for nuclear, and $12.8 billion for coal.[103]

The subsidy imbalance is even greater when viewed in terms of energy produced. The most subsidized sources also produce the least power, so renewables' per MWh subsidies are even bigger compared to the thermal units. Per MWh gas and oil receive $0.39 in subsidies, nuclear receives $1.93, and coal receives $0.73. Meanwhile, wind receives $18.86 in subsidies for every MWh produced and solar receives $82.46 per MWh.[104] Comparing subsidies in light of power produced makes the extreme disparity in subsidy spending clear.

Continuing to support intermittent wind and solar with subsidies also harms market signals in the electricity market. The Investment Tax Credit and Production Tax Credit, which have historically paid wind, solar, and other energy companies for investment and for each MWh of production respectively, were extended and expanded under the Inflation Reduction Act to include producers of all zero-greenhouse gas emissions energy starting at the beginning of 2025.[105] These tax credits make it difficult for more reliable thermal units to compete economically because they lower the price at which wind and solar generators can bid in to power auctions and remain competitive. This means that other generators are competing with artificially low prices that they may be unable to match. This dynamic could explain why an environmentally-friendly plant like Unit 1 at Three Mile Island had to close in the first place.

Fig. 2: US electricity subsidies per MWh, 2010-19



Source: Bill Peacock, "US Federal Renewable Energy Subsidies are Driving the Energy Transition."

[103] Paige Lambermont, "New Paper Shows the Problem with Power Subsidies," *Catalyst*, September 4, 2024, https://catalyst.independent.org/2024/09/04/power-subsidies-problem/.

[104] Bill Peacock, "US Federal Renewable Energy Subsidies are Driving the Energy Transition," Energy Alliance, 2024, https://static1.squarespace.com/static/5f08b9b336577f152f2c5c3e/t/66cf9597cd92d7355853f439/1724880279206/Federal+Renewable+Energy+Subsidies+are+Driving+the+Energy+Transition+Final.pdf.

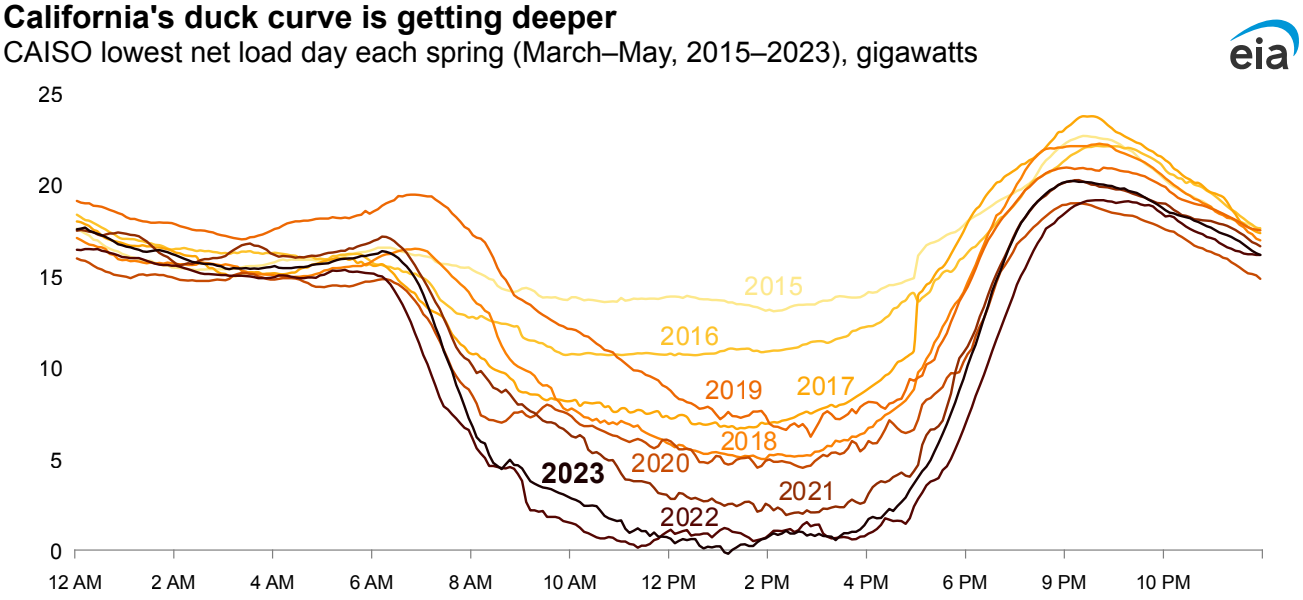
[105] "Summary of Inflation Reduction Act provisions related to renewable energy," Environmental Protection Agency, accessed December 6, 2024, https://www.epa.gov/green-power-markets/summary-inflation-reduction-act-provisions-related-renewable-energy.

A related problem is that government-imposed price caps in electricity markets artificially suppress the market's ability to reflect true scarcity prices. In a fully competitive market without caps, prices would spike higher when power is scarce, allowing power plant owners to earn enough revenue during those peak times to help cover their fixed costs. Because price caps prevent these higher "scarcity prices" from happening, many generators—especially plants that receive fewer subsidies—can struggle to make enough money to stay in service. This is referred to as the "missing money" problem, because often high fixed cost plants are unable to recoup their real costs. FERC and the grid operators have attempted to ameliorate this impact through capacity markets and other administrative mechanisms, but the issue remains.[106]

Removing harmful subsidies and price controls would therefore remove the distortions that these policies create in the market and make it more economical to build units that better support rising demand. Ideally, all energy subsidies and price controls should be removed, but renewable subsidies are particularly problematic given both their size relative to megawatt-hours produced and their corresponding distortionary impacts on the market. This kind of imbalanced system will not be conducive to large rises in power demand in the near future.

Figure 3, the CAISO duck curve, highlights one of the key distortions caused by heavy renewable subsidies. As subsidies drive rapid solar deployment, midday generation increasingly exceeds demand at that time of day, forcing grid operators to curtail output or risk destabilizing the system. This oversupply issue is already a challenge, but as power demand grows—particularly from AI-driven data centers and electrification—it could become even more problematic. Instead of encouraging investments in flexible generation, subsidies incentivize an excess of intermittent supply without adequate market-driven mechanisms to balance the grid. This makes it harder to meet rising demand efficiently.

Figure 3: California independent system operator "duck curve"



Source: Energy Information Administration, "As solar capacity grows, duck curves are getting deeper in California," June 21, 2023, https://www.eia.gov/todayinenergy/detail.php?id=56880.

[106] L. Lynne Kiesling, "Regional Transmission Organizations as Market Platforms II," American Enterprise Institute, January 24, 2025, https://www.aei.org/articles/regional-transmission-organizations-as-market-platforms-ii/.

AI and the data centers powering AI systems require reliable power that does not just produce at times of day when the sun is shining. This means dispatchable power sources like natural gas and nuclear, not intermittent sources like wind and solar. A market with heavy regulations and subsidies will not be conducive to the large, round-the-clock rises in power demand expected in the near future. Reform of power subsidies will be essential to reducing uncertainty, meeting rising demand, and restoring healthy price signals for the power grid.

Ensure need for transmission projects: Determining the need for new transmission infrastructure is challenging due to distortions in the electricity market, particularly the influence of subsidies. However, need can be demonstrated through several factors, including:

- Evidence of demand for transmission capacity, such as commitments from users like power generators or utilities showing they are willing to pay for it;
- A clear necessity to address grid reliability concerns, such as to mitigate congestion or prevent outages;
- Proof that the project will reduce overall electricity costs for consumers; and
- Demonstration that less-costly alternatives are insufficient to meet rising demand.

These criteria help establish whether transmission projects are justified and necessary. Transmission costs should typically be allocated based on a "beneficiary-pays" principle. This means those who directly benefit from the transmission project—whether they are electricity consumers, utilities, or generators—should bear the associated costs. This avoids imposing costs on parties that do not gain from the project, ensures fairness, and maintains market efficiency.

Relax nuclear regulation: One area that requires sector-specific reform is nuclear regulation. Because nuclear power permitting is managed through the Nuclear Regulatory Commission (NRC), easing the burden to build these facilities would require reform of the agency, including the statutes that it administers.

The ADVANCE Act, signed as part of the Fire Grants and Safety Act in July of 2024, contained many important reforms to NRC regulation of new nuclear facilities.[107] These reforms included initiatives to make the review of license applications more timely and predictable.[108]

The bill also updates the NRC's mission to acknowledge the potential benefits of nuclear power.[109] In December of 2024, the mission still stated, "The NRC licenses and regulates the Nation's civilian use of radioactive materials to provide reasonable assurance of adequate protection of public health and safety and to promote the common defense and security and to protect the environment."[110] This mission fails to acknowledge benefits that nuclear power provides and focuses on it only as a threat to be protected from, not as a resource to be stewarded. The ADVANCE Act required that within a year the mission statement be updated to include, "licensing and regulation of the civilian use of radioactive materials and nuclear energy be conducted in a manner that is efficient and does not unnecessarily limit— (1) the civilian use of radioactive materials and deployment of nuclear energy; or (2) the benefits of civilian use of radioactive materials and nuclear energy technology to society."[111]

It has since been updated to, "The NRC protects public health and safety and advances the nation's common defense and security by enabling the safe and secure use and deployment of civilian nuclear energy technologies and radioactive materials through efficient and reliable licensing, oversight, and regulation for the benefit of society and the environment."

[107] "ADVANCE Act (Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy Act of 2024)," Nuclear Regulatory Commission, accessed December 6, 2024, https://www.nrc.gov/about-nrc/governing-laws/advance-act.html.

[108] "ADVANCE Act (Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy Act of 2024)."

[109] Paige Lambermont, "Congress Just Passed Legislation to Greenlight Nuclear Energy," Independent Women's Forum, June 24, 2024, https://www.iwf.org/2024/06/24/congress-just-passed-legislation-to-greenlight-nuclear-energy/.

[110] "About NRC," Nuclear Regulatory Commission, December 6, 2024, https://www.nrc.gov/about-nrc.html.

[111] Incorporated in S.870 - Fire Grants and Safety Act of 2023, 118th Congress (2023-2024), https://www.congress.gov/118/bills/s870/BILLS-118s870eah.pdf.

The updated mission does not use as strong of language regarding the benefits of the use of radioactive materials as the ADVANCE Act, but still appears to be a step towards acknowledging a role for the NRC that is more steward than guard. This is a small step toward a Nuclear Regulatory Commission that acknowledges the benefits of the technology that it regulates.

This, coupled with the permitting review reforms, is progress for the agency. More reform is still needed. Texas, Utah, and startup Last Energy have filed a lawsuit against the NRC, arguing that the agency exceeds its statutory authority by subjecting SMRs to the same extensive regulations as large-scale nuclear plants.[112] The plaintiffs contend that SMRs fall outside the NRC's legal jurisdiction.[113] Having states or a different federal agency regulate smaller reactors could make sense if these entities lie outside NRC's authority, and would also likely allow these reactors to be built much more quickly and affordably.

As part of its mission change, the NRC should also revisit its risk assessment practices, including its reliance on the Linear No-Threshold model, which assumes that any amount of radiation exposure increases cancer risk. This model forms the basis for the "As Low As Reasonably Achievable" standard that leads to excessive compliance costs for the industry. The agency should consider shifting to an alternative dose-response model that better conforms with known science.[114]

Use public land for data centers: In the waning days of his administration, President Biden issued an executive order directing federal agencies to explore avenues for advancing the development of AI data centers on federal lands.[115] Although the executive order had some shortcomings and was quickly rescinded by the Trump administration, expanding leasing opportunities on federal lands for both data centers and energy production offers significant advantages in meeting AI's growing energy and infrastructure demands.[116] Federal lands, with their abundant space and proximity to energy sources such as oil and gas, solar, wind, geothermal, and hydroelectric power, provide a promising setting for supporting AI infrastructure and energy supply. Encouraging both energy production and data center development on these lands would promote better geographic distribution of critical infrastructure, alleviating pressure on congested urban grids and fostering economic growth in rural areas.

This approach may gain new momentum with the announcement of the Stargate Project, the planned $500 billion data center investment project aimed at developing next-generation AI computing infrastructure.[117] There will likely be opportunities for siting the envisioned data centers on public lands. Alongside some advantages, however, federal and state lands can sometimes be subject to more severe permitting and regulatory processes, particularly where areas are protected for environmental reasons or are subject to conservation easements.[118] Therefore, opening up public lands for data center development will likely require permit streamlining in order to reduce delays and costs associated with building.

[112] Paige Lambermont, "NRC Lawsuit Could Change Small Reactor Regulation," Independent Women's Forum, January 10, 2025, https://www.iwf.org/2025/01/10/nrc-lawsuit-could-change-small-reactor-regulation/.

[113] Brian Martucci, "Texas, Utah, Last Energy challenge NRC's 'overburdensome' microreactor regulations," Utility Dive, January 6, 2025, https://www.utilitydive.com/news/texas-utah-last-energy-nrc-overburdensome-microreactor-nuclear-regulation/736545/.

[114] James Broughel, "Myths and Facts in Radiation Risks A simple solution to remove obstacles to nuclear power," Competitive Enterprise Institute, April 2024, https://cei.org/studies/myths-and-facts-in-radiation-risks/.

[115] Joe Biden, "Executive Order on Advancing United States Leadership in Artificial Intelligence Infrastructure," January 14, 2025, https://bidenwhitehouse.archives.gov/briefing-room/presidential-actions/2025/01/14/executive-order-on-advancing-united-states-leadership-in-artificial-intelligence-infrastructure/.

[116] Samuel Hammond, "Unlocking Federal Lands for AI Compute Infrastructure," Foundation for American Innovation, December 16, 2024, https://www.thefai.org/posts/unlocking-federal-lands-for-ai-compute-infrastructure.

[117] Paul Smith-Goodson and Matt Kimball, "The Stargate Project: Trump Touts $500 Billion Bid For AI Dominance," *Forbes*, January 30, 2025, https://www.forbes.com/sites/moorinsights/2025/01/30/the-stargate-project-trump-touts-500-billion-bid-for-ai-dominance/.

[118] Kyle Baranko et al., "Fast, scalable, clean, and cheap enough: How off grid solar microgrids can power the AI race," Off Grid AI, December 2024, https://www.offgridai.us/.

Avoid reliable capacity closures: Another component of being ready to meet rising demand is the stewardship of existing thermal capacity. This means reassessing the Environmental Protection Agency's power plant rule that would result in coal and natural gas plants being pushed offline.[119] At a time of growing demand, these plants will play an essential role in the power grid. Pushing them to close prematurely will only exacerbate the strain of increased demand. The power plant rule is currently being litigated, and the Trump administration's EPA will likely repeal the rule.[120] It is also important to prevent premature closures of existing nuclear, gas, and coal plants for other reasons, such as related to politicized lawsuits or other unnecessary regulations.

The consent decree process has also become a tool for groups like the Sierra Club to push costly and disruptive energy policies. The DTE Energy settlement is a prime example of this dynamic, where environmental activists pressured a utility into an agreement that forced premature power plant retirements. Utilities tend to go along because closing older units and building new infrastructure can expand their rate base and guarantee them higher returns.[121] In response, states could require public utility commission approval for any consent decrees that could impact grid reliability.

Allow alternatives to being on the grid: The best solutions for data center power demand may not always be grid-based. Some of this load may be best served through deals that allow behind the meter connections to new power plants and colocation of new power plants with new data centers. Generally, these facilities are still connected to the grid regardless of whether they use or need that connection.

There are alternative arrangements that could speed up connection to power for new data centers while keeping their load off the power grid. This concept is called consumer regulated electricity (CRE). CRE would allow independent power grids not run by the monopoly public utility. These grids would inevitably be highly geographically limited but may be intense in their power demand. Instead of making a colocation agreement through a utility for a new power plant to serve their load, a technology company could create or join an independent grid that serves a specific campus of data centers and similar users.[122] This option would create flexibility for companies looking to build new data centers while insulating the broader power grid from fluctuations.

For this to be possible, state lawmakers would need to pass a law amending the enabling legislation for their utility regulator that exempts CRE from the utility's monopoly.[123] To enable more off-grid energy production and co-located facilities, restrictions on bilateral energy sales between off-grid generators and co-located consumers should be removed. In many regions, utilities hold exclusive rights to distribute electricity. Policymakers should remove the legal and regulatory barriers that prevent private companies from utilizing local infrastructure or developing their own distributed systems. State lawmakers should consider these avenues to provide options for companies that want power beyond the traditional grid structure.

[119] Environmental Protection Agency, "New Source Performance Standards for Greenhouse Gas Emissions From New, Modified, and Reconstructed Fossil Fuel-Fired Electric Generating Units; Emission Guidelines for Greenhouse Gas Emissions From Existing Fossil Fuel-Fired Electric Generating Units; and Repeal of the Affordable Clean Energy Rule," *Federal Register*, Vol. 89, No. 91 (May 9, 2024), pp. 39798-40064, https://www.federalregister.gov/documents/2024/05/09/2024-09233/new-source-performance-standards-for-greenhouse-gas-emissions-from-new-modified-and-reconstructed.

[120] Ethan Howland, "Trump taps former Rep. Lee Zeldin to lead EPA," Manufacturing Dive, November 13, 2024, https://www.manufacturingdive.com/news/trump-elects-lee-zeldin-epa-power-plant-carbon-ash-remand-stay/732740/.

[121] Environmental Protection Agency, "US Will Not Appeal District Court Decision Allowing Sierra Club-DTE Energy Settlement," February 4, 2021, https://www.epa.gov/newsreleases/us-will-not-appeal-district-court-decision-allowing-sierra-club-dte-energy-settlement.

[122] Travis Fisher, "What Would Consumer-Regulated Electricity Look Like?," Cato Institute, August 9, 2024, https://www.cato.org/blog/what-would-consumer-regulated-electricity-look.

[123] Glen Lyons, "Consumer Regulated Electricity: The Path to Faster, Reliable Power Solutions?," Data Center Knowledge, July 2, 2024, https://www.datacenterknowledge.com/energy-power-supply/consumer-regulated-electricity-the-path-to-faster-reliable-power-solutions-.

Avoid an electricity tax: In some respects, the circumstances surrounding the debate about AI electricity use mirror debates that have been ongoing surrounding cryptocurrencies for several years. Cryptocurrency mining, like the creation and use of AI models, is an energy-intensive activity.[124] The International Energy Agency (IEA) estimates that global electricity demanded by data centers, AI, and cryptocurrency mining reached 460 TWh in 2022.[125] Given that global electricity consumption in 2022 was about 27,000 TWh,[126] this is equivalent to around 1.5 to 2 percent of global electricity consumption. Additionally, IEA projects that energy consumption from these sources will more than double by 2026.[127]

Former President Biden and others have been calling for a tax on crypto electricity use.[128] Some have called for similar taxes on AI.[129] While AI and cryptocurrencies differ in some significant ways, the argument for selectively taxing the energy consumption of any industry is dubious.[130] Rather than targeting specific industries for taxation, policymakers should focus on ensuring a stable and affordable energy supply for all users.

Recognize electricity's practical purpose: Energy is an input in the production process, and hence its use is a cost of production. Focusing solely on costs without considering any of the corresponding benefits of a technology, product or service is to only consider half of the equation. Even if the early days of a technology may prove to have a lot of inefficiencies, these tend to be worked out with time.

Already, technology companies are finding productive uses for some excess heat produced by data centers. For example, energy released from data centers can be redirected to useful purposes, such as to heat pools.[131] More efficiencies such as this will undoubtedly be discovered in the years to come. It is important not to punish technology companies simply based on their energy use.

Avoid unwarranted pessimism: In the early days of the space race, there was plenty of outcry over money going to space rather than to the poor. One sign at a 1969 launch site read, "Billions for space. Pennies for the hungry."[132] The idea that working on an audacious scientific feat is somehow morally unacceptable if scarcity exists is an appeal to emotion, not logic. It is precisely through developing new technologies that we solve the world's most pressing problems and alleviate poverty.

A more recent example of public outcry has been against so-called "space billionaires."[133] This title mainly refers to SpaceX Founder Elon Musk, but is also used to refer to Blue Origin Founder Jeff Bezos and Virgin Galactic Founder Richard Branson. The title has been used to imply that private space investment is the purview of bored billionaires, and their money would be better spent on other things.[134] But private space innovation (admittedly financed in part by government contracts) is the reason that SpaceX can now land a more economic and environmentally-friendly reusable rocket booster for not one, not two, but three different space crafts. No other company has achieved this level of reusable rocket capability. And, even more importantly for those looking for earthly benefits, Starlink now allows high speed internet access all over the world with its satellites, a service that has proved vital in response

[124] Broughel, Berlau, and Patinkin, *Don't Depower Crypto*.

[125] International Energy Agency, "Electricity 2024: Analysis and forecast to 2026," Executive Summary, January and May 2024, https://www.iea.org/reports/electricity-2024/executive-summary.

[126] Statista, "Net electricity consumption worldwide in select years from 1980 to 2022," July 17, 2024, https://www.statista.com/statistics/280704/world-power-consumption/.

[127] International Energy Agency, "Electricity 2024: Analysis and forecast to 2026," Executive Summary.

[128] The White House, "The DAME Tax: Making Cryptominers Pay for Costs They Impose on Others," May 2, 2023, https://www.whitehouse.gov/cea/written-materials/2023/05/02/cost-of-cryptomining-dame-tax/.

[129] James Broughel, "Beware The Coming Artificial Intelligence Tax," *Forbes*, January 16, 2024, https://www.forbes.com/sites/jamesbroughel/2024/01/16/beware-the-coming-artificial-intelligence-tax/.

[130] Broughel, Berlau, and Patinkin, *Don't Depower Crypto*.

[131] Kelcee Griffis, "This Paris Olympics pool has an unusual heat source: a data center," Tech Brew, August 6, 2024, https://www.emergingtechbrew.com/stories/2024/08/06/equinix-paris-olympics-pool-data-center?s=09.

[132] Passant Rabie, "Senator Bernie Sanders Throws Shade at Private Space Industry," Gizmodo, April 22, 2022, https://gizmodo.com/senator-bernie-sanders-throws-shade-at-private-space-in-1848829728.

[133] Passant Rabie, "Senator Bernie Sanders Throws Shade at Private Space Industry."

[134] Paige Lambermont, "In Defense of Space Billionaires," *Catalyst*, December 3, 2021, https://catalyst.independent.org/2021/12/03/space-billionaires/.

to natural disasters.[135] Starlink also provides critical encrypted intelligence to Ukraine and its allies in the Russo-Ukrainian War.[136]

Another similar innovation has been the development by Boom Supersonic of a supersonic commercial airliner. Boom's aircraft, the XB-1, was recently able to reach supersonic speeds without an accompanying sonic boom.[137] These examples highlight that investments take time to pay off, and sometimes the most important investments have the longest latency periods. Given that governments are often averse to taking such risks with taxpayer dollars, there is a role to play for ambitious private sector experiments with new technologies. Preemptively restricting an experimental market's growth by taxing its electricity use or burdening it with stringent regulation is likely to stunt a promising new technology's development and thereby prevent its full potential from being realized.

Conclusion

Abundant and affordable energy is the foundation of a thriving society. What is now accomplished cheaply and cleanly with the flick of a light switch once required filling a lamp with expensive whale oil, lighting it, and then ensuring that the flame did not jump to any of the flammable items in the vicinity. Central heating would once have been accomplished by hours of chopping firewood and then tending the fire in a wood burning stove, but now is accomplished effortlessly with electricity. Today, reliable energy powers modern industry, transportation, and infrastructure, improving quality of life and expanding economic opportunity.

New technologies will further shape our world, and AI is one of the most transformative among them. Just as past innovations eliminated physical toil, AI will do something similar for digital drudgery. However, AI's potential depends on access to sufficient energy. Ensuring a stable and scalable energy supply is critical not just for AI, but for meeting the growing demands of modern life.

AI development is still unfolding, but its benefits are already becoming clear. It will analyze and organize massive volumes of information much more efficiently than humans are able to, freeing them up from setting meetings or managing rote spreadsheets, and allowing higher order goals to take their place. To get there, we need power, from a multitude of sources. We should eliminate government barriers to our most reliable power sources, and work to prevent new barriers from being erected. For AI to fully deliver on its transformative potential, we must ensure our energy policies support rather than constrain its power needs.

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[135] "Hurricane Relief (Helene and Milton)," Starlink, accessed December 6, 2024, https://www.starlink.com/support/article/58126733-e4d2-db62-b919-9da261a4e096.

[136] Rachel Amran, "Bloomberg: Pentagon blocks Russian military from accessing Starlink in Ukraine," *The Kiev Independent*, May 9, 2024, https://kyivindependent.com/bloomberg-pentagon-blocks-russian-military-from-accessing-starlink-in-ukraine/.

[137] Boom Supersonic, "XB-1 Goes Mach 1," accessed February 13, 2025, https://boomsupersonic.com/xb-1.

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