Better Energy Policy for Ohio

By Rea S. Hederman Jr. and Greg R. Lawson

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FOREWORD

Energy policy in Ohio has become increasingly complex, creating an environment where entrenched special interests thrive while consumers are left footing the bill. At Americans for Prosperity Ohio, in partnership with The Buckeye Institute, we are proud to present this study—a foundational resource for citizens and legislators who believe in free-market solutions and a consumer-first approach to energy policy.

For too long, Ohio's energy policies have been dominated by cronyism and opaque frameworks that prioritize special interests over consumers, resulting in higher costs and fewer choices for Ohioans. This report seeks to demystify Ohio's energy landscape, shedding light on the real problems while equipping policymakers with the tools to implement bold, transparent reforms.

By focusing on transparency, competition, and innovation, we can foster a paradigm shift that places Ohio consumers—not special interests—at the center of energy policymaking. This study serves as both a primer and a call to action, laying the groundwork for a future where Ohio leads the way in energy innovation, economic growth, and individual freedom.

Together, we can ensure that Ohio's energy policies not only power our state but also empower its people.

Donovan O'Neil
State Director
Americans for Prosperity Ohio

EXECUTIVE SUMMARY

Until recently, U.S. demand for electricity had been relatively flat for years. Regulators and grid operators built generators and transmission lines accordingly, expecting that energy demand would continue to grow slowly. Those projections proved inaccurate as computer data storage, artificial intelligence programs, electric vehicles, and cryptocurrencies have emerged rapidly to require and consume massive amounts of electricity. New forecasts now predict that data centers alone will consume almost 10 percent of America's total electricity consumption by the end of the decade[1]—an almost 400 percent increase from 2023 levels.[2]

Energy supply should rise with demand. But government policies have artificially limited supply of less expensive, dispatchable energy, favoring more expensive and less reliable "green" energies. Bureaucracies at every level encourage reliable power producers to close or never open, and have made powerplant upgrades and expansion difficult, costly, and time-consuming. These preferences aimed at reducing the "carbon footprint" contravene the simultaneous demand for ultra-reliable energy for AI-computing, cryptocurrency mining, and data storage centers that must be powered around the clock. Intermittent energy sources cannot meet these demands and Europe's experience should warn American policymakers of the economic dangers of pursuing poor energy policies. European energy policies and carbon taxes promoted green energy and forced many dispatchable powerplants to close. Even before Russia invaded Ukraine, Europe suffered artificially high electricity prices—with natural gas being four to five times more expensive than in the United States—that create severe economic disadvantages when compared to America, China, and other global competitors.[3] Ohio faces an electricity shortfall because of inadequate energy infrastructure needed to easily produce, transmit, and store fuel sources and power relative to expected demand growth. Policymakers must address this shortfall quickly because although its effects may not be felt for several years, energy infrastructure develops slowly and current policies will impede that development.

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[1] Jennifer Hiller, **'Three New York Cities' Worth of Power: AI is Stressing the Grid**, *The Wall Street Journal*, September 28, 2024.
[2] John D. Wilson and Zach Zimmerman,, **The Era of Flat Power Demand is Over**, Grid Strategies, December 12, 2023.
[3] Mario Draghi, et al, **The future of European competitiveness**, European Commission, September 2024.

Instead of adopting the European energy model, state and federal policymakers should promote energy sector competition, streamline regulations and permitting, and end government subsidies that favor inefficient energy types at taxpayer expense. Adopting such policies will spur economic growth, enrich American families and businesses, and sustain the standard of living that the modern U.S. household now enjoys and expects.

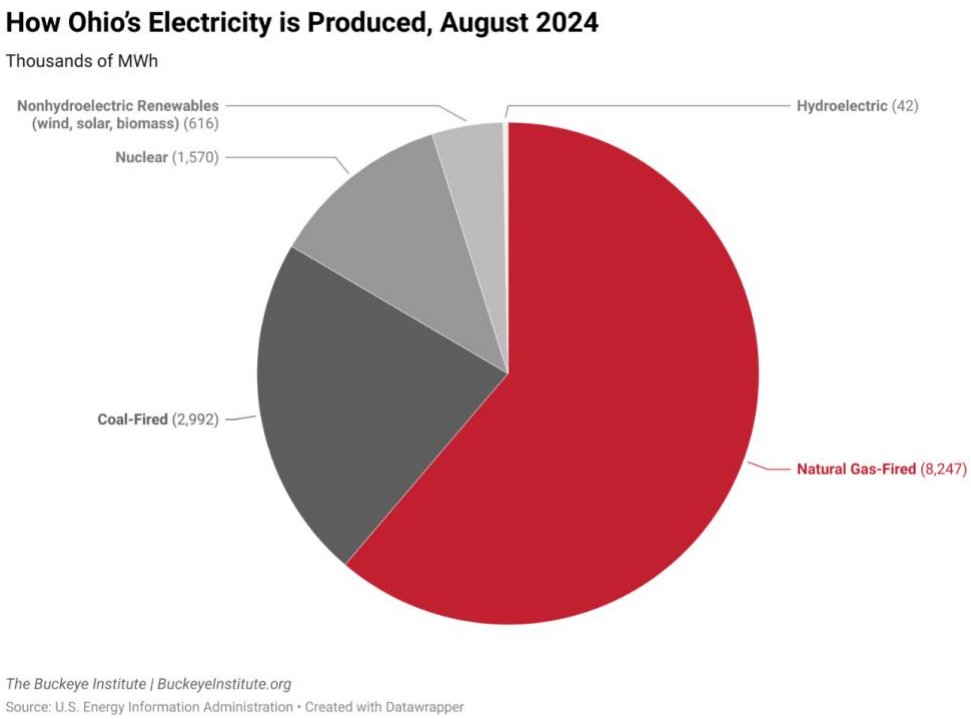
INTRODUCTION

Abundant, reliable, affordable energy is a staple of American life. Households and businesses run on electricity. Demand for power continues to rise as the industrial manufacturing age gives way to the digital information age of the 21st century and new technologies require and consume more electricity than ever before. As energy demand increases so should supply. But public policies have restricted supplies of less expensive, dispatchable energy, favoring instead intermittent "green" energy sources that are more expensive and less reliable. Regulatory bureaucracies at every level have encouraged reliable power producers to close or never open, and have made powerplant upgrades and expansion difficult, costly, unpredictable, and time-consuming. European policymakers have pursued even more stringent environmental and energy rules, and the results have been economically devastating. American policymakers should learn from and not repeat Europe's mistakes as the U.S. economy competes with China and other international competitors for manufacturing, artificial intelligence, cryptocurrencies, and digital data storage supremacy. Those energy-intensive technologies and sectors will continue to require a stable energy grid that provides affordable, reliable power 24 hours a day. State and federal policymakers should promote energy sector competition, streamline regulations and permitting, and end government subsidies that favor inefficient energy types at taxpayer expense. Adopting such policies will spur economic growth, enrich American families and businesses, and sustain the standard of living that the modern household now enjoys and expects.

ENERGY POLICY: A PRIMER

Ohio produces and consumes significant quantities of energy. Since 2019, natural gas has been the state's primary source of electricity, generating 15,632 megawatts, with an additional 3,100 megawatts approved but not yet in operation.[4] Coal, long Ohio's dominant energy source, is still the state's second largest electricity provider, but only four coal-fired plants remain in service. [5] Two nuclear power plants generate 12 percent of Ohio's electricity. A reliable, inexpensive power source, nuclear energy's potential has been curtailed by regulatory uncertainty. Wind and solar power contribute nearly five percent of Ohio's electricity, with almost 7,000 megawatts of solar energy approved to come online soon.[6] Energy production costs vary by power source.[7] The levelized full system cost of electricity (LFSCOE) is a comprehensive metric that accounts for the intermittent nature of renewables and consequent need for backup power or batteries. The LFSCOE finds that, on an unsubsidized basis, nuclear energy costs $122 per megawatt-hour; coal $90 per megawatt-hour; natural gas $40; onshore wind $291; and solar $413 per megawatt-hour.

[4] **Gas Generation & CHP Case Status**, Ohio Power Siting Board, (Last visited October 23, 2024).
[5] **Number of operational coal-fired power plants in the United States as of 2024, by state**, statista.com (Last visited January 14, 2025).
[6] **Solar Case Status**, Ohio Power Siting Board (Last visited October 23, 2024).
[7] Bank of America Global Research, **The RIC Report, The nuclear necessity**, Bank of America Securities, May 9, 2023.



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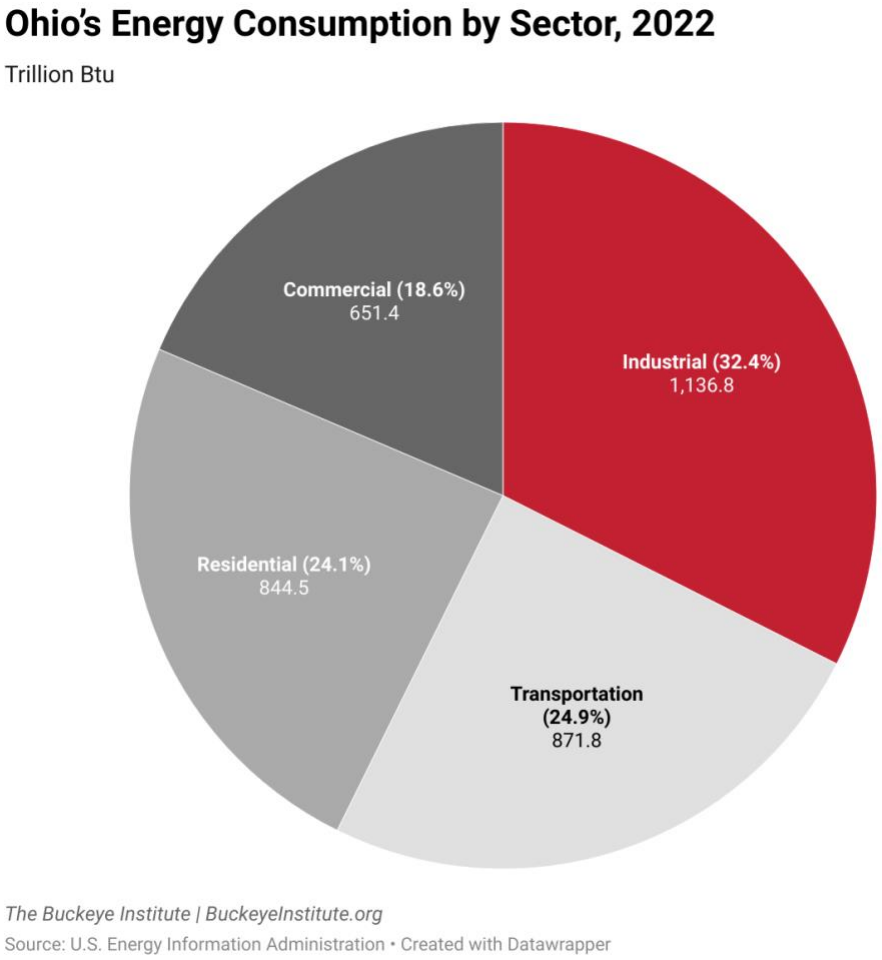

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Fortunately, Ohio has a partially deregulated energy market, which means that utilities must separate their power generation, distribution, and transmission businesses to allow other companies to compete. And consumers may compare energy rates, reliability, service plans, contract terms, and discount offers when choosing an energy provider through the state's Energy Choice Program. This quasi-competitive market has helped keep Ohio's electricity prices on par with the national average, with residents typically paying $100-125 per month, slightly more than six percent of the average household's expenditures.[8] Ohio's average retail electricity price is the 18th highest in the nation, more affordable than

[8] **Consumer Expenditures for the U.S., regions and selected metropolitan areas**, Consumer Expenditure Survey, Bureau of Labor Statistics (Last visited January 14, 2025).

Michigan and Pennsylvania but more expensive than Kentucky and Indiana.[9] Ohio is a member in PJM, a regional transmission organization (RTO) that serves all or part of 13 states and the District of Columbia. The PJM grid uses market mechanisms to ensure affordable, reliable energy service and allows generators to sell electricity to consumers in other states, which provides customers with access to more electricity. As the seventh most populous state, Ohio has the fourth highest electricity usage,[10] and over the last 20 years the state has consumed 10-25 percent more electricity than its own utilities produce,[11] so access to out-of-state power has been advantageous for Ohio homeowners that consume nearly a quarter of the state's power, and the industrial sector, which consumes almost a third.[12]

State Policies

In the late 1990s, Ohio was at an energy policy crossroads. Policymakers sought to spur competition, lower consumer prices, and drive energy innovation with legislative initiatives designed to dismantle the sector's vertically integrated monopolies. Senate Bill 3, passed in 1999, laid the groundwork for deregulation and Ohio's competitive electricity market.[13] Although the law required investor-owned utilities to separate their generation, transmission, and distribution functions, it did not require actual divestment of generating assets. Electric utility corporations could retain power plant ownership through subsidiaries, a policy allowance that permitted cross-subsidization[14] and has prevented a fully competitive energy market in Ohio.[15] Senate Bill 3 also stipulated that customers who did not choose a competitive retail energy supplier would receive a standard service offer (SSO)[16] to help establish fair pricing for non-competitive providers and ensure reliable service.[17]

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[9] **Rankings: Average Retail Price of Electricity to Residential Sector**, August 2024, U.S. Energy Information Agency.gov (Last Visited November 21, 2024)

[10] **Leading states in electricity consumption in the United States in 2022**, statista.com (Last visited January 14, 2025).

[11] **Ohio State Profile and Energy Estimates**, U.S. Energy Information Administration (Last visited October 23, 2024).

[12] **Ohio Energy Consumption by End-Use Sector, 2022**, U.S. Energy Information Administration (Last visited January 15, 2025).

[13] **Senate Bill 3** of the 123rd Ohio General Assembly (Last visited January 14, 2025).

[14] Andrew Thomas, Mark Henning, William Bowen, Edward (Ned) Hill, Adam Kanter, ***Update on Electricity Customer Choice in Ohio: Competition Continues to Outperform Traditional Monopoly***, Northeast Public Energy Council, 2018.

[15] Noah Dormady, Zhongnan Jiang, Matthew Hoyt, ***Why Ohio's Retail Electric Deregulation Has Been Bad for Households and Why Re-Regulation Would be Even Worse***, John Glenn College of Public Affairs at The Ohio State University, March 2017.

[16] **What is the Price-to-Compare/Standard Service Offer?**, Sopec-Oh.gov (Last visited October 29, 2024).

[17] **Senate Bill 3** of the 123rd Ohio General Assembly (Last visited January 14, 2025).

These policies created opportunities for new market participants, including natural gas and renewable energy providers,[18] but Senate Bill 3 did not solve the problem of so-called "stranded costs" imposed on utilities[19] as they move away from their traditional business models.[20] Many utilities had invested heavily in transmission and generation because they had relied on a regulated market guaranteeing returns across all business elements. Utilities argued successfully that Ohio's deregulation devalued their investments and would saddle them with substantial, unrecoverable costs. "Stranded costs" loomed over the deregulation effort and led to higher, undesirable consumer fees.[21] Policymakers addressed the issue primarily through regulatory measures and financial mechanisms such as rate adjustments approved by the Public Utilities Commission of Ohio (PUCO) that allowed utilities to recover their investments. Some utilities voluntarily divested generation assets to mitigate stranded costs[22] and reduce the financial burden of underperforming or obsolete facilities in a competitive market.[23] Ultimately, without a comprehensive solution, stranded costs led to electric security plans (ESP) established by Senate Bill 221 in 2008.[24]

Senate Bill 221 allowed utilities to propose strategies for cost recovery and long-term power purchase agreements and permitted them to choose between ESPs and market rate offers (MRO). MROs incentivize competitive pricing by allowing utilities to pass the wholesale cost of electricity on to consumers. Unfortunately, an MRO has never been adopted,[25] which has limited the potential benefits of a truly competitive electricity market. Meanwhile, although ESPs were a stopgap to help utilities prepare for market competition, they bypassed regular rate-making and

[18] Ohio Manufacturers' Association, **Ohio's Journey to Electricity Competition**, Ohiomfg.com, June 12, 2013.
[19] Noah Dormady, Zhongnan Jiang, Matthew Hoyt, ***Why Ohio's Retail Electric Deregulation Has Been Bad for Households and Why Re-Regulation Would be Even Worse***, John Glenn College of Public Affairs at The Ohio State University, March 2017.
[20] Congressional Budget Office, ***Electric Utilities, Deregulation, and Stranded Costs***, CBO.gov, October 1998.
[21] Noah Dormady, Zhongnan Jiang, Matthew Hoyt, ***Why Ohio's Retail Electric Deregulation Has Been Bad for Households and Why Re-Regulation Would be Even Worse***, John Glenn College of Public Affairs at The Ohio State University, March 2017.
[22] Congressional Budget Office, ***Electric Utilities, Deregulation, and Stranded Costs***, CBO.gov, October 1998.
[23] **Duke Energy completes sale of its non-regulated Midwest generation business to Dynegy**, Duke Energy news release, April 2, 2015.
[24] **Senate Bill 221 of the 127th Ohio General Assembly**, Legislature.Oh.gov (Last visited January 14, 2025).
[25] Maureen Willis, agency director, Ohio Consumers' Counsel, **Proponent Testimony** Before the Ohio Senate Energy and Public Utilities Committee on Senate Bill 143, January 23, 2024.

allowed utilities to add surcharges to the wholesale price.[26] By granting utilities significant control over pricing and procurement processes, ESPs disadvantage independent energy producers, undermine consumer choice, stifle innovation, and keep retail prices artificially higher than the wholesale cost of energy requires.[27] A Northeast Ohio Public Energy Council study highlights a 2017 FirstEnergy "distribution modernization rider," for example, that allowed the utility to recover $168 million in consumer charges without having to show where the funds were spent.[28] And Ohio State University researchers found that some utilities were significantly cross-subsidizing their purportedly "separated" generation assets and thus not allowing consumers the benefits of lower-cost natural gas.[29]

The rise of renewable energy exacerbated the inherent tensions in Ohio's energy policy. Senate Bill 221 committed the state to adopt "renewable energy portfolio standards" (RPS),[30] and required that utilities procure up to 12.5 percent of their energy from renewable sources by 2024.[31] This initiative aligned with national trends promoting cleaner energy solutions and was hailed as a crucial step toward reducing reliance on fossil fuels. But the RPS hiked consumer costs[32] and raised concerns over the financial implications of integrating renewable energy. These pressures culminated in Senate Bill 310 in 2014, which effectively froze the RPS requirements for two years,[33] and then the infamous House Bill 6 of 2019 reduced the required RPS to 8.5 percent by 2026, while introducing a raft of new subsidies that distorted Ohio's energy market and led to even higher consumer prices.[34]

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[26] Noah Dormady, Zhongnan Jiang, Matthew Hoyt, ***Why Ohio's Retail Electric Deregulation Has Been Bad for Households and Why Re-Regulation Would be Even Worse***, John Glenn College of Public Affairs at The Ohio State University, March 2017.

[27] Kathiann M. Kowalski, **Why Did Utility Bills Go Up As Electricity Prices Went Down?**, EyeOnOhio.com, 2019.

[28] Andrew Thomas, Mark Henning, William Bowen, Edward (Ned) Hill, Adam Kanter, ***Update on Electricity Customer Choice in Ohio: Competition Continues to Outperform Traditional Monopoly***, Northeast Public Energy Council, 2018.

[29] Noah Dormady, Matthew Hoyt, Alfredo Roa-Henriquez, "**Who Pays for Retail Electric Deregulation?: Evidence of Cross-Subsidization from Complete Bill Data**," *The Energy Journal,* Volume 40 Issue 2 (April 2019) p. 161-194.

[30] **Senate Bill 221 of the 127th Ohio General Assembly**, Legislature.Oh.gov (Last visited January 14, 2025).

[31] *Ibid.*

[32] Orphe Divounguy, PhD, Rea S. Hederman Jr., Joe Nichols, and Lukas Spitzwieser, ***Economic Research Center Analysis: The Impact of Renewables Portfolio Standards on the Ohio Economy***, The Buckeye Institute, March 3, 2017.

[33] **Senate Bill 310 of the 130th Ohio General Assembly**, Legislature.Oh.gov (Last visited January 14, 2025).

[34] **House Bill 6 of the 133rd Ohio General Assembly**, Legislature.Oh.gov (Last visited January 14, 2025).

Federal Policies

In addition to state energy policies, federal law and rulemaking significantly affect Ohio's energy market. The Obama administration used the U.S. Environmental Protection Agency (EPA) to bypass Congress and implement sweeping regulations under a so-called Clean Power Plan until the U.S. Supreme Court intervened and held in *West Virginia v. U.S. EPA* that federal regulators cannot enact such regulations without explicit congressional authority.[35] But the Biden administration continued undaunted, directing the EPA to impose regulatory burdens on fossil fuel power plants and adopt a 2024 rule requiring all coal plants and new natural gas power plants to capture 90 percent of carbon emissions and tighten restrictions on mercury emissions and water pollutants.[36] Under the rule, new natural gas plants may not run more than 40 percent of the time unless they can capture and store 90 percent of their carbon emissions—a major disincentive for new natural gas plants to operate at full capacity. And all coal plants will have higher costs if they want to operate under the 90 percent capture standard. In issuing the rule, the EPA ignored objections that no current technology would enable coal plants to meet the required goal, and businesses and industry experts argued that no company can comply with the new standard.[37] Utilities warned that the rule threatens the energy grid as some plants will likely be forced to close and others may never open. Rural electric coops declared the rule "unlawful, unrealistic and unachievable,"[38] and states, businesses, and interested parties again sued the EPA for overstepping its regulatory authority. The Supreme Court has declined to stay the rule, and litigation is ongoing.

Federal regulatory overreach chills investment in new power plants and subjects energy markets to uncertainty. Natural gas power plants can take almost five years to build and cost more than a billion dollars.[39] The potential for onerous new regulatory requirements that may make construction more expensive and profitable operation less certain makes energy investment riskier. That additional risk makes energy more expensive to produce and therefore more expensive to consume.

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[35] ***West Virginia et al. v. Environmental Protection Agency et al.***, 597 U.S. 697 (2022)
[36] **Biden-Harris Administration Finalizes Suite of Standards to Reduce Pollution from Fossil Fuel-Fired Power Plants**, United States Environmental Protection Agency news release, April 25, 204.
[37] The Buckeye Institute, et al, **Comment on EPA's Proposed Rule for New and Existing Fossil Fuel-Fired Power Plants**, August 8, 2023.
[38] Robert Walton, **EPA finalizes power plant emission rules, but utilities balk at expected need for carbon capture**, UtilityDive.com, April 25, 2024.
[39] **Guernsey Power Station, Ohio, USA**, Power-technology.com (Last visited January 14, 2025).

INCREASED ENERGY DEMAND

The EPA has exerted heavy-handed regulatory influence and restrictions on American power supply just as demand for reliable, inexpensive energy has begun to surge. The early years of the 21st century saw relatively flat demand for power and regulators and grid operators built transmission lines and infrastructure expecting that energy demand would grow slowly. Those forecasts and assumptions have changed as computer data storage, artificial intelligence (AI) programs, electric vehicles, and cryptocurrencies have emerged rapidly in recent years to require and consume massive amounts of electricity.[40] Technology will improve to enhance their respective efficiencies, but that efficiency will likely coincide with even more consumer demand for the power-hungry products.

Cloud-computing, digital data storage centers, and AI-driven computers need large electric servers, processors, cooling fans, and other electronic equipment that requires significant energy to run. One forecast estimates that data centers alone will consume almost 10 percent of America's total electricity consumption by the end of the decade[41]—an almost 400 percent increase from 2023 levels.[42] And an energy provider in the PJM market has reported that electricity demand from data centers has recently doubled, with more growth expected.[43] Because an AI-powered ChatGPT request consumes ten times the electricity as a Google search, Goldman Sachs anticipates that AI data center electricity demand will grow by 160 percent by 2030,[44] which, according to Bain researchers, will require utilities to increase energy generation by 200-500 percent.[45] Similarly, American Electric Power (AEP) testified that it expects data center electricity consumption will grow from 100 megawatts to 5000 megawatts during the 2020s,[46] the equivalent of more than twice Ohio's nuclear energy capacity. AEP expects Central Ohio's total

[40] John D. Wilson and Zach Zimmerman,, **The Era of Flat Power Demand is Over**, Grid Strategies, December 12, 2023.
[41] Jennifer Hiller, **'Three New York Cities' Worth of Power: AI is Stressing the Grid**, *The Wall Street Journal*, September 28, 2024.
[42] John D. Wilson and Zach Zimmerman,, **The Era of Flat Power Demand is Over**, Grid Strategies, December 12, 2023.
[43] Ethan Howland, **Exelon's 'high probability' data center load has nearly doubled to 11GW, CEO says**, UtilityDive.com, October 31, 2024.
[44] Goldman Sachs, **AI is poised to drive 160% increase in data center power demand**, Goldman Sachs, May 14, 2024.
[45] Maegan Rouch, Aaron Denmanj, Peter Hanbury, Paul Reno, and Ellyn Grey, **Utilities Must Reinvent Themselves to Harness the AI-Driven Data Center Boom**, Bain & Company, October 10, 2024.
[46] Carolina O'Donovan, **Tech giants fight plan to make them pay more for electric grid upgrades**, *The Washington Post*, September 13, 2024.

electricity load will more than double from approximately 4,000 MW to 9,000 MW over the course of a decade, and the utility's top five customers will all be data centers by 2030. It has received inquiries and preliminary requests for service from more than 50 customers at more than 90 sites totaling more than 30,000 MW.[47] PJM forecasts that demand growth in the AEP service territory will increase from about 21,000 to about 26,000 MW by 2034,[48] which has prompted to AEP to no longer accept new data center requests for energy, because they do not believe they can effectively meet surging demand.[49]

Cryptocurrency mining is another new technology spurring demand for electricity. Digital currencies like Bitcoin use blockchain codes to complete financial transactions. Cryptocurrency "miners" use high-powered computer networks to answer complex mathematical equations. The first to solve such equations receive payment in the cryptocurrency. The "mining" computers consume large amounts of electricity and industry experts estimate that crypto mining, which already accounts for between 0.6-2.3 percent of total US electricity consumption, will continue to grow rapidly after 2029.[50]

Another possible source of energy demand growth is an industrial manufacturing renaissance spurred by productivity growth through advanced manufacturing technologies, foreign investment in America, and reshoring efforts.[51]

[47] Lisa O. Kelso, **Testimony** to the Public Utilities Commission of Ohio on behalf of Ohio Power Company, May 13, 2024.
[48] **PJM Load Forecast Report, January 2024**, PJM.com (Last visited January 14, 2025).
[49] Jennifer Hiller, **'Three New York Cities' Worth of Power: AI is Stressing the Grid**, *The Wall Street Journal*, September 28, 2024.
[50] Matt Morey, Glenn McGrath, and Hiroaki Minato, **Tracing electricity consumption from U.S. cryptocurrency mining operations**, United States Energy Information Administration, February 1, 2024.
[51] Erin McLaughlin and Dana M. Peterson, "**A Reshoring Renaissance Is Underway**," *MIT Sloan Management Review*, November 2, 2023.

CLEAN ENERGY AND THE NEED FOR RELIABLE POWER

The dramatic rise in energy demand to service burgeoning new technologies like AI and cryptocurrency has not diminished the more mundane need to heat and cool homes, power factories and businesses, and literally keep the lights on. Those needs persist and the added demand for energy only highlights the expectation that energy producers and grid operators provide consumers—and the information age economy—with reliable electricity. Two federal agencies oversee the reliable-energy effort.

The Federal Energy Regulatory Commission (FERC) and the North American Energy Reliability Corporation (NERC) manage grid reliability and energy generation. FERC focuses on the transmission of electricity, natural gas, and oil in the United States, and it regulates natural gas storage and hydropower projects. NERC assesses and maintains grid reliability to prevent electricity disruptions throughout North America. Through electric reliable organizations (ERO), NERC creates grid reliability standards and then monitors energy grids as they work to meet those standards. FERC sets the rules and regulations for NERC and approves and enforces its reliability standards.

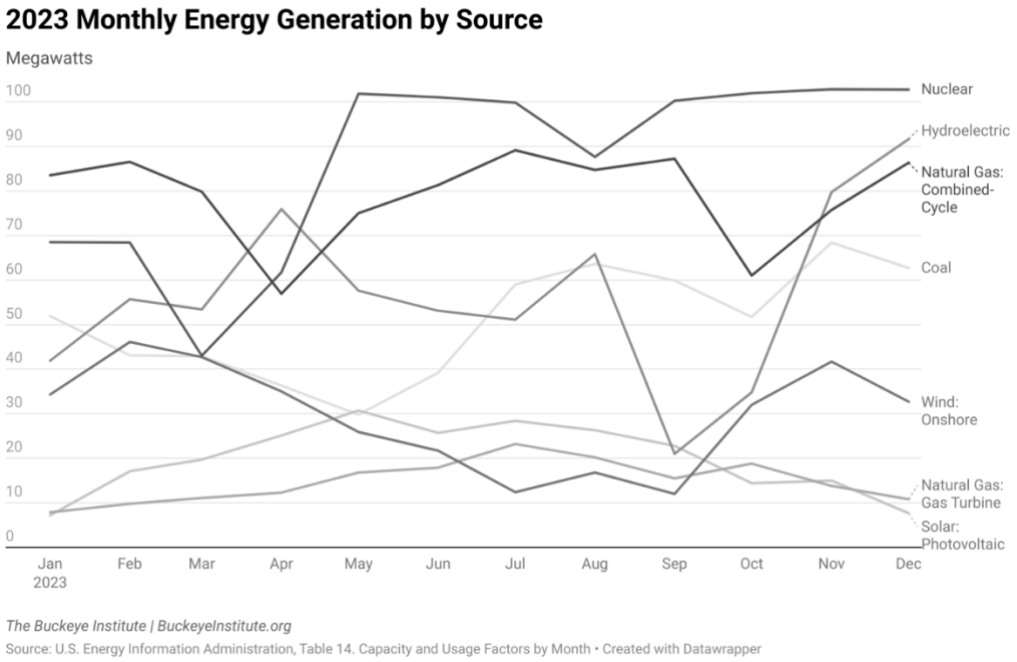
The Reliability First ERO, headquartered in Cleveland, covers Ohio, the Great Lakes, and part of the mid-Atlantic region. It audits utility companies and assists with training and outreach to promote grid reliability. Recent audits and estimates of Ohio's energy providers have been positive. Reliability First estimates, for example, that the PJM grid has a reserve power capacity of 39 percent, significantly exceeding the minimal reserve capacity of 27 percent.[52] But reserve power capacity has slightly decreased due to electricity demand increasing faster than supply, so although the PJM market has enough energy generation to meet short-term demand in an emergency, PJM's reserve margin has shrunk to meet the higher demand. PJM officials have warned of potential shortfalls in electricity generation in the next ten years.[53] Given the rising demand, fewer power plants have been retired, and some scheduled for retirement are instead continuing to operate.[54] A

[52] **Winter 2023-2024 Reliability Assessment**, Reliability First (Last visited January 14, 2025).
[53] Aftab Khan, **Statement on Resource Adequacy and Expected Load Growth, Docket No. AD24-10-000 to the Federal Energy Regulatory Commission**, PJM, October 16, 2024.
[54] Ashley Cai, **How Booming Electricity Demand is Stalling Efforts to Retire Coal and Gas, In Charts**, *The Wall Street Journal*, August 16, 2024.

power plant retires when it can no longer operate safely or efficiently, but policy and regulatory changes can force plants to retire prematurely. And forcing coal and natural gas plants to retire early for regulatory reasons could cause a regional energy shortfall of 400 gigawatts by 2032.[55]

As intermittent power sources (*e.g.*, solar and wind), replace dispatchable power sources (*e.g.*, coal and natural gas), the minimum reserve capacity should be raised to reflect the inherent unreliability and unpredictability of intermittent power sources—a particular concern during winter and in Ohio where sun and wind are not abundant.[56] In northern Ohio, December averages eight sunny days, with the other 23 days having at least 80 percent cloud cover. Later sunrises and earlier sunsets mean that the sun shines five to six hours less in Ohio during winter. Likewise, the wind needed to turn turbine blades to charge batteries does not blow on command, a key factor in wind's unpopularity in many areas.[57] Intermittent power sources have lower "capacity factors" than dispatchable power sources. A plant's capacity factor measures its actual production compared to its maximum potential production. In Ohio, natural gas plants boast an 81 percent capacity factor, while wind and solar have capacity factors of 33 and 22 percent, respectively.

[55] Mario Loyola, **Our Coming Energy Famine**, *National Review*, August 2024.
[56] **Average sunshine in Ohio for December**, Currentresults.com (Last visited January 14, 2025). In 2021, hundreds died in Texas as a result of a power grid failure during a winter storm. Texas had an inadequate amount of dispatchable power, which they have attempted to correct since 2021. Ensuring natural gas plants have adequate fuel supply and ability to operate in extreme adverse conditions is critical for a state like Ohio that gets most of its electricity from natural gas.
[57] Guori Ren, Jinfu Liu, Jie Wan, Yufang Guo, and Daren Yu, **Overview of wind power intermittency: Impacts, measurements, and mitigation solutions**, *Applied Energy*, Volume 204, Issue 15 (October 2017), p. 47-65.

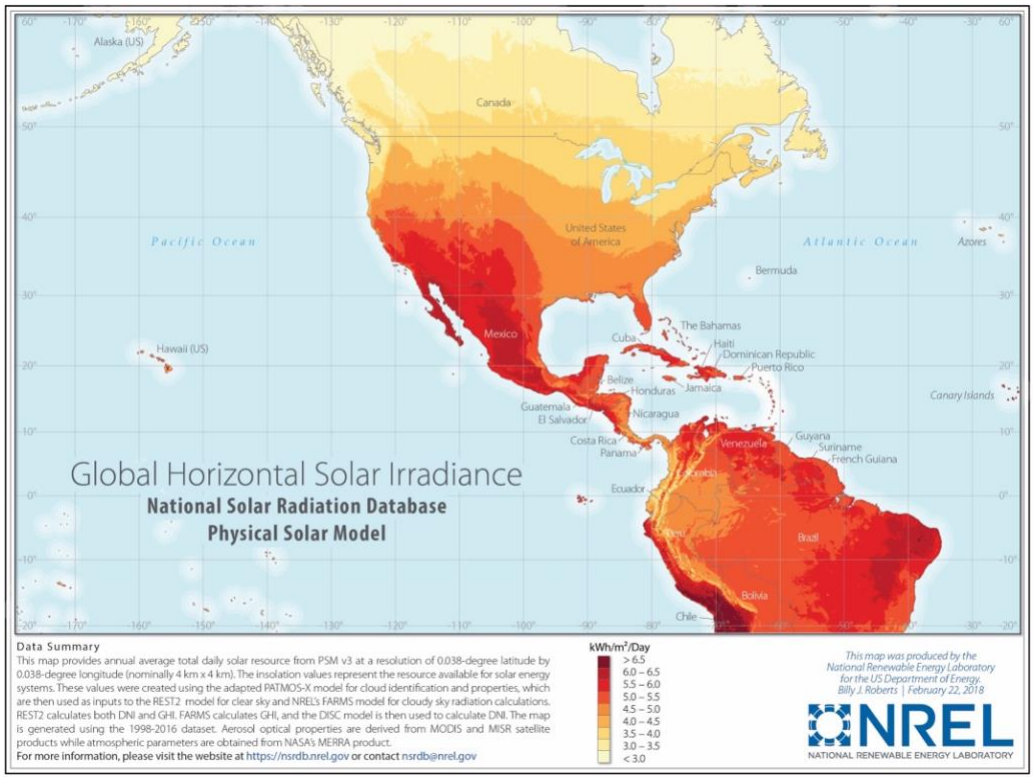


(click the chart to see an interactive version)

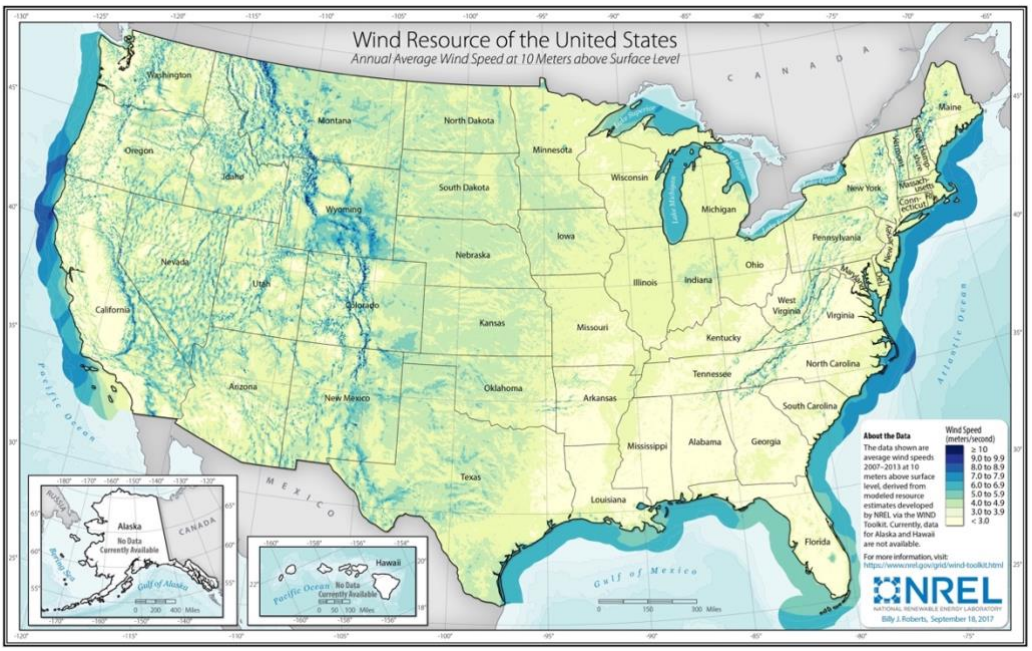
Relatively low-capacity factors in the intermittent energy sector affect grid reliability and planning. Safe reserve levels become harder to predict as intermittent energy sources are counted among available energy,[58] but PJM estimates that intermittent power generation should generate at least twice as much energy as a dispatchable power plant to maintain current levels of grid reliability, and even then traditional fuel sources are needed if more coal plants retire early.[59] PJM's independent market monitor (IMM) has cautioned that "[o]ne of the key challenges facing the PJM markets is the potentially high level of expected thermal resource retirements between now and 2030 with no clear source of replacement capacity. Although the exact numbers may vary, an estimated total of between 24,000 MW and 58,000 MW of thermal resources are at risk of retirement."[60] That IMM also noted that although there are plans for about 7,000 MW of reliable resource plants to come online, history suggests only about 3,800 MW should be expected, which will fall far short of replacing the 24,000-58,000 MW scheduled to retire. Similarly, although generous government

[58] Wood Mackenzie, **Addressing Risk from Renewable Energy Intermittency in Power Markets**, Forbes.com, April 22, 2024.
[59] **Energy Transition in PJM, Flexibility for the Future**, PJM, June 24, 2024.
[60] **State of the Market Report for PJM, January through June,** Monitoring Analytics, August 8, 2024.

subsidies yield plans for about 203,000 MW of renewable energy, only about 30,000 MW should be expected, and the capacity rating only counts for about 11,000 MW due to intermittency.[61]



[61] **State of the Market Report for PJM**, Monitoring Analytics, March 14, 2024.



The rise in the use of intermittent power sources to reduce "carbon footprints" is at odds with the simultaneous rise in ultra-reliable energy demands from AI-computing, cryptocurrency mining, and data storage centers that must be powered every minute of every day. Intermittent energy sources cannot meet the growing demand of the information technology age, and even though tech companies are turning to nuclear energy to help meet their electricity needs, doubts persist that nuclear power with its notoriously slow regulatory process can generate enough electricity to meet those demands.[62] According to PJM, intermittent energy sources threaten grid reliability and more backup power will be needed as coal plants close and yet its queue of energy generation projects is primarily for intermittent energy supply.[63] Some of the incongruity stems from the heavy state and federal subsidization of renewable energy, which makes the energy market less efficient, makes it harder for dispatchable powerplants to compete, and makes the grid less reliable. At the federal level, the Biden administration has endangered grid reliability by simultaneously encouraging the retirement of dispatchable powerplants and subsidizing intermittent energy sources. As PJM has warned, the region's reserve margin for emergency power could decline for the first time in history.[64] Given these concerns, dispatchable powerplants—especially natural gas

[62] Katherine Blunt, **Nuclear Powered AI: Big Tech's Bold Solution or a Pipedream**, *The Wall Street Journal*, October 22, 2024.
[63] **PJM Details Resource Retirements, Replacements and Risks,** PJM Inside Lines, February 24, 2023.
[64] *Ibid.*

plants—remain necessary to ensure grid reliability and meet energy demand for the foreseeable future. Clean energy advocates see natural gas as a key, reliable source of electricity for when intermittent sources fail.[65] And, according to NERC, "[n]atural-gas-fired generators are essential for meeting demand; they are dispatchable at any hour and provide a consistent rated output under a wide range of conditions."[66] But although natural gas is abundantly available in Ohio, relatively clean-burning, economically efficient, and reliable, Ohio and PJM will need additional pipeline and storage capacity to effectively supply enough natural gas for home heating, industrial uses, and growing electricity demand simultaneously. Policymakers should pursue efforts to ease natural gas supply constraints to help ensure long-term electric reliability.

[65] Robin Gaster, ***Why Wind and Solar Need Natural Gas: a Realistic Approach to Variability***, Information Technology & Innovation Foundation, September 24, 2024.
[66] **2023 Reliability Assessment**, North American Energy Reliability Corporation, December 2023.

AFFORDABLE ENERGY AND ECONOMIC GROWTH

Affordable energy is vital to Ohio's economy. Despite the recent emergence of data and technology centers in parts of the state, manufacturing still comprises more than 15 percent of Ohio's economy and employs more than 10 percent of the workforce. It is the third largest chemical manufacturing state in the country, and steel mills, automobile factories, iron works, and fabricators still call Ohio home. These and other manufacturers rely heavily on electricity, which can be the second or third highest cost of doing business. Not surprisingly then, manufacturers consider energy costs when deciding where to locate and invest; and they consistently move to areas with lower energy prices.[67] One major steel producer in Ohio estimates that a tenth of a cent increase in the price of electricity can raise the cost of steel mills by a million dollars annually.[68] Those higher costs impact economic prospects and growth, with academic consensus showing that higher energy prices and volatility negatively affecting national, state, and local economies.[69] Thus, if manufacturing costs rise and the sector struggles, Ohio's economy will suffer.

Europe's experience should warn American policymakers of the economic dangers of pursuing poor energy policies. European energy policies and carbon taxes favored intermittent green energy and forced many dispatchable powerplants to close. Even before the Russian invasion of Ukraine, Europe suffered artificially high electricity prices—with natural gas being four to five times more expensive than in the United States—that place it at a severe economic disadvantage to America, China, and other global competitors.[70] And those high energy prices have caused some European manufacturers and energy-intensive companies to relocate for competitive reasons,[71] and almost half of Germany's energy-intensive

[67] Matthew E. Kahn and Erin T. Mansur, **How Energy Prices, and Labor and Environmental Regulations Affect Local Manufacturing Employment Dynamics? A Regression Discontinuity Approach**, National Bureau of Economics working paper #16538, November 2010.
[68] Joe Nichols, ***Power to the People: Repeal Ohio's Counter-Productive Energy policies***, The Buckeye Institute, July 20, 2015.
[69] **The Economic Effects of Recent Increases in Energy Prices**, Congressional Budget Office, July 21, 2006.
[70] Mario Draghi, et al, ***The future of European competitiveness***, European Commission, September 2024.
[71] David Uberti, **High Natural-Gas Prices Push European Manufacturers to Shift to the U.S.**, *The Wall Street Journal*, September 21, 2001.

companies currently plan to reduce output or relocate to more affordable energy areas.[72] European economic growth has stagnated and economic growth in Germany, Europe's biggest economy, declined in the second quarter of 2024.

The United States should learn from Europe's mistakes as it competes against China for manufacturing, computing, and technological superiority. As China and the U.S. invest in AI programming, for example, affordable, reliable energy will be needed. And China is unburdened by the EPA or green energy advocates. It seeks enhanced AI to tighten state control and increase regional economic and military power as it builds new coal-powered and nuclear plants to meet the affordable energy demands of its technology sector.[73] Without affordable power, the United States will fall behind. Just as European manufacturers migrate to America for cheaper fuel, some technology companies are already leaving the U.S. over concerns that domestic energy policies will restrict affordable energy and therefore impede AI development.[74]

[72] Riham Alkousaa and Christian Kraemer, **More German companies mull relocation due to high energy prices-sruvey**, Reuters, August 1, 2024.
[73] Jessica Brandt, Sarah Kreps, Chris Meserole, Paveneet Singh, and Melanie W. Sisson, ***Succeeding in the AI Competition with China, a Strategy for Action***, Brookings Institute, September 30, 2022.
[74] Tim Fist and Arnab Datta, ***How to build the future of AI in the United States***, Institute for Progress, October 23, 2024.

POWER PLANTS AND REGULATORY APPROVALS

Building power plants and running transmission lines require regulatory approvals from local, state, and federal agencies. At the local level, zoning and siting boards can dramatically affect plant and transmission line construction through permitting requirements, nuisance and noise ordinances, tax abatements, and public hearings.[75] Opposition at the local level influences decisions at the state level on approving power plants.[76] At the state level in Ohio, the Ohio Power Siting Board regulates energy generation plants and transmission lines. The board reviews the need for a facility or transmission line, assesses its likely environmental impact and water use, and determines whether the proposed project is consistent with regional plans. Siting Board members include the head of state agencies and the chair of PUCO, which regulates various utilities markets to promote competition, affordable prices, and safety. And at the federal level, FERC regulates interstate energy transmission and wholesale commerce of natural gas and electricity. Other federal agencies also exercise regulatory authority for certain energy generators. The U.S. Nuclear Regulatory Commission, for example, oversees construction, maintenance, and ongoing operations of nuclear plants. And the EPA can regulate powerplant operations through emissions and other environmental requirements. Stringent EPA rules can force powerplants to close or never be constructed.

[75] Samantha Gross, ***Renewables, Land Use, and Local Opposition in the United States***, Brookings Institute, January 2020.

[76] For example, see the decision of the Ohio Power Siting Board in **Case No.21-1090-EL-BGN**, November 20, 2024.

Basic Principles of Good Energy Policy

Ohio families and businesses need good energy policy to ensure a healthy supply of affordable, reliable energy to meet the state's rising consumer demands. State, local, and federal regulations have made reliable energy more expensive to generate, and recent policy preferences favoring intermittent energy sources jeopardize the region's power grid. Government subsidies have distorted energy markets, rewarded inefficiencies, hampered competition, and limited innovation. Ohio deserves smarter, principled energy policies that reduce bureaucratic red tape and help power supply keep pace with new demands.

End Government Subsidies That Damage Energy Markets

Subsidies distort markets and corporate decision-making. They protect companies from competition and prevent them from creating and delivering better products. Companies spend on lobbying politicians to maintain or increase their subsidies rather than spending on innovation, customer service, staff, or expansion. Subsidies come from taxpayers. They take money from businesses and families and redirect it to government-favored entities. The Biden administration's Inflation Reduction Act gave almost $400 billion in subsidies to green energy projects, distorting the decisions of energy suppliers to build or upgrade energy plants.[77]

Focus on Energy Reliability and Affordability

Electricity is fundamental to American life and should be affordable and available when needed. Policies must ensure that power grids remain operational during inclement weather and high demand. Energy policies that encourage power plants to retire early make electricity more expensive and less reliable by restricting supply in the face of rising demand.

[77] Trevor W. Lewis and Ankith Reddy, ***Net-Zero Climate Control Policies Fail the Family Farm***, The Buckeye Institute, February 7, 2024.

The Permitting Process Needs to be Faster and More Efficient

Federal, state, and local approvals needed to build powerplants and transmission lines can delay construction for years if not decades.[78] The permitting process for powerplants, especially at the federal level, should be easier. The transmission permitting process has become increasingly cumbersome at the state and local levels, which makes it harder to get affordable electricity to where it is needed. Ohio policymakers should encourage federal reforms and pursue state policies that streamline rules and make permitting for energy infrastructure more efficient.

Environmental Policies Should Promote Well-Being

Clean air and water contribute to the well-being of people. Businesses and families should be encouraged to adopt policies that keep their communities and outdoor areas clean, but those decisions should be voluntary and people should not be coerced to buy certain products in the name of energy efficiency.[79] Policies that promote cheaper, more efficient energy enrich families and businesses, allowing them to purchase more goods and services that can be beneficial for the environment.

Abundant Energy is Needed for Prosperity

Businesses of every type and in every sector need energy to operate. Affordable, plentiful energy allows businesses to operate more competitively and profitably, which in turn spurs additional growth and prosperity or owners, shareholders, and employees. Policymakers should pursue energy and environmental policies that keep energy affordable and readily available.

Promote Transparency and Competition

Market and industry transparency promote competition, and competition leads to innovation and affordability. Energy companies should be transparent about their environmental impacts and their needs for new energy projects. Ohio utilities, for example, should publicize maps that show current and projected transmission line capacity to encourage businesses to locate in areas with fewer capacity constraints. And energy regulators should encourage competition by not favoring certain

[78] Daniela Rus and Nico Enriquez, **To compete with China on AI, we need a lot more power**, *The Washington Post*, September 24, 2024.
[79] Joe Nichols, ***Power to the People: Repeal Ohio's Counter-Productive Energy policies***, The Buckeye Institute, July 20, 2015.

companies or energy types. Energy providers should succeed and fail on the merits of their products and services, not government subsidies or regulatory favoritism.

CONCLUSION

Energy is the lifeblood of the modern economy. Electricity powers manufacturers, businesses, and the family home. Demand for affordable electricity in the digital information age is rapidly rising as new technologies consume and rely upon around-the-clock power. As energy demand increases, government regulations have simultaneously restricted energy supply or increased production costs. Regulatory shifts favoring intermittent "green" energies to the disadvantage of dispatchable energy sources have endangered regional power grids. Demand is poised to outpace supply, which will raise prices and even threaten reliability such that Texas-style crises may become more common. Expensive, unreliable energy has already damaged European economies and will harm American households and businesses if policymakers pursue similar, failed policy preferences. Ohio energy policies have had mixed results of late, and state and local policymakers should learn from Europe's mistakes. Energy policymakers should encourage private sector competition among energy providers, reduce and discourage government subsidies, promote market and corporate transparency, streamline and expedite powerplant and transmission line permitting, and recognize the vital role that reliable, affordable energy plays in 21st century America. Policymakers need to act with urgency because long development timelines for energy infrastructure mean that changes are needed now in order to prevent a severe crisis in the not-too-distant future.

APPENDIX: GLOSSARY OF ENERGY TERMS

Dispatchable Power: Power that can be turned on or off on demand by power grid operators to supply more or less electricity as needed.

Electric Security Plan (ESP): A traditional, cost-of-service-based rate plan, similar to the process in place before Ohio's restructuring. Utilities can base their standard service offer (SSO) on either an ESP or a market rate offer (MRO). ESPs allow utilities to add extra fees called "riders" to their rate plans, some of which are billed to the customer even if they switch to another electricity supplier. Utilities have historically relied on ESPs and not MROs to set their rates.

Federal Energy Regulatory Commission (FERC): The Federal Energy Regulatory Commission, or FERC, is an independent agency that regulates the interstate transmission of natural gas, oil, and electricity. FERC also regulates natural gas and hydropower projects as part of its mission to help consumers obtain reliable, safe, secure, and economically efficient energy services at a reasonable cost through appropriate regulatory and market means, and collaborative efforts.

Grid Reliability: The power grid is stable and can adequately meet consumer demand, including during emergencies such as a heat waves and winter freezes.

Independent Market Monitor (IMM): The IMM examines compliance with PJM rules and regulations to ensure competition and a reliable energy grid. The IMM looks at how PJM's plan is implemented and comments on flaws in PJM's plan and operations.

Inflation Reduction Act (IRA): A federal law enacted in 2022 without Republican support that allocated almost a trillion dollars in subsidies to so-called green companies.

Intermittent Power: Power that is not available on demand because it relies on an external source such as wind or sun. It cannot be increased to meet higher energy needs when the external source is not producing energy.

Market Rate Offer (MRO): A process by which utilities seek open bids in the wholesale electricity market to supply power to their standard service offer (SSO) customers and pass along the costs from the lowest and best bidder.

Megawatt: One million watts, which is enough electricity to power 600-800 homes in Ohio.

North American Electric Reliability Corporation (NERC): A nonprofit international regulatory authority that focuses on grid reliability and security.

Ohio Power Siting Board: The 11-member Ohio regulatory authority that approves changes to the Ohio power infrastructure such as building new powerplants and transmission lines. Chaired by the chair of PUCO, other board members are directors from the departments of Agriculture, Health, Development, Natural Resources, and the Environmental Protection Agency. The last voting member is an engineer appointed by the governor. There are four non-voting members, two from the Ohio House of Representatives and two from the Ohio Senate.

PJM: A regional transmission organization (RTO) that manages the commerce, delivery, and reliability of electricity through 13 states and Washington, DC, and provides long-term planning of electricity delivery and generation in its region.

Public Utilities Commission of Ohio (PUCO): Ohio's regulatory body overseeing utilities such as water, electricity, telecommunications, rail, and trucking. Five governor-appointed members serve five-year terms. PUCO members cannot be employed by utilities or share in their financial interest.

Renewable Portfolio Standards (RPS): Ohio's requirement that a certain amount of electricity be generated by renewable sources, with the required amount varying by year and acts of the legislature.

Riders: A utilities add-on charge that allows them to recoup specific costs for programs and investments.

Rural Electric Cooperative (Rural Co-op): A nonprofit utility in which customers are also the owners. Ohio has 25 rural co-ops.

Stranded Costs: Costs to a power company that cannot be recovered due to market or policy changes such as when a power company builds a nuclear plant, but regulatory policy changes force the plant to close.

Standard Service Offer (SSO): The default electricity rate that consumers pay if they do not choose an electricity rate plan.

U.S. Nuclear Regulatory Commission (NRC): An independent federal agency that monitors and regulates the use of radioactive materials, including nuclear reactors, waste from reactors, and transportation of radioactive fuel and waste.

ABOUT THE AUTHORS

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Prior to joining Buckeye, Hederman was director, and a founding member of the Center for Data Analysis (CDA) at the **Heritage Foundation**, where he served as the organization's top "number cruncher." Under Hederman's leadership, the CDA provided state-of-the-art economic modeling, database products, and original studies.

While at Heritage, Hederman also oversaw the organization's technical research on taxes, healthcare, income and poverty, entitlements, energy, education, and employment, among other policy and economic issues. He was also responsible for managing Heritage's legislative statistical analysis and econometric modeling.

Hederman's commentary has been published in *The Washington Post*, *The Washington Times*, *National Affairs*, *The Hill*, National Review Online, and FoxNews.com, among others. He is regularly quoted by major newspapers and wire services, and has appeared on Fox News Channel, CNN, CNBC, and MSNBC.

Hederman graduated from **Georgetown Public Policy Institute** with a Master of Public Policy degree and holds a Bachelor of Arts from the **University of Virginia**.

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Lawson also serves as Buckeye's liaison to the state government policymakers where he educates policymakers in the legislative and executive branches on free-market solutions to Ohio's challenges. In this role, he is regularly called on to **testify** before legislative committees on policies that impact Ohio's families and the state's economy.

With nearly 20 years of experience working on 10 state budgets, Lawson is a recognized expert on Ohio's budget, and is the co-author of ***Principled Spending: Using Ohio's Capital Budget to Benefit Ohioans***. He has a deep knowledge of state and local taxes, and how Ohio funds Medicaid, education, and transportation. He is the author of the *Piglet Book*, The Buckeye Institute's biennial publication outlining areas of government waste.

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Lawson is a frequent speaker across the state of Ohio and is regularly quoted in media outlets throughout the state. His writings have appeared in most major Ohio newspapers including *The Cincinnati Enquirer, The Plain Dealer,* and *The Columbus Dispatch*, as well as national publications including *Forbes*. He also regularly provides commentary on policy and Ohio's political landscape on Ohio's premier public affairs programs.

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