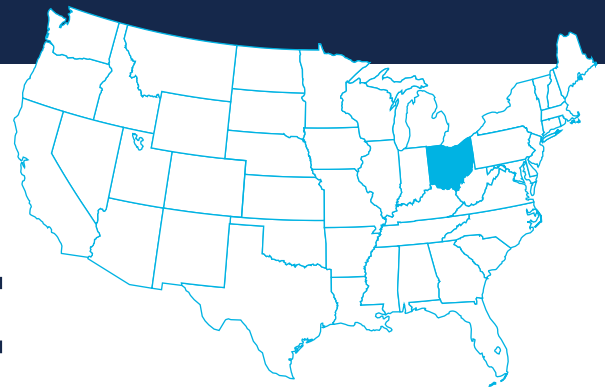




ISSUE BRIEF

OHIO'S CLEAN ENERGY FUTURE



Opportunities to Cut Carbon Pollution Under the Clean Power Plan

Ohio has an opportunity to use the Clean Power Plan to its advantage, by tapping a well of economic growth that could provide new jobs, expand the economy, and help ward off the impacts of a changing climate. That well is clean energy.

WHAT IS OHIO'S CLEAN ENERGY FUTURE?

With the right policies in place, Ohio can:

- **Emerge from the past.** *Energy efficiency* is the cheapest and fastest way to improve comfort in our homes and businesses and bring energy-hogging industrial systems into the new century. Emerging from the past means that Ohio will waste less energy and save more money.
- **Capitalize on the present.** By moving beyond the current roadblock in state policy and implementing clean energy now, we can pave the way for a successful economic future in Ohio. *Clean energy now* means new, good-paying jobs, lower electric bills, and cleaner air and water for our communities.
- **Build a successful, prosperous future.** Expanding energy efficiency and renewable energy is the best path forward because these resources make *electricity cheaper* and *more reliable*.

One way for Ohio to realize clean energy growth is through the Clean Power Plan, which, for the first time ever, limits carbon emissions from the power sector. Ohio can cut a significant amount of carbon pollution by improving energy efficiency in homes and buildings and by expanding the amount of power it gets from renewable sources like the wind and sun. These investments will create new clean energy jobs, protect people from the harmful health effects of air pollution, and save Ohioans money on their electric bills.

Carbon pollution is the main contributor to climate change, which in turn is bringing stronger storms, harsher droughts, and rising temperatures. In fact, 2014 was the hottest year on record globally. Scientists and experts around the world have warned that human-induced climate change impacts are being felt today and are worsening in every region of the United States, including Ohio.¹

Extreme rainfall events in Ohio have become 49 percent more frequent over the past 60 years.² Increased rainfall not only increases the risk of flooding but can also contribute to drinking water contamination. And these events are impacting Ohio *now*. Ohio State University has predicted more frequent algal blooms like the one that led to a three-day drinking water ban in Toledo in 2014.^{3,4} These harmful algal blooms are caused in part by longer storm seasons and more severe storm events that cause nutrient runoff into Lake Erie and other valuable waterways.

The costs of climate change are rising as well. Climate-related disasters in 2012 cost American taxpayers more than \$100 billion.⁵ Ohioans paid an estimated \$4.2 billion, or *\$1,100 per taxpayer*, in federal taxes for recovery from extreme weather events in 2012 alone.⁶

Ohio can't afford to ignore the increasing number of major environmental crises happening on its doorstep. Moving forward to build a safe, successful future begins with making changes today that lay the foundation for clean, reliable energy.

OVERVIEW OF THE EPA'S CLEAN POWER PLAN

The nation's fossil-fuel power plants are the single biggest source of carbon pollution in the United States, accounting for nearly 40 percent of the total. Ohio is one of the nation's leading carbon polluters, ranking fourth in 2011 in carbon emissions from its electric power sector.⁷ Carbon emissions

not only threaten Ohioans by contributing to climate change, but jeopardize public health by worsening smog pollution, which can cause serious respiratory illnesses.

Previously, no limits on these emissions existed, but the rules are changing. On June 2, 2014, the U.S. Environmental Protection Agency (EPA) proposed the Clean Power Plan, which sets the first-ever standards limiting carbon pollution from the power sector. These standards are set to be finalized in 2015, at which point they will hasten the reduction of carbon pollution from power plants to 30 percent below 2005 levels.⁸

Ohio's years of investment in clean energy are poised to pay off. Recent studies by the Natural Resources Defense Council (NRDC) show Ohio could cost-effectively meet the Clean Power Plan's carbon pollution targets by focusing on its existing energy efficiency and renewables standards.⁹

When the state doubles down on clean energy, Ohioans win. Increased investment in energy efficiency and renewable energy to cut carbon pollution also stimulates local economies across the state and creates good-paying jobs. This new "clean energy economy" is a way to revive Ohio's manufacturing sector by creating a skilled labor force that can develop, install, and maintain wind and solar energy resources.

By tapping this vast well of potential to expand clean energy, Ohio stands to jump-start its economy, cut electricity costs, and protect our health—all while cutting carbon emissions.

And these benefits extend beyond Ohio. Nationwide, the Clean Power Plan can usher in annual climate and health benefits worth an estimated \$55 billion to \$93 billion in the year 2030. That includes preventing 2,700 to 6,600 premature deaths. These benefits far outweigh the estimated national compliance costs of \$7 to \$9 billion annually in the year 2030.¹⁰

OHIO'S CARBON EMISSIONS TARGET

Every state, Ohio included, has the opportunity to craft its own best strategy to reduce pollution and protect our climate. The Clean Power Plan is expected to be finalized in the summer of 2015, and the following year each state must submit an initial plan to meet its pollution target.

HOW DOES THE CLEAN POWER PLAN WORK?

It sets each state's carbon reduction target by assessing four methods (or "building blocks") that are already being used to cut emissions in each state. The target is expressed in intensity, meaning pounds of carbon dioxide per megawatt-hour (MWh) of electricity produced. Ohio's target is a 28 percent reduction in carbon intensity by 2030.¹¹

The four building blocks used to establish state targets are: 1) making coal-fired power plants more efficient by increasing the amount of electricity they generate from each ton of coal burned; 2) using natural gas power plants more effectively by dispatching them before coal plants; 3) upping the growth of renewable energy based on levels already being installed in the region; and 4) increasing energy efficiency (cutting energy waste) in homes and buildings, thereby reducing the amount of energy that must be generated from fossil fuels.

While the carbon *targets* are based on these building blocks, each state can meet its goal in any way it chooses. The Clean Power Plan puts Ohio in the driver's seat, with the flexibility to design a path that works best for Ohio's own unique energy mix. Investing in energy efficiency and renewable wind and solar power should be a fundamental part of Ohio's strategy to cut carbon

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LESS POLLUTION, MORE JOBS, LOWER ELECTRIC BILLS

Today Ohio has an opportunity to pave a new economic future by ramping up renewable power and energy efficiency. This equates to more jobs, more money in consumers' pockets, and healthier Ohioans. According to The Ohio State University, the state's renewable energy and energy efficiency standards have already led to the creation of over 3,000 direct jobs. **In total, Ohio is home to more than 400 advanced energy companies that employ more than 25,000 people.**

Ohio has already proved it can capitalize on clean energy. As recently as 2013, the state was leading the country in the number of facilities manufacturing components for wind technology and ranked second in the number of solar equipment providers. A Pew study showed that Ohio attracted \$1.3 billion in private clean energy investment from 2009 to 2013 and predicted that the state would draw an additional \$3 billion over the next 10 years.¹²

In 2014, a two-year freeze was imposed on Ohio's efficiency and renewables policies with the passage of Senate Bill 310 (SB 310), putting clean energy development on hold. As each day of the freeze goes by (it expires on January 1, 2017), Ohioans lose out—the Pew study found that investors are now putting their money in other states in the face of policy uncertainty at the Ohio statehouse.¹³ The good news is that reasserting Ohio's commitment to clean energy can reverse this trend, helping slash customers' energy bills, create jobs, and cut harmful carbon pollution. An NRDC analysis shows that ramping up energy efficiency in Ohio would create **8,600 new energy efficiency jobs** and that the state's households and businesses would save **\$903 million on their electric bills** in 2020.¹⁴

Energy efficiency investments reduce energy waste in homes and buildings, leading to smaller monthly electric bills while also cutting pollution. These investments create good-paying jobs as demand increases for manufacturers of efficient appliances, construction workers to build efficient homes and weatherize existing ones, and skilled technicians to do energy audits and install efficient technologies. In addition, as energy bill savings put more money into consumers' pocketbooks, there is increased spending on other goods and services—and associated job creation—across the economy.

GRID RELIABILITY IN OHIO

For 40 years our country has been able to dramatically reduce pollution under the Clean Air Act while keeping the lights on and keeping costs reasonable. Grid operators like PJM, which provides power in Ohio and 12 other states (plus the District of Columbia), plan ahead to meet changing electricity needs. Smart grid planning, coupled with supply- and demand-side investments, will position grid operators to be able to fulfill electricity demand while states implement the Clean Power Plan.

In recent years, billions of dollars have been invested in new transmission infrastructure to make sure electricity can be distributed wherever and whenever it is needed. Energy efficiency savings continue to temper demand, which makes it easier for producers and grid operators to ensure adequate electricity supplies.

Ohio experienced these benefits firsthand in 2014, when energy efficiency prevented potentially life-threatening power shortages in the Midwest and Northeast as these regions scrambled to meet electricity demands during periods of subzero weather.¹⁵

In addition, renewable energy like wind and solar can actually *increase* the reliability of the electric grid. Thanks to more precise weather forecasts and improved technologies, grid operators are increasingly able to predict renewable energy power output. Wind resources can be used to help stabilize the grid with high-quality power.¹⁶ Unlike fossil generation and nuclear sources, which can have large, abrupt, and unpredictable changes in electricity output, changes in wind and solar generation tend to be gradual and predictable.¹⁷ This means that wind and solar need less backup generation than fossil fuels or nuclear sources.

This has been recently demonstrated in the region in and around Ohio. PJM found that its system can operate with 30 percent of its energy coming from wind and solar resources while maintaining reliability, resulting in substantial pollution cuts as well as lower costs for fuel, operation, and maintenance.¹⁸

Thanks to management, planning, and improvements in grid technologies, Ohio can cut pollution, increase energy efficiency, and add renewable energy capacity while maintaining a strong and reliable electric grid.

THE ELECTRICITY SECTOR IN OHIO TODAY

Figure 1, following, shows that in 2013, coal dominated Ohio's electricity generation mix, accounting for nearly 70 percent of the total, with the remainder coming mostly from natural gas (15 percent) and nuclear power (12 percent).¹⁹ Non-hydro renewable energy still represents only a very small amount of generation (1.4 percent).

Ohio's current generation mix does not come cheap. In 2012, Ohio sent \$1.2 billion out-of-state to pay for more than 20 million tons of imported coal, accounting for over half of the coal used to generate Ohio's electricity that year.²⁰

CLEAN ENERGY DELIVERS OHIO'S LOWEST-COST POWER

Although Ohio's proportion of coal-fired power may make its carbon target seem daunting, the state can actually cut significant amounts of carbon without costly measures.

As shown in Figure 2, energy efficiency is the lowest-cost resource for the Midwest region, including Ohio. Renewable generation, such as wind and utility solar PV, are competitive with new natural gas combined cycle plants. By focusing on energy efficiency and renewable energy, Ohio can reach its carbon target cost-effectively, even if it chooses to forgo upgrades to coal plant technology and significant increases in the use of natural gas.

Ohio's utilities concur that clean energy is cost-effective. American Electric Power (AEP), one of the largest utilities in the state, says its efficiency programs deliver power at a rate of less than 2 cents per kWh, making **energy efficiency the "lowest cost alternative."**²¹

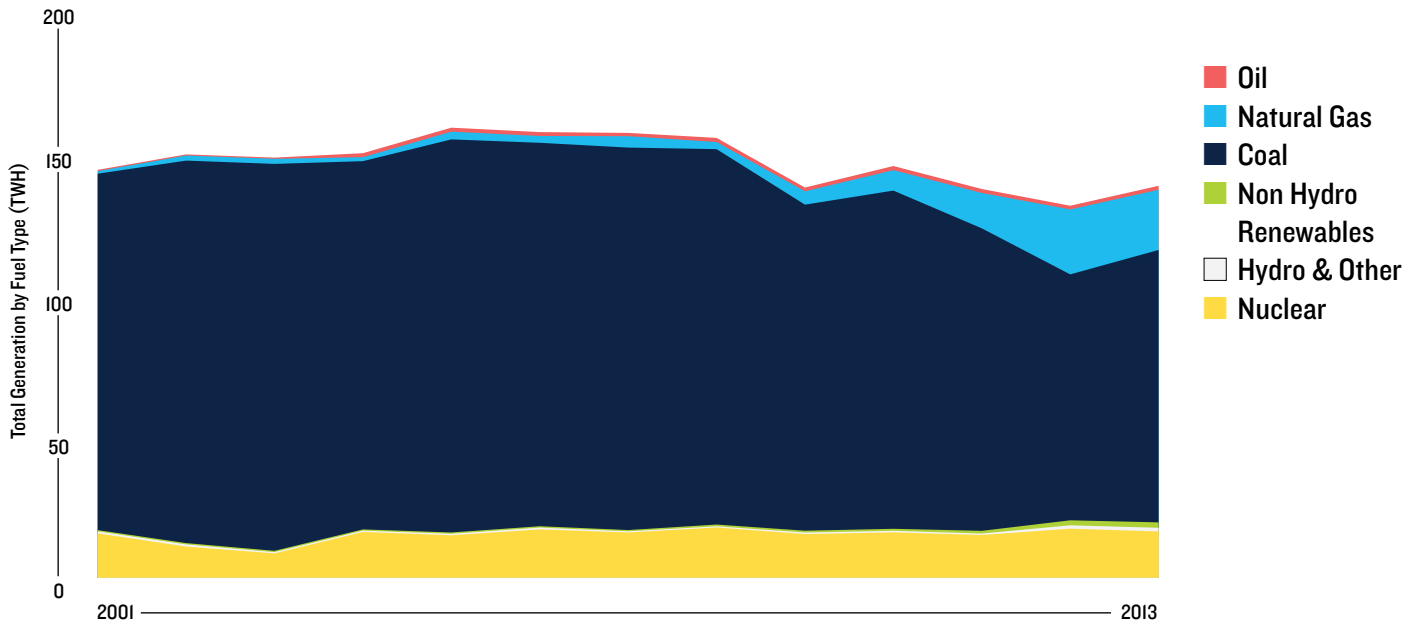
And efficiency keeps power costs low. If we lower demand by becoming more efficient, we lower the price of electricity for consumers, businesses, and manufacturers. In fact, according to the American Council for an Energy Efficient Economy, efficiency is significantly lowering wholesale energy prices across Ohio and saving consumers money.²²

STATUS OF OHIO'S CLEAN ENERGY POLICIES

Ohio's legislature embraced clean energy in 2008, creating renewable energy and energy efficiency standards to help reduce the state's need for fossil fuel power. However, the SB 310 freeze legislation put these standards on hold for two years while a study committee reviews them. Once the standards are revived in 2017, the growth of clean energy

in Ohio will have been delayed for that two-year period. Under the adjustments of the SB 310 freeze legislation, the renewables standard now requires the state's utilities to supply 12.5 percent of electricity from renewable energy sources by 2026. The energy efficiency standard now requires a gradual ramp-up to an annual 2 percent reduction in energy use (a cumulative 22 percent reduction) by 2027.

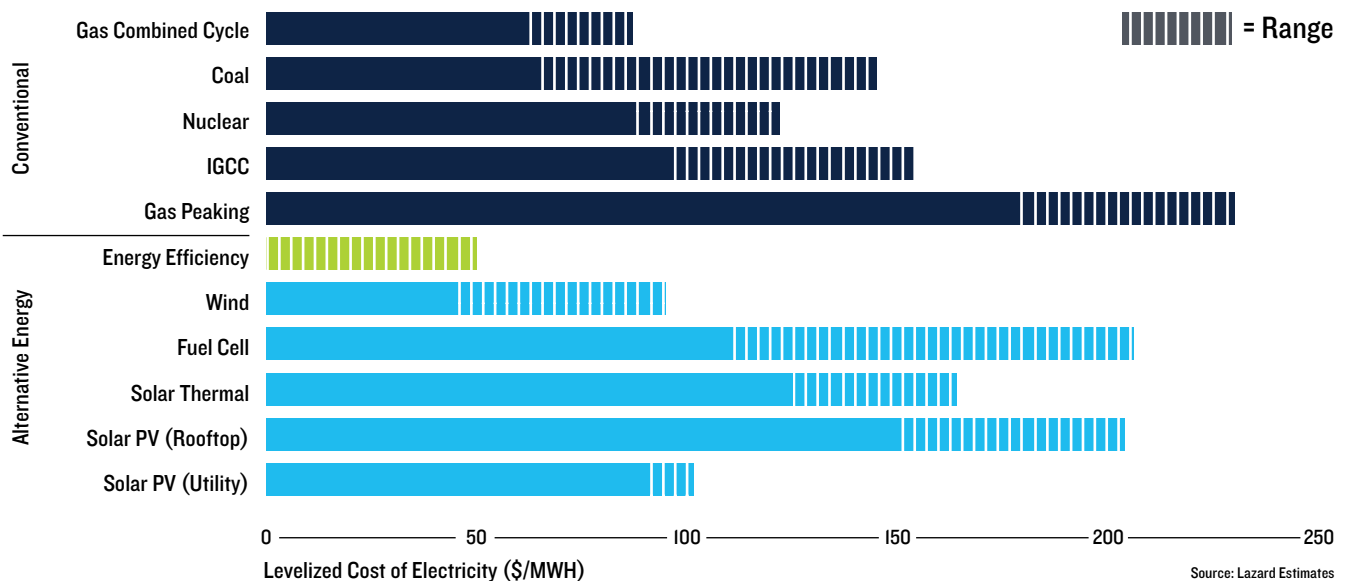
FIGURE 1: OHIO'S ELECTRICITY GENERATION SOURCES (2001-2013)



Source: Energy Information Administration

FIGURE 2: COSTS OF ELECTRICITY GENERATION BY SOURCE (\$/MWH)

Energy efficiency is the cheapest of all energy resources. Wind and utility solar PV are competitive with new natural gas combined cycle.



Source: Lazard Estimates

Ohio's energy efficiency improvements are achieved via utility-led programs. These programs have been successful, with annual incremental savings exceeding 1 percent in 2013. But Ohio can do even more. As shown in Figure 3, at least 10 other states have surpassed 1 percent and some are on the way to achieving 2 percent annual reductions. Ohio can do the same—all while cutting carbon and energy costs.

Ramping up these programs means more savings for electricity customers. Utilities report that energy efficiency programs saved Ohioans more than \$1.5 billion on their bills over the past five years alone.²³ Customer savings over the lifetime of these energy efficiency investments will be \$4.15 billion.²⁴ Duke Energy, AEP, and Dayton Power & Light recognize the value of these programs; despite the freeze, these utilities have committed to helping their customers cut energy waste in homes and businesses.

In fact, all of Ohio's utilities have publicly acknowledged the value of energy efficiency for their customers. AEP has called efficiency an **"important resource for the state of Ohio, AEP Ohio, and its customers."**²⁵ FirstEnergy reports that efficiency programs balance "near-term energy savings opportunities among all rate classes with longer-term programs that continue to **create jobs and build capacity for delivering greater energy and demand reductions in the future.**"²⁶

USING CLEAN ENERGY TO CUT CARBON IN OHIO

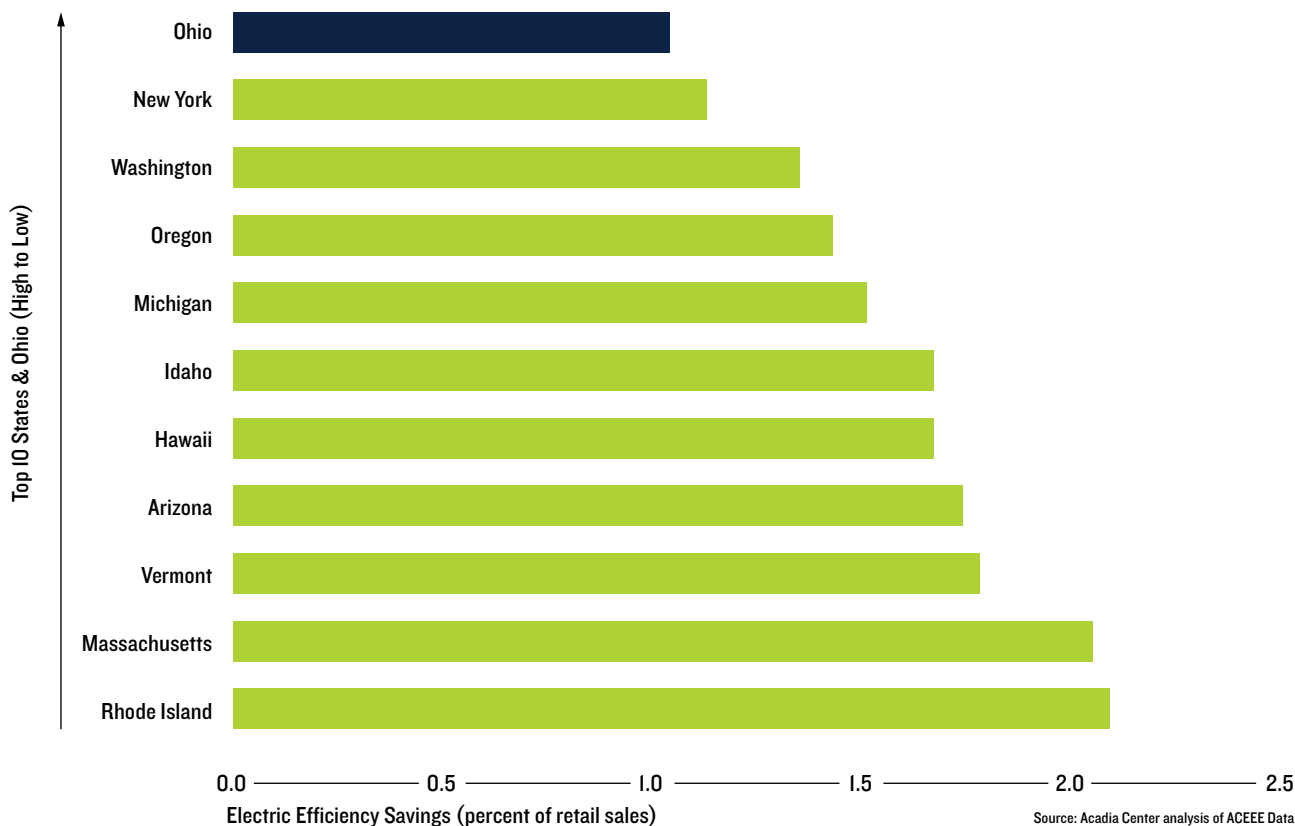
Thanks to Ohio's energy efficiency and renewables standards, the state is well positioned to meet its Clean Power Plan pollution target. This is an opportunity to renew Ohio's commitment to clean energy development.

Current state policies put Ohio far ahead of the EPA's compliance schedule. An analysis by NRDC demonstrated that if the two-year freeze were lifted, the existing energy efficiency and renewables standards can get Ohio to its 2030 carbon target years ahead of schedule.²⁷ By 2030, these standards would yield nearly twice as much generation from zero-emitting sources than the EPA assumed was possible.

And the current state policies would get Ohio the necessary reductions without having to resort to more costly measures. As shown in Figure 4, below, Ohio could rely on efficiency and renewables and opt to not seek carbon reductions from its coal fleet or from an increase in its lower-emitting natural gas generation. Ohio could meet—and even exceed by 8 percent—its Clean Power Plan pollution target simply by carrying out its current efficiency and renewable energy policies.²⁸ According to a recent PJM analysis, using clean energy like efficiency and renewables and partnering with neighboring states to cut carbon can help Ohio lower compliance costs and ensure reliability.²⁹

FIGURE 3: OHIO'S ENERGY EFFICIENCY

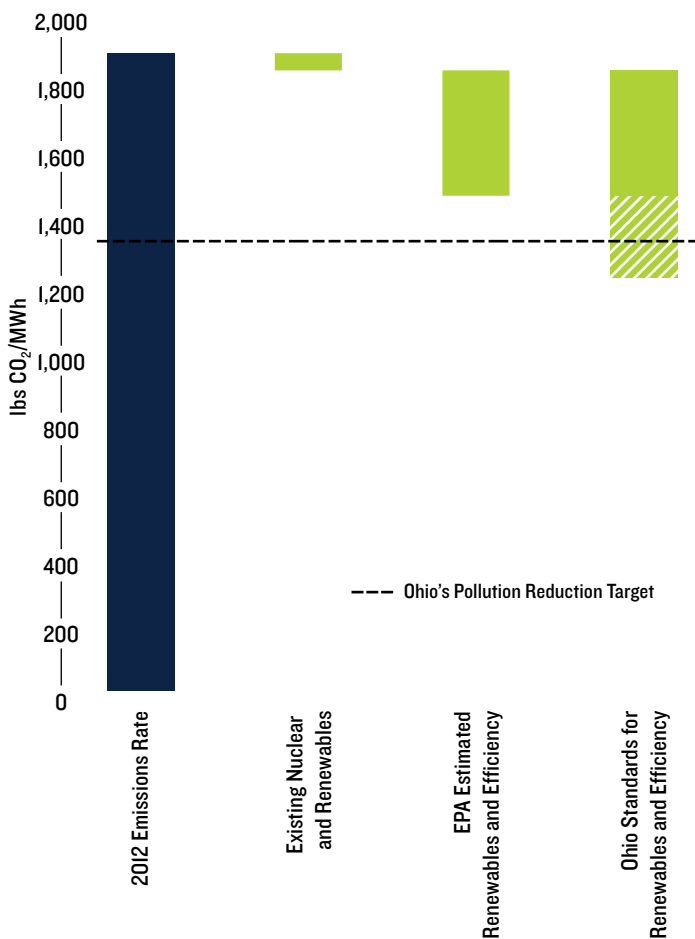
Comparison with the 10 states with the most robust energy efficiency rates. Ohio ranked 12th as of 2013.



We are at a critical juncture with Ohio's energy policies. If we do not move forward with robust policies that ensure investment in clean energy in Ohio we will miss out on valuable opportunities to strengthen the economy and to protect the public health. The choice is clear: investment in energy efficiency and renewable energy is the key to Ohio's carbon pollution reductions and clean energy future.

FIGURE 4: ONE OHIO PATHWAY TO CUT CARBON POLLUTION BY 2030

Ohio's efficiency and renewable energy standards are stronger than what EPA assumed. The difference is illustrated by the shaded green bar. Ohio can easily meet its final 2030 pollution reduction target of 1338 lbs CO₂/MWh simply by achieving its existing clean energy goals.



THERE ARE MANY OPTIONS TO SET OHIO ON THE RIGHT PATH, BUT WE NEED TO TAKE ACTION NOW

A smart, effective, and forward-looking Ohio plan can reduce market barriers and unlock the development of clean energy. Table 1 shows the policy options available to states under the flexibility provided by the Clean Power Plan and offers recommendations for how states can achieve economic and environmental benefits as they cut carbon pollution.

The Clean Power Plan also provides states the option to pursue partnerships with other states to reduce pollution. Table 1 shows that regional or multistate approaches present a number of potential advantages over a single-state plan, such as consumer savings, reduced compliance costs, increased flexibility, and avoided electricity market distortions. This has been confirmed by PJM's recent analysis, which concluded that a regional approach would result in lower compliance costs and less capacity at-risk for retirements than state-by-state approaches.³⁰

CONCLUSION

Ohio's leaders have an opportunity to chart a strong clean energy future.

Under the proposed Clean Power Plan, states have incredible flexibility to design their own most cost-effective path to cut carbon pollution. Ohio will be required to submit an initial state plan to the EPA in 2016 to demonstrate how it will reduce carbon emissions from its power fleet. Energy efficiency and renewables are the lowest-cost resources Ohio can use to both cut carbon and create thousands of new, homegrown jobs.

Ohio already has the policies in place to seize on this opportunity, to:

- **Emerge from the past** through efficiency programs that deliver lower-cost energy to homes and businesses;
- **Capitalize on the present** by seizing on clean energy investment in Ohio; and
- **Build a successful, prosperous future** that provides low-cost, safe, and reliable power for Ohioans while protecting our air and water.

The economic and physical health of Ohioans depends on the actions that decision makers take today. As we have seen, as the effects of carbon pollution are getting stronger, the opportunities to fix the problem are not being fully leveraged. The Clean Power Plan is a way to get there, presenting Ohio with the opportunity to improve public health, foster new economic development, and help stabilize our climate.

This is a win-win for Ohioans and for our future generations.

TABLE I. STATE POLICY OPTIONS FOR CLEAN POWER PLAN COMPLIANCE.

States have ample flexibility under the Clean Power Plan to choose the best method to reduce pollution.

	Flexible Intensity-based	Mass-based with Trading	Carbon Fee	Portfolio/Resource Standards
Environmental Goal, Units, & Outcome	State has emissions intensity goal in pollution per unit of electricity generated (lbs/MWh)	State has emissions limit in total, fixed amount (tons), regardless of amount of electricity generation	State establishes a carbon fee (\$/ton) at price estimated to deliver the emissions goal; price is fixed but emissions outcome is uncertain	State sets minimum requirements for efficiency and renewable resources at levels estimated to deliver the emissions goal
Market Structure & Trading	Fossil power plants that pollute above the intensity standard must buy credits from others that operate below the standard	State agency issues allowances (tons) equal to the emissions limit; allowances can be auctioned or allocated; fossil power plants have to hold an allowance for every ton of emissions	State agency estimates the carbon fee (\$/ton) needed to achieve the emissions goal; revenue could be returned to utility customers through rebates, energy efficiency investments, or other state goals	Eligible resources are identified (i.e., efficiency and renewables) and energy (MWh) is tracked using generator certificate tracking systems; the distribution utilities need enough certificates to show they are meeting the required standard
Electric System Reliability	All of these market-based approaches provide significant flexibility for plant operators, grid operators, and regulators to ensure that reliability requirements are met. If a plant is needed in the short term it can keep operating by buying allowances or credits or by paying a fee. A unit could be designated as “must-run” for reliability reasons until the reliability constraint is addressed, and other facilities would adjust their performance to accommodate the output from that plant.			
Regional Approaches:	<p>There are significant benefits associated with states pursuing consistent regional approaches to compliance. The primary benefits are:</p> <ol style="list-style-type: none"> 1) LOWER COST—A larger market should be more efficient and reduce costs 2) EQUAL TREATMENT—Generators, market participants, and consumers should face consistent market signals, costs and benefits 3) IMPROVED ENVIRONMENTAL OUTCOME—Regional approaches avoid different price signals across a market region and on either side of state boundaries. This would help avoid emissions leakage and higher national emissions than anticipated 4) REMOVE OR REDUCE RELIABILITY CONCERNS—A larger market and additional flexibility further reduces reliability concerns 			

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