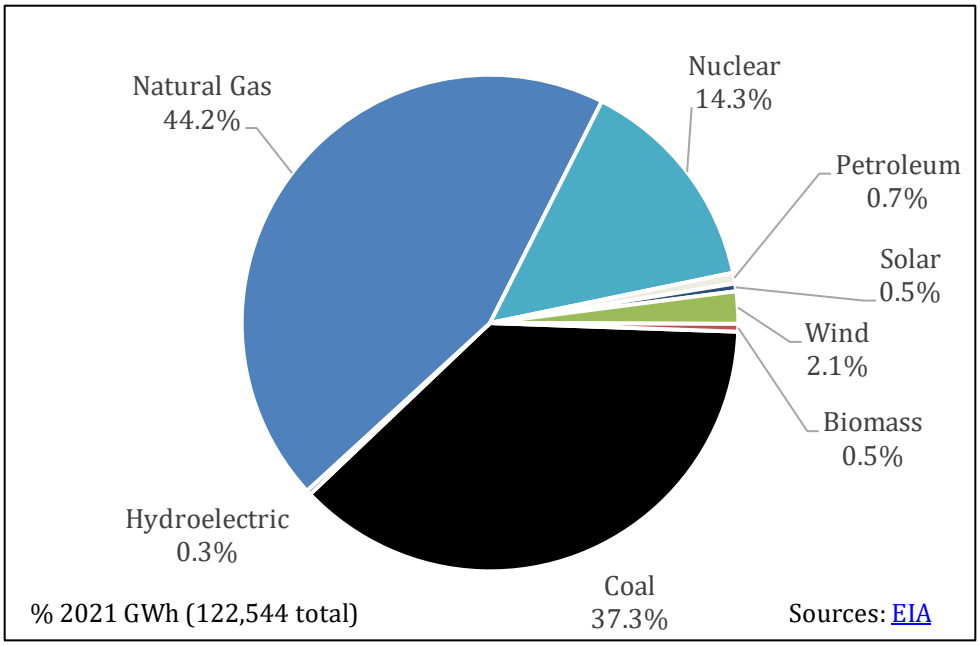
State Brief: Ohio

BACKGROUND

Ohio is the nation's 14th largest coal-producing state. While Ohio exports approximately one-third of its coal production out of state by barge, truck, and rail, it is also one of the nation's top ten consumers of coal, requiring the state to rely heavily on coal imports to meet its energy needs. In 2019, in-state natural gas production was 34 times greater than in 2010, and although production declined in 2020, it remained nearly 31 times higher than the previous decade. In 2021, natural gas made up 44% of the state's net generation while coal dropped to 37%.

Ohio has the fourth-largest interstate system in the U.S., and transportation is the third largest consumer of energy in the state.

Ohio's Net Annual Electric Generation, 2021



Renewable energy resources supply almost 3% of Ohio's net electricity generation. Wind power supplies three-fifths of the state's renewable energy. The Buckeye State had more than 850 megawatts (MW) of installed wind generating capacity in April 2021. Ohio's renewable portfolio standard (RPS) was a driving force behind wind development, however in 2019, House Bill 6 reduced the current RPS to 8.5% by 2026 and will terminate the RPS after that.

The 2021 U.S. Energy and Employment Report found that Ohio has 87,724 traditional energy workers (2.0% of total state employment). In 2020, Ohio ranked eighth nationwide for clean energy jobs (including jobs in energy efficiency and solar) and the industry employed 103,437 Buckeyes.[1]

The Public Utilities Commission of Ohio (PUCO) regulates the state's electric and natural gas utilities. Bipartisan by law, the PUCO's five commissioners are appointed to a term of five years by the Governor. Ohio is currently under unified control with Republican majorities in both the House and Senate. Republican Governor Mike DeWine was elected in 2019.

In April 2018, PUCO approved American Electric Power (AEP)'s Electric Security Plan (ESP), which is approved through May 2024. The ESP allocates $10 million for an electric vehicle (EV) charging station rebate program and another $10 million for microgrid projects to increase reliability and resilience. In addition, the ESP requires that AEP will build or enter into power purchase agreements (PPAs) for 900 MW of wind and solar. AEP earned PUCO approval for phase 3 of the more than $220 million effort to modernize its grid. AEP equipped 900,000 homes with smart meters during phases 1 and 2 of the plan, with an additional 475,000 expected be installed in phase 3.

POLICY STRENGTHS AND OPPORTUNITIES

The National Renewable Energy Laboratory (NREL) developed the notion of "policy stacking,"[2] an important framework for policymakers to consider. The basic idea behind policy stacking is that there is an interdependency

[1] This is in addition to the number of traditional energy jobs in the state.

[2] V.A. Krasko and E. Doris, *National Renewable Energy Laboratory*, 2012. Strategic Sequencing for State Distributed PV Policies: A Quantitative Analysis of Policy Impacts and Interactions. http://www.nrel.gov/docs/fy13osti/56428.pdf.

and sequencing of state policy that, when done effectively, can yield greater market certainty, private sector investment, and likelihood of achieving stated public policy objectives.

In theory, but not always in practice, clean energy policies can be categorized into one of three tiers of the policy stack. Tier 1, market preparation policies, remove technical, legal, regulatory, and infrastructure-related barriers to clean energy technology adoption. Tier 2, market creation policies, create a market and/or signal state support for clean energy technologies. Tier 3, market expansion policies, create incentives and other programs to expand an existing clean energy market by encouraging or facilitating technology uptake by additional market participants.

For example, before financial incentives for combined heat and power (CHP) will be successful, two key considerations for deployment are having clear interconnection standards and favorable stand-by rates for customers who opt to add CHP. In this example, states should adopt policies to address interconnection and stand-by rates before adopting financial incentive programs.

MODERNIZING UTILITIES AND EMPOWERING CONSUMERS

Digital technologies have enabled utilities to better manage the grid and provide opportunities for consumers to customize their services to fit their priorities. These technologies allow a two-way flow of information between the electric grid and grid operators and between utilities and their customers.

Emerging technologies improve system reliability and resiliency by enabling better tracking and management of resources. These technologies allow grid operators to incorporate central and distributed energy resources, energy storage technologies, and electric vehicles, and assist in addressing the challenges associated with planning, congestion, asset utilization, and energy and system efficiency.

On the customer's side of the meter, dynamic pricing, advanced metering infrastructure, and other technologies allow an exchange of information and electricity between a consumer and their electric provider. Grid modernization is associated with greater consumer choice by allowing customers to meet their energy priorities by producing their own energy or through contracting innovative clean energy services from different providers.

Grid modernization will require a suite of state and federal policy changes to support advancements in grid technologies, grid management, and utility regulation.

Launched in April 2017, the PUCO's PowerForward proceeding was intended to "chart a path forward for future grid modernization projects, innovative regulations, and forward-thinking policies." The PUCO released the follow-up report, PowerForward: A Roadmap to Ohio's Electricity Future, at the end of August 2018. The Roadmap recommended creating a PowerForward Collaborative to study issues related to the deployment of electric vehicle (EV) charging infrastructure, energy storage, and other non-wires alternatives (NWAs). However, the proceedings were officially closed in April 2020. No work appears to have been undertaken on this initiative post early 2019. Ohio's policymakers might consider reviving the PowerForward workgroup to continue this work.

The Infrastructure Investment and Jobs Act of 2021 (IIJA) is a landmark federal spending bill that includes earmarked funding for grid modernization projects. This funding includes $11 billion for Department of Energy grants directed specifically towards electric infrastructure to enhance resiliency (including grid hardening against severe weather and cybersecurity improvements), $2.5 billion for transmission development, and $3 billion for the Smart Grid Investment Matching Grant Program.[3]

There are policies that Ohio's policymakers could adopt to support in-state grid modernization efforts:

1. Build upon the PowerForward proceeding. Legislation could require that grid modernization plans address cybersecurity, integrating distributed energy resources (including EVs and energy storage), and demand response and/or demand-side management (DSM) programs. Policymakers might also consider requiring that these plans outline a clear set of grid modernization goals and that they describe methods to measure, report,

[3] For more information on the grid-related earmarks included in the IIJA, see Potomac Law Group's January 2022 analysis: "The Infrastructure, Investment & Jobs Act of 2021: What's in It For You? (Part V: Grid Infrastructure and Resiliency)" https://www.potomaclaw.com/news-Infrastructure-Investment-Jobs-Act-of-2021-Whats-In-It-For-You-Part-V-Grid-Infrastructure-and-Resiliency

verify, and enforce progress towards those goals. The state can also provide incentives or cost recovery mechanisms for utilities that meet grid modernization goals.

2. Develop new utility business models. Today, non-traditional energy resources, including emerging, disruptive technologies (for example, customer-owned distributed generation, EVs, and energy storage) are increasingly cost competitive with more traditional resources. This has not only led to shifting customer expectations but also to new market realities confronting energy providers. In light of this, many argue that the regulated utility industry needs a new set of principles that are more sophisticated, forward-planning, and incentive-based. The state could build upon the PowerForward proceeding by continuing to investigate alternative ratemaking mechanisms and utility business models that support grid modernization, which includes promoting improved system efficiency, increased penetration of distributed energy resources (DERs), and enhanced affordability, reliability, and customer satisfaction. The state might also investigate performance-based regulation.

3. Utilities in Ohio have taken the lead in smart meter deployment, approximately 1.3 million homes will be equipped with smart meters by the end of phase 3 of AEP's plan, with 900,000 homes already installed. In June 2021, the PUCO approved phase 1 of AES Ohio's smart grid plan, a $267 million investment in the area's grid. The PowerForward Roadmap suggested creating a Data and the Modern Grid Workgroup to address a protocol for privacy protections and real-time data availability. Ohio does not have clear state policies governing customer data access and privacy protections. To address this, policymakers could develop legislation or rules that, at minimum, do the following: clarify who owns the energy data associated with customer energy usage; protect customer privacy; outline the process for allowing direct access to data by third parties; and promote access to the highest resolution of data possible. AEP facilitates customer access to energy data through the Green Button Connect program.

4. State departments of workforce services or their equivalent can be directed to work with utilities and other stakeholders to develop training programs for grid technicians and engineers. With new grid technology and distributed energy systems coming online, a new generation of workers can be trained to meet evolving needs, which will keep jobs local and contribute to economic development.[4]

The adoption of incentives for or a requirement to integrate a certain amount of renewable energy and energy storage on the grid alongside enhancing energy conservation and electric vehicle policies can support modernization efforts.

MAINSTREAMING RENEWABLES

As the renewable energy industry has matured, technology has improved, and global production of equipment has increased, renewable energy is increasingly seen as the least cost and lowest risk form of energy (excluding energy efficiency). With increased deployment, utilities are learning more about how to integrate renewables effectively, investors are becoming more comfortable with the technologies, and building code officials are recognizing common standards and best practices for integrating distributed renewable energy resources. In the U.S., the expansion of renewable energy has been one of the most consequential shifts in electricity generation over the last decade. The U.S. Energy Information Administration (EIA) predicts that most of the growth in U.S. electricity generation in 2022 and 2023 will be from new renewable energy sources. For these reasons, it is in the interest of policymakers to ensure that their states are well positioned to benefit from this shift.

While the IIJA doesn't provide money for specific renewable energy projects, the energy funding in the Act will benefit renewable energy development. Grid resiliency, energy storage, and updated transmission are all essential to the successful integration of renewable energy generation.

To reduce barriers to customer and utility participation in the renewable energy market, Ohio might consider several policy options.

[4] For a discussion of specific workforce needs states might explore see: GridWise Alliance and U.S. Department of Energy. 2020. "Grid Modernization Index Insights into a Transformation: Principles for the Next Decade of Progress."

Customer-Oriented Policies

1. **Interconnection, Net Metering, and Streamlined Permitting –** In general, customers want a clear, streamlined, affordable, and predictable process for connecting renewable energy systems to the grid. To ensure this, Ohio's policymakers could consider requiring that utilities credit net excess generation at the customer's retail rate. Allowing aggregated net metering would be especially beneficial to the state's agricultural operations. Other applications for aggregated net metering include commercial properties and public entities like state and local governments, universities, and schools. The state might also consider establishing either statewide standards for streamlined permitting processes, or resources to support local governments that voluntarily implement a streamlined program. In May of 2021, NREL launched the SolarAPP+, an online platform designed to automate the solar permitting process. By running compliance checks and processing permit approvals, the service is intended to drastically reduce permit wait times. Currently restricted to rooftop solar, thirteen communities in Arizona and California have adopted the platform, processing nearly 5,000 permits for more than 31 MW of generation with an estimated 4,700 hours saved in permit review time. State incentives, such as tax credits, financial incentives, or loans can be tied to systems that are established within a designated streamlined permitting jurisdiction.

2. **Shared Renewables –** Due to building and property attributes and ownership issues, many customers are unable to install renewable energy technologies. Allowing shared, or community, renewable energy projects addresses these barriers. These projects have multiple owners or subscribers who pay for a portion of the generation provided by the system. A $3.55 million grant from the George Gund Foundation to the GO Green Energy Fund in 2020 will provide funding for approximately 1 MW of community solar for the Hough in Cleveland. Buckeye Power electric co-ops have installed 2.1 MW of community solar infrastructure across 23 locations throughout Ohio. To expand access to these types of projects, state policymakers might consider requiring that utilities contract a minimum capacity of shared renewables annually. Alternatively, legislation might direct the PUCO to develop a statewide virtual net metering policy. Virtual net metering allows a customer to receive credits from a shared system as if the generation were on site. Virtual net metering is different from a power purchase agreement (PPA), which pays the customer for the proportion of power they produce. Because it is treated as a credit on the customer's bill, the customer can avoid the tax implications of a PPA payment - which can adversely affect the economics of the system (and may come as a surprise to the participant).

   Low credit ratings often deter participation in renewable energy markets; this can affect low- and moderate-income (LMI) households' adoption of renewable energy solutions. Supportive policies for shared renewables can be designed to encourage participation by LMI households; this can increase adoption of renewable technologies and reduce energy costs. Low-income participation can be encouraged either through a percentage mandate for the overall annual contracted capacity, or by offering a higher rate of payment for the portion of shared solar capacity attributed to low-income customers. States that have a shared renewables program may want to coordinate this program with implementation of the federal Weatherization Assistance Program (WAP) to provide recipients of assistance with access to participation in a shared system.

   There are several additional policy options that Ohio might consider to promote renewable energy uptake by low- and moderate-income consumers. Generally, successful state policies should be tailored to these customers, be cost-effective and financially sustainable, have measurable performance indicators, and be flexible enough to allow later changes in design.

3. **Energy Assistance Programs –** Programs such as the Low-income Home Energy Assistance Program (LIHEAP) and WAP provide assistance for paying utility bills and reducing household energy costs. Including distributed energy resources as eligible for funding under these programs can reduce energy costs and increase energy security for those LMI families who are able to benefit from WAP and LIHEAP. Colorado, for example, includes rooftop solar in their WAP program. For approval to add solar to a state's implementation of WAP, a state must show that the investment would be cost-effective – achieving a Savings to Investment Ratio (SIR) of 1.0 or more.[5]

[5] For guidance on the state approval process see the WAP Memorandum 024 (2017), the Solar Template for Incorporating Solar Photovoltaics into WAP (2018), and the Preliminary Assessment Guide for Integrating Renewable Energy into Weatherization (2019).

Since 2010, Ohio has received $145.5million from WAP and $18.7 million from the State Energy Program (SEP) which has helped to fund a number of energy initiatives in the state.

4. **Funding Distributed Generation (DG) for Community Organizations –** Organizations or groups that provide support services for LMI communities can be provided funding to install solar or other distributed energy resources. Sites such as homeless shelters, food banks, clinics, and community centers often have enough rooftop area for solar installations. After installation, these resources can reduce an organization's utility bills, freeing up funds for other activities that support the community.

5. **On-Bill Financing/Pay As You Save (PAYS) –** PAYS programs enable LMI consumers to invest in energy upgrades with no upfront payment. The utility or a third party will pay the initial costs to install the upgrade with the cost of that upgrade recovered through the utility bill. Because repayment includes consideration of the cost savings resulting from the energy upgrade, customers see monetary benefits almost immediately. Once equipment costs are recovered, the equipment belongs to the customer. State policies that reduce lending risk by creating a loan loss reserve and/or a credit enhancement fund can encourage lending to customers that might otherwise not qualify for a loan and can keep interest rates low.

6. **Corporate Procurement –** Many Fortune 100 and 500 companies have established either climate goals or commitments to purchase renewable energy. Since 2016, over 41 gigawatts (GW) of renewable contracts have been announced by corporate entities. In 2020 alone, corporations signed 100 agreements for over 10 GW of renewable energy. Procter & Gamble, headquartered in Cincinnati, set a goal of 100% renewable energy by 2030. Facebook continues to expand its New Albany data center, while also maintaining a commitment to powering the facilities through 100% renewable energy. JPMorgan Chase completed a 2.8 MW rooftop solar array project at its Polaris Corporate Center in Columbus in 2019 and announced plans for a 12 MW array covered carport project in 2020. These installations are part of the company's commitment to source 100% of its energy from renewable resources. In 2020, Smart Columbus introduced a renewable energy procurement initiative for large energy buyers in the region. Ohio's policies allow companies to purchase renewable energy credits (RECs), provide access to renewable energy through the retail and wholesale markets, and develop or lease onsite renewable energy projects.

   Ohio's policymakers might consider developing a statewide shared renewables policy to support corporate procurement. In addition, it is prudent to integrate corporate renewable purchase commitments into the long-term plans that utilities submit to regulators to plan for resource needs over multiple decades. By integrating these renewable purchase commitments into utilities' plans, regulators can avoid over-building resources and stranding generation assets.

Utility-Oriented Policies

Some states have created programs that aim to reduce greenhouse gas (GHG) emissions and increase investments in clean energy resources. Utilities are also setting their own GHG reduction goals and are increasingly investing in clean energy resources. As mentioned above, House Bill 6, passed in 2019, will terminate Ohio's RPS after 2026. To increase utility adoption of clean energy technologies, Ohio's policymakers might consider the following:

1. **Accelerating and Amending Renewable Portfolio Standards –** States can revisit existing RPS policies to increase targets and/or accelerate target dates to continue to spur the development of renewable resources and save ratepayers money. Additionally, states might add one or more carve-outs to further incentivize the development of distributed generation and offshore resources. Embedding an RPS within broader clean electricity or emissions standard can allow technological flexibility.

2. **Emissions Standards –** Emissions targets can take a technology neutral approach that looks at the total emissions of the utility portfolio and drives emissions down with a combination of renewables, traditional fuels, efficiency, and technological advances. Emissions reductions can be achieved through 1) a carbon portfolio standard approach, or 2) a market-based approach. A portfolio emissions standard sets emissions reduction targets to be achieved over time. This can be implemented through the IRP process or by establishing a maximum allowable rate of emissions per unit. Under a market-based approach, a state or a group of states might set a certain emissions reduction target, for example, 50% below 2005 levels by 2030. This reduction is achieved by the distribution of annual emission allowances that decrease to the point that the standard is met in 2030. One

of the advantages of a market-based program is that it is designed to reduce emissions in the most economically efficient manner possible. Such a standard can also address other concerns such as pollution, asthma risk, environmental justice, and water use.

3. **Clean Peak Standards (CPS) –** Clean Peak Standards aim to increase the share of clean energy resources used to meet peak demand and decrease energy bills over the long-term by reducing peak demand in the hours when energy costs are highest. These objectives can be met through different policy options, including planning and procurement that focuses on peak demand; a moratorium on the construction of new peaking units or a phase out of existing units; incentives – including carve-outs in states with RPSs – for clean energy resources delivered during peak times; and/or adopting a new clean peak standard that sets a target for clean energy deliveries during peak times.

ENERGY STORAGE

Energy storage offers a unique opportunity to manage supply and demand dynamically while also maximizing the value of grid resources. By deploying storage to strategic locations, utilities can more effectively manage their energy portfolios. First, storage allows utilities to manage intermittent demand – helping reduce peak demand requirements. Because the generation resources that provide peak power are the system's most expensive, reducing peak demand can save consumers money. Second, the responsiveness of energy storage can allow utilities to implement voltage regulation and other ancillary services, which are useful for improving system efficiency. Third, because storage technologies can both store and dispatch power, storage enables better integration of intermittent power generation resources like renewable energy to the grid.

On the customer side of the meter, the flexibility of battery storage combined with advanced metering infrastructure allows customers to control, for instance, how and when they use energy from the grid or from solar panels installed on their home or business. In most cases, this can provide greater cost savings than standalone solar systems. Energy storage can also help the commercial sector avoid costly demand charges. As utilities around the country consider implementing or extending demand charges to other sectors, energy storage will become more relevant as a customer cost-saving investment. Combined with time-varying rates or real-time pricing programs, state policy can further support customer choice and open a new market for energy services. Further, prices that better reflect the time-varying and location-dependent costs of producing and delivering electricity can lead to several economic and environmental gains.

Two major trends have enabled increased deployment of energy storage: declining costs and technological advances. State policies can help maximize the benefits of energy storage by establishing both a framework for easy integration of storage resources onto the grid and a marketplace that monetizes the benefits of energy storage for cost-effective investment.

The April 2018 settlement leading to PUCO's order approving AEP's ESP includes a provision requiring that AEP assist Kroger and Walmart with DSM programs that utilize battery storage. Funding will be provided through AEP's energy efficiency and peak demand reduction plan. The Village of Minster is home to the nation's first municipal utility-owned solar-plus-storage project.

New federal funding through the IIJA provides a unique opportunity to fund energy storage projects. According to an analysis by the Energy Storage Association, the IIJA provides $505 million for grants to support energy storage demonstration projects, $6.15 billion for building out the U.S. battery supply chain, and $14.7 billion for grid resilience programs that include energy storage as a qualified technology.

There are several policy opportunities to take advantage of the growing technological advances in and declining costs of energy storage. The recommendations here draw heavily from the Interstate Renewable Energy Council's (IREC) 2017 report, "Charging Ahead – An Energy Storage Guide for Policymakers." Policymakers in Ohio could consider the following:

1. Amend existing interconnection policies to ensure that storage can connect to the grid through a transparent and simple process. IREC has produced a series of interconnection protocols that states can easily adopt. The state could establish best practices for interconnecting storage in statute, or legislation could provide an instruction to the PUC to update existing policy.

2. Instruct the utilities commission to evaluate the value of energy storage in multiple strategic locations across the utility system and consider a requirement to deploy storage where it is cost-effective or identify the price point at which it will be cost-effective. Ensure that cost-effectiveness calculations include all the benefits storage can deliver to the system, including frequency regulation and avoided investments in new infrastructure.

3. Require the inclusion of energy storage as a critical piece of the energy system as both a demand and supply management resource. Some states have required that utilities evaluate the cost effectiveness of non-wires alternatives to large transmission and generation investments. Alternatively, states might want to require that utilities develop a distribution investment plan that identifies the locations on the distribution system where energy storage or other distributed resources would offer the greatest value.

4. Consider adding a mandatory energy storage procurement target or requirement for energy storage with a documented process for periodic review of progress towards that goal. Procurement targets can jump-start market creation, spur fast learning, and guide the development of a regulatory framework.

5. Finance and incentivize energy storage for customers and utilities. Incentives could enable customers to use storage to manage their electric load and store locally produced renewable energy. Incentives in the form of rebates, grants, and tax credits can provide a bridge to scalable deployment of storage. Incentives can be designed to decline as storage values become more readily monetized and/or as the cost of storage decreases. Policymakers could allow utilities that provide incentives to customers to recover the costs of installing smart meters. This would enable dynamic and time-varying energy management from multiple distributed battery systems. This could also signal to customers the value of leveraging storage and better align customer costs with system costs. Financing energy storage installations for commercial customers could help reduce their demand charges. Policymakers might want to start first with a policy that provides grants to pilot projects. Policy might also target solar system owners. Financial incentives should be designed to ensure that the state will meet other goals including emissions and peak demand reductions, and equitable access to clean energy.

6. Clear data access policies that allow third parties to provide energy management services based on signals from the utility can greatly increase the value of efforts to monetize the value stream offered by energy storage. State policy should include measures to protect customer data, while also encouraging the use of this information to facilitate additional improvements to grid management and customer services. To address this, policymakers can develop legislation or rules that clarify who owns the energy data associated with customer energy usage; protect customer privacy; outline the process for allowing direct access to data by third parties; and promote access to the highest resolution of data possible.

THE BUILT ENVIRONMENT

In the U.S., buildings consume nearly 40% of total energy used.[6] Energy efficiency plays a prominent role in state energy and climate policies. Energy efficiency reduces energy demand and emissions and creates savings for utility customers. Coupled with beneficial electrification, which involves replacing direct fossil fuel use with electricity, there is great potential to reduce energy costs, reduce pollution, and provide more resilient, comfortable, and healthy buildings. Energy efficiency includes a multitude of measures to reduce the energy consumption of a building. These measures range from installing energy efficient appliances to full building renovations updating a building envelope.

Increasing levels of low carbon resources supplying the electric grid are reducing emissions associated with the electric sector. When policies are adopted to shift from energy uses based on fossil fuels (such as natural gas) for building heating, water heating, and appliances, to highly efficient electric alternatives, states can maximize achieving the dual objectives of energy efficiency and reduced emissions. This reduces overall energy usage, leading to emissions reductions, and in some cases, lower energy costs.

In March 2021, House Bill 128 was enacted, dismantling two major parts of the 2019 House Bill 6, the so-called "nuclear bailout law". However, provisions in House Bill 6 that eliminated the state's energy efficiency programs remain active. A Midwest Energy Efficiency Alliance report found that Ohioans missed out on $980 million in net benefits per program year due to the gutting of energy efficiency programs.

[6] For additional information, see ACEEE Building Policies and Codes.

Ohio has used Energy Saving Performance Contracts (ESPCs) since 1994, with the process coordinated by the Ohio Facilities Construction Commission. ESPCs are a financing mechanism for energy efficiency upgrades. They are often used within large institutions, such as college or government campuses, allowing them to meet their energy and environmental goals. An energy service company will pay the upfront cost of efficiency upgrades and execute the project, often guaranteeing the projected energy savings. The large institution will then pay back the service company with savings from their utility bills. This allows institutions to pay for their upgrades from their operating budget, instead of finding new financing, such as loans or bonds, for capital upgrades.

The IIJA provides $500 million for grants to fund energy efficiency and renewable energy upgrades in public schools, $3.5 billion for the Weatherization Assistance Program, and further funds the Energy Efficiency and Conservation Block Grant program by $550 million and the State Energy Program by $500 million.

Policymakers in Ohio can consider a variety of policies to encourage energy efficiency and beneficial electrification:

Energy Efficiency Policies

1. **Building Codes –** The Department of Energy projects that, over time, improvements in building codes can have the greatest single impact in energy efficiency within the built environment. On average, commercial buildings waste 30% of energy used.[7] Because buildings will be around for generations, energy efficiency within the built environment is a matter of statewide and long-term importance. States can set requirements for energy systems, require statements of energy use, and set performance standards for energy use or emissions. Building codes can be required by state legislation or implemented by home rule, where local governments set more strict building codes than mandated by the state.

2. **Appliance Efficiency Standards** – Appliance efficiency standards set minimum requirements for efficiency in everything from washing machines to water heaters. Efficiency standards save consumers money on utility bills and reduce energy demand on the grid, most importantly reducing peak energy demand. Many states choose to adopt the federal appliance efficiency standards that were in effect on January 1, 2017[8]. These include, among other things, standards on metal halide lamp fixtures, residential furnaces and boilers, and external AC to DC power supplies.

3. **Low-Income Energy Efficiency Programs –** While equity should be incorporated into all policy development, it is often necessary to ensure that specific programs are targeted towards historically underserved populations. Recent research suggests that weatherization can reduce energy use by 25-35%, allowing households to reduce their financial energy burden. The federal WAP program provides energy efficiency upgrades for income qualified homeowners. However, in many states there is difficulty in reaching individuals who may be eligible. Lawmakers can pass legislation requiring outreach and education to groups eligible for WAP.

   Ohio offers a Home Energy Assistance Program (HEAP) which provides funds to low-income Ohioans with energy bill assistance. Ohio's Home Weatherization Assistance Program works to reduce low-income energy usage. The program provides an on-site energy audit that guides the placement of cost-effective efficiency technologies.

4. **Energy Efficiency Resource Standards (EERS)** – EERS require utilities to demonstrate a reduction in energy demand from programs offered to their consumers. Because this means selling less electricity and reducing revenues, there is not always an incentive for the utility to make their consumers more productive or efficient users of electricity. If legislatures want to ensure a more productive and efficient energy distribution system that takes advantage of the latest technological innovations, they may want to require that a utility demonstrate a percent reduction in demand through efficiency or "demand side" programs. Legislators can also instruct their utility regulators to consider energy efficiency when approving rate cases, by allowing cost-recovery of energy efficiency improvements on a customer's utility bill.

[7] For more information, see the Office of Energy Efficiency & Renewable Energy's Commercial Buildings Integration (CBI) Program.

[8] Based upon research conducted by the Center for the New Energy Economy.

Ohio currently does not have an EERS, as it was removed by House Bill 6 in 2019 after being originally enacted in 2008, leaving significant opportunity for policymakers in Ohio to take the lead in this area.

5. **Revenue Decoupling and Performance-Based Incentives –** Utilities earn revenue by selling electricity. As a result, there is no incentive for them to promote energy efficiency because it leads to a reduction in sales, and therefore a reduction in revenue. Revenue decoupling disconnects revenue from the amount of electricity sold. Rather than selling as much electricity as they can, they are allowed a set amount of revenue regardless of the amount of electricity sold. While this doesn't directly incentivize energy efficiency, it removes the inherent disincentive to promote energy efficiency.

   Incentive policies may be layered on top of a decoupling policy. For example, if a utility meets set energy reduction targets, performance-based incentives, as determined by a PUC board, provide monetary incentives for meeting those targets. This also ensures that customers benefit from the extra revenue from electrification by saving on their bills.

   Ohio instituted decoupling for FirstEnergy in House Bill 6. However, the decoupling program didn't offset losses due to energy efficiency increases, but instead calculated guaranteed revenue based on a lucrative year for utilities. In fact, the bill eliminated all energy efficiency standards in Ohio. In early 2021, House Bill 128 removed the decoupling provision. A recent PUCO decision ordered FirstEnergy Ohio to refund approximately $27.5 million in decoupling charges to customers.

Electrification Policies

1. **Strategically Targeting Beneficial Electrification** – Target areas of beneficial electrification in buildings can be home heating and hot water systems, systems that typically use gas as a power source. According to the Environment and Energy Study Institute, new electric heat pump technology can heat space and water at efficiencies of 200 to 300 percent, compared to 67 percent efficiency in typical Energy Star gas water heaters.[9] This allows savings on electricity bills, as well as decreased greenhouse gas emissions.

   Some utilities, like AEP Ohio, offer tools and resources on the benefits of electrification and how to choose and install beneficial technologies.

2. **Tools Advancing Electrification Policies** – Primarily, building codes and incentive programs are used to advance electrification policies. In many states, the primary jurisdiction for these codes are local governments, however some state legislatures have incorporated requirements for local jurisdictions. Incentive programs managed by cities, utilities, or states can be targeted at replacement of fossil fuel resources with high efficiency electric appliances including water heaters, furnaces, ovens, and ranges. Heat pump water heaters and space heating systems are being incentivized as high efficiency replacements for traditionally fossil-based equipment. In conjunction with utility regulatory policy, these technologies can serve as demand response management tools by utilities in exchange for compensation to the ratepaying home or business owner.

   As a note, cities across the country are implementing new building codes promoting beneficial electrification by limiting or banning the installation of natural gas in new construction. At the same time, some states are passing pre-emptive legislation to disallow municipalities from banning new gas hookups.[10] State legislatures can work to pass enabling legislation, allowing specific municipalities to make independent decisions on electrification building codes.

Programmatically, there will always be greatest benefit by combining measures – so incentives that bundle improvements will generate greater gains than individual measures. For example, a high efficiency heat pump will be much more effective and efficient when coupled with insulation. The entire system will increase in efficiency, rather than just the mechanical component.

[9] For more information, see EESI's Beneficial Electrification.
[10] See, "Battle Brews over Banning Natural Gas to Homes." The Wall Street Journal, 1 June 2021, https://www.wsj.com/articles/battle-brews-over-banning-natural-gas-to-homes-11622334674.

ELECTRIFICATION OF THE TRANSPORTATION SECTOR

An estimated 58% of new car sales will be electric by 2040. Therefore, a key part of building a modernized grid involves designing infrastructure that will facilitate easy connection of electric vehicles (EVs) to the grid. One of the most important barriers to increased adoption of EVs is the consumer's awareness of the availability of EV charging stations. Ultimately, drivers want to be sure that their car will get them where they need to go. The good news is that both supportive policies for developing charging infrastructure and technological advancements have eased this "range anxiety."

Previously, Ohio's Development Services Agency's Alternative Fuel Transportation Program provided financial assistance to businesses, non-profits, school districts, and local governments for the purchase of alternative fueling infrastructure, but the program is not currently funded. To encourage EV adoption, lawmakers might consider reinstating funding for this program. After receiving a one-time verification inspection, EVs in Ohio are exempt from state emissions inspections. The Ohio Environmental Protection Agency administers a Diesel Emissions Reduction Grant Program, which provides funding for eligible entities to purchase hybrids, alternative fuel vehicles, as well as other vehicle modifications aimed at reducing diesel-related emissions. Additionally, in April 2018, the PUCO approved AEP's $10 million electric vehicle supply equipment (EVSE) program, which will fund the installation of 375 charging stations and rebates for home and workplace installations. Dayton Power and Light agreed to provide up to $1 million to fund charging stations. In coordination with a DriveOhio study, the Ohio EPA awarded $3.5 million in grants to install public level 2 chargers in eligible counties. The grants will provide funding or partial funding for more than 170 charging locations.

As of May 2022, the city of Columbus has raised approximately $720 million of its $1 billion goal to fund its 'smart-city initiative.' The city is using a $40 million grant from the Department of Energy to modernize its transportation network. Honda and Ohio State University are collaborating to build an autonomous-vehicle test ground. Columbus continues to be an autonomous vehicle hub of innovation.

The IIJA provides nearly $5 billion over the next five years to support the electrification of the transportation sector. In 2022, $615 million will be made available for the installation of charging stations along designated alternative fuel corridors. The Act also provides approximately $1.1 billion for grants to state and local governments to assist with the purchase or lease of low- or no-emission vehicles for transportation fleets. To be eligible, a state must have a Zero-Emission Fleet Transition Plan in place.

There are opportunities to expand the market for EVs in Ohio:

1. **Charging Infrastructure Plan –** Locating charging infrastructure is different from locating conventional fueling stations. While some drivers will need to charge more quickly, others will refuel when they are parked for longer periods of time, for example when shopping at the mall or going to work. Charging infrastructure plans should attempt to pair the appropriate level of charging (level 2 or direct current fast charging) with a reasonable amount of time a person will be at that location. Legislation could direct a state agency to develop an infrastructure plan through a stakeholder process. Ohio's existing registration fee for EVs could help fund these efforts.

2. **Parking Infrastructure Requirements –** In tandem with the development of a statewide plan, legislation could set requirements for parking lots and other infrastructure. Some states have adopted permitting standards for parking lots, requiring, for instance, that for every 100 parking spaces, there must be at least one EV charging space. Legislation could also incentivize utilities to develop make-ready locations. These locations supply power to the point where a utility or third-party developer might install an EV charging station. Ohio's Statewide Building Energy Codes could also be updated to include requirements for EV charging infrastructure.

3. **EV and Charging Equipment Financing and Financial Incentives –** Providing financial incentives and innovative financing options can help spur greater market penetration of EVs. Sales, property, and income tax credits are some of the simplest methods for addressing the high up-front costs of EVs and EV charging equipment. While sales tax credits are typically applied at the time of purchase, property and income tax credits

may do less to address upfront cost barriers, as the credit is not applied at the time of purchase.[11] States have adopted other financial incentives including low-interest loans, grants, vouchers, and rebates. A handful of states qualify EV charging equipment under their property assessed clean energy (PACE) programs. A simple solution is to increase and expand existing tax credits to incentivize commercial, publicly available charging stations.

4. **HOV and HOT Incentives –** Allowing EVs to use high-occupancy vehicle (HOV) or high-occupancy toll (HOT) lanes regardless of number of passengers, and without paying the toll, may make EV ownership more attractive. Most states require that EVs using these lanes display a decal or particular license plate; others also limit eligibility to certain types of vehicles or to a certain number of vehicles.

NEWS

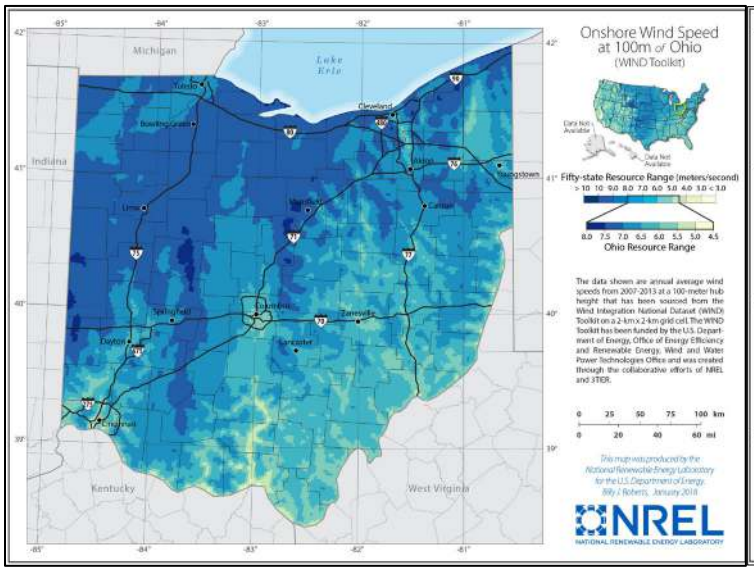
- May 25, 2022: Mapping Tools Help Ohio Cities Chart Course for Environmental Justice
- May 22, 2022: How a Small Town Won Ohio's Biggest Foreign Investment
- May 17, 2022: Gas, Electric Companies Cut Off 270,000 Ohioans Amid Pandemic and Billions in Profits
- May 3, 2022: Pilot Program Will Pay For Rooftop Solar Installations on up to 10 Low-to-Medium Income Homes in Cleveland
- April 29, 2022: Terra State Embracing Solar with New Energy Savings Project
- April 26, 2022: Storms Strain Ohio's Electric Grid, and Climate Change Could Make it Worse
- April 20, 2022: Ohio Regulators to Review Two Massive Renewable Energy Project Proposals
- February 11, 2022: Ohio to Get $140 Million for Electric Vehicle Charging Stations from Bipartisan Infrastructure Bill
- February 9, 2022: Could Community Solar See the Light of Day in Ohio? Supporters See Momentum
- January 24, 2022: Ohio Solar Power Companies Excited About New Intel Announcement
- October 18, 2021: AES Ohio Will Soon Install Smart Meters as Part of $267M 'Smart Grid'

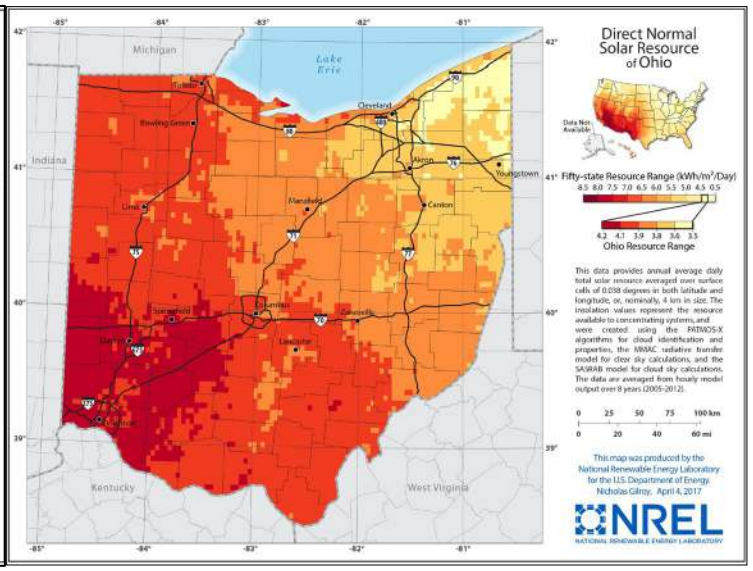
OTHER RESOURCES

- Ohio Development Services Agency: https://development.ohio.gov/
- Midwest Energy Efficiency Alliance: https://www.mwalliance.org/initiatives/policy/ohio
- American Clean Power Association, Ohio State Fact Sheet: https://cleanpower.org/wp-content/uploads/2022/06/Ohio_clean_energy_factsheet.pdf
- The American Council for an Energy-Efficient Economy State and Local Policy Database, Ohio: https://database.aceee.org/state/ohio
- The Database of State Incentives for Renewables and Efficiency, Ohio: http://programs.dsireusa.org/system/program?fromSir=0&state=OH
- U.S. Department of Energy's Alternative Fuels Data Center, Ohio: https://afdc.energy.gov/states/oh
- U.S. Energy Information Administration, Ohio: https://www.eia.gov/state/?sid=OH
- SPOT for Clean Energy, Ohio: https://spotforcleanenergy.org/state/ohio/

[11] A study by the Congressional Research Service suggests that tax credits are important tools for ensuring increased adoption of alternative-fueled vehicles.

OHIO'S WIND AND SOLAR RESOURCES
WIND https://windexchange.energy.gov/states/oh
SOLAR https://www.nrel.gov/gis/solar.html





Our Resources

CNEE Homepage: https://cnee.colostate.edu/

The SPOT for Clean Energy: https://spotforcleanenergy.org/

The Advanced Energy Legislation (AEL) Tracker: https://www.aeltracker.org/

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