

House Bill 114

Reforming Ohio's Electric Portfolio Mandates

House Public Utilities Committee

Prepared Statement of Sam Randazzo General Counsel Industrial Energy Users-Ohio

March 21, 2017

Mr. Chairman, Ranking Member Ashford, Members of the House Public Utilities Committee, I am Sam Randazzo. I am here today in my capacity as General Counsel for the Industrial Energy Users-Ohio ("IEU-Ohio"). IEU-Ohio is a trade association that was created more than 25 years ago to help Ohio businesses address issues affecting the price and availability of energy. I have included a list of IEU-Ohio's members in Appendix A, attached to my testimony.

The purpose of my testimony is to express general support for House Bill 114 ("HB 114") as it has been presented to the Committee by Representative Blessing. HB 114 has an impressive number of co-sponsors from both sides of the aisle. My perspective on this topic is that of a person who has walked the Ohio energy beat for the better part of five decades and someone who was "in the room" when Ohio, regrettably, made arbitrary portfolio mandates and their hidden taxes part of Ohio law. If you want to know how much the mandates are currently costing customers each month, IEU-Ohio's mandate cost calculator (<http://www.ieu-ohio.org/mandate-cost-calculator.aspx>) may be helpful.



Origin of Ohio's Mandates – A Brief History

In 2008 and as a subordinate part of Amended Substitute Senate Bill 221 ("SB 221"), supply-side and demand-side mandates were made part of Ohio law. There was no analysis to consider their effect on reliability or the affordability of electricity. The mandates were sold based on future predictions of energy scarcity plus high and volatile prices. The considerable cost of the mandates was hidden in electric bills.

At customers' expense, Ohio's electricity portfolio mandates pick winners and losers based on expectations that existed in 2007 and 2008. And the expectations that existed in 2007 and early 2008, when Ohio adopted electricity supply-side and demand-side mandates, are very different than today's realities. They are also very different than reasonable expectations about the future.

For example, the 2008 vintage mandates assumed, among other things, that: (1) our domestic natural gas supply would soon be depleted, leaving us increasingly dependent on imported liquefied natural gas; (2) we would not realize the energy price and reliability benefits that are currently flowing from our abundant domestic shale resources; and (3) an overheated economy would continue rather than be stunningly "corrected" by the Great Recession. None – not one – of these assumptions would be regarded as credible if advanced today to support adoption of the 2008 mandates.

In the face of this undisputed mismatch between SB 221's expectations and reality, the General Assembly enacted Substitute Senate Bill 310 ("SB 310"). SB 310 called a two-year time-out in the escalation of the annual mandate compliance "benchmarks." During this "time-out," the mandates were evaluated through a study committee process that produced a report and recommendations.

SB 310 also contained counting or compliance measurement provisions that mostly corrected problems created at the Public Utilities Commission of Ohio ("PUCO") during the implementation of SB 221.

And, SB 310 gave the largest electric users the right to opt out of the cost and benefits of the energy efficiency and peak demand reduction mandates through a streamlined process.

The alternative to these reforms would have been for the General Assembly to ignore reality and continue a system that forces most¹ Ohio electric consumers to pay higher and higher electric bills for the benefit of stakeholders who profit from parasitic technologies which intermittently show up for work.

As indicated above, SB 310 created a 13-member Energy Mandates Study Committee to study Ohio's mandates and issue a report and recommendations by September 30, 2015. SB 310 also stated "... that the General Assembly intends to enact legislation in the future, after taking into account the recommendations of the Energy Mandates Study Committee that will reduce the renewable energy resource, EE and PDR mandates."² The Energy Mandates Study Committee issued a report and recommendations on September 30, 2015.

In September 2016, the Ohio Business Roundtable ("OBR") issued a report called Improving Ohio Energy Competitiveness. The OBR and its CEO-led Energy Steering Committee³ engaged in a year-long effort to improve Ohio's energy competitiveness by comprehensively addressing all aspects of oil, gas and electric power. The recommendations were supported by a comprehensive fact-base, including benchmarking, scenario modeling and detailed analysis. The OBR offered its recommendations to identify "... actions we believe Ohio business leaders,

¹ Ohio's mandates force the electric customers of Ohio's investor-owned electric distribution companies and Competitive Retail Electric Service ("CRES") providers to purchase and pay for the things that the mandates identify as "winners." These mandates do not reach the electric customers of Ohio's electric cooperatives or Ohio's municipal electric utilities.

² SB 310 Bill Summary, available at: <http://www.lsc.ohio.gov/analyses130/s0310-rh-130.pdf>.

³ The CEO-led Energy Steering Committee included Gary R. Heminger, Chairman, President and CEO, Marathon Petroleum Corporation; Nicholas K. Akins, President and CEO, American Electric Power; Charles E. Jones, President and CEO, FirstEnergy Corp.; Robert H. Schottenstein, Chairman, CEO and President, M/I Homes; Michael H. Thaman, Chairman and CEO, Owens Corning; Ward J. Timken, Jr., Chairman, CEO and President, TimkenSteel; and John Warner, Senior Partner, McKinsey & Company.

policymakers and stakeholders must take to move our state forward in the energy space.”⁴ Among other things, the OBR report stated:

The growing share of renewables in Ohio’s power generation mix, today and tomorrow, offers the state an opportunity to capture a larger market share of renewable development and manufacturing. But if legislation or mandates forced greater adoption of renewables, power prices would rise. Retail power prices are projected to increase regardless of renewable mandates, but mandates would increase prices more dramatically.

To combat rising power prices and ensure that Ohio remains competitive, the state should phase out mandates”.⁵

As the two-year time-out clock was ticking, the General Assembly passed Substitute House Bill 554 (“HB 554”). Much of what is in HB 114 was included in HB 554. The Governor,⁶ however, vetoed HB 554 and, as a result, the annual escalation in the mandates’ compliance requirements and the compliance costs loaded into customers’ electric bills have resumed. This is why the **large and small industrial and commercial customers** that are members of IEU-Ohio have, through IEU-Ohio, continued to meet with you and urge you to enact incremental reforms. And, based on our review of HB 114, we ask that you favorably consider this bill as soon as reasonably possible.

⁴ The OBR report at 2. The OBR report is attached (Appendix B).

⁵ The OBR report at 24.

⁶ Prior to the Governor’s veto of HB 554, the Governor’s office distributed information indicating that the unfrozen compliance requirements for the renewable mandate had already been achieved. See Appendix C. Among other things, the Governor’s veto message stated “Sub. HB 554 risks undermining ... progress by taking away some of those energy generation options, particularly the very options most prized by the companies poised to create many jobs in Ohio in the coming years, such as high technology firms.” See <http://www.governor.ohio.gov/Portals/0/pdf/Kasich%20Announces%20Actions%20On%20Three%20Bills.pdf?ver=2016-12-27-153214-673>. As explained in Appendix D, the Nation’s leading high-tech and retail businesses have jointly urged states to adopt the “customer choice” model to encourage high-tech and retail businesses to invest in their state. As explained below, the Advanced Energy Economy has also urged policy makers to empower customers with “choice” if they want to create a framework that will bring advanced technologies forward. **Ohio put its “customer choice” structure in place almost two decades ago. It allows companies like Amazon and Google to use “renewable” resources to satisfy 100% of their electricity demand. Amazon and Google have no such right in Kentucky, West Virginia, Indiana, Michigan or most other states.**

Expanding the Streamlined Opt-Out

As discussed above, SB 310 gave Ohio's largest electricity users the right to get out of the way of Ohio's energy efficiency and peak demand reduction mandates. For most of the state, this right did not go into effect until January 1, 2017. During the SB 310 process, IEU-Ohio pushed to extend the streamlined opt-out right to most of Ohio's businesses by making this right available to all "mercantile customers" (a defined term in R.C. 4928.01). This expansion was not included in SB 310 because some utilities asserted that a flash-cut expansion to include all mercantile customers would have, at that time, created administrative problems with regard to mandate compliance plans that were then in process. Since then we have continued to urge you to expand the streamlined opt-out to include all mercantile customers and the Energy Mandates Study Committee Report agreed that this change should be made effective January 1, 2019.

The current version of HB 114 expands the streamlined opt-out to make it available to all mercantile customers effective January 1, 2019. This lag in the effective date will allow ample time for the expansion to be folded into compliance plans.

The streamlined opt-out mechanism requires an adjustment in the energy efficiency and peak demand reduction compliance baselines so that the compliance obligation associated with the opt-out customers' kilowatt-hours ("kWh") or kilowatt ("kW") demand is not shifted to other customers. Below I offer a highly simplified illustration of how this works. In the illustration, I focus on the energy efficiency mandate but the process is exactly the same in the case of the peak demand reduction mandate.

Assumptions

- Assume an Ohio electric distribution utility (“EDU”) has two customers (a residential customer that uses 10,000 kWh per year plus a mercantile customer that uses 1,000,000 kWh per year) and, accordingly, an energy efficiency mandate compliance baseline of 1,010,000 kWh.
- Assume that the energy efficiency compliance benchmark for a particular compliance year is five percent (5%) of the compliance baseline and that the total kWh of energy efficiency required is 50,500 kWh ($.05 \times 1,010,000$) if the mercantile customer does not opt out using the streamlined opt-out provision.
- Assume that the mercantile customer elects to opt out using the streamlined process effective at the beginning of the particular compliance year.

Based on the above assumptions, and the compliance baseline adjustment that is **required by current law** whenever a streamlined opt-out becomes effective, the compliance baseline for the compliance year after the effective date of the streamlined opt-out is reduced to 10,000 kWh and the energy efficiency compliance quantity is similarly reduced to 500 kWh. The net effect of this mandatory baseline adjustment is to produce a compliance obligation that is based on the kWh usage of the remaining customers.

In addition to the mandatory compliance baseline adjustment that occurs with a streamlined opt-out, the compliance plan process at the PUCO has resulted in a separation of the overall compliance effort into two buckets. One bucket is for residential customers and the other bucket is for mercantile customers. Maintaining this current compliance plan separation also protects against cost and compliance obligation shifting as between residential and mercantile customers.

2017 and Counting

Like HB 554, HB 114 includes provisions that will recognize the energy efficiency and peak demand reduction opportunities that are available in the water, wastewater, generating plant heat rate improvement⁷ areas and, more broadly, when there are reductions in “energy intensity.”⁸

In the past, stakeholders who have urged Ohio to retain and expand its portfolio mandates have, ironically, objected to recognizing these areas for purposes of measuring compliance with the demand side (energy efficiency and peak demand reduction) mandates. These objections are designed to blind the General Assembly to things that are commonly recognized as providing meaningful efficiency opportunities. If these commonly recognized opportunities are ignored in Ohio’s law, the General Assembly will increase the cost of compliance that is paid by Ohio’s electricity consumers.

Below is an illustration of the relationship between electricity usage and water delivery and treatment functions.⁹

⁷ One of the building blocks of the so-called Clean Power Plan calls for improving the efficiency, as measured by net unit heat rate of coal-fired electric generating plants. See <https://www.bv.com/Home/news/solutions/energy/coal-plant-heat-rate-improvements-for-clean-power-plan>.

⁸ The definition of “energy intensity” is modified in R.C. 4928.6610 as follows: “‘Energy intensity’ means the amount of energy used to produce a certain level of output or activity, measured by the quantity of energy needed to perform a particular activity, expressed as energy per unit of output, energy per unit of gross total floor space, or an activity measure of service.” This definition might also apply to “energy productivity” which is the ratio of output divided by energy input and is useful for purposes of understanding the energy efficiency potential of an industry, sector or an economy.

⁹ This illustration was used in conjunction with the Federal Energy Star programs and was prepared for a presentation involving the Salt River Project.

The Cost to Treat and Deliver Water

Getting it home:

Component	Energy Requirements
Pumping	5.41 kWh / 1000 gal
Water Treatment	

6.47 kWh / 1000 gal

Taking it away:

Waste Water Transport	.4 kWh / 1000 gal
Waste Water Treatment	4.15 kWh / 1000 gal

4.55 kWh / 1000 gal

11 kWh are required to treat and deliver 1000 gallons of water to your home. This is the same as the energy needed to power a 100 watt light bulb for 4 hours per day for a month.

In 2016, Advanced Energy Economy (“AEE”) issued a paper (*This is Advanced Energy*).¹⁰ At page 49 of this paper, you will find a discussion about importance of recognizing the connection between energy and water systems (“Any assessment of advanced energy would be incomplete without also considering the important

¹⁰ The AEE paper is available *via* the Internet at <http://info.aee.net/this-is-advanced-energy>. In the early part of this paper (beginning at page 1) you see AEE’s recognition of the importance of giving customers more choices (rather than forcing them to “march up mandate mountain”).

- **Empower customers with unprecedented choice and control** – Advances in energy technology have not just changed the supply of electricity. They are also transforming the way businesses and individuals obtain and use energy. From technologies providing on-site energy to tools and technologies that control energy demand and increase energy efficiency to new options for personal mobility and the transport of goods and services, advanced energy is giving consumers and businesses the same choice and control over their energy use that they have come to expect in other sectors of the economy.
- **Increase competition in the energy marketplace** – More choice means more competition, as advanced energy technologies increase the options available to utilities, grid operators, businesses, households, and individuals with regard to energy production, delivery, and consumption. Working together even as they compete in the marketplace, these technologies are already transforming the energy system of yesterday into an increasingly diverse, dynamic, responsive, and flexible system.

See also *Energy Down the Drain: The Hidden Costs of California’s Water Supply*, Natural Resources Defense Council, August 30, 2004 available at <https://www.nrdc.org/resources/energy-down-drain-hidden-costs-californias-water-supply> and *The Connections Between Our Energy and Water Use*, Union of Concerned Scientists, at http://www.ucsusa.org/clean-energy/energy-water-use/energy-and-water#.WM_td2YzUok.

connections between our energy and water systems.”) The discussion covers both the water production and delivery cycles as well as the waste treatment cycle. The paper acknowledges (at page 49) that “[t]otal energy use related to water use is significant, equating to an estimated 3% to 3.5% of total U.S. electricity consumption, not including energy consumed by the end use of water, such as water heating, which brings the figure up to as high as 13%.”

If Ohio is going to continue requiring or encouraging, at consumers’ expense, compliance with energy efficiency and peak demand reduction mandates, it is important to recognize legitimate efficiency and peak demand reduction strategies when it comes time to measure compliance. Leaving legitimate options off the list means that the slope of the mountain gets steeper and customers pay more for the march.

I urge your favorable consideration of the counting provisions in HB 114.

Attached to my testimony, I have included materials and information that may be useful as you consider HB 114 and other energy-related proposals that may come your way.

- Appendix A** IEU-Ohio’s Member Companies
- Appendix B** Ohio Business Roundtable Report: Improving Ohio Energy Competitiveness (September 2016)
- Appendix C** Renewable Energy Resource and Energy Efficiency Benchmarks (Governor’s Office Chart)
- Appendix D** Options for Customers to Act on Their Portfolio Preferences
- Appendix E** State of Market Report for PJM (March 9, 2017)
- Appendix F** Boondoggle: How Ontario’s pursuit of renewable energy broke the province’s electricity system, Terence Corcoran, Financial Post, October 6, 2016

Thank you for your service and your attention. If you have any questions, I will do my best to provide answers.

IEU-OHIO'S MEMBER COMPANIES

Abbott Nutrition	John Carroll University
Airgas, Inc.	Kent Elastomer Products, Inc.
AMAC Enterprises, Inc.	Kent State University
American Greetings Corporation	Kraton Polymers U.S. LLC
American Manufacturing Inc.	Landmark Plastic Corporation
Anheuser-Busch Companies, Inc.	Lincoln Electric Company
Appvion, Inc.	Marathon Petroleum Company
Area Aggregates, LLC	Mar-Bal Incorporated
ASHTA Chemicals Inc.	McGean-Rohco, Inc.
Ashtabula Rubber Co.	Mercury Plastics, Inc.
Aurora Plastics, Inc.	MetalTek International
Automation Plastics Corporation	MICA
Avalon Precision Casting Company, LLC	Miceli Dairy Products, Inc.
Avon Lake Regional Water	Milliron Iron & Metal, Inc.
Barberton Steel Industries	Mondeléz International
Bescast, Inc.	Neff-Perkins Company
Burton Rubber Processing	Norman Noble, Inc.
BWX Technologies, Inc.	Ohio Star Forge Co.
ClarkDietrich Building Systems	P.H. Glatfelter Co.
Cleveland Cavaliers	Paulo Products Company
Cleveland Indians	Plastipak Packaging Inc.
Cleveland Museum of Natural History	Pressure Technology, Inc.
Cobra Plastics, Inc.	Quaker City Castings
Component Repair Technologies, Inc.	Quintus Landlord LLC
Cristal USA Inc.	Rothenbuhler Cheesemakers, Inc.
DRS Industries Inc.	RTS Companies, Inc.
Duramax Marine, LLC	Saint Gobain Companies
Energizer Manufacturing, Inc.	Sajar Plastics, LLC
Eramet Marietta Inc.	Salem-Republic Rubber Company
Falcon Foundry Company	Sauder Woodworking Co.
Federal Metal Company, The	Tate & Lyle Americas, Inc.
Ferriot, Inc.	TimkenSteel Corporation
Flambeau, Inc.	Toledo Refining Company, LLC
Glen-Gery Corporation	Tri-Cast Ltd.
Globe Metallurgical, Inc.	Trilogy Plastics
GoldKey Processing, Inc.	U. S. Steel Seamless Tubular Operations, LLC
Independent Franchises DBA McDonald's	U.S. Casting Company, Inc.
Iten Industries	University of Akron
J.H. Routh Packing Company	USG Corporation
Jack Thistledown Racino	Vallourec Star
Jacobson Manufacturing LLC	Viking Forge Corporation
Jet Rubber Company	Welded Tubes, Inc.

IMPROVING OHIO ENERGY COMPETITIVENESS

SEPTEMBER 2016



OHIO BUSINESS
ROUNDTABLE

MESSAGE FROM THE CHAIRMAN

September 2016

On behalf of the members of the Ohio Business Roundtable and our CEO-led Energy Steering Committee, we are pleased to share this summary report capturing a year-long effort to improve Ohio's energy competitiveness.

This work presents energy in a comprehensive way, addressing all aspects of oil, gas and electric power. It is supported by a comprehensive fact-base, which includes benchmarking, scenario modeling and detailed analysis. Finally, it outlines the actions we believe Ohio business leaders, policymakers and stakeholders must take to move our state forward in the energy space.

We appreciate the support of McKinsey & Company in undertaking this work.

Energy competitiveness is the top priority of the Ohio Business Roundtable in 2016-17. In the coming months, we will use this summary report as a beginning framework to engage our partners across Ohio in serious, fact-based dialogue. With such dialogue comes progress and change, and, ultimately, economic growth and an improved quality of life. That is the aim of the Ohio Business Roundtable.

Gary R. Heminger

Chairman, Ohio Business Roundtable and Chair, Energy Steering Committee
Chairman, President and CEO, Marathon Petroleum Corporation

Energy Steering Committee

Nicholas K. Akins, President and CEO, American Electric Power
Charles E. Jones, President and CEO, FirstEnergy Corp.
Robert H. Schottenstein, Chairman, CEO and President, M/I Homes
Michael H. Thaman, Chairman and CEO, Owens Corning
Ward J. Timken, Jr., Chairman, CEO and President, TimkenSteel
John Warner, Senior Partner, McKinsey & Company

Note: The comprehensive fact base supporting this report may be accessed via a passcode protected link at www.OhioBRT.com

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EXECUTIVE SUMMARY

For the 25 years since our inception, the CEOs of the Ohio Business Roundtable have tackled the most complex issues facing our state, working in partnership with our elected leaders. We believe energy can have a transformative impact on Ohio's economy and quality of life.

Energy competitiveness is determined by the supply of natural resources and the methods used to generate and distribute electricity and gas to consumers. Today, with new forces and opportunities reshaping our energy landscape, we as business leaders have come together to understand what these changes mean for the state and how we can work together to ensure that Ohio is energy competitive as we move forward.

Ohio has enormous **natural gas resources** opportunity in the deep Utica basin, as well as a portion of the Marcellus shale. Ohio's shale gas reserves can generate tremendous economic value and significantly boost the economy, much like we've witnessed in Pennsylvania's Marcellus basin, Louisiana's Haynesville basin, and Texas' Eagle Ford basin.

Across the country, the **electric power landscape** is changing rapidly, as states generate electricity from more diverse sources and rely more on natural gas and renewables than on traditional coal plants. Renewables in particular have dramatically grown in capacity and output, in part due to regulations and subsidies, but also as their costs have declined and made them a competitive alternative to conventional technologies in many parts of the US. In Ohio, we expect renewables to continue to grow as a supply of power generation, equal to nuclear by 2030. As the energy landscape continues to change, opportunities will develop in shale gas, and shifts will occur in power demand, reshaping the generation, transmission, and distribution of electric power.

In Ohio, shifts in the structure of the electric power market magnify the challenges and opportunities. Ohio has moved from a regulated state to a restructured state, allowing greater customer choice. Simultaneously, Ohio has joined PJM, a regional energy system that regulates generation and transmission across 13 states.

The evolution of both the power and gas sectors in Ohio will bring market, infrastructure, and regulatory challenges that Ohio must address to capture the full value of energy-related opportunities.

To respond to the changing energy landscape and position the state as an energy leader, Ohio will need to act on six fronts:

1. Maximize Ohio's natural gas advantage
2. Meet the evolving needs of the power market
3. Build the required support infrastructure
4. Improve the ease of doing business in the energy sector
5. Ensure adoption of renewables and advanced energy technologies is market-based
6. Drive economic benefits from energy competitiveness.



SUMMARY OF OIL AND GAS OPPORTUNITY



Ohio's natural gas opportunity is massive. Like the recent natural gas booms in Texas, Louisiana, and Pennsylvania, natural gas extraction and associated downstream industries offer huge potential for Ohio's economy. Ohio sits atop the Utica basin and a portion of the Marcellus shale play. Development of the Marcellus shale play is already well underway, and development of the Utica basin is rapidly advancing as technology, the supporting infrastructure and the key players across the value chain have come together with a focus on further developing both basins.

Key takeaways

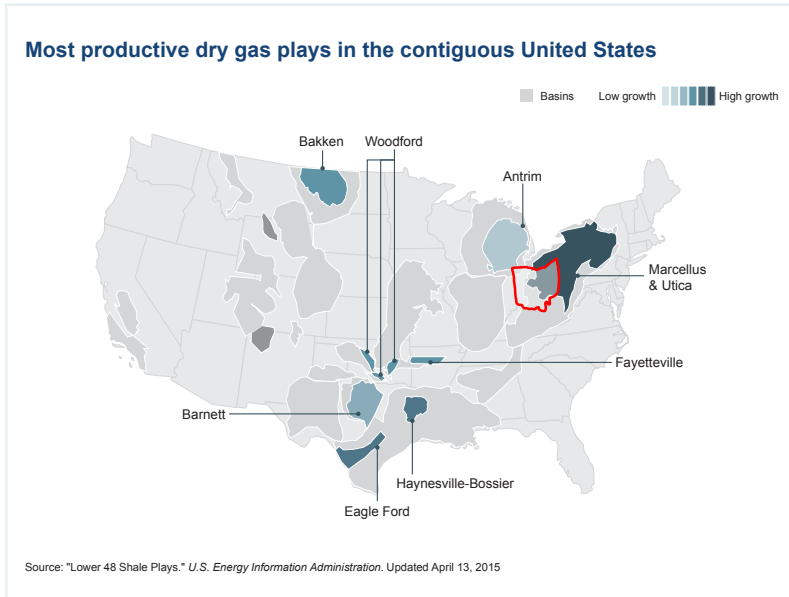
- ▶ The Utica and Marcellus shale plays are two of the country's largest natural gas basins.
- ▶ The extraction of Ohio's portion of the Utica shale alone could increase Ohio's GDP \$8 billion and sustain 130,000 jobs by 2025.¹
- ▶ The Utica shale play is cost-competitive, with gas extraction costs 16% below the national average.
- ▶ Natural gas pipeline capacity is struggling to keep pace with increased gas production.
- ▶ Natural gas liquids (in particular ethane, propane, and butane) offer an immense economic opportunity.

THE UTICA AND MARCELLUS SHALE PLAYS ARE TWO OF THE COUNTRY'S LARGEST NATURAL GAS BASINS

In the last six years, gas extractions in the Marcellus and Utica basins have become some of the most productive dry gas plays in the contiguous United States (gas plays with very little condensate or liquid reserves), accounting for approximately 70% of US gas production growth (Exhibit 1).² Development of the Utica shale play began in 2013, launching the next major wave of shale development in the United States.

The Utica shale, a layer of shale below the Marcellus, represents a valuable opportunity for Ohio, as 23 trillion cubic feet of dry gas resources (98% of the basin's proven reserves) remain untapped. These resources amount to about a year's worth of total US gas production.³ In addition to dry gas, the Utica shale play has 1.3 billion barrels (Bb) of natural gas liquids reserves (NGLs, also called wet gas) and limited reserves of light tight oil.⁴

EXHIBIT 1



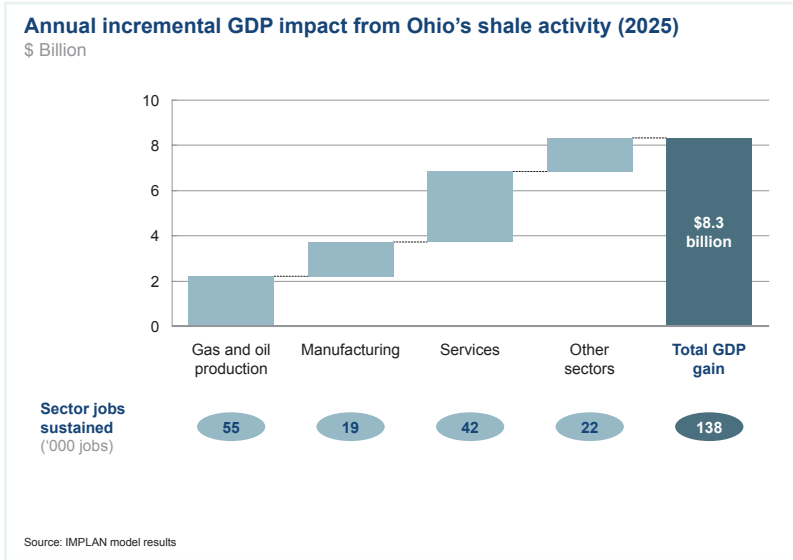
THE EXTRACTION OF UTICA SHALE COULD INCREASE OHIO'S GDP \$8 BILLION AND CREATE AND SUSTAIN 130,000 JOBS BY 2025

The extraction of the Utica basin's resources will benefit Ohio's oil and gas industry directly, while benefiting downstream manufacturing and local services indirectly. Louisiana's similar Haynesville shale play sustained about 90,000 jobs and increased disposable income across the state by \$5.7 billion in 2009.⁵ The economic benefit for Ohio should be similar.

Shale gas is projected to spur large capital expenditures for drilling infrastructure, pipelines, and downstream processing infrastructure. The state will benefit from capital expenditures during the construction of new infrastructure and from an expanded tax base once new gas pipelines are in service.

Of the \$8 billion in GDP growth by 2025, \$2 billion is expected to come directly from the oil and gas industry, with an additional \$6 billion expected to come from local manufacturing, services, and other related sectors (Exhibit 2).⁶ The oil and gas sector is likely to sustain some 55,000 jobs, and industries related indirectly to oil and gas are likely to sustain about 80,000 jobs.⁷ These jobs include chemicals and plastics manufacturing, professional services, education, hospitality, and wholesale and retail trade.⁸ This broad employment growth reflects the broad economic impact of Ohio's natural gas opportunity.

EXHIBIT 2



THE UTICA SHALE PLAY IS COST-COMPETITIVE

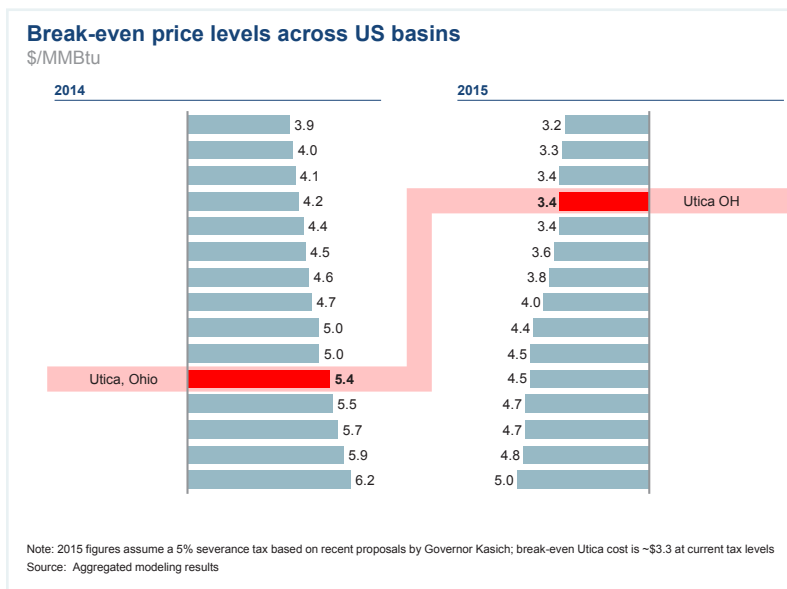
Compared with other US shale plays, Utica is cost-competitive. Gas extraction costs in the Utica basin are 16% lower than the national average for all other basins, and Ohio's competitive position is expected to strengthen.⁹

Break-even prices are projected to drop 30% or more in the Utica basin (Exhibit 3).¹⁰ Oil and rich gas (gas with higher quantities of liquids) wells generally have better economics than dry gas wells.¹¹ Counties with rapidly increasing production—Monroe, Noble, Belmont, and Harrison—are expected to have the lowest break-even prices.

The number of wells completed per year in Ohio more than quadrupled in two years, from 91 in 2012 to 445 in 2014 -- with the cumulative well count reaching 1230 in 2015.¹² The well count is expected to rise as production increases.

Unconventional basins, including Utica, typically require a long learning period while the first 1,000 - 1,500 wells are drilled, when well production increases substantially.¹³ Costs will fall as drillers gain experience in the Utica basin and producers drill longer laterals.¹⁴ Longer laterals increase the amount of gas extracted per well because the well extends deeper into the shale play.

EXHIBIT 3

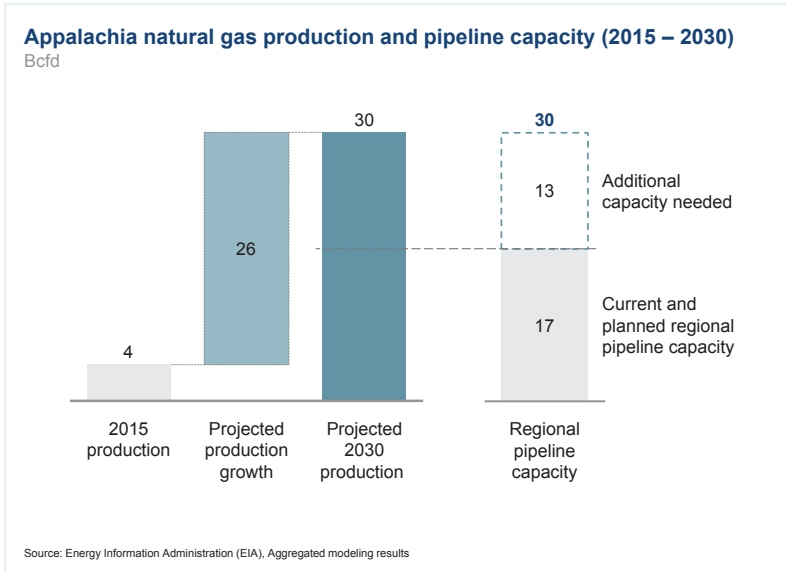


NATURAL GAS PIPELINE CAPACITY IS STRUGGLING TO KEEP PACE WITH INCREASED GAS PRODUCTION

Current natural gas pipeline capacity is not sufficient to handle projected production levels.¹⁵ Pipeline capacity is already constrained during peak periods of demand.¹⁶ This creates a major economic loss for producers, as prices are at their highest during these periods.

To begin to address the capacity constraints, producers have reversed the flow of natural gas pipelines to send gas out of the region, instead of importing it.¹⁷ Flow reversals from Ohio to West Virginia and Pennsylvania began in 2013. Since 2010, gas flows through Ohio to other states have fallen 60%.¹⁸ Gas flows are increasingly heading from Ohio to Michigan or Canada to meet regional demand.¹⁹ Despite these efforts, the Appalachian region requires additional pipeline capacity of 13 billion cubic feet per day (bcfd) by 2020 to handle Appalachia’s projected gas production growth (Exhibit 4).²⁰

EXHIBIT 4



NATURAL GAS LIQUIDS OFFER AN IMMENSE ECONOMIC OPPORTUNITY

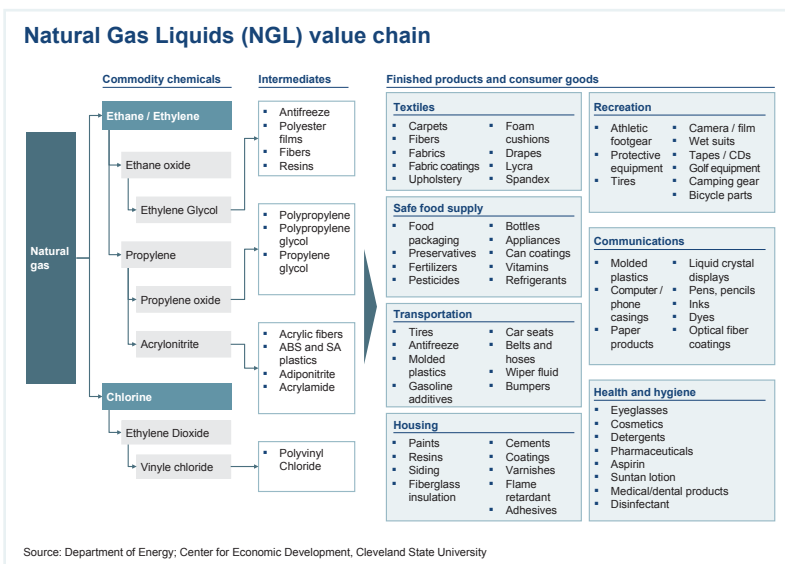
The Utica's 1.3 Bb of NGLs represent an immense economic opportunity for Ohio.²¹ NGLs, or wet gas, can be processed and converted into ethylene and propylene, which are used as feedstock for end products like plastics and rubber.

To unlock the full value of these liquids and create local demand for NGLs, Ohio must continue to encourage the development of crackers, which refine and process NGLs into end products for the textile, food, transportation, and communications industries, among others (Exhibit 5). Crackers employ highly skilled workers, including chemical engineers, lab techs, and chemists.

PTT Global Chemical is investing significantly to develop detailed engineering designs for a world-scale petrochemical complex in Belmont County.

This ethane cracker and other proposed crackers would also create local demand for NGLs and support the development of downstream industries in Ohio. The wealth of Ohio's NGLs, alone, could support several crackers.²²

EXHIBIT 5²³



SUMMARY OF POWER OPPORTUNITY



The structure of Ohio's electric power market has been evolving for some time, and will continue to a future end-state that is somewhat uncertain. While power prices have remained stable across the state, power demand is falling and is likely to remain flat for the next 10-15 years.

At the same time, Ohio's power supply is shifting, as natural gas and renewables (especially wind and solar) replace coal as a supply source for generation. Historically, Ohio has been a net importer of power and will remain so for the foreseeable future. The evolving market structure and shifting generation mix create uncertainty, with many baseload coal and even nuclear assets under economic pressures that appear more likely than not to continue in the near and medium term. As these coal and nuclear assets eventually retire, either for economic or end-of-life reasons, they will be replaced by gas-fired combined cycles and renewables technologies.

Key takeaways

- ▶ Two regulatory agencies—the Federal Energy Regulatory Commission (FERC) and the Public Utilities Commission of Ohio (PUCO)—shape the structure of Ohio's electric power market.
- ▶ Ohio's retail power prices have remained competitive with the national average.
- ▶ Ohio's power demand is falling and is expected to remain flat.
- ▶ Ohio is becoming a larger net importer of power.
- ▶ Ohio's generation mix is shifting to include gas, renewables, and distributed generation technology, and renewables will continue to become a larger part of Ohio's generation mix.

TWO REGULATORY AGENCIES SHAPE THE STRUCTURE OF OHIO'S ELECTRIC POWER MARKET

Over the past 15 years, Ohio has shifted from a regulated state to a restructured state, allowing customer choice. Restructured states let customers choose their electricity provider through the public utility that distributes the power to their home or business.

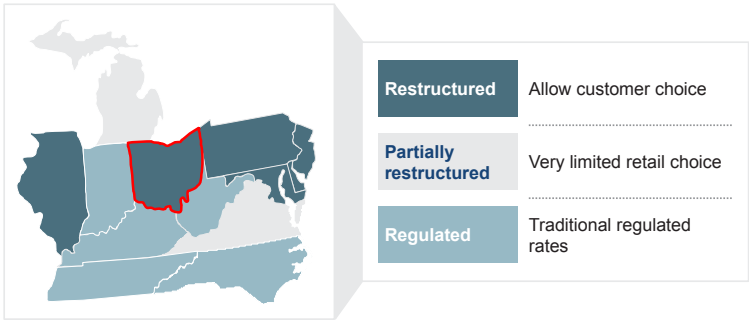
Ohio's utilities have joined PJM, a regional transmission system (RTO) that coordinates the movement of wholesale electricity in all or parts of 13 states and the District of Columbia, subject to FERC jurisdiction (Exhibit 6). PJM incentivizes additional generation capacity based on projected power demand.²⁴ Despite PJM's broad reach, it is still evolving as a power market.

PJM has proposed changes in its capacity market tariff to address concerns about generation performance. These changes include creating an obligation for providers to deliver energy during specific high-demand hours set by PJM and increasing provider penalties for underperformance. PJM's priority is to ensure a reliable power supply for the entire region, given this is addressed at a regional level (coincident with transmission operator territories) as states are limited in their ability to advocate for themselves within the organization.

The PUCO is the major institution that regulates utility service providers in the state. PUCO is responsible for enforcing rules and state laws that apply to public utilities and power generation. The regulatory body manages parts of the permitting and siting process and ensures that rates for electricity are fair to consumers.²⁵ The evolution of Ohio's regulatory mechanism has not kept pace with the overall rate of change in the energy industry, which is marked by extensive customer choice, many new players, and a shift from state-based to regional policy.

EXHIBIT 6

Current regulatory status of states participating in the PJM



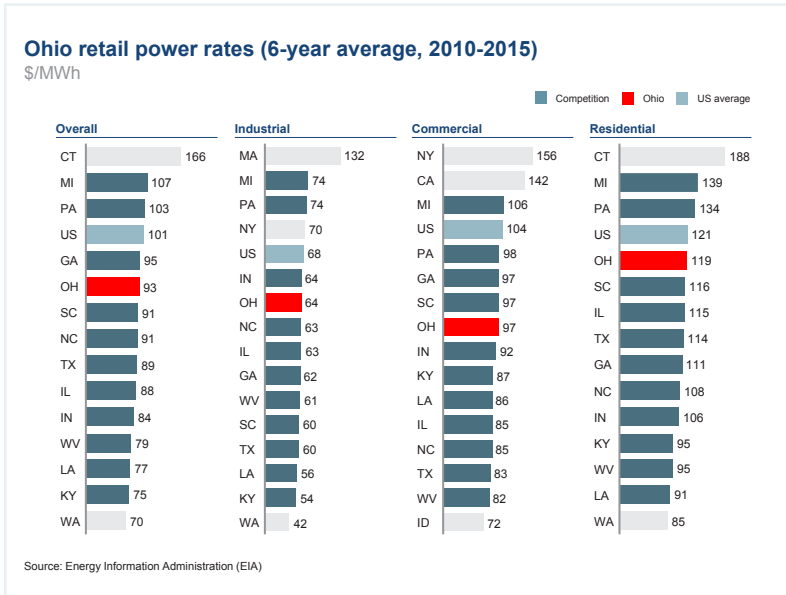
OHIO'S RETAIL POWER PRICES HAVE REMAINED COMPETITIVE

The average power rate paid by Ohio consumers in the last six years is \$95 per megawatt hour (MWh), \$7/MWh below the national average.²⁶ One MWh can power about 1,000 homes. Across segments—industrial, commercial, and residential—Ohio outperforms the national average by at least 7%.

Ohio's industrial rates have increased but remained competitive over the last 15 years (Exhibit 7).²⁷ Large industrial players in Ohio can negotiate specific rates to fit their situations. Many large industrial companies operate on a bilateral rate basis, which tends to be lower than the average industrial rate for the state because the companies negotiate their rates with providers. The majority of industrial electric consumers are competing in a global market with often-subsidized foreign competitors. As a result, strictly comparing electricity rates on a state-by-state basis is not sufficient to determine global competitiveness for Ohio's manufacturers. Commercial rates have also increased over the past 15 years and are third highest among benchmark states but still \$6 below the national average.²⁸

Future power rates are uncertain, given the evolving regulatory environment and shifting commodity prices. Preliminary modeling indicates that retail prices are likely to rise due to falling power demand given that they are based on volumetric rates (i.e., the total cost to maintain the infrastructure of an electric grid is distributed across the units sold; therefore, if fewer customers are consuming units, they bear an increasing proportional burden).

EXHIBIT 7



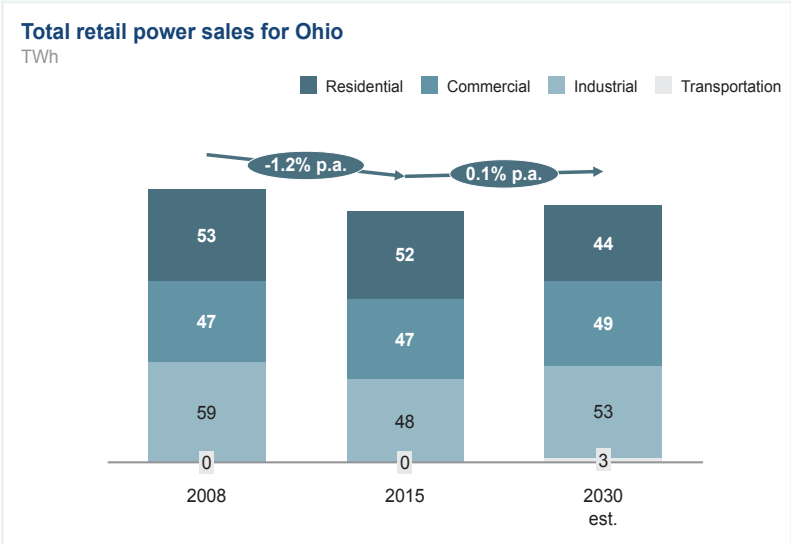
OHIO'S POWER DEMAND IS FALLING AND EXPECTED TO REMAIN FLAT

Ohio's power demand has inched down 1.2% since 2008 and is likely to remain flat for the next 10-15 years (Exhibit 8).²⁹ This drop is due, in part, to industrial losses during the recession³⁰ and is consistent with the flat-to-negative load growth nationwide during the same period.

The industrial load lost during the recession has not recovered, despite growing industrial GDP. Improvements in industrial energy efficiency and a higher price per unit of production that keeps GDP high, despite lower production, are part of the reason.³¹ Efforts to increase residential energy efficiency contributed to demand decline, and continued adoption of energy efficiency standards is predicted to lower residential demand further.³² But industrial and commercial demand is expected to increase slightly over the next 10-15 years as the economy grows.

Some regions of the state have seen considerable growth. Regional demand near the Utica basin in eastern Ohio has increased since 2011 due to the exponential growth of gas operations. AEP has seen a 17% increase in power sales in this area in the last five years. Growth was even higher over the last three years. But falling residential demand and slow growth in commercial and industrial demand mean that Ohio's overall power demand is projected to remain flat.

EXHIBIT 8



OHIO IS BECOMING A LARGER NET IMPORTER OF POWER

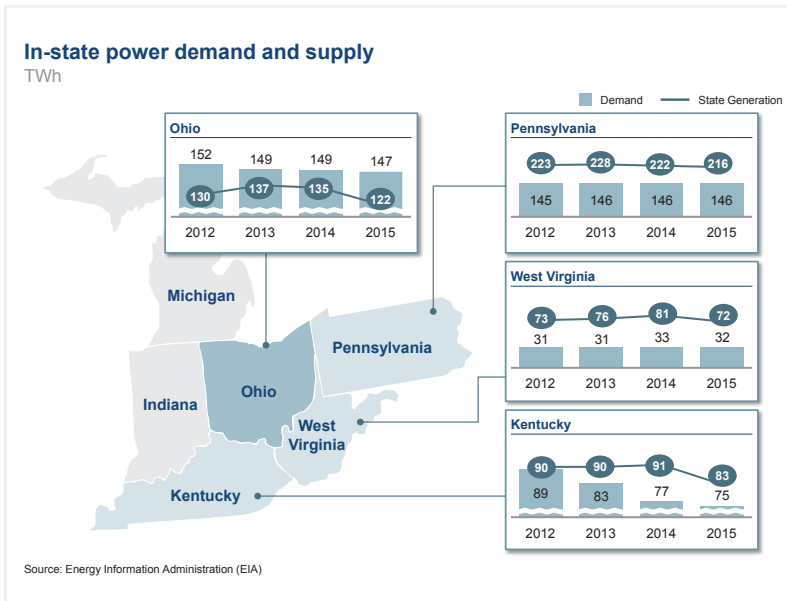
Ohio continues to be a net importer of power, and the state is projected to remain a net importer for the near future as Ohio’s coal plants are shuttered and natural gas plants take up only a portion of the slack.³³ Imports peaked as a share of demand in 2012 when gas prices hit a record low, but imports are forecast to rise as a share of demand going forward.³⁴

Ohio can continue to rely on relatively inexpensive imports from other states, as many states produce more power than they consume, and Ohio can import that power at a competitive price (Exhibit 9).³⁵ Increased imports have not created any reliability concerns for Ohio consumers.

Ohio’s producers have consistently met demand with limited price volatility. Except for two incidents, the polar vortex in 2014 and an isolated transmission incident in 2013, power prices have remained stable across the state. Had the strains on the system that caused volatile prices been more extreme, they could have created power reliability issues.

Given Ohio’s shifting power landscape, there is some uncertainty about baseload assets potentially retiring from service.

EXHIBIT 9



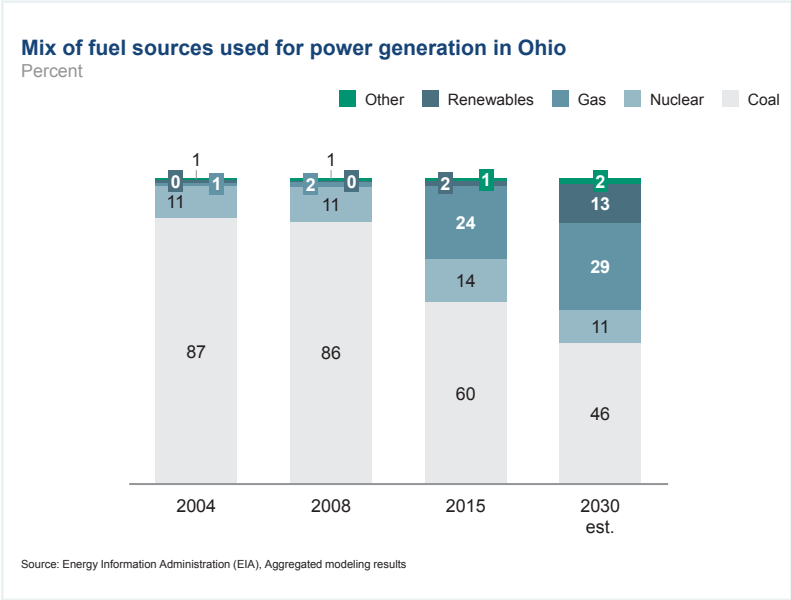
OHIO'S GENERATION MIX IS SHIFTING TO INCLUDE GAS, RENEWABLES, AND DISTRIBUTED GENERATION TECHNOLOGY

Ohio's power supply is shifting, as coal-fired power plants retire in favor of gas plants, renewables, and distributed generation technology.³⁶ Over the past six years, Ohio has seen a 29% decrease in coal power generation, while gas-fired generation has increased twelvefold.³⁷

Ohio has twelve gas generation plants in different stages of development, with an average construction timeline of three to four years.³⁸ The development timeline can vary by type of plant. A plant's success in the permitting and siting process creates timeline uncertainty, but Ohio's success rates match the national average.

If all of these plants were constructed successfully, they would expand Ohio's gas generation capacity by 5,900 MW, enough power to supply approximately 6 million homes.³⁹ While gas generation is rapidly gaining share in Ohio's generation mix, coal-fired generation will remain the largest source of Ohio's power generation (Exhibit 10).

EXHIBIT 10



RENEWABLES ARE EXPECTED TO BECOME A LARGER PART OF OHIO'S GENERATION MIX

Renewables, especially wind, are expected to account for a growing portion of Ohio's generation mix in the next 15 years (Exhibit 11).⁴⁰ Renewables provided only 1% of Ohio's and 3% of PJM's power generation in 2014.⁴¹ By 2030, renewables are projected to represent 13% of Ohio's total power generation.⁴² Ohio's installed capacity for renewables is expected to almost double in the near future, thanks to new investments in renewable assets and improved efficiencies.⁴³ Furthermore, the market-based adoption of renewables will accelerate as technology costs fall and certain customers prioritize renewable power.

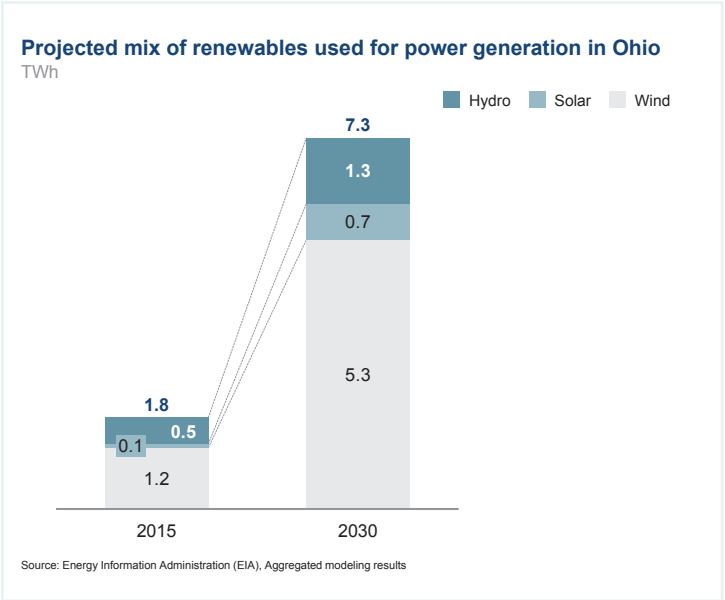
Ohio's geography and climate are not as suited to renewables as some other states, especially those in the southwest. Ohio's year-round, frequent cloud cover is a challenge for solar power as an option for almost all of the state. Sustained winds are most common in the northern part of the state along Lake Erie and in west central Ohio, but the region lacks ample space to build wind turbines, and winds can be inconsistent.

Renewables, including solar and wind, are intermittent sources of power and increase demands on the power grid. Because power cannot be stored cost effectively after it is generated, a wind or solar farm that goes offline intermittently, when the wind stops blowing or the sun stops shining, must be replaced by other fast-starting gas, coal-fired, or nuclear capacity. This adds complexity to managing a grid with a high share of renewables.

Despite these challenges, the pace and agility of renewables development, and their technological advances in output and price, have surprised many. As other markets with increasing adoption of these technologies, such as California and Europe, have shown some successes with renewables, those same markets have illustrated the significant challenges created by increased reliance on intermittent renewable energy, including higher prices and reliability concerns. Ohio can benefit from these precedents, and apply a cautious approach to integrating renewable generation sources to ensure customers have access to affordable and reliable power.

Renewable power from wind and solar are not the only emerging technologies that could play a meaningful role in Ohio's power landscape, as storage, distributed generation technologies, and energy efficiency continue to decline in costs and present new benefits to consumers. Adoption of these technologies has obvious environmental impacts, such as lowering greenhouse gas emissions, and is increasingly seen as a competitive advantage to attracting businesses and talent.

EXHIBIT 11



ACTIONS TO PURSUE

To capitalize on the gas and power opportunities and make the state sustainably energy-competitive, Ohio should act on six fronts:

- 1. Maximize Ohio's natural gas advantage
- 2. Meet the evolving needs of the power market
- 3. Build the required support infrastructure
- 4. Continue to improve the ease of doing business in the energy sector
- 5. Ensure adoption of renewables and advanced energy technologies is market-based
- 6. Drive economic benefits from energy competitiveness.

MAXIMIZE OHIO'S NATURAL GAS ADVANTAGE

Ohio should seek to maximize the natural gas opportunity in order to capture its full economic value. This would require addressing the infrastructure and regulatory challenges associated with the opportunity.

Ohio would have to overcome bottlenecks in gas transportation and encourage the development of more regional gas pipelines. Reaping the full value of the Utica basin's NGLs would require creating a local source of demand, in part by encouraging downstream producers to invest in facilities like crackers in Ohio.

The regulatory landscape in Ohio is evolving. Ongoing and unresolved debates on the appropriate level of severance tax, despite the Ohio Business Roundtable's support for Governor Kasich's prior severance tax proposals, have created a climate of uncertainty that could potentially discourage investments in the future.

Resolving these issues would give businesses the clarity they need to move forward to new health and safety challenges, building upon the Governor's already successful regulatory reforms, including well casing and surface water data requirements on drilling fluids, clean air rules on air emissions, and underground injection inspections.

Leaders in Ohio should remain engaged with local communities and other interest groups to minimize disruption and maximize the benefit of the opportunity.

Goals

- ▶ Nurture production growth in the Utica basin from 2 bcf/d to more than 10 by overcoming emerging transportation bottlenecks from key production areas to key demand areas
- ▶ Build state and regional demand for valuable Utica by-product liquids (e.g., ethane and condensate)
- ▶ Implement additional measures to avoid accidents or health and safety events that would constrain or collapse Ohio's oil and gas industry
- ▶ Boost investor/producer confidence by creating certainty about production, regulation, and future tax structure

MEET THE EVOLVING NEEDS OF THE POWER MARKET

Ohio's power regulatory landscape has shifted in recent years. In 1999, the Ohio General Assembly passed Senate Bill 3, sparking deregulation of the power market. Five years later, Ohio moved to enter the PJM, shifting governance of the power market from state utility plans to a regional model and effectively limiting Ohio's control of and influence on the capacity market.

Since then, Ohio's in-state power demand has fallen, and in-state power generation has fallen even faster. Imports make up the difference, and Ohio's reliance on these imports has grown over the past ten years, from 2% of demand in 2004 to 10% in 2015.

Meanwhile, the changing economics of fuel sources have shifted the way we generate power in Ohio. Coal-fired generation is slowly surrendering to natural gas and renewable generation—a trend that is expected to continue.

These changing dynamics may create reliability challenges in the power market. While reliability has been consistent over the past ten years, the shifts in power generation assets reinforce the need to work with PUCO, PJM, and other stakeholders to ensure the adequacy of transmission infrastructure to provide reliable and affordable power to customers.

Goals

- ▶ Promote an environment that balances the needs of customers and developers
 - Customers: cost-effective, predictable, reliable power
 - Developers: continued investment in new and existing assets
- ▶ Strengthen Ohio's voice in PJM and at the FERC to improve the overall function of the capacity market and allay wholesale market uncertainty
- ▶ Align Ohio's energy players around the future generation assets, capacity market, and transmission and distribution network
- ▶ Encourage the development of cost-effective generation assets in "stranded" gas areas (areas where the available gas supply exceeds the pipeline capacity to bring it to market)

BUILD THE REQUIRED SUPPORT INFRASTRUCTURE

Ensuring competitiveness in both natural gas and electric power requires sufficient infrastructure.

Dry gas and liquids pipelines will face substantial obstacles to creating value without added investment. Current and planned pipelines will supply only about 55% of expected production by 2030. Thus, without new pipelines, an estimated 32 trillion cubic feet of potential production cannot reach the market. In fact, pipeline capacity is already constrained at periods of peak demand when prices are highest, which creates the largest commercial loss. Therefore, pipeline capacity is a current and growing issue.

Changes in the generation mix require new transmission infrastructure to get that power to the market. While reliability of transmission has not historically been an issue, the shifts in generation could create challenges. Planned transmission and distribution investments in the US are already increasing, from roughly \$17 billion in 2013 to \$20 billion in 2017. Ohio investments must increase as well to support the shifts in the supply/demand profile of the power market and ensure reliable, cost-effective power for consumers.

These investments will require adequate financing options to meet the challenges associated with underwriting and financing large infrastructure projects.

Goals

- ▶ Develop a state-wide strategy to anticipate energy infrastructure needs and manage the transition
- ▶ Define a solution that accommodates the changing supply/demand profile of the electric grid in a reliable and cost-effective way
- ▶ Identify and resolve any constraints on enhancing the inter- and intra-state gas and liquids pipeline network, including capital asset tax
- ▶ Maximize the use of the Ohio River as a critical part of the transportation infrastructure, recognizing the potential value of commodities produced in the state

CONTINUE TO IMPROVE THE EASE OF DOING BUSINESS

Ohio's business leaders have voiced concerns about several things that do or seem to influence the ease of doing business in the state, specifically the protracted severance tax debate and construction of new power generation.

The severance tax debate in Ohio has served to increase uncertainty, potentially decreasing the attractiveness of investing in the state.

The success of gas generation turbines slightly lags the regional average, but not on a per-megawatt level. Streamlining the permitting and siting process could reduce the uncertainty associated with power plant development.

Ohio is on par with other states' gas and power regulatory environments. Ohio's regulations on gas dispersion, wastewater treatment, and fracturing are similar to those of other energy-producing states. Regulations on site preparation are actually less stringent in Ohio, and the permitting and siting process is not appreciably more difficult in Ohio than in other states.

To make doing business in Ohio easier, the state should continue to improve its regulatory and tax environment, to maximize value and encourage investment. Resolving the severance tax debate to reduce uncertainty could help. Ohio should streamline the permitting and siting process and increase the transparency of PUCO.

Goals

- ▶ Continue to streamline the review and approval process for energy investments (e.g., new generation and pipelines) to closely match permitting and siting times with construction times
- ▶ Increase the transparency and clarity of electric power price-setting
- ▶ Minimize the cost and disruptiveness of implementing the Clean Power Plan
- ▶ Promote favorable conditions in Ohio with public efforts to counter myths about barriers to doing business in Ohio

ENSURE THAT ADOPTION OF RENEWABLES AND ADVANCED ENERGY TECHNOLOGIES IS MARKET-BASED

The growing share of renewables in Ohio's power generation mix, today and tomorrow, offers the state an opportunity to capture a larger market share of renewable development and manufacturing. But if legislation or mandates forced greater adoption of renewables, power prices would rise. Retail power prices are projected to increase regardless of renewable mandates, but mandates would increase prices more dramatically.

To combat rising power prices and ensure that Ohio remains competitive, the state should phase out mandates. Without mandates, Ohio could support the adoption of renewable technologies when the business case warranted investment. To capitalize on the economic value of renewables when the market favored investment, Ohio could continue attracting manufacturers of renewable energy technology, such as the producers of wind turbines and solar panels. Together, these steps would help the state manage the transition to a generation mix with a larger share of renewables.

Goals

- ▶ Support adoption of renewables and advanced energy technologies when the business case (and self-calculated economics) warrant
- ▶ Phase out mandates for renewable technologies and riders for energy efficiency in a gradual and efficient way
- ▶ Maximize the production base for energy efficiency and renewable technology in the state by attracting manufacturers to Ohio

DRIVE ECONOMIC BENEFITS FROM ENERGY COMPETITIVENESS

Other states with shale booms like Ohio's have captured economic benefits beyond the direct gains from gas and oil production by using low energy prices to attract new businesses. Resource extraction in Texas created a wide variety of jobs, including truck drivers, retail salespeople, and lawyers. Louisiana saw disposable income jump \$5.7 billion as a direct result of gas extraction. When dense industrial and residential areas of Pennsylvania bought cheap gas, economic activity increased across the region. While these economic results are impressive, Ohio's projected GDP gain is actually larger than what Louisiana and Pennsylvania realized.

Ohio should continue leveraging energy competitiveness to fuel economic development. The state, through JobsOhio, should continue to communicate the opportunity to businesses outside Ohio and encourage them to relocate or expand into Ohio to take advantage of low energy prices. Improvements in the state's infrastructure and regulatory environment could make Ohio even more attractive to investors.

Development of the oil and gas industry in Ohio would create the need for a more skilled workforce. Ohio should encourage the development of skills within the state and attract workers from out of state in order to capitalize on the natural gas opportunity.

Goals

- ▶ Maximize the economic benefits of being an energy leader by attracting and retaining gas and liquids producers, power generation facilities, and critical energy infrastructure
- ▶ Leverage Ohio's status as an energy leader to capture new investment in energy-intensive manufacturing and other complementary activities

NOTES (*Reference Comprehensive Fact Base at www.OhioBRT.com*)

- ¹ IMPLAN model results (A96)
- ² Energy Information Administration (EIA), April 2015 (A11)
- ³ Energy Information Administration (EIA), April 2015 (A5)
- ⁴ Rystad Ucube, May 2015; Energy Information Administration (EIA) (A61)
- ⁵ Louisiana DNR, IMPLAN model results (A96)
- ⁶ IMPLAN model results (A96)
- ⁷ IMPLAN model results (A96)
- ⁸ IMPLAN model results (A96, A101)
- ⁹ Drillinginfo; RigData; Company presentations (A14)
- ¹⁰ Energy insights (A14, A92)
- ¹¹ Drillinginfo; RigData; Company presentations (A14, A92)
- ¹² Rystad Ucube (A22)
- ¹³ Energy insights (A22)
- ¹⁴ Rystad Ucube (A15)
- ¹⁵ Energy Information Administration (EIA) (A29)
- ¹⁶ Ventyx; Energy Velocity (A26, A27)
- ¹⁷ Ventyx; Energy Velocity (A25)
- ¹⁸ Energy Information Administration (EIA) (A27)
- ¹⁹ Energy Information Administration (EIA) (A24)
- ²⁰ Energy Information Administration (EIA) (20)
- ²¹ Rystad Ucube, May 2015; Energy Information Administration (EIA) (A61)
- ²² SRI; TECNON; AFPM; JobsOhio (A95)
- ²³ Department of Energy (from Jobs Ohio/Cleveland State report)
- ²⁴ PJM
- ²⁵ PUCO
- ²⁶ Energy Information Administration (EIA) (B5)
- ²⁷ Energy Information Administration (EIA) (B5)

- ²⁸ Energy Information Administration (EIA) (B5)
- ²⁹ Energy Information Administration (EIA) (B21)
- ³⁰ Energy Information Administration (EIA) (B22)
- ³¹ Energy Information Administration (EIA) (B24)
- ³² Energy Information Administration (EIA) (B51)
- ³³ Energy Information Administration (EIA) (B28)
- ³⁴ Energy Information Administration (EIA)
- ³⁵ Energy Information Administration (EIA) (B29)
- ³⁶ Energy Information Administration (EIA) (B30)
- ³⁷ Energy Information Administration (EIA) (B30)
- ³⁸ Ventyx, Energy Velocity (B81)
- ³⁹ Ventyx, Energy Velocity (B82)
- ⁴⁰ Energy Information Administration (EIA); BRT Working Team Analysis (B71)
- ⁴¹ Energy Information Administration (EIA) (B34)
- ⁴² BRT Working Team Analysis (B69)
- ⁴³ Energy Information Administration (EIA); BRT Working Team Analysis (B70)



OHIO BUSINESS
ROUNDTABLE

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Renewable Energy Resource and Energy Efficiency Benchmarks

	SB 221	Current Status ¹	Recommendation
Advanced Energy Resources²	12.5%	12.7% ³	Restore the Requirement
Renewable Energy Resources			Maintain Current Benchmark
<i>Non-Solar</i>	12%	13.2% ⁴	
<i>Solar</i>	0.5%	0.4% ⁵	
Energy Efficiency	22%	8.6% ⁶	Add a Cost Cap

¹ Future needs of the mandates in MWh are forecasted to estimate future demand.

² SB 221 required that by 2025 and thereafter, 25% of the electricity distributed in Ohio must be generated from renewable energy resources or advanced energy resources. SB 310 lowered the benchmark to 12.5%, removed the advanced energy resource component, and extended the implementation date to 2027.

³ Includes four new natural-gas fired plants that are currently under construction.

⁴ 500MW of wind from AEP settlement would result in an increase to 14.5%.

⁵ 400MW of solar from AEP settlement would result in an increase to 0.8%.

⁶ Through recent settlements, FirstEnergy has committed to achieving 800,000MWh of Energy Efficiency from 2017-2025 and AEP has committed to achieving 1.33% of the mandate from 2017-2019. This would result in an increase to 14.9%.

“States that wish to gain the job creation and economic development benefits of corporate RE-powered facilities should encourage their policymakers and regulators to enable customer choice.”¹

During the Senate and House floor debates regarding HB 554, proponents asserted that Ohio’s electric customers have the right and ability to act on their own portfolio preferences and buy as much “renewable” electricity as they may be willing to pay for. Some opponents suggested otherwise.

In the interest of sharing information on some of the options that allow customers to **voluntarily** satisfy their electricity demand by relying on “renewable resources,” I offer the following.

It is easy to be “green” if you are an electric customer located in Ohio.

Path 1 – Competitive Retail Electric Service (“CRES”) Providers & Renewable Supply Offerings

https://www.chooseenergy.com/suppliers/direct-energy/?gclid=CjwKEAiAyanCBRDkiO6M_rDroH0SJAAfZ4KLxIS4y4JR60iDZB-yIQfQFJ_kPbiBngsS6-Ri-1brHBoCinPw_wcB

The above link will take you to Direct Energy’s² webpage that describes the renewable electricity purchase opportunities that CRES providers like Direct Energy make available to retail customers in “customer choice” states like Ohio. These offerings come from market forces—not mandates or regulators—and let willing buyers and sellers act on their own portfolio preferences.

Also, you can learn about IGS’ renewable offerings here: <http://www.igsenergy.com/your-energy-choices/green-energy>.

These are just two examples of the opportunities that retail customers in Ohio have to vote for renewable energy with their wallet without being compelled to do so by the force of a government mandate or a utility to which the customer is captive. Because the General Assembly acted to give all retail customers of investor-owned electric utilities the right to act on their own portfolio preferences, retail customers have the right to beat a path to the better mouse trap. If Amazon or Google wants to locate a facility in a state where they have the right to buy 100% “renewable,” that is something they can do in Ohio

¹ *Corporate Clean Energy Procurement Index: State Leadership & Rankings* at 13 (emphasis added) (January 2017).

² In the interest of full disclosure, neither Direct Energy nor IGS is a client and I have no relationship of any type with either. Their renewable options are referenced here simply because they are large and active CRES providers in Ohio.

now. They cannot do this in Michigan, Indiana, Kentucky, West Virginia or most other states.

Because Ohio is a “customer choice” state, CRES providers have the opportunity and motive to offer supply options that customers want. They do this without demanding “lost revenues” and “shared savings” that are demanded by investor-owned electric distribution utilities (“EDUs”) in exchange for “playing mandate ball.”

CRES providers do this because they want customers and they don’t have a monopoly. They have to obtain customers the old fashion way; they have to earn them.

Ohio’s “customer choice” structure is the main reason why the Retail Industry Leaders Association (“RILA”),³ the Information Technology Industry Council (“ITI”)⁴ and Clean Edge, Inc. (“CleanEdge”)⁵ ranked Ohio as providing the 8th best opportunity in the United States for businesses interested in buying “renewable energy.”⁶ Ohio’s 8th place finish in this rating system confirms that real customers value structures that empower customers to act on their own portfolio preferences.

Some state electricity market structures enable more customer choice, a strong desire of many large buyers. States that limit customer choice can see higher RE [renewable energy] costs, making their markets less attractive. That means the structure of a state’s electricity market can directly influence where corporations choose to invest in renewable projects, and in which states they decide to expand their operational footprint.

The index ranks all 50 U.S. states based upon the ease with which companies can procure RE for their operations located within each state. The index consists of 15 indicators, broken into three categories: Utility Purchasing Options, Third-Party Purchasing Options, and Onsite/Direct Deployment Options.⁷

³ RILA describes itself as the “... trade association for the world’s largest and most innovative retail companies.” (Available at: <http://www.rila.org>). RILA’s members include The Home Depot, Lowes, Target, Walmart, Costco, KOKL’S, Apple, Cabela’s, Kroger, Lbrands, GAP, Dollar General, Best Buy, Sears Holdings, AutoZone, JCPenney, Staples, CVS Health, Walgreens, Giant Eagle, Meijer, Publix, Whole Foods and Nike.

⁴ ITI describes itself as “... the global voice of the tech sector.” (Available at: <http://www.itic.org>). ITI’s members include Amazon, Dell, Google, Facebook and Microsoft.

⁵ CleanEdge describes itself as the world’s first research and advisory firm devoted to the clean-tech sector. It provides clean-energy benchmarking services including stock indexes, utility and consumer surveys, and regional leadership (state and metro) tracking. (Available at: <http://www.cleandedge.com>).

⁶ *Corporate Clean Energy Procurement Index: State Leadership & Rankings* (January 2017).

⁷ *Corporate Clean Energy Procurement Index: State Leadership & Rankings*, Executive Summary (January 2017). The full report is available at CleanEdge’s website at <http://www.cleandedge.com>.

The availability of retail choice is a critical factor for a state's attractiveness to corporate and other large institutional buyers of RE. **States that wish to gain the job creation and economic development benefits of corporate RE-powered facilities should encourage their policymakers and regulators to enable customer choice.**⁸

This rating system was created to assist large renewable energy buyers select states in which they can conveniently and effectively make investments in renewable energy projects and systems.⁹

Path 2 – Behind the Meter Renewables & Net Metering

<https://www.aepohio.com/save/residential/renewable/>

The above link will take you to AEP-Ohio's webpage that briefly explains the net metering option that is designed to facilitate "behind the meter" installations of "renewable" generating systems like a rooftop solar system.¹⁰

With net metering, the behind the meter production reduces the amount of electricity the customer needs to purchase when total renewable energy production is less than the total demand by the customer. When the renewable production is greater than the customer's demand, the customer's renewable production fully satisfies the customer's demand and the excess renewable output is exported to the grid (and the customer is paid for the exported quantity). In addition, behind the meter resources are eligible for tax benefits and renewable energy credits. Plus, each kilowatt-hour ("kWh") of behind the meter production used by the customer avoids the cost of things like Ohio's kWh tax, the charges to support the Universal Service Fund (bill payment assistance for residential customers), the riders that recover the cost of the mandates and other utility charges.

A generation mix disclosure requirement was made part of Ohio law as a result of Ohio's electric restructuring legislation (Am. Sub. SB 3) some 18 years ago so that retail customers could act on their own portfolio, environmental and technology preferences.

Every EDU in Ohio must have a net metering tariff because this is required by Ohio law.

⁸ *Corporate Clean Energy Procurement Index: State Leadership & Rankings* at 13 (January 2017) (emphasis added).

⁹ See more at:
http://www.gongwer-oh.com/programming/news.cfm?article_id=860070208#sthash.dkkvenNh.dpuf.

¹⁰ The Solar Energy Industries Association offers information showing the extent to which businesses are investing in behind the meter deployment of solar energy systems. (Available at:
<http://www.seia.org/news/new-report-finds-more-american-businesses-are-installing-solar-ever.>)

Electric co-ops also offer green buying programs even though they are not subject to any mandates. The same is true for the municipal electric utilities like the one owned and operated by Bowling Green, Ohio. As discussed below, Ohio's "customer choice" legal and regulatory structure also allows units of local government to offer "renewable energy" supply through opt-out and opt-in aggregation programs.

Path 3 – Renewable Energy Certificates ("REC") Purchases

A REC is a certificate documenting that a "renewable resource" has produced one megawatt-hour ("MWH") of electricity. To obtain a REC, the "renewable resource" must be certified by a state. In Ohio, the Public Utilities Commission of Ohio ("PUCO") is charged with certifying renewable resources that, once certified, are eligible to obtain a REC for each MWH of production. In 2015, the first year of the so-called "freeze," more megawatts of renewable resources were certified by the PUCO than in 2014 (before the freeze began).

If you want to support renewable resources, you don't need to buy the electricity produced by a renewable resource. You can buy a REC and you can buy as many as you want.

RECs are publicly traded and there are lots of reporting services that provide pricing for non-solar and solar RECs. If you are really keen on supporting renewable electricity production, you can also pay an above-market price for the RECs you purchase.

REC prices are established by willing buyers and sellers. The proceeds from REC sales are a part of the revenue stream that rationalizes and supports investment in renewable resources.¹¹

You may have heard claims that the SB 310 "freeze" on the escalation mandates' compliance burden destroyed REC prices. Actually, mandates and regulators equipped with mandates destroy REC prices because they force more and more renewable production and thereby devalue REC prices (a simple supply and demand consequence).

Path 4 – Aggregation

Ohio's "customer choice" framework embraces aggregation by governmental entities acting alone or jointly as well as any other association or individual.¹²

¹¹ The REC option is discussed at the PUCO's webpage: <http://www.puco.ohio.gov/puco/index.cfm/be-informed/consumer-topics/electricity-and-the-environment/#sthash.g6ThRr7P.dpbs>. Please note that this PUCO webpage also explains the environmental disclosure information that is periodically provided to customers by their generation supplier. Each supplier (including CRES providers) must disclose its generation mix and environmental characteristics. Typically, residential customers will see this disclosure included with their electric bills.

¹² The PUCO's webpage describes the aggregation options in Ohio: <http://www.puco.ohio.gov/puco/index.cfm/be-informed/consumer-topics/governmental-energy-aggregation-local-community-buying-power/#sthash.60kZYlwo.dpbs>.

For example, the City of Cleveland established an aggregation program that has fifty percent (50%) of the electricity supply sourced from renewable resources and an option for participating customers to increase the renewable portion to one hundred percent (100%).¹³

Organizations interested in helping customers act on their preference for renewable energy can individually or jointly aggregate customers wishing to buy electricity produced by renewable resources or RECs.

Path 5 – Property Assessed Clean Energy (“PACE”) Financing

PACE programs are one of the many means of financing energy efficiency and renewable energy improvement projects. They allow qualifying energy improvements to be financed through assessments on a property owner’s real estate tax bill. The special assessments are used to secure local government bonds issued to fund the improvements without requiring the borrower or the sponsoring local government to pledge its credit. PACE financing enables property owners to reduce energy costs with no upfront investment.

Ohio’s entry into PACE programs began on July 17, 2009 when the General Assembly passed, and Governor Strickland approved, Ohio House Bill 1 (HB 1). This legislation allowed Ohio municipalities and townships to assist property owners with solar photovoltaic and solar thermal (e.g., roof-top and ground-mounted solar arrays, solar water heaters) installations through a special financing district called a “special improvement district” (SID). By creating a SID, municipalities and townships are able to facilitate the financing of solar photovoltaic and solar thermal systems through the levy of a special assessment on the real estate tax bill of any consenting, participating property owner. Less than a year later, the General Assembly passed, and the Governor approved, Ohio Amended Substitute Senate Bill 232 (SB 232) which further expanded Ohio’s PACE program to provide financing for geothermal, wind, biomass, gasification, and energy efficiency projects.

The changes introduced through SB 232 provide municipalities and townships with the flexibility to offer a full range of renewable and advanced energy options to residential, commercial, industrial, nonprofit and government property owners. PACE financing in Ohio is now available for:

- Solar photovoltaic improvements
- Solar thermal improvements
- Geothermal improvements

¹³ Available at: <http://www.city.cleveland.oh.us/node/5935>.

- Customer-generated energy projects which include wind, biomass or gasification facilities that are either: 1) designed to have a generating capacity of 250 kW or less; or 2) located on the project owner's property, operated in parallel with electric transmission and distribution facilities serving the property, not producing energy for direct sale to the public, and intended primarily to offset all or part of the electricity requirements of the facility-owner)
- Energy efficiency improvements defined to include "technologies, products and activities that reduce or support the reduction of energy consumption, allow for the reduction in demand, or support the production of clean, renewable energy and that are or will be permanently fixed to real property."

Under SB 232, PACE financing can be utilized for solar photovoltaic, solar thermal, geothermal and energy efficiency improvements regardless of size or whether such improvements are on the customer or utility side of the meter. With respect to the other technologies, PACE financing can be used for projects of any size on the customer side of the meter, or for projects of up to 250 kW on the utility side of the meter.¹⁴

Path 6 – Port Authorities

The powers which Ohio has delegated to port authorities are broad and these powers are being creatively applied to help businesses that want to obtain renewable energy or reduce their energy intensity.¹⁵ For example, the Toledo Lucas County Port Authority offers a program called BetterBuildings Northwest Ohio.

Through BetterBuildings, owners of virtually every type of building are eligible for low-cost financing to pay for high-efficiency improvements to their facilities and building systems. The goal is to make cost-effective energy practices and technology more accessible to individuals, businesses and governmental entities across Northwest Ohio - while also helping transform the way whole communities use energy.

Now, BetterBuildings offers attractive commercial financing at competitive interest rates with terms up to 15 years for projects that focus on conserving energy and generating savings through equipment retrofits to existing facilities. Financing is structured so that the energy savings will cover the

¹⁴ Property Assessed Clean Energy (PACE) Financing: The Ohio Story, available at: <http://www.bricker.com/insights-resources/publications/property-assessed-clean-energy-pace-financingthe-ohio-story>; see also <http://gcpace.org/>.

¹⁵ Ohio's Development Services Agency established the Loan Loss Reserve Program which offers credit enhancement to eligible Ohio Port Authorities as they originate loans for energy efficiency projects. (Available at: https://development.ohio.gov/cs/cs_llr.htm.)

cost of equipment, upgrades, installation and transaction cost, which make these projects “self-funding” In addition, eligible utility company rebates and other incentives can be included in the financing.¹⁶

All of the above paths/options work for individual retail customers and with aggregation.

¹⁶ Available at: <http://www.toledoport.org/services/energy-finance/betterbuildings-northwest-ohio/>; see also <http://pacenation.us/pace-in-ohio/>, <https://paceavenue.com/find-PACE/states/Ohio.html> and <http://midwestenergynews.com/2016/08/01/ohio-citys-energy-financing-tool-could-be-start-of-regional-trend/>.