



Union of
Concerned
Scientists

FACT SHEET

A Bright Future for the Heartland

POWERING OHIO'S ECONOMY WITH CLEAN ENERGY

As in most Midwest states, coal dominates Ohio's power supply, posing serious risks to public health and the environment and leaving families and businesses vulnerable to price hikes. And like the rest of the Midwest, Ohio has struggled to fully rebound from the recent deep recession.

Fortunately, practical and affordable ways are available to help revitalize the state's economy and ensure a clean, safe, and reliable power supply. Energy efficiency technologies and renewable resources such as wind, solar, and bio-power offer a responsible path away from the state's overreliance on polluting fossil fuels to generate electricity.

Ohio has already taken important steps to promote these solutions. However, the Buckeye State must go further to create a clean and sustainable energy economy and reduce the urgent threat of global warming. Doing

so would deliver many important economic and environmental benefits, such as keeping Ohio competitive in the growing clean energy industry.

In 2009, the Midwestern Governors Association—a collaboration of 10 states (including Ohio) working on key public policy issues—released the *Midwestern Energy Security and Climate Stewardship Roadmap*. The Energy Roadmap's policy recommendations outline a path to a clean energy economy that entails maximizing local resources while reducing global warming pollution.

The Energy Roadmap recommends producing 30 percent of the Midwest's power supply from renewable resources by 2030, and investing in energy efficiency technologies to reduce power consumption at least 2 percent annually by 2015 and thereafter. The Union of Concerned Scientists performed an analysis that focused on these two recommendations, which we modeled as a renewable electricity standard (RES) and an energy efficiency resource standard (EERS).

The RES and EERS have proven to be effective and popular tools for advancing renewable energy and energy efficiency. As of April 2011, eight Midwest states had adopted an RES (among 29 states nationwide, plus Washington, DC). Five of these states also have an EERS (among 26 states nationwide).

Ohio adopted an RES in 2008 requiring the state to generate 12.5 percent of its power from renewable resources by 2025. The legislation also included an EERS requiring the state to reduce its annual electricity use

The Benefits of a Clean Energy Economy for Ohio by 2030



Job Creation:

Nearly 14,000 net new jobs from deploying renewable energy and energy efficiency technologies

Economic Development:

Nearly \$2.5 billion in new capital investment, \$320 million in new income for farmers and rural landowners, and \$170 million in new local tax revenues

Consumer Savings:

\$7.4 billion in lower electricity and natural gas bills by 2030 (\$124 for a typical family)

Diversified Energy Mix:

5,940 megawatts of capacity for generating electricity from non-hydro renewable resources (up from about 150 megawatts in 2010)

Climate Solutions:

Across the Midwest, reductions in global warming pollution from power plants equal to the annual emissions from 30 typical new coal plants

0.7 percent by 2012, 2 percent by 2020, and 2.2 percent by 2025 and each year thereafter.

We used a modified version of the U.S. Department of Energy's (DOE's) National Energy Modeling System (NEMS) to examine the long-term impact on Ohio and the entire Midwest of achieving the Energy Roadmap targets. We modeled two policy scenarios, which we call our *core policy case* and *alternative technology pathway*. The two scenarios differ only in that the core policy case includes more pessimistic assumptions about the technology and costs of biopower



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than the DOE assumes in the NEMS model, to reflect the significant uncertainties and constraints facing biomass development today and into the future. We compared our two scenarios with an *existing policies case*, or base case, which assumes no new state or federal policies.¹

Overall, our analysis shows that Ohio and the entire Midwest would reap significant economic, consumer, and environmental benefits from achieving the targets in the Energy Roadmap.²

JOB CREATION AND OTHER ECONOMIC DEVELOPMENT BENEFITS

Under our core policy case, for example, we found that investments in clean energy needed to achieve the renewable energy and energy efficiency targets in the Energy Roadmap would create 14,000 new jobs in Ohio by 2030. Those jobs would be on top of those created under Ohio's existing policies, and would span numerous sectors of the state's economy, including manufacturing, construction, operations,

maintenance, agriculture, forestry, finance, and retail. Those investments would also yield \$670 million in new annual income in Ohio by 2030, and \$500 million per year in new gross state product.

Our analysis of changes in employment found that job gains from investments in renewable energy and energy efficiency would far outweigh any job losses from displaced fossil fuel generation. Electricity produced from renewable resources and gains in energy efficiency typically delivers more jobs than power produced from fossil fuel because a larger share of the money remains in the regional economy and in labor-intensive sectors such as manufacturing, installation, and maintenance. Many of the expenditures required to produce power from coal and natural gas flow to states outside the region, and support fuel extraction and transportation that is less labor-intensive.

Besides creating jobs, the stronger renewable electricity and energy efficiency standards in the Energy Roadmap would provide other important boosts to Ohio's economy by 2030.

These economic benefits include:

- \$2.5 billion in new capital investment in renewable energy and energy efficiency
- \$320 million in new income for farmers and rural landowners who produce biomass energy or lease their land to wind developers
- \$170 million in new property tax revenues, which would help communities pay for schools and vital public services³

The Solar Industry Shines Bright in Northeast Ohio

In August 2010, Ohio's largest solar power facility began providing clean, homegrown electricity in Wyandot County. Built by PSEG Solar Source, the Wyandot Solar Farm will generate enough power for more than 9,000 homes.

The project attests to the economic impact of the burgeoning solar energy industry on Ohio's economy. With help from the Wyandot Economic Development office, PSEG Solar Source employed Ohio workers to build the project, and used equipment from solar manufacturers within the state (*Solar Daily* 2010).

First Solar, a leader in manufacturing thin-film solar panels, built the solar panels in its 1,000-employee facility in Perrysburg (First Solar 2011). Myers Controlled Power, based in Canton, made the plant's power stations. Vaughn Industries, based in Wyandot County, was the main construction contractor (*Solar Daily* 2010).

CONSUMER SAVINGS

Consumers in Ohio stand to realize big savings on their energy bills if the state implements the renewable energy and energy efficiency targets in the Energy Roadmap. Investments in energy efficiency deliver much of these savings by reducing demand for electricity in homes, businesses, and industry.

Greater reliance on renewable energy and energy efficiency adds to the savings by fostering competition in the regional energy market. That leads to slightly lower and more stable prices for the coal and natural gas used to generate electricity and provide heat for buildings and industrial uses. Annual consumer electricity prices would be 4.4 percent lower, on average, from



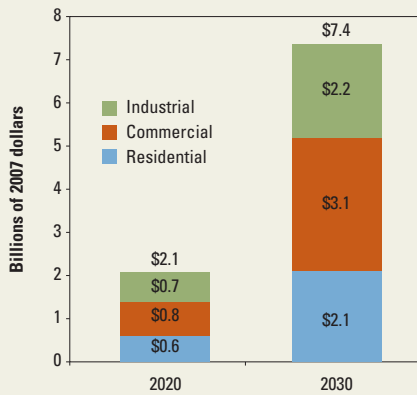
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¹ Existing policies include state-level RESs and EERSs adopted as of March 2010, and the federal renewable energy tax credits and incentives in the American Recovery and Reinvestment Act of 2009. It does not include recent changes in power plant regulations that the U.S. Environmental Protection Agency is using to enforce the Clean Air Act.

² To read our full report, fact sheets on other Midwest states, and a technical appendix describing our modeling approach and assumptions, see www.ucsusa.org/brightfuture.

³ Results are in cumulative 2007 dollars and use a 7 percent real discount rate.

Figure 1. Cumulative Savings on Ohio's Consumer Energy Bills under the Energy Roadmap



2010 to 2030 under the Energy Roadmap targets, and consumer natural gas prices would be 0.8 percent lower.

The savings from reduced energy consumption and lower prices for electricity and fossil fuels would more than offset the costs of investing in renewables and energy efficiency. Cumulative savings on electricity and natural gas bills for Ohio consumers would total \$2.1 billion by 2020, and grow to \$7.4 billion by 2030, with all sectors of the economy sharing in the savings (Figure 1). The typical Ohio family would begin to see small savings in annual gas and electricity costs in 2011, with savings reaching \$50 by 2020, and \$124 by 2030. From 2010 to 2030, a typical household would save an average of \$54 on electricity and natural gas bills each year.

DIVERSIFYING THE ELECTRICITY MIX

In 2009, less than 1 percent of the electricity generated in Ohio came from renewable resources. The rest of the state's power came primarily from coal, along with nuclear energy and other fossil fuels—with most of the fuel imported from out of state.

Yet the state is rich in untapped renewable energy resources. Ohio has

the technical potential to generate nearly 1.3 times its 2009 electricity demand from renewables—led primarily by wind and bioenergy—although economic and physical barriers will curb some of that potential.

Under the regional renewable energy targets in the Energy Roadmap, Ohio would diversify its coal-dependent mix of power, making its supply more reliable and secure. Ohio would increase its homegrown generating capacity based on non-hydro renewable resources from less than 150 megawatts (MW) today to 5,940 MW in 2030, primarily by adding wind power and biopower. That development represents an 84 percent increase over the renewable energy generation that would occur under existing policies (Figure 2).

Ohio also has a wealth of untapped potential for replacing coal-fired power and diversifying its electricity mix by relying more strongly on energy efficiency technologies. Investing in energy efficiency is one of the quickest and most cost-effective ways to transition to a clean energy economy.

By 2030, the energy efficiency targets in the Energy Roadmap would reduce electricity use by an additional 8.4 billion kilowatt-hours annually in Ohio—equivalent to replacing the power output from two new coal plants of a typical size (600 MW). Greater reliance on renewable energy and energy efficiency would reduce the need to generate power from coal by 13 percent in 2030 compared with existing policies.

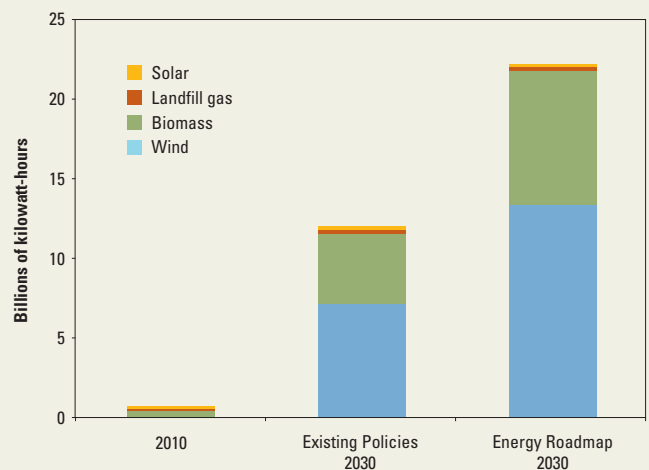
ALTERNATIVE TECHNOLOGY PATHWAY

Given its abundant and diverse renewable resources, the Midwest could develop various mixes to meet the Energy Roadmap's targets. In our model, small changes in assumptions about the cost, performance, and siting or supply constraints of each technology affect the mix. In our alternative technology pathway, we assume that some of the significant development constraints facing biomass can be overcome, leading to lower cost and better performance of the technology.

Under this alternative technology pathway, Ohio would generate 21 percent more electricity from renewables in 2030 than under the core policy case. This finding primarily reflects the state's strong potential for co-firing biomass at existing coal plants. Under the alternative technology pathway, nearly two times more electricity would come from such co-firing by 2030. The amount of electricity generated from wind and other renewable energy resources would be similar under both scenarios.

While the alternative technology pathway alters the mix of renewable

Figure 2. Use of Renewable Resources to Generate Electricity in Ohio, 2030: Existing Policies vs. Energy Roadmap



resources used to generate electricity, Ohio still achieves the Energy Roadmap targets while reaping consumer savings and other economic benefits (Table 1). Job creation is somewhat lower than under the core policy case, because the state meets a larger share of the renewable energy target by co-firing biomass at existing coal plants—a less labor-intensive approach than building new renewable energy facilities. However, greater reliance on biomass under the alternative technology pathway puts more money in the pockets of rural landowners from the harvest and sale of biomass products.

RESPONSIBLE ACTION ON CLIMATE CHANGE

The Midwest produces 27 percent of U.S. heat-trapping emissions such as carbon dioxide (CO₂), and Ohio ranks fourth among all states in total CO₂ emissions (EIA 2010).

If heat-trapping emissions are left unchecked, global warming—which already threatens our health and environment—will worsen. Ohio will see significant consequences in the next few decades, and they will become more severe as the century progresses (Hayhoe et al. 2009).

Fortunately, renewable energy and energy efficiency are smart and affordable global warming solutions that cut CO₂ emissions by reducing fossil fuel use. Under the core policy case, the Energy Roadmap targets would lower CO₂ emissions from Midwest power plants by 130 million metric tons annually by 2030 (16.7 percent below base-case levels)—equivalent to the

annual emissions from 30 typical new coal plants.

THE BOTTOM LINE

As Ohio and other Midwest states search for ways to help revitalize their economies, investing in clean energy is a smart and responsible course. Adopting the Energy Roadmap's goals for renewable energy and energy efficiency would spur innovation, create thousands of jobs in big cities and small towns across Ohio, provide much-needed savings on energy bills for families and businesses, and diversify the state's power supply, making it more reliable and secure.

Ohio has already taken important steps toward a clean energy future. However, the Buckeye State should go further, increasing its renewable electricity requirement from 12.5 percent by 2025 to 30 percent by 2030 for all utilities. Ohio also needs to strengthen its energy efficiency resource standard to match the target in the Energy Roadmap of 2 percent annual cuts in electricity use by 2015 and thereafter.

State and federal tax credits and other financial incentives, more funding for research and development, stronger energy codes for buildings, and better processes for planning, siting, and approving electricity transmission lines are also needed. By doing

Table 1. Ohio's Economic Benefits from Meeting the Energy Roadmap Targets: Core Policy Case vs. Alternative Technology Pathway

	Core Policy Case	Alternative Technology Pathway
Savings on Electricity and Natural Gas Bills (cumulative)		
2010–2020	\$2.1 billion	\$2.5 billion
2010–2030	\$7.4 billion	\$7.2 billion
Typical annual household savings, 2030	\$124	\$99
Net Job and Economic Benefits (in 2030)		
Net job creation	14,000	10,500
Income	\$670 million	\$530 million
Gains in gross state product	\$500 million	\$380 million
Other Net Economic Benefits (cumulative 2010–2030)		
New capital investment in renewable energy	\$1.1 billion	\$1.4 billion
New capital investments in energy efficiency	\$1.4 billion	\$1.4 billion
Biomass payments	\$300 million	\$600 million
Wind land-lease payments	\$20 million	\$20 million
Property tax revenues	\$170 million	\$190 million

its part to promote renewable energy and energy efficiency in the Midwest, Ohio will reap significant economic and environmental benefits today while creating a clean and sustainable energy economy for future generations.

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The full text of this report is available on the UCS website at www.ucsusa.org/brightfuture.



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Citizens and Scientists for Environmental Solutions

The Union of Concerned Scientists is the leading science-based nonprofit working for a healthy environment and a safer world.

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