



Union of
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Scientists

FACT SHEET

A Bright Future for the Heartland



POWERING IOWA'S ECONOMY WITH CLEAN ENERGY

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

Iowa has already taken important steps to promote these solutions. However, the Hawkeye 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 Iowa

competitive in the growing clean energy industry.

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

Iowa has a modest RES that required 105 MW of the state's power supply to come from renewable resources by 1999—equivalent to about 1 percent of the electricity generated in the state in 2010. Iowa also has an

The Benefits of a Clean Energy Economy for Iowa by 2030



Job Creation:

Nearly 7,300 net new jobs from deploying renewable energy and energy efficiency technologies

Economic Development:

Nearly \$5.8 billion in new capital investment, \$50 million in new income for farmers and rural landowners, and \$560 million in new local tax revenues

Consumer Savings:

\$2.6 billion in lower electricity and natural gas bills by 2030 (\$226 for a typical family)

Diversified Energy Mix:

12,310 megawatts of capacity for generating electricity from non-hydro renewable resources (up from about 3,700 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

energy efficiency goal, which varies by utility. For example, that goal required MidAmerican Energy, the state's largest utility, to reduce electricity sales 1.5 percent by 2010.

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 Iowa 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



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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 Iowa 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 nearly 7,300 new jobs in Iowa by 2030. Those jobs would be on top of those created under Iowa's existing policies, and would span numerous

sectors of the state's economy, including manufacturing, construction, operations, maintenance, agriculture, forestry, finance, and retail. Those added investments would also yield \$420 million in new annual income in Iowa by 2030, and \$460 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 Iowa's economy by 2030. These economic benefits include:

- \$5.8 billion in new capital investment in renewable energy and energy efficiency
- \$50 million in new income for farmers and rural landowners who produce biomass energy or lease their land to wind developers
- \$560 million in new property tax revenues, which would help communities pay for schools and vital public services³

The Iowa Advantage: Manufacturing for Wind Energy

Iowa has taken advantage of its location in the heart of the Midwest's abundant wind resources and become a national leader in the wind industry. As of 2010, Iowa obtains a higher percentage of its electricity from wind power than any other state, and ranks second in installed wind capacity.

Iowa is also a hub for manufacturers of wind turbine equipment. One recent estimate cites 80 Iowa-based companies contributing to the wind industry's manufacturing supply chain. These firms employ 2,300 Iowans (Craig, Learner, and Pakenham 2010).

Clipper Windpower led the industry's rush to Iowa in late 2005, drawn by "the state's quality of transportation, proximity to markets, availability of suppliers, and support for wind power voiced by Iowa's leaders," according to Clipper Chairman James G.P. Dehlsen (IA DED 2010). Clipper's plant, located in Cedar Rapids, employs more than 325 Iowans and supplies turbines for installations throughout the United States and Mexico.

CONSUMER SAVINGS

Consumers in Iowa 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



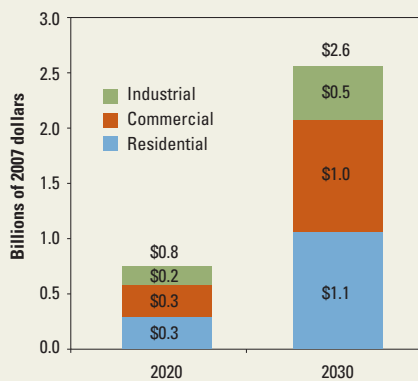
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¹ Existing policies include state-level RESs and EERSs adopted as of March 2010, and the federal renewable energy tax credits and incentives in the American Recovery and Reinvestment Act of 2009. It does not include recent changes in power plant regulations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



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 Iowa consumers would total \$800 million by 2020, and grow to \$2.6 billion by 2030, with all sectors of the economy sharing in the savings (Figure 1). The typical Iowa family would begin to see small savings in annual gas and electricity costs in 2011, with savings reaching \$75 by 2020, and \$226 by 2030. From 2010 to 2030, a typical household would save an average of \$101 on electricity and natural gas bills each year.

DIVERSIFYING THE ELECTRICITY MIX

In 2009, about 14 percent of the electricity generated in Iowa 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. Iowa has the technical potential to generate nearly 48 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, Iowa would diversify its coal-dependent mix of power, making its supply more reliable and secure. Iowa would increase its homegrown generating capacity based on non-hydro renewable resources from about 3,700 megawatts (MW) today to 12,310 MW in 2030, primarily by adding wind power and biopower. That development represents a nearly 60 percent increase over the renewable energy generation that would occur under existing policies (Figure 2).

Iowa 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.

By 2030, the energy efficiency targets in the Energy Roadmap would reduce electricity use by an additional 15.7 billion kilowatt-hours annually in Iowa—equivalent to replacing the power output from four new coal plants of a typical size (600 MW). Greater reliance on renewable energy and

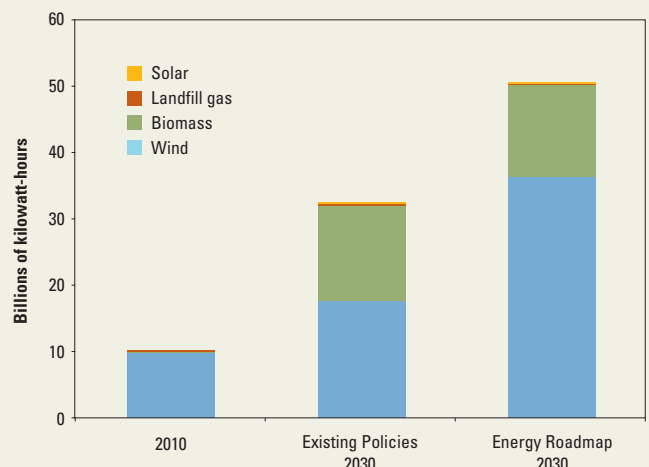
energy efficiency would reduce the need to generate power from coal by 19 percent in 2030 compared with existing policies.

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, Iowa's renewable energy resources make a smaller contribution to achieving the regional Energy Roadmap targets. That is because of the strong potential for co-firing biomass at existing coal plants throughout the region to produce power—an option that competes favorably with Iowa's wind resources. Iowa would therefore produce 15 percent less

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



electricity from renewable sources in 2030 under the alternative technology pathway compared with the core policy case—but would produce three times as much power from co-firing.

While the alternative technology pathway alters the mix of renewable resources used to generate electricity, Iowa still achieves the Energy Roadmap targets while reaping consumer savings and economic benefits similar to those under our core policy case (Table 1).

Job creation is somewhat lower under the alternative technology pathway, because the state relies less heavily on renewables to generate electricity, and because the state meets a larger share of the renewable energy target by co-firing biomass at existing coal plants—a less labor-intensive route than building new renewable energy facilities. However, greater use of 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

If heat-trapping emissions are left unchecked, global warming—which already threatens our health and environment—will worsen. Iowa 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 Iowa 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 Iowa, provide much-needed savings on energy bills for families and businesses, and diversify the state's power supply, making it more reliable and secure.

Iowa has already taken important steps toward a clean energy future. However, the Hawkeye State should go further, increasing its renewable electricity requirement from about 1 percent today to 30 percent by 2030. Iowa 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. Iowa'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	\$0.7 billion	\$0.9 billion
2010–2030	\$2.6 billion	\$2.7 billion
Typical annual household savings, 2030	\$226	\$225
Net Job and Economic Benefits (in 2030)		
Net job creation	7,300	5,400
Income	\$420 million	\$270 million
Gains in gross state product	\$460 million	\$240 million
Other Net Economic Benefits (cumulative 2010–2030)		
New capital investment in renewable energy	\$4.2 billion	\$1.6 billion
New capital investment in energy efficiency	\$1.5 billion	\$1.5 billion
New income from biomass and wind land-lease payments	\$50 million	\$130 million
Property tax revenues	\$560 million	\$210 million

lines are also needed. By doing its part to promote renewable energy and energy efficiency in the Midwest, Iowa will reap significant economic and environmental benefits today while creating a clean and sustainable energy economy for future generations.

References

- Craig, A., H. Learner, and C. Pakenham. 2010. *The wind energy supply chain in Iowa*. Chicago, IL: Environmental Law and Policy Center. Online at <http://elpc.org/wp-content/uploads/2010/11/IowaWindSupplyChainReportDownload.pdf>.
- Deyette, J., and B. Freese. 2010. *Burning coal, burning cash: Ranking the states that import the most coal*. Cambridge, MA: Union of Concerned Scientists.
- Hayhoe, K., J. VanDorn, V. Naik, and D. Wuebbles. 2009. *Climate change in the Midwest: Projections of future temperature and precipitation*. Cambridge, MA: Union of Concerned Scientists.
- Iowa Department of Economic Development (IA DED). 2010. *Wind energy: Where wind and innovation work*. Des Moines, IA. Online at <http://www.iowalifechanging.com/business/downloads/windenergy.pdf>.

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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