



# Power to the People: Repeal Ohio's Counterproductive Energy Policies

By Joe Nichols

## Executive Summary

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In 2008, the Ohio General Assembly passed Senate Bill 221, which implemented renewable energy and energy efficiency mandates. In 2014, Ohio led the nation in energy policy when the General Assembly suspended the counterproductive mandates via continuing legislation SB 310. That bill also created an Energy Mandates Study Committee; the Committee must recommend by September 30, 2015, whether to repeal, re-suspend, or restart the continuing legislation. The best policy choice: Repeal the renewable and efficiency mandates.

This decision is important for Ohio because it is the fourth-highest consumer of electricity in the United States. Repeal would foster the continued supply of affordable, reliable electricity and would allow Ohio businesses to thrive, and Ohio families to secure a better future.

The market process is the best means of ensuring a continued supply of affordable and reliable energy. For the energy market to function well, suppliers need to compete on a level playing field and consumers need the freedom to make decisions for themselves.

Unfortunately, mandates such as Ohio's renewable energy and energy efficiency standards distort the market by politically picking winners and losers among electricity generators and taking choice away from consumers. By distorting the energy market, these policies drive up prices, discourage innovation, and harm the economy.

Proponents of the energy mandates tout the health and environmental benefits of increasing renewable energy generation and decreasing electricity demand. However, these direct benefits create unintended consequences that must be considered for sound policymaking.

In 2014, Ohio became a national leader in energy policy when it suspended the state renewable energy and energy efficiency mandates. Since then, other states have repealed or have proposed the repeal of their energy mandates. Ohio can maintain its economic competitiveness by freeing its energy producers and consumers from state energy mandates.



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## Introduction

Ohio is coming to a crossroads in state energy policy. By September 30, 2015, a special legislative committee must recommend whether the General Assembly should repeal, re-suspend, or restart the state's renewable energy and energy efficiency mandates. Repealing these energy mandates would reduce the cost of electricity to Ohio families and businesses, and would not incur significant health or environmental costs. The best policy for Ohio is to free the energy market from these counterproductive, anti-consumer regulations.

## Background

In 2008, Ohio enacted Senate Bill 221, which implemented renewable energy and energy efficiency mandates. The bill implemented an Alternative Energy Portfolio Standard (AEPS) that required Ohio's electric utilities and retailers to supply at least 25% of their electricity from alternative energy resources by 2025.<sup>1</sup> The bill included two provisions.

First, a Renewables Portfolio Standard (RPS) specified that utilities must meet at least 12.5% of this alternative energy goal with renewable resources such as wind and solar. The bill provided a schedule that gradually increased the required level of alternative energy generation each year until the state met the 25% goal in 2025.<sup>2</sup>

Second, an energy efficiency mandate (commonly called an Energy Efficiency Resource Standard or EERS) that required electric utilities and electric retailers to implement programs that would reduce electricity consumption by 22% by 2025.<sup>3</sup>

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1 Am. Sub. S.B. 221, 127<sup>th</sup>, Ohio General Assembly, (2008).

2 See Appendix I for more detail, including SB 221 and SB 310s alternative-energy generation schedules.

3 Am. Sub. S.B. 221, 127<sup>th</sup> Ohio General Assembly, (2008).

In 2013, the General Assembly enacted Senate Bill 310, which led the nation by suspending the AEPS at 2013 levels for two years.<sup>4</sup> The bill also created the Energy Mandates Study Committee, a special joint legislative committee, to study the impact of these mandates on the state economy and to recommend a course of action. By September 30, 2015, the Committee is to recommend whether to repeal, re-suspend, or restart the mandates.

## **Energy mandates distort the market**

Renewables Portfolio Standards and Energy Efficiency Resource Standards distort the energy market because they favor some electricity generators over others and require consumers to purchase products and services (such as renewable electricity and energy-efficient light bulbs) that they would not purchase voluntarily. As discussed below, this distortion increases energy prices and costs jobs in the short run, and also creates a drag on economic growth in the long run by allocating resources inefficiently.

### *Renewable energy mandates drive up electricity prices*

RPS laws create a market for new electricity-generating resources that would not be competitive in the market and would not likely exist without the mandate. Forcing electric utilities and electric retailers to purchase electricity from these new, uncompetitive resources creates “imposed costs” on existing, conventional resources.<sup>5</sup> That is, utilities have to purchase the new politically-favored electricity instead of conventionally-generated electricity, leaving less revenue available to the conventional power plants. Because the conventional plants sell less electricity, they must fetch a higher price in terms of dollars per megawatt-hour (MWh) of electricity generated in order to continue operating. This factor drives up the existing plants’ costs to generate electricity by approximately \$15 to \$30 per MWh.<sup>6</sup>

Ultimately, mandating renewables means higher retail prices because installing new renewable resources is more expensive than allowing existing conventional power plants to operate. One study estimates the cost of new wind resources is at least \$47 per MWh higher than existing combined cycle gas plants and \$58 per MWh more expensive than existing coal plants.<sup>7</sup> Renewables also require increased power transmission infrastructure—at a median cost of \$15 per MWh for wind, for example—<sup>8</sup> and force fossil fuel plants to operate less efficiently, at a cost of approximately \$2 per MWh.<sup>9</sup>

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4 Sub. S.B. 310, 130<sup>th</sup> Ohio General Assembly, (2014).

5 Thomas F. Stacy and George S. Taylor, PhD, “The Levelized Cost of Electricity from Existing Generation Resources,” Institute for Energy Research, June 2015, [http://instituteforenergyresearch.org/wp-content/uploads/2015/06/ier\\_lcoe\\_2015.pdf](http://instituteforenergyresearch.org/wp-content/uploads/2015/06/ier_lcoe_2015.pdf).

6 *Ibid.*

7 *Ibid.*

8 Andrew Mills, Ryan Wiser, and Kevin Porter, “The Cost of Transmission for Wind Energy: A Review of Transmission Planning Studies,” Ernest Orlando Lawrence Berkeley National Laboratory, February 2009, <https://escholarship.org/uc/item/2z12z7wm#page-8>.

9 Nikhil Kumar et. al, “Power Plant Cycling Costs,” National Renewable Energy Laboratory, April 2012, <http://wind.nrel.gov/public/wwis/aptechfinalv2.pdf>.

The net impact of legislating uncompetitive resources onto the market is that the cost to deliver the same amount of electricity is higher. Consumers ultimately foot the bill for these higher costs, while renewable energy investors reap the benefits.

Increasing electricity prices threatens the vitality of Ohio's economy. The Buckeye State is the fourth-largest consumer of electricity in the United States.<sup>10</sup> This means that decreasing energy costs—like the fall in natural gas prices due to shale drilling—benefit the state's economy by increasing disposable income and investment.<sup>11</sup> Conversely, even a small increase in energy costs has a significant, widespread, and detrimental impact on the state economy.

Ohio's manufacturing sector is especially vulnerable to energy prices. For example, The Timken Company notes that electricity is its third-largest production cost, and a one-tenth of one cent increase in the price of electricity increases the annual electric bill for its two Canton steel mills by \$1 million.<sup>12</sup> The higher cost of energy due to the mandates is a disincentive for manufacturers to create jobs and grow operations in Ohio. And while the manufacturing sector is sensitive to electricity prices, the Ohio economy is sensitive to the manufacturing sector—manufacturing comprises 18% of state GDP,<sup>13</sup> and 13% of state employment.<sup>14</sup>

Common sense tells us energy mandates raise electricity costs on all consumers. Empirical evidence tells us how much. A 2015 study of Ohio's energy mandates by the Institute for Political Economy at Utah State University estimated that the total net cost to consumers of restarting the mandates in 2017 would be \$1.9 billion greater than repealing the mandates.<sup>15</sup> In 2026 alone, its model predicts electricity price increases would reduce real (inflation-adjusted) personal income by \$258 million across the state economy. An American Tradition Institute analysis suggested the total economic cost of Ohio's original, pre-suspension mandates will be at least \$5.22 billion from 2016 to 2025.<sup>16</sup>

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- 10 US Department of Energy, Energy Information Administration, "Electricity Consumption Estimates, 2013," updated May 1, 2015, accessed July 1, 2015, [http://www.eia.gov/state/seds/sep\\_fuel/html/pdf/fuel\\_use\\_es.pdf](http://www.eia.gov/state/seds/sep_fuel/html/pdf/fuel_use_es.pdf).
  - 11 Catherine Hausman and Ryan Kellogg, "Welfare and Distributional Implications of Shale Gas," National Bureau of Economic Research, April 2015, <http://www.nber.org/papers/w21115>.
  - 12 *Hearings on Senate Bill 310, Before the Senate Public Utilities Committee*, 130<sup>th</sup> Ohio General Assembly (April 8, 2014) (statement of Peggy R. Claytor, Manager-State Government Affairs, The Timken Company), [http://www.ohiomfg.com/wp-content/uploads/2014-04-11\\_lb\\_energy\\_Peggy-Claytor-TimkenTestimony-SB-310.pdf](http://www.ohiomfg.com/wp-content/uploads/2014-04-11_lb_energy_Peggy-Claytor-TimkenTestimony-SB-310.pdf).
  - 13 U.S. Department of Commerce, Bureau of Economic Analysis, "Regional Data: GDP & Personal Income," accessed July 15, 2015, <http://bea.gov/iTable/iTableHtml.cfm?reqid=70&step=10&isuri=1&7003=200&7035=-1&7004=naics&7005=-1,12&7006=39000&7036=-1&7001=1200&7002=1&7090=70&7007=2014&7093=levels>
  - 14 U.S. Department of Labor, Bureau of Labor Statistics, "Table 1: Employees on Nonfarm Payrolls in States and Selected Areas by Major Industry," accessed July 15, 2015, [http://www.bls.gov/sae/eetables/sae\\_annavg114.pdf](http://www.bls.gov/sae/eetables/sae_annavg114.pdf).
  - 15 Randy T. Simmons et al., "Renewable Portfolio Standards: Ohio," Institute for Political Economy at Utah State University, April 2015, <http://www.strata.org/wp-content/uploads/2015/06/RPS-Ohio-Report.pdf>.
  - 16 American Tradition Institute, "The Cost and Economic Impact of Ohio's Alternative Energy Portfolio Standard," April 2011, [http://www.atinstitute.org/wp-content/uploads/2011/04/ATI\\_OH\\_RPS\\_study.pdf](http://www.atinstitute.org/wp-content/uploads/2011/04/ATI_OH_RPS_study.pdf).

## *Energy mandates fail to live up to their promises*

Advocates of energy mandates often claim that Renewables Portfolio Standards will create jobs and spur investment. Though such mandates will certainly encourage investment and job creation in the renewable energy sector, any such increases merely come at the expense of other sectors of the economy.<sup>17</sup> Mandates do not represent government sparking economic growth; they represent government shifting labor and investment from the broad economy to the renewable energy industry. Without the mandates, those investment dollars would have been put to other uses and the workers would have had other jobs. Because businesses seek to maximize their profits, and because businesses were not using renewable energy before mandates, it is unlikely that those man-hours and investment dollars are being used more effectively in the renewable energy industry than in the broad economy.

Therefore, the jobs and investment dollars that are seen to flow into the renewable energy industry mask the job losses and lost investments in the rest of the economy, which remain unseen. Every job that government-favored green energy companies create is offset by energy-intensive manufacturers that must fire employees, cut their workers' hours, or relocate. The Timken Company estimates that in 2014 alone the energy mandates cost it up to \$2.9 million.<sup>18</sup> That money could have been spent to hire more employees, increase existing employees' wages or benefits, pay higher dividends to fixed-income retirees, or make new investments in its business. The Institute for Political Economy estimates that nearly 3,600 Ohioans will lose their jobs if the RPS resumes—even after accounting for job gains in the green energy sector.<sup>19</sup>

Various pro-RPS studies claim that energy mandates will save ratepayers' money. This is a sleight-of-hand assertion. An electric bill is a function of the price per kilowatt-hour (kWh) of electricity times the number of kWh used. RPS mandates drive up the cost of electricity on a per-kWh basis. Simultaneously, Energy Efficiency Resource Standards require customers to use less kWh of electricity. So these studies typically project that the effect of the EERS will overwhelm the effect of the RPS. In other words, the claim is based on the belief that the efficiency mandate will force customers to use less electricity to a greater degree than the renewable mandate will drive up prices, so energy bills will decrease on net.<sup>20</sup> But do the reductions in electricity demand actually offset the cost to implement the energy efficiency programs? The evidence says they do not.

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17 Joe Nichols, "Why Ending the Renewable Energy Mandate is Good for Ohio Families and the Economy," The Buckeye Institute for Public Policy Solutions, January 29, 2015, [http://www.buckeyeinstitute.org/uploads/files/Pew%20Renewables%20Final\(1\).pdf](http://www.buckeyeinstitute.org/uploads/files/Pew%20Renewables%20Final(1).pdf).

18 *Hearings on Senate Bill 310, Before the Senate Public Utilities Committee*, 130<sup>th</sup> Ohio General Assembly (April 8, 2014) (statement of Peggy R. Claytor, Manager-State Government Affairs, The Timken Company), [http://www.ohiomfg.com/wp-content/uploads/2014-04-11\\_lb\\_energy\\_Peggy-Claytor-TimkenTestimony-SB-310.pdf](http://www.ohiomfg.com/wp-content/uploads/2014-04-11_lb_energy_Peggy-Claytor-TimkenTestimony-SB-310.pdf).

19 Randy T. Simmons et al., "Renewable Portfolio Standards: Ohio," Institute for Political Economy at Utah State University, April 2015, <http://www.strata.org/wp-content/uploads/2015/06/RPS-Ohio-Report.pdf>.

20 David G. Tuerck, PhD, Ryan Murphy, and Paul Bachman, "Peer Review of 'The Economic, Utility Portfolio, and Rate Impact of Clean Energy Development in North Carolina,'" The Beacon Hill Institute at Suffolk University, April 2013, <http://www.johnlocke.org/acrobat/spotlights/RTIPeerReview20130401A.pdf>. See also, Benjamin Powell, "The Faulty Economics of Colorado's Climate Change Action Plan," Independence Institute, February 2008, <http://www.i2i.org/articles/1-2008.pdf>.

### *Energy efficiency mandates are not economically efficient*

Evidence from the federal Weatherization Assistance Program (WAP), the largest residential energy efficiency program to date, suggests that EERS are not cost-effective. Researchers at the University of Chicago's Becker-Friedman Institute found that the actual cost to implement the WAP is approximately twice as high as the actual energy savings.<sup>21</sup> This study is insightful because it is an evaluation of real world outcomes, rather than an *ex ante* estimate of outcomes from an engineering model. The report shows that modeled outcomes were highly optimistic: actual savings from the WAP were 2.5 times *less* than estimated savings.

The average household that participated in WAP received more than \$5,000 in taxpayer-subsidized energy efficiency upgrades, but the upgrades were not worth the costs. Even accounting for societal benefits of energy efficiency (such as emissions reductions), the average rate of return of the WAP is negative 9.5% per year per household.<sup>22</sup> Unfortunately for taxpayers, the government socialized this cost onto them, rather than requiring households that benefitted from the WAP to bear the cost. Ohio should not create a similar situation by continuing the state EERS.

Another study of Ohio's Energy Efficiency Resource Standard showed that the mandate provided no net economic benefit, despite the significant amounts of money utilities spent to comply with the standards. The majority of EERS compliance has involved subsidizing energy efficient light bulb purchases, mostly by large electricity consumers that would have bought the bulbs anyway. Utilities recovered the cost of these energy efficiency programs by raising electricity prices for all ratepayers. This system essentially allows purchasers of energy efficient bulbs to "free ride" on other Ohioans, because the buyers pay relatively little money for the bulbs, but received the benefits of increased energy efficiency. The author further shows that as the EERS becomes more stringent with higher targets for electricity reduction, the costs to meet those higher standards will increase.<sup>23</sup>

To summarize, energy mandates such as RPS and EERS pick winners and losers and restrict consumer choice. This distortion makes the energy market less efficient and increases electricity prices, which harms consumers and the economy.

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21 Meredith Fowlie, Michael Greenstone, and Catherine Wolfram, "Do Energy Efficiency Investments Deliver? Evidence from the Weatherization Assistance Program," The Becker-Friedman Institute for Research in Economics, June 2015, [http://econresearch.uchicago.edu/sites/econresearch.uchicago.edu/files/paper\\_draft\\_06\\_15\\_clean.pdf](http://econresearch.uchicago.edu/sites/econresearch.uchicago.edu/files/paper_draft_06_15_clean.pdf).

22 *Ibid.*

23 Robert J. Michaels, "Ohio's Energy Efficiency Resource Standard: Where Are the Real Savings?," Mercatus Center at George Mason University, December 2014, <http://mercatus.org/sites/default/files/Michaels-Energy-Efficiency-OH.pdf>.



## The state of Ohio should not force citizens to make energy consumption decisions contrary to their own expressed preferences

The state government should not restrict consumer choice by forcing Ohioans to purchase politically-favored goods or services—especially when the vast majority of Ohioans explicitly refuse to purchase them voluntarily.

An Institute for Energy Research survey shows that when given the choice, electricity ratepayers will not choose to pay slightly higher utility bills to purchase larger amounts of renewable-sourced electricity. Refer to Chart 1. Of 31 such utility programs in 24 states, the average participation rate was only 2.1%. More tellingly, approximately two-thirds of the programs experienced participation rates of 1% or less, including Ohio, while a few states with high participation rates drove up the national average.<sup>24</sup>

**PARTICIPATION RATE OF UTILITY CUSTOMERS IN GREEN PRICING PROGRAMS**

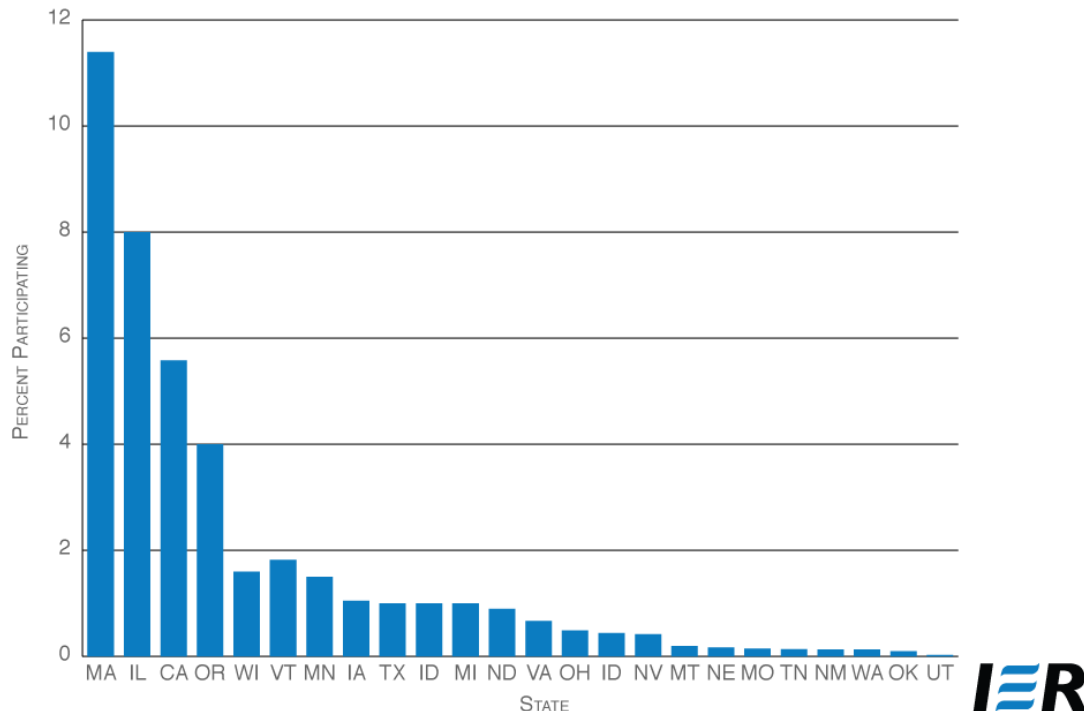


Chart 1. Green pricing programs, which allowed customers the option to pay extra on their bills for more expensive renewable electricity, experienced an average participation rate of 2.1%.

Source: Institute for Energy Research

24 Institute for Energy Research, “Evaluating Voluntary Consumer Adoption of Green Pricing Programs,” June 2013, <http://instituteforenergyresearch.org/wp-content/uploads/2013/06/Green-Pricing-White-Paper.pdf>.

Electricity customers are also disinclined to voluntarily participate in energy efficiency programs. The Becker-Friedman Institute study shows that only 1% of eligible candidates initially enrolled in the Weatherization Assistance Program, even though there was no out-of-pocket charge and the program would have reduced their energy bills.<sup>25</sup> Even after a follow-up participation campaign that cost \$1,000 per participating household, the rate increased to just 6% of eligible households.

The evidence shows that most people are not willing to pay the price for renewable energy and energy efficiency. If families and businesses don't currently value those items enough to pay for them, government should not force them (or worse, taxpayers) to pay for these products against their will. A more sound policy would allow people to save their money to spend it on energy investments as they become more cost-effective in the future.

## **Energy mandates discourage innovation**

Energy mandates will likely discourage private sector investment in new renewable energy and energy efficiency technologies that would improve the electric power sector in the future. A profit-seeking company has little incentive to risk its capital to develop new and innovative technologies for *tomorrow* when government guarantees it market share and profit *today* by requiring consumers to buy its products.

Down the road the energy mandates may crowd out new entrepreneurs from the field. First, existing companies that benefit from mandates may use government connections to keep competitors out of the market. Second, consumers who are required to spend extra money on uneconomic renewable electricity and energy efficient products today will have less money to purchase similar, better products in the future.

Mandates like RPS and EERS “pull forward” future energy investments into the present, much like financing current consumption will reduce future consumption through loan payments. In short, these mandates do not provide taxpayers, consumers, or families with a good return on investment. A better policy would allow individuals and businesses to pay for renewable electricity and energy efficiency products through voluntary decision-making.

## **Electricity price increases linked to poverty and poor health**

Advocates of energy mandates claim that RPS and EERS will create health benefits by reducing air pollution created by fossil fuel power plants. However, these claims ignore the harmful side effects of higher electricity prices. Higher energy prices force vulnerable Ohioans into poverty, which is linked to negative health outcomes.

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25 Meredith Fowlie, Michael Greenstone, and Catherine Wolfram, “Do Energy Efficiency Investments Deliver? Evidence from the Weatherization Assistance Program,” The Becker-Friedman Institute for Research in Economics, June 2015, [http://econresearch.uchicago.edu/sites/econresearch.uchicago.edu/files/paper\\_draft\\_06\\_15\\_clean.pdf](http://econresearch.uchicago.edu/sites/econresearch.uchicago.edu/files/paper_draft_06_15_clean.pdf).



The effect of energy mandates on electricity prices is highly regressive. Families in the lowest income quintile spend 9.6% of their income on energy, versus 1.4% for families in the highest quintile of income.<sup>26</sup> Increasing energy prices have a greater impact on the ability of low-income families to afford other basic necessities including food and shelter. In one survey, more than half of Americans said that a \$20 increase in their utility bills would cause hardship.<sup>27</sup>

Policies that raise the cost of energy, such as Ohio's RPS, have a negative impact on the most vulnerable residents of Ohio. One study examined the impact of proposed federal environmental regulations that included renewable energy and energy efficiency mandates. The study estimated the rule would raise the cost of electricity in low-income African-American neighborhoods in Ohio up to 26% of household income.<sup>28</sup> As more people are forced into energy poverty, taxpayers are strained by increasing demand for government energy assistance.<sup>29</sup>

Further, families living in poverty are more likely to suffer asthma. Researchers at Johns Hopkins University analyzed whether disparities in asthma prevalence are primarily related to heavier pollution levels in inner-city areas, or to socioeconomic and demographic factors. Their analysis revealed that household poverty was one of the strongest predictors of asthma, while living in an inner-city neighborhood had no effect.<sup>30</sup>

Another study of asthma disparities attributed the higher prevalence of asthma in poor households to low indoor air quality. Factors such as indoor smoking and allergens released by rodents and cockroaches contributed to the low indoor-air quality in these homes.<sup>31</sup>

Energy mandates such as EERS and RPS force poor, minority households to bear the brunt of the unseen costs. As electricity prices rise and more marginal families are pushed into poverty by rising energy bills, more Ohioans are likely to suffer from asthma as an unintended consequence of energy mandates.

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26 Joe Nichols, "EPA's Clean Power Plan Will Hit Ohio's Most Vulnerable the Hardest," The Buckeye Institute for Public Policy Solutions, December 16, 2014, <http://buckeyeinstitute.org/the-liberty-wall/2014/12/16/epas-clean-power-plan-will-hit-ohios-most-vulnerable-the-hardest/>.

27 *Ibid.*

28 Wayne Winegarden, PhD, "The Regressive Impact on Ohio's Lower-Income and African-American Families from EPA's Proposed Regulations on Carbon Dioxide Emissions," Pacific Research Institute, December 2014, [http://www.pacificresearch.org/fileadmin/documents/Studies/PDFs/2013-2015/EPA\\_Ohio\\_rfweb.pdf](http://www.pacificresearch.org/fileadmin/documents/Studies/PDFs/2013-2015/EPA_Ohio_rfweb.pdf).

29 Barbara Alexander, Cynthia Mitchell, and Gill Court, "Renewable Energy Mandates: An Analysis of Promises Made and Implications for Low-Income Customers," Oak Ridge National Laboratory, June 2009, [liheap.ncat.org/dereg/renewables%20and%20low%20income.doc](http://liheap.ncat.org/dereg/renewables%20and%20low%20income.doc).

30 Corinne A. Keet et al., "Neighborhood poverty, urban residence, race/ethnicity, and asthma: Rethinking the inner-city asthma epidemic," *The Journal of Allergy and Clinical Immunology* 135, no. 3 (March 2015): 655-662, [http://www.jacionline.org/article/S0091-6749\(14\)01676-5/fulltext](http://www.jacionline.org/article/S0091-6749(14)01676-5/fulltext).

31 Rosalind J. Wright, MD, MPH, and S.V. Subramanian, PhD, "Advancing a Multilevel Framework for Epidemiological Research on Asthma Disparities," *CHEST Journal* 132, no. 5 (November 2007): 757S-769S, <http://journal.publications.chestnet.org/data/Journals/CHEST/22064/757S.pdf>.

## Energy mandates are counterproductive for pollution reduction

Energy mandate advocates assert that decreased fossil fuel-fired electricity generation will produce environmental benefits such as lower levels of pollutants. But, RPS also creates negative side effects for the environment. Further, it is unlikely that any additional environmental benefits gained from restarting the mandates would be worth the high cost in light of past emissions reductions.

RPS mandates incentivize the use of solar and wind energy resources. By their nature these resources can only generate electricity when the sun shines and the wind blows. The intermittent and uncontrollable nature of renewable energy resources means that electricity grid operators must have fossil-fuel-fired backup generators available to increase generation on short notice. Until energy storage challenges are resolved, renewables are inferior to fossil fuel resources, which are dispatchable—they generate electricity on demand.

The intermittency of renewables has two effects. First, intermittency forces dispatchable resources to “cycle,” meaning they must ramp electricity production up and down rather than operate at fairly stable, predictable levels. Cycling causes fossil fuel plants to operate less efficiently in terms of fuel use, driving up emissions and costs.<sup>32</sup> Just as cars are more fuel efficient when driven at a continuous speed, fossil fuel power plants are more efficient when operated at a continuous level.

Second, grid operators must ensure there is dispatchable backup for intermittent resources that can generate power on short notice. This requires increasing the amount of “spinning” or “operating” reserves, which are nimble, typically natural gas-fired turbines.<sup>33</sup> If the wind or sun disappears too quickly for a baseload coal or nuclear resource to compensate, grid operators can quickly dispatch these reserves to keep the lights on. The environmental cost is that these reserves must idle even when not generating electricity, which uses fuel and emits pollutants.<sup>34</sup>

In sum, when government mandates renewable energy generation it forces fossil fuel power plants to run dirtier by decreasing their fuel efficiency. Researchers at Carnegie Mellon University estimate that 20%-50% of expected pollutant reductions from increased renewable capacity will not materialize due to these factors.<sup>35</sup>

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- 32 Thomas F. Stacy and George S. Taylor, PhD, “The Levelized Cost of Electricity from Existing Generation Resources,” Institute for Energy Research, June 2015, [http://instituteeforenergyresearch.org/wp-content/uploads/2015/06/ier\\_lcoe\\_2015.pdf](http://instituteeforenergyresearch.org/wp-content/uploads/2015/06/ier_lcoe_2015.pdf). See also George Taylor, PhD, and Thomas Tanton, “The Hidden Costs of Wind Electricity,” American Tradition Institute, December 2012, <http://eelegal.org/wp-content/uploads/2013/09/Hidden-Cost.pdf>.
- 33 Marissa Hummon et al., “Fundamental Drivers of the Cost and Price of Operating Reserves,” National Renewable Energy Laboratory, July 2013, <http://www.nrel.gov/docs/fy13osti/58491.pdf>.
- 34 Thomas F. Stacy and George S. Taylor, PhD, “The Levelized Cost of Electricity from Existing Generation Resources,” Institute for Energy Research, June 2015, [http://instituteeforenergyresearch.org/wp-content/uploads/2015/06/ier\\_lcoe\\_2015.pdf](http://instituteeforenergyresearch.org/wp-content/uploads/2015/06/ier_lcoe_2015.pdf).
- 35 Warren Katzenstein and Jay Apt, “Air Emissions Due to Wind and Solar Power,” Environmental Science & Technology 43, no. 2 (2009): 253-258, <http://pubs.acs.org/doi/pdf/10.1021/es801437t>.

Additionally, restarting the AEPS would not likely reduce pollutant levels significantly from current levels. As Chart 2 shows, the state and federal governments have already worked with the electric power sector to significantly decrease power plant emissions.

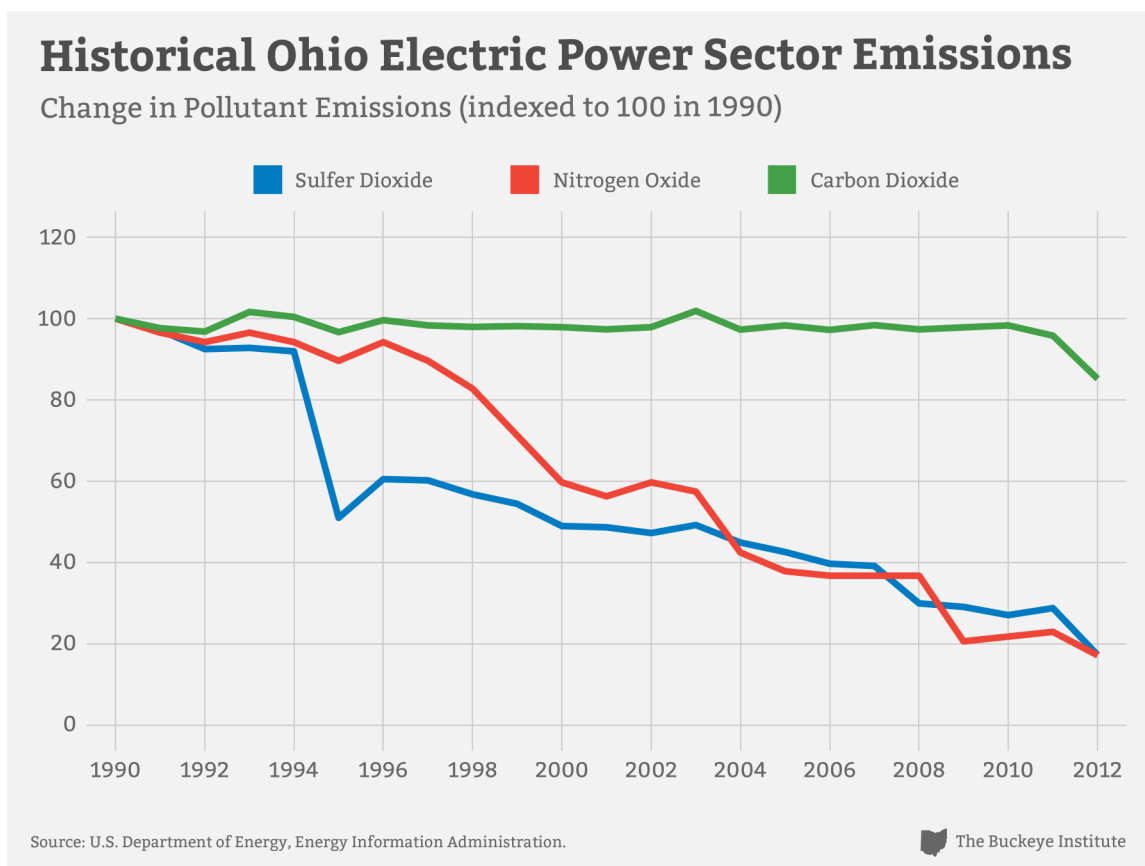


Chart 2. From 1990 to 2012 the Ohio electric power sector reduced emissions of sulfur dioxide and nitrogen oxide by more than 80%, and carbon dioxide emissions by 15%.

Sulfur dioxide and nitrogen oxide emissions from Ohio power plants fell by 83% from 1990 to 2012, and carbon dioxide emissions fell by 15% over the same period.<sup>36</sup> Factors such as a federal mercury regulation (MATS) and increasing substitution of natural gas for coal (due to the shale boom) continue to drive down emissions.<sup>37</sup> These reductions have already come at a high price—the MATS rule alone is estimated to cost \$9.6 billion per year nationally. In 2012, only 1.5% of Ohio’s electricity was produced by renewable resources, and because some or much of that may have been generated out-of-state, this amount would have had a negligible effect on past emission reductions.

36 US Department of Energy, Energy Information Administration, “Electric Power Industry Emissions Estimates Back to 1990, Ohio,” May 1, 2014, <http://www.eia.gov/state/search/#?1=101&5=124&2=216>.

37 US Department of Energy, Energy Information Administration, “Annual Energy Outlook 2015,” April 2015, [http://www.eia.gov/forecasts/aeo/pdf/0383\(2015\).pdf](http://www.eia.gov/forecasts/aeo/pdf/0383(2015).pdf).

Past regulations have generated substantial emissions reductions—at a high cost to businesses and consumers. Thus, given presently available technology, it is counterproductive for policymakers to legislate further reductions in pollution through energy mandates at increasing incremental costs. It would be more economical to allow people and business to buy renewable energy and energy efficiency products on their own terms as these products improve, thus reducing emissions without government intervention.

## **Considerations for unwinding the mandate**

The Renewables Portfolio Standard encouraged investors to fund renewable energy projects because the mandate made these projects artificially competitive in the market. These investments are unlikely to remain profitable without the mandate. This begs the question: If the General Assembly repeals the mandates, what may happen to existing contracts between electric utilities and renewable energy companies that were signed for the purpose of compliance with the mandate? Other states have taken two approaches to this issue.

The first approach is to repeal the RPS without any government influence over how existing contracts are treated. The West Virginia legislature chose this option when it repealed its renewable energy mandate in January 2015.<sup>38</sup>

The second approach allows utilities to continue their contracts with renewable electricity generators and recover their compliance costs, so long as those contracts were signed before the law was repealed. In March 2015 the Michigan legislature introduced an RPS repeal bill that took this approach,<sup>39</sup> and the North Carolina legislature introduced a similar bill in April 2015.<sup>40</sup>

## **Conclusion**

Energy mandates such as Ohio's renewable energy and energy efficiency standards are costly and harm the economy. The state legislature should not require families, businesses, and consumers to spend money for renewable and efficiency products that they would not purchase voluntarily. In fact, forcing Ohioans to purchase energy products that are not presently economic will discourage innovation into renewables and efficiency products that may be commercially valuable in the future. Energy mandates also have unseen consequences

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38 House Bill 2001, 82<sup>nd</sup> West Virginia Legislature, (2015), [http://www.legis.state.wv.us/Bill\\_Status/bills\\_text.cfm?billdoc=hb2001%20sub%20enr.htm&yr=2015&sesstype=RS&i=2001](http://www.legis.state.wv.us/Bill_Status/bills_text.cfm?billdoc=hb2001%20sub%20enr.htm&yr=2015&sesstype=RS&i=2001).

39 House Bill 4308, Michigan House of Representatives, (2015), <https://www.legislature.mi.gov/documents/2015-2016/billintroduced/House/htm/2015-HIB-4308.htm>.

40 House Bill 681, North Carolina House of Representatives, (2015), <http://www.ncga.state.nc.us/Sessions/2015/Bills/House/PDF/H681v1.pdf>.

for health and the environment that must be accounted for. Because the energy mandates carry high costs for little additional health or environmental benefits, the legislature should repeal the mandates in full.

Ohio became the first state to suspend its energy mandates in 2014. Since then, Oklahoma and West Virginia have enacted full repeals of their similar statutes, and Michigan is considering a full repeal. Ohio should continue making progress toward a free energy market rather than regress back to counterproductive regulation.

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**The Economic Research Center (ERC)** was established at The Buckeye Institute in 2014 to provide reliable economic research, data analysis, and econometric modeling at the state level.

Founded in 1989, The Buckeye Institute for Public Policy Solutions is an independent research and educational institution—a think tank—whose mission is to advance free-market public policy.

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# Appendix I

## Senate Bill 221 Alternative Energy Portfolio Standard Compliance Schedule

Year	Total alternative energy supplied <sup>1</sup>	Maximum advanced energy supplied <sup>2</sup>	Minimum renewable energy supplied <sup>2</sup>	In-state renewable energy supplied <sup>2</sup>	Solar energy supplied <sup>3</sup>
2009	0.50%	0.25%	0.25%	0.125%	0.004%
2010	1.00%	0.50%	0.50%	0.250%	0.010%
2011	2.00%	1.00%	1.00%	0.500%	0.030%
2012	3.00%	1.50%	1.50%	0.750%	0.060%
2013	4.00%	2.00%	2.00%	1.000%	0.090%
2014	5.00%	2.50%	2.50%	1.250%	0.120%
2015	7.00%	3.50%	3.50%	1.750%	0.150%
2016	9.00%	4.50%	4.50%	2.250%	0.180%
2017	11.00%	5.50%	5.50%	2.750%	0.220%
2018	13.00%	6.50%	6.50%	3.250%	0.260%
2019	15.00%	7.50%	7.50%	3.750%	0.300%
2020	17.00%	8.50%	8.50%	4.250%	0.340%
2021	19.00%	9.50%	9.50%	4.750%	0.380%
2022	21.00%	10.50%	10.50%	5.250%	0.420%
2023	23.00%	11.50%	11.50%	5.750%	0.460%
2024	25.00%	12.50%	12.50%	6.250%	0.500%

Senate Bill 221, passed in 2008, required Ohio’s electric utilities and retailers to: (1) Supply at least 25% of their electricity from “alternative energy” resources by 2025, (2) Supply up to 12.5% from “advanced energy resources” such as clean coal or advanced nuclear plants, (3) supply at least 12.5% from “renewable energy resources” such as wind and solar, (4) supply 0.5% of the 12.5% renewable energy mandate from solar resources, and (5) supply at least 50% of the renewable energy from resources located within the state of Ohio.

Senate Bill 221’s energy efficiency mandate (Energy Efficiency Resource Standard or EERS) used average annual electricity consumption from 2006 through 2009 as a baseline and required electric utilities and electricity retailers to implement programs that would reduce electricity consumption by 22% by 2025.

Passed in 2013, Senate Bill 310 suspended the RPS and EERS at 2013 levels for two years, lowered the total advanced energy goal to 12.5% from 25%, disregarded advanced energy for compliance, and eliminated the in-state renewable requirement.



# Senate Bill 310 Alternative Energy Portfolio Standard Compliance Schedule

Year	Total alternative energy supplied <sup>1</sup>	Maximum advanced energy supplied <sup>2</sup>	Minimum renewable energy supplied <sup>2</sup>	In-state renewable energy supplied <sup>2</sup>	Solar energy supplied <sup>3</sup>
2009	0.25%	0.00%	0.25%	0.000%	0.004%
2010	0.50%	0.00%	0.50%	0.000%	0.010%
2011	1.00%	0.00%	1.00%	0.000%	0.030%
2012	1.50%	0.00%	1.50%	0.000%	0.060%
2013	2.00%	0.00%	2.00%	0.000%	0.090%
2014	2.50%	0.00%	2.50%	0.000%	0.120%
<b>*2015</b>	<b>2.50%</b>	<b>0.00%</b>	<b>2.50%</b>	<b>0.000%</b>	<b>0.120%</b>
<b>*2016</b>	<b>2.50%</b>	<b>0.00%</b>	<b>2.50%</b>	<b>0.000%</b>	<b>0.120%</b>
2017	3.50%	0.00%	3.50%	0.000%	0.150%
2018	4.50%	0.00%	4.50%	0.000%	0.180%
2019	5.50%	0.00%	5.50%	0.000%	0.220%
2020	6.50%	0.00%	6.50%	0.000%	0.260%
2021	7.50%	0.00%	7.50%	0.000%	0.300%
2022	8.50%	0.00%	8.50%	0.000%	0.340%
2023	9.50%	0.00%	9.50%	0.000%	0.380%
2024	10.50%	0.00%	10.50%	0.000%	0.420%
2025	11.50%	0.00%	11.50%	0.000%	0.460%
2026	12.50%	0.00%	12.50%	0.000%	0.500%

1	As a percent of total electricity supplied from all resources
2	As a percent of total electricity supplied from alternative resources
3	As a percent of total electricity supplied from renewable resources
*	Suspension year