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Concerned
Scientists

FACT SHEET

A Bright Future for the Heartland

POWERING WISCONSIN'S ECONOMY WITH CLEAN ENERGY

As in most Midwest states, coal dominates Wisconsin'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, Wisconsin 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.

Wisconsin has already taken important steps to promote these solutions. However, the Badger 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,



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such as keeping Wisconsin competitive in the growing clean energy industry.

In 2009, the Midwestern Governors Association—a collaboration of 10 states (including Wisconsin) 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 of 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).

Wisconsin first adopted an RES in 1999, and expanded it in 2006 to require 10 percent of the state's power supply to come from renewable resources by 2015. Wisconsin also has an energy efficiency goal, with annual reductions in electricity use of 0.75 percent by 2011, and 1.5 percent by 2014 and each year thereafter.

The Benefits of a Clean Energy Economy for Wisconsin by 2030



Job Creation:

Nearly 11,500 net new jobs from deploying renewable energy and energy efficiency technologies

Economic Development:

Nearly \$2.7 billion in new capital investment, \$20 million in new income for farmers and rural landowners, and \$80 million in new local tax revenues

Consumer Savings:

\$6 billion in lower electricity and natural gas bills by 2030 (\$269 for a typical family)

Diversified Energy Mix:

2,860 megawatts of capacity for generating electricity from non-hydro renewable resources (up from about 690 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

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 Wisconsin and the entire Midwest of achieving the Energy Roadmap targets. We modeled two policy scenarios to evaluate a reasonable range of possible technology pathways for meeting the regional renewable energy targets, 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

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 Wisconsin 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 11,500 new jobs in Wisconsin by 2030. These would be on top of the jobs created under Wisconsin'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 \$550 million in new annual income in Wisconsin by 2030, and \$360 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, which are less labor-intensive.

Besides creating jobs, the stronger renewable electricity and energy efficiency standards in the Energy Roadmap would provide other important boosts to Wisconsin's economy by 2030. These economic benefits include:

- \$2.7 billion in new capital investment in renewable energy and energy efficiency
- \$20 million in new income for farmers and rural landowners who produce biomass energy or lease their land to wind developers
- \$80 million in new property tax revenues, which would help communities pay for schools and vital public services³

Holsum Dairies Turns Manure Green

Nearly two dozen dairy farmers across Wisconsin are reaping extra revenue from an unlikely source: cow manure. When cow manure decomposes in the field, it attracts flies, causes odors, and releases methane gas, a powerful global warming agent. These farmers collect the manure for use in a specialized anaerobic digester, which produces biogas containing methane. A generator then burns the methane to produce electricity and heat.

Holsum Dairies has installed digesters and generators at its two farms, Irish Dairy and Elm Dairy, near Hibert. With 4,000 cows at each farm, Holsum produced enough biogas to generate 9.46 million kilowatt-hours (kWh) of electricity in 2007—enough to meet the needs of both farms and sell 4.2 million kWh of excess electricity to a utility (Buelow 2008).

"We originally installed the digesters to control odor and provide energy," says Kenn Buelow, Holsum's co-owner and manager. "The plan was to break even on our investment. But since installing the digesters, we have been able to increase revenues and reduce our cost."

CONSUMER SAVINGS

Consumers in Wisconsin 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



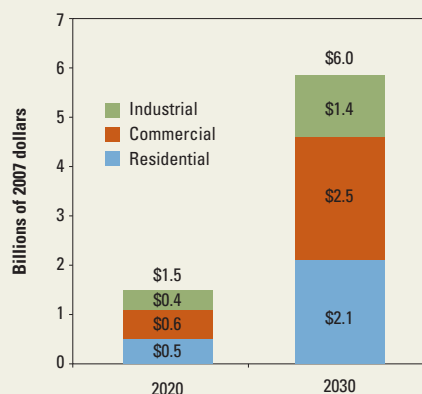
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¹ Existing policies include state-level RESs and EERSs adopted as of March 2010, and the federal renewable energy tax credits and incentives in the American Recovery and Reinvestment Act of 2009. It does not include recent changes in power plant regulations 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 Wisconsin's Consumer Energy Bills under the Energy Roadmap



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 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 Wisconsin consumers would total \$1.5 billion by 2020, and grow to \$6 billion by 2030, with all sectors of the economy sharing in the savings (Figure 1). The typical Wisconsin family would begin to see small savings in annual gas and electricity costs in 2011, with savings reaching \$98 by 2020, and \$269 by 2030. From 2010 to 2030, a typical household would save an average of \$111 on electricity and natural gas bills each year.

DIVERSIFYING THE ELECTRICITY MIX

In 2009, just 3 percent of the electricity generated in Wisconsin came from renewable resources. The rest of the

state's power came primarily from coal, along with nuclear energy and other fossil fuels—with all the fuel imported from out of state.

Yet the state is rich in untapped renewable energy resources. Wisconsin has the technical potential to generate nearly five 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 renewable energy targets in the Energy Roadmap, Wisconsin would diversify its coal-dependent mix of power, making its supply more reliable and secure. Wisconsin would increase its homegrown generating capacity based on non-hydro renewable resources from some 690 megawatts (MW) today to 2,860 MW in 2030, primarily by adding wind power and biopower. That development represents a 26 percent increase over the renewable energy generation that would occur under existing policies (Figure 2).

Wisconsin also has a wealth of untapped potential to replace coal-fired power and diversify 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.

Expanding Wisconsin's existing EERS to match the energy efficiency targets in the Energy Roadmap would reduce electricity use by an additional 22.9 billion kilowatt-hours annually—equivalent to replacing the power output from

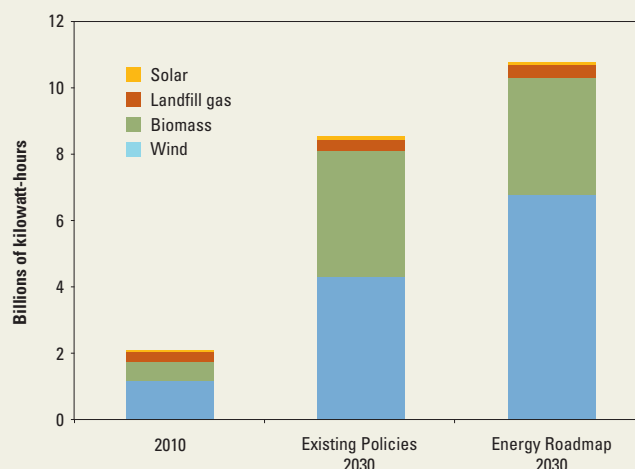
more than five new coal plants of a typical size (600 MW). Greater reliance on renewable energy and energy efficiency would reduce the need to generate power from coal by 23 percent in 2030 compared with existing policies.

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 and 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, Wisconsin would generate 33 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, more than three times

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



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 would alter the mix of renewable resources used to generate electricity, Wisconsin would still achieve the Energy Roadmap targets while reaping consumer savings, economic development, and jobs—in amounts similar to those under the core policy case (Table 1). However, greater reliance on biomass under the alternative technology pathway would put more money in the pockets of rural landowners from the harvest and sale of biomass products.

RESPONSIBLE ACTION ON CLIMATE CHANGE

If heat-trapping emissions are left unchecked, global warming—which already threatens our health and environment—will worsen. Wisconsin will see significant consequences in the next few decades, and they will become more severe as the century progresses (Hayhoe et al. 2009). A recent analysis for Wisconsin found that unabated climate change would lead to higher air temperatures during all seasons but especially winter, degraded water resources, and dangerous storms and flooding, putting more stress on agriculture (WICCI 2011).

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 Wisconsin 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 Wisconsin, provide much-needed savings on energy bills for families and businesses, and diversify the state's power supply, making it more reliable and secure.

Wisconsin has already taken important steps toward a clean energy future, and it should not retrench. Instead, the Badger State should go further, increasing its renewable electricity requirement from 10 percent by 2015 to 30 percent by 2030. Wisconsin also needs to strengthen its energy efficiency resource standard by making it binding, and by matching the Energy Roadmap target 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

Table 1. Wisconsin'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	\$1.5 billion	\$1.7 billion
2010–2030	\$6 billion	\$5.9 billion
Typical annual household savings, 2030	\$269	\$251
Net Job and Economic Benefits (in 2030)		
Net job creation	11,500	11,900
Income	\$550 million	\$560 million
Gains in gross state product	\$360 million	\$450 million
Other Net Economic Benefits (cumulative 2010–2030)		
New capital investment in renewable energy	\$0.4 billion	\$0.8 billion
New capital investments in energy efficiency	\$2.3 billion	\$2.3 billion
Biomass payments	\$20 million	\$380 million
Wind land-lease payments	\$5 million	\$10 million
Property tax revenues	\$80 million	\$120 million

lines are also needed. By doing its part to promote renewable energy and energy efficiency in the Midwest, Wisconsin 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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