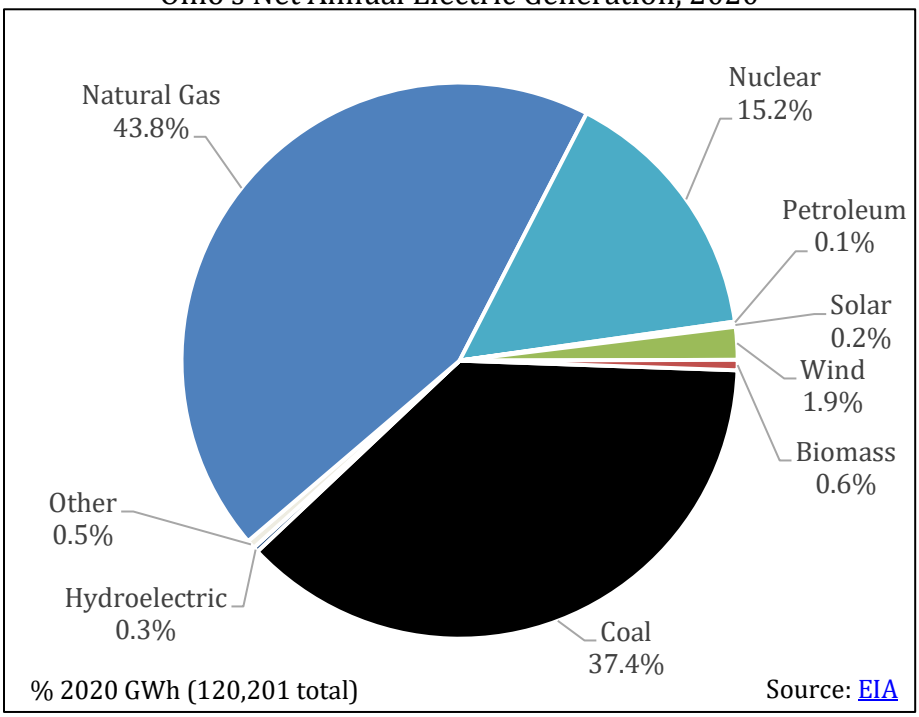
State Brief: Ohio

BACKGROUND

Ohio is the nation's 15th largest coal-producing state, shipping two-fifths of the coal mined in state out to other states by barge, truck, and rail. While Ohio exports about a third of its coal production, 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 30 times greater than in 2012, and electric sector use was 14 times greater than in 2008.

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, 2020



% 2020 GWh (120,201 total) Source: EIA

Renewable energy resources supply almost 3% of Ohio's net electricity generation. The Buckeye State had 39 wind projects, with a combined capacity of 864 megawatts (MW) online at the beginning of 2020. An additional 388 MW is under construction. Ohio's renewable portfolio standard (RPS) was a driving force behind wind development, however in 2019, H.B. 6 reduced the current RPS by 5%, and will terminate the RPS after 2026.

The 2020 U.S. Energy and Employment Report found that Ohio has 97,983 traditional energy workers (1.8% 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's (AEP) Electric Security Plan (ESP). The ESP allocates over $20 million for an electric vehicle (EV) charging station program and for one or more microgrid projects. In addition, the ESP requires that AEP will build or enter into power purchase agreements (PPAs) for 900 MW of wind and solar. AEP will spend approximately $200 million to modernize its grid and equip nearly 900,000 homes with smart meters. As of July 2020, the city of Columbus has raised approximately $600 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.

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

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 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.

GRID MODERNIZATION

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, 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.

There are additional supportive policies that Ohio's policymakers could adopt to promote grid modernization.

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, 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] 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.

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, and PUCO's recent order approving AEP's gridSMART Phase 2 project will bring smart meters to an additional 894,000 customers. AEP filed for approval for gridSMART Phase 3 in 2019. 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.[3]

The adoption of incentives for or a requirement to integrate a certain amount of energy storage on the grid alongside enhancing renewable energy and EV policies would support modernization efforts and improve the chances of successful grid modernization.

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. Finally, energy storage can 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.

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. 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. 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 these benefits by establishing both a framework for easy integration of energy storage resources onto the grid and a marketplace that monetizes the benefits of energy storage for cost-effective investment.

[3] For a discussion of specific workforce needs that 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."

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.

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. The Interstate Renewable Energy Council (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 utilities to evaluate the value of energy storage in multiple strategic locations across the utility system and consider a requirement to deploy storage where it will be cost effective, or identify the price point at which it will become cost effective.

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 (NWAs) 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 for storage. These incentives can also be designed to decline as the value of storage becomes more readily monetized, and/or as the cost of storage decreases. Policymakers could allow utilities that provide storage incentives to customers to also recover the costs of installing smart meters. This would enable dynamic and time-varying energy management from multiple distributed battery systems. This should signal to customers the value of leveraging storage while better aligning customer costs with system costs. Financing energy storage installations for commercial customers could help reduce their demand charges. Policymakers might start first with a policy that provides grants to pilot projects, and/or that targets existing solar system owners. Financial incentives should be designed to ensure that the state meets other goals including emissions and peak demand reductions, and equitable access to clean energy.

MAINSTREAMING RENEWABLES

As the renewable energy industry matured, technology improved, and global production of generating equipment increased. Renewable energy is increasingly seen as the least cost and lowest risk form of energy (excluding energy efficiency). A 2021 Energy Information Administration report predicts that the share of the United States' electricity generation mix supplied by renewable energy resources will increase from 21% in 2020 to 42% by 2050. 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 these reasons, it is in the interest of policymakers to ensure that their states are well positioned to benefit from the transition to clean and sustainable energy resources.

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

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, as Cleveland has done. 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. Buckeye Power electric co-ops have installed 2.1 megawatts 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 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 renewable program may want to coordinate this program with implementation of the federal Weatherization Assistance Program to provide recipients of assistance with participation in a shared renewable 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.

   Corporate Procurement – Many Fortune 100 and 500 companies have established either climate goals or commitments to purchase renewable energy. Since 2016, nearly 31 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. The products available in Ohio currently meet four of the Corporate Renewable Energy Buyers' Six Principles. Ohio's policies allow companies to purchase renewable energy credits (RECs), provides access to renewable energy through the retail and wholesale markets, and develop or lease onsite renewable energy projects. The state was ranked 12th overall in the Retail Industry Leaders Association's 2020 rankings of state corporate procurement policies.

   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 emissions and increase investments in clean energy resources. As mentioned above H.B. 6, passed in 2019, and 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 standards 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 2025. This reduction is achieved by the distribution of annual emission allowances that decrease to the point that the standard is met in 2025. 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.

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 "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, 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.

There are a number of additional opportunities to expand the market for EVs in Ohio:

1. **EV and EV Charging Equipment Financing and Financial Incentives –** Providing additional 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 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.[4] 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.

2. **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.

3. **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.

4. **Parking Infrastructure Requirements –** In tandem with the development of a statewide plan, legislation could set requirements for EV parking 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.

NEWS

- June 15, 2021: Ohio's 'Voltage Valley' Looks to Develop Workforce for Electric Vehicle Industry
- June 3, 2021: RWE Powers Up 250MW Onshore Wind Farm in Ohio
- June 2, 2021: Analysis Suggests Climate Policy in Ohio Could Save the World as Much as $1 Trillion
- May 18, 2021: Ohio Transit Agencies Debut Electric Buses, but Funding is Needed for More Efforts
- May 5, 2021: Columbus Green-Power Aggregation Currently More Expensive, but Maybe Not for Long
- April 26, 2021: Underfunded Public Transit Systems Face Ongoing Challenges in Ohio
- March 5, 2021: Ohio Advocates Want Equity on the Agenda as State, Country Cuts Carbon

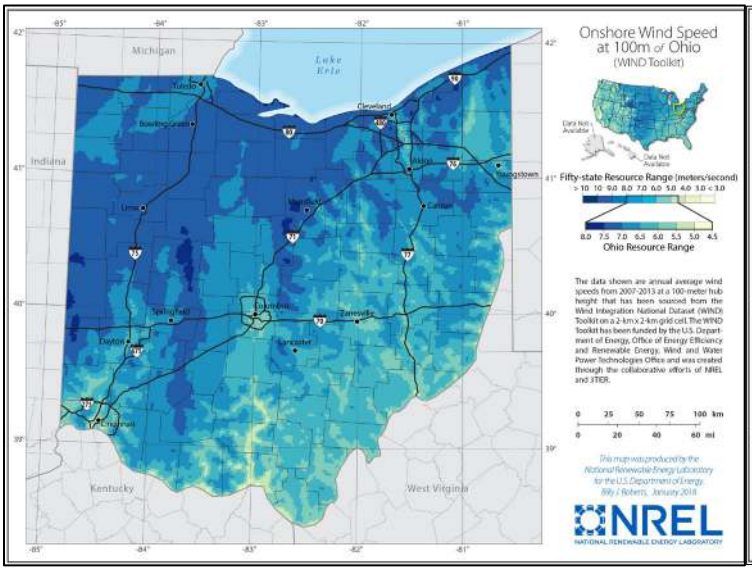
OTHER RESOURCES

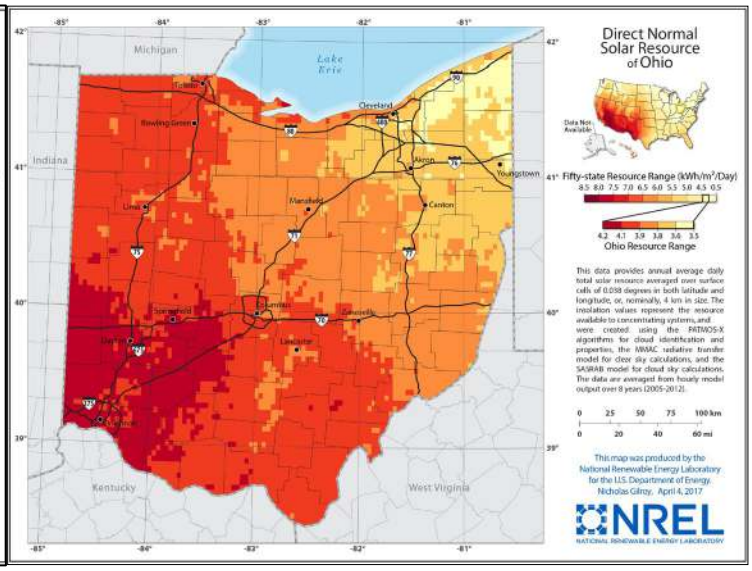
- Ohio Development Services Agency: https://development.ohio.gov/
- Midwest Energy Efficiency Alliance: https://www.mwalliance.org/initiatives/policy/ohio
- American Clean Power Association, North Carolina State Fact Sheet: https://cleanpower.org/wp-content/uploads/2021/01/Ohio-clean-energy-factsheet.pdf
- 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/

[4] 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





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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