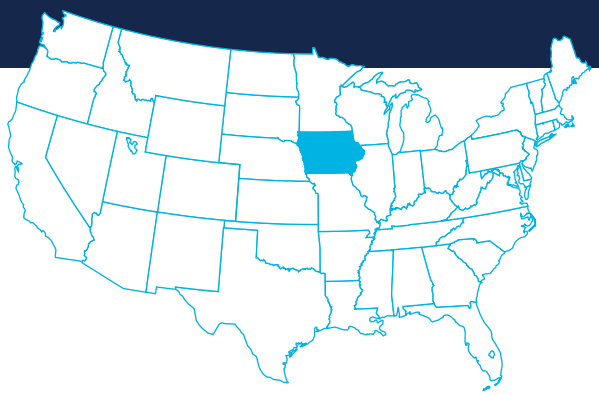
NRDC

ISSUE BRIEF

IOWA'S CLEAN ENERGY FUTURE



Opportunities to Cut Carbon Pollution Under the Clean Power Plan

Iowa has an opportunity to tap a well of economic growth that could provide new jobs, expand the economy, and help protect future generations from the worst impacts of a changing climate. That opportunity is clean energy, and one way for Iowa to realize more clean energy growth in the coming years is through the U.S. Environmental Protection Agency's Clean Power Plan. Iowa can cut a significant amount of carbon pollution by improving energy efficiency in homes and buildings and by continuing to increase the amount of power it gets from renewable sources like the wind and sun. These investments will create new clean energy jobs, protect people from the harmful health effects of air pollution, and save them money on their electric bills.

Climate change is a clear and present danger to Iowans' health and communities, bringing stronger storms, harsher droughts, and rising temperatures—most recently highlighted by findings that 2014 was, globally, the hottest year on record.[1] The National Climate Assessment, a recent report from 13 federal agencies, warned that human-induced climate change impacts are happening today, and worsening in every region of the United States.

Climate change is a threat to the state's economy and public safety. In the past century, annual average precipitation in Iowa has increased by 4.2 inches—the second-highest rise in the Midwest region— resulting in more frequent and severe flooding in Iowa.[2] Flooding can destroy crops and damage farmland, and declining harvests place financial strain on farming families and communities. The costs of climate change are rising as well. Climate-related disasters in 2012 cost American taxpayers more than $100 billion.[3] Iowans paid an estimated $761 million in federal taxes to clean up extreme weather events, or $1,100 per taxpayer, in 2012.[4]

OVERVIEW OF THE EPA'S CLEAN POWER PLAN

For the sake of our children and generations to come, we have an obligation to reduce the dangerous carbon pollution that traps heat and is fueling climate change. The nation's fossil-fuel power plants are the single biggest source of carbon pollution in the United States, accounting for nearly 40 percent of the total. Today we limit mercury, lead, and soot from these power plants, but not carbon pollution. That is changing. On June 2, 2014, the EPA proposed the Clean Power Plan, which sets the first-ever standards limiting carbon pollution. The plan, when in place, would prevent the emission of about 550 million metric tons of carbon dioxide nationwide annually in the year 2030, and would cut power sector pollution 30 percent below 2005 levels.[5] Nationwide, the Clean Power Plan can usher in climate and health benefits worth an estimated $55 billion to $93 billion in the year 2030, according to EPA analysis; that includes preventing 2,700 to 6,600 premature deaths. These benefits far outweigh the estimated national costs of $7.3 billion to $8.8 billion in the year 2030.[6] Additionally, the EPA's proposed carbon pollution standards will stimulate investment that puts Americans to work making our homes and businesses more energy efficient. The EPA estimates this projected increase in smarter energy use will shrink consumers' electricity bills by roughly 8 percent in 2030 nationwide.[7]

Putting carbon pollution limits on power plants also will give the United States leverage in the international community to elicit strong commitments to reduce pollution from countries around the world. Already, the Clean Power Plan proposal helped the United States reach a landmark agreement in November 2014 with China to reduce carbon pollution in both countries.

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HOW DOES REDUCING POLLUTION CREATE JOBS AND SHRINK ELECTRIC BILLS?

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

IOWA'S CARBON POLLUTION TARGET

Every state, Iowa included, has the opportunity to craft its own best strategy to reduce pollution and protect our climate. The EPA is expected to finalize the Clean Power Plan in the summer of 2015, and the following year each state must submit an initial plan to meet its pollution target. Investing in energy efficiency and renewable wind and solar power should be a fundamental part of Iowa's strategy.

The Clean Power Plan proposal sets a state pollution reduction target by assessing four readily available methods (or "building blocks") for cutting pollution in each state. The target is expressed in intensity—pounds of carbon dioxide per megawatt-hour (MWh) of electricity produced—and Iowa is being asked to reduce its pollution intensity 16 percent by 2030. The four building blocks EPA used to establish state targets are: 1) making coal-fired power plants more efficient by increasing the amount of electricity they generate from each ton of coal burned; 2) using natural gas power plants more effectively by dispatching them before coal plants; 3) increasing renewable energy growth, based on a growth rate already being met in the region; and 4) increasing energy efficiency (cutting energy waste) in homes and buildings, thereby reducing the amount of energy that must be generated from fossil fuels to power them. While the carbon pollution targets are based on these building blocks, states can meet their goals with any variety of policies and resource choices. The Clean Power Plan puts Iowa in the driver's seat, with flexibility to design a plan based on its energy mix, to chart a low-carbon path forward.

LESS POLLUTION, MORE JOBS, LOWER ELECTRIC BILLS

Cutting carbon pollution will create benefits to consumers on their electric bills and will boost Iowa's job growth. According to a Natural Resources Defense Council (NRDC) analysis, setting a standard to reduce more carbon pollution than the EPA's current proposal would still create jobs and reduce consumer energy bills.

If Iowa ramps up energy efficiency and renewable power to the higher but still relatively modest levels NRDC analyzed, **Iowa would see the creation of 2,500 new jobs**, and the state's households and businesses would **save $235 million on their electric bills** in 2020.[9] Because of the benefits to consumer electric bills and to the state's job growth, NRDC recommended that EPA require more pollution reductions nationally than are currently in the Clean Power Plan proposal.

GRID RELIABILITY IN IOWA

For the 40 years since the passage of the Clean Air Act, our country has been able to dramatically reduce pollution while keeping the lights on and costs low. Grid operators like MISO, which operates the grid that includes Iowa and other Midwest states, plan ahead to meet changing electricity needs. Smart grid planning, coupled with supply- and demand-side investments, will position grid operators to be able to fulfill electricity demand while states implement the Clean Power Plan. In recent years, billions of dollars have been invested in new transmission infrastructure to make sure electricity can be distributed wherever and whenever it is needed. Energy efficiency savings continue to temper demand, which makes it easier for utilities and grid operators to ensure adequate electricity supplies. Moreover, since 2005, changes in the nation's power supply and state policies have already resulted in a in a 15 percent reduction in carbon pollution from power plants.[10] Increases in energy efficiency and renewable energy have displaced fossil generation, and lower-cost natural gas generation has increasingly displaced coal-fired power plants. The grid has easily accommodated these changes through management and planning. These examples bode well for maintaining electricity reliability while cutting carbon pollution under the Clean Power Plan.

In addition, renewable energy can actually *increase* reliability of the electric grid. Thanks to more precise weather forecasts and improved technologies, grid operators are increasingly able to predict renewable energy power output while maintaining reliability. Wind power can be used to help stabilize the grid with high-quality power.[11] Unlike fossil generated and nuclear sources, which can have large, abrupt, and unpredictable changes in electricity output, changes in wind and solar generation tend to be gradual and predictable.[12] Wind turbines are spread across a large area, and thus it typically takes many hours for changes in weather to impact a large share of a region's wind output.[13] Even if wind speeds decline rapidly in a single location, the change in the region's total wind energy will occur very slowly. Wind and solar power need less backup generation than fossil fuels or nuclear sources. In fact, MISO needs almost no additional fast-acting power reserves to back up its 10,000-plus MW of wind power, which is enough to power 10 million homes.[14] Thanks to management, planning, and improving grid technologies, Iowa can cut pollution, increase energy efficiency, and add renewable energy capacity while maintaining a strong and reliable electric grid.

THE ELECTRICITY SECTOR IN IOWA TODAY

Iowa has made great strides in clean energy, with more than 5,000 MW of installed wind power and more than 100 wind projects across the state, plus an additional 1,055 MW of wind under construction.[15,16] However, Figure 1 shows that, in 2013, 59.2 percent of the state's electricity generation came from coal.[17] While non-hydro renewable energy was the second-largest source of electricity (27.7 percent), it provided less than half the amount of electricity from coal. The rest of the state's electricity generation mix came from nuclear (9.4 percent) and natural gas (2.5 percent).[18] While Iowa has ample wind resources, it has no coal deposits, forcing the state to import all of the coal it burns. In 2012 alone, Iowa spent $590 million on coal imports, or $193 per person—the seventh-highest coal expenditure per capita in the country.[19]

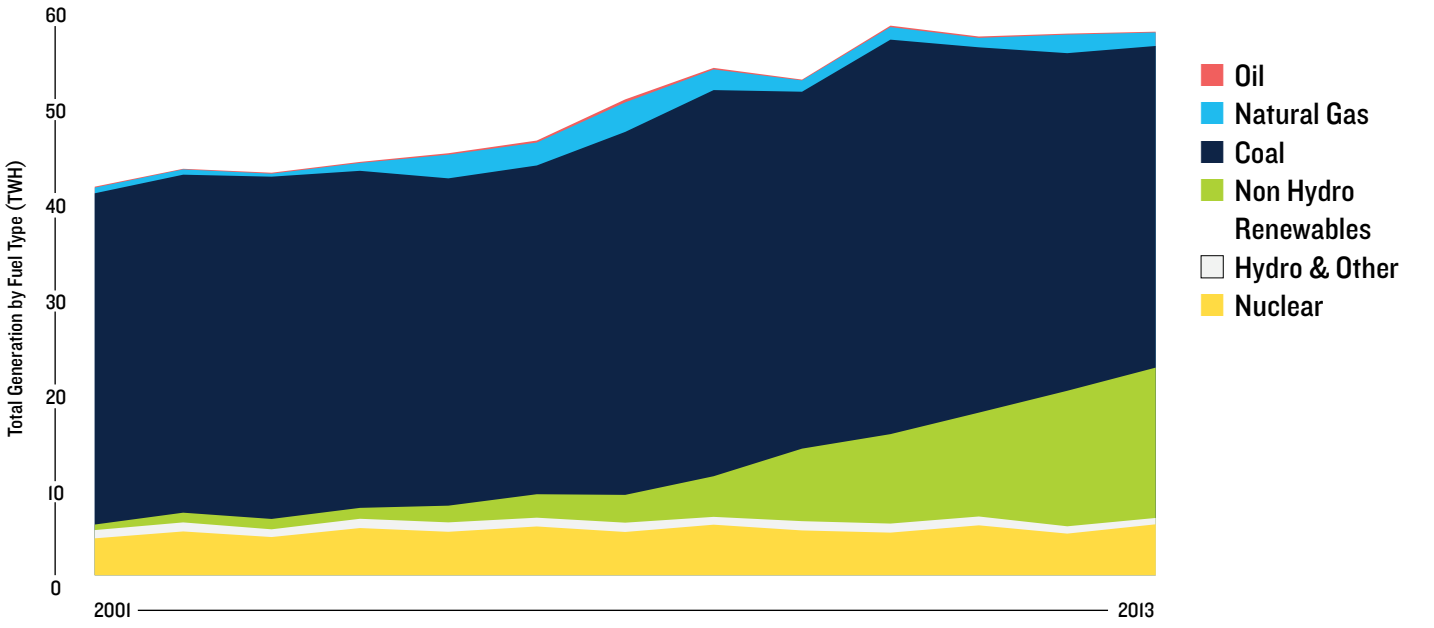
Clean energy can reduce Iowa's dependence on coal imports, keeping money and jobs within the local economy. Over 5,177 MW of wind have been installed in Iowa—the third-largest capacity in the nation—supporting more than 3,000 jobs and producing enough electricity to power 1.5 million households in 2013.[20] Even more can be added. Current wind installations represent less than 10 percent of the state's technical wind potential.[21]

In addition, solar can greatly add to Iowa's clean energy economy. While Iowa's solar industry is still relatively small, it has been growing substantially in recent years due to the state's solar tax credit. More than 200 jobs have been added since 2013.[22] There are now 44 solar companies employing more than 900 Iowans in the state.[23] Given the jobs created by a relatively small amount of solar generation, continued solar growth could significantly boost Iowa's employment and its economy.

As shown in Figure 2, energy efficiency and renewable energy technologies are zero-carbon, low-cost options that can help meet the goals of the Clean Power Plan. In the Midwest, energy efficiency is the lowest-cost resource to meet the state's carbon pollution reduction goals; electricity savings can be achieved at costs well below those of new generation, resulting in lower electricity bills for homes and businesses. In fact, investments in energy efficiency could save Iowa businesses $134 million in 2020.[24] Further, with technological advances and taller wind turbines that have improved performance, wind power has become competitive with new natural gas plants in many parts of the country.[25,26] In the Midwest, the average cost of purchased wind power is 2.1 cents per kilowatt-hour (kWh), less than natural gas and competitive with energy efficiency.[27] Solar power is also becoming increasingly competitive, as a result of rapidly declining costs for solar panels, and most analysts expect that these costs will continue to decline over the next decade.[28] Additionally, a new Deutsche Bank report predicts that distributed solar power will be cheaper than average retail electricity prices in Iowa by 2016, even without a federal Investment Tax Credit.[29]

In addition to incredible progress in renewable energy, Iowa has made significant strides in energy efficiency. Following a Iowa Utilities Board (IUB) order in 2008, electric utilities are required to establish energy efficiency programs to meet IUB's set energy savings goals. Municipal and electric cooperative utilities are also required to establish utility-specific goals for energy savings. As shown in Figure 3, annual net incremental savings for the state was 1.06 percent in 2013, the 11th-highest in the nation.[30] These utility programs have produced large savings. Between 2009 and 2013, Alliant Energy had an average annual incremental savings of 1.32 percent, and in 2013 the company achieved

FIGURE 1: IOWA'S ELECTRICITY GENERATION SOURCES (2001–2013)



Source: Energy Information Administration

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

Energy efficiency is the cheapest of all forms of energy. Wind and utility solar PV are competitive with new natural gas combined cycle plants. In the Midwest, the cost of purchased wind (2.1 cents per kWh, or $21 per MWh) is even more competitive than the national averages shown below.

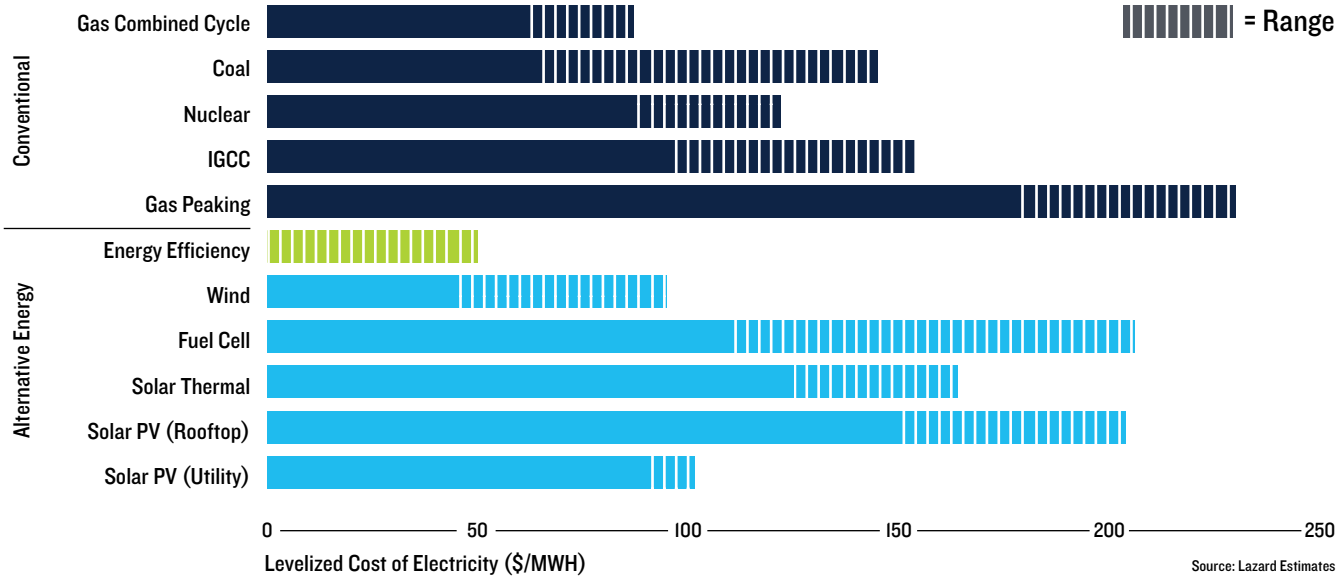
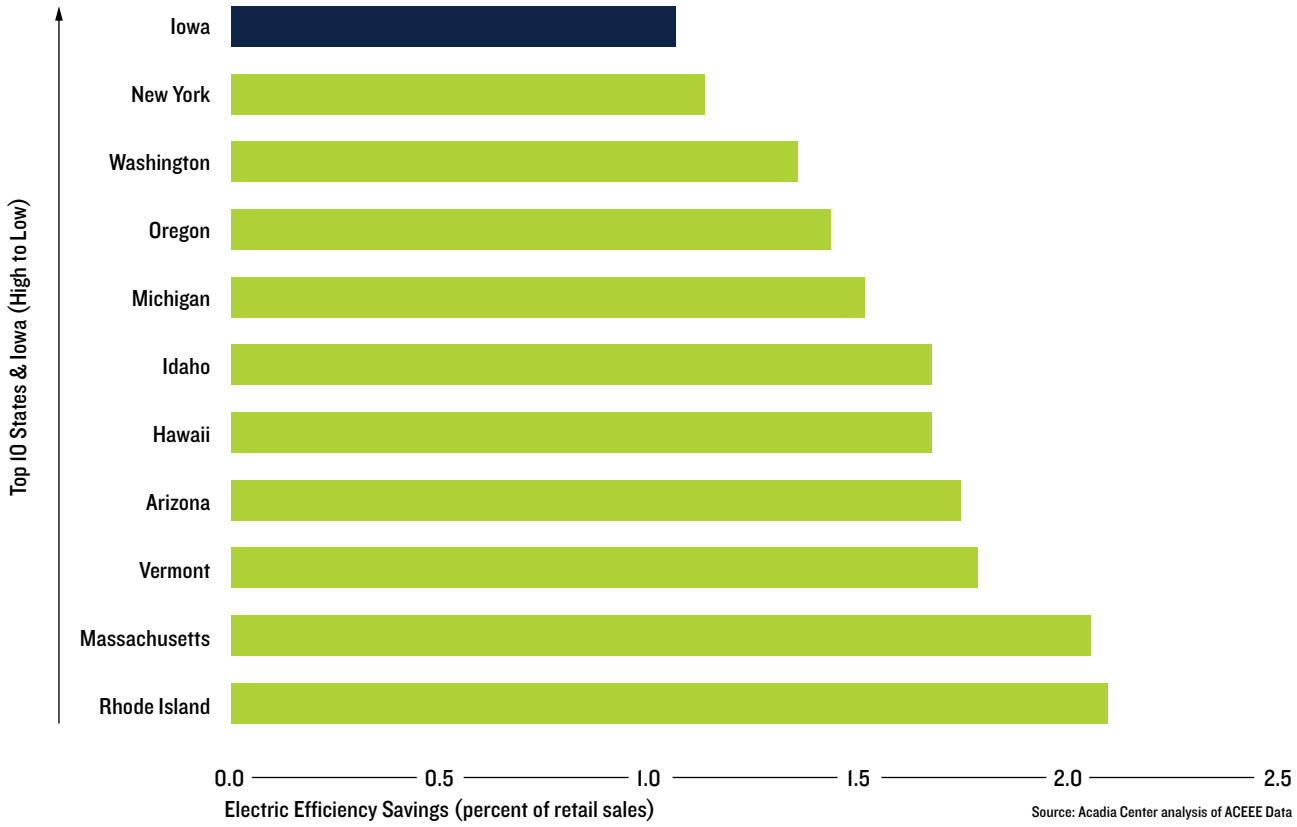


FIGURE 3: IOWA'S ENERGY EFFICIENCY

Comparison with the 10 states with the highest energy efficiency rates. Iowa ranked 11th as of 2013.



savings of 1.5 percent of annual sales. MidAmerican Energy achieved an average annual incremental savings of 1.18 percent between 2009 and 2013. Investor-owned utilities have developed new energy-efficiency portfolios for 2014 through 2018, establishing annual savings goals of 1.2 percent.[31] These are robust savings, but it is worth noting that Cadmus Group found in 2012 that there was economic potential to save nearly 2 percent per year, even excluding such energy efficiency measures as building codes, combined heat and power, and more.[32]

A CLEAN ENERGY FUTURE FOR IOWA

Iowa is well positioned to meet its carbon pollution target due to its strong leadership in renewable energy and energy efficiency. After accounting for existing nuclear and renewable sources, as shown in the "2012 Adjusted [Emissions] Rate" in Figure 4, the planned wind builds over the next few years alone would get Iowa 51 percent of the way from this adjusted rate to compliance with its final 2030 target. Meeting the efficiency goals used by the EPA to set Iowa's target—savings levels not much higher than what Iowa already has planned—would achieve pollution reductions beyond Iowa's 2030 target. And, when one factors in planned power plant retirements and fuel-switching—expected to occur by 2019, and based on decisions made prior to the release of the Clean Power Plan—Iowa can go even further, reducing emissions to a level 15 percent below the EPA's 2030 target.[33] Alternatively, given its strong wind resources, Iowa can reach the reduction target through wind alone.[34] Iowa has abundant wind resources that can help it cost-effectively cut carbon pollution. These resources could also draw investment from neighboring states working to comply with their own carbon pollution reduction targets, bringing additional benefits and investment to Iowa.

Decision makers should consider key environmental and policy factors when planning Iowa's energy future, such as the economic and health benefits that Iowans can reap through increased investment in clean energy. **Investment in energy efficiency and renewable energy is the key to Iowa's pollution reductions and clean energy future.**

STATES CAN CHOOSE FROM A RANGE OF POLICY APPROACHES

A smart, effective, and forward-looking Iowa plan can reduce market barriers that may hinder the development of clean energy. Table 1 shows the policy options available to states under the flexibility provided by the EPA's Clean Power Plan and offers recommendations for how states can achieve economic and environmental benefits as they cut carbon pollution. The Clean Power Plan also provides states the option to pursue partnerships with other states to reduce carbon pollution. Table 1 addresses the option of regional approaches, which present a number of potential advantages over single-state plans such as consumer savings, reduced compliance costs, increased flexibility, and avoided electricity market distortions.

CONCLUSION

Iowa has an opportunity to lead the way into our nation's clean energy future. Under the proposed Clean Power Plan, states have incredible flexibility to design their own best, most cost-effective plan to cut carbon pollution. The progress already made in Iowa provides a model for other states, demonstrates the affordability and reliability of clean energy, and means that the state is well situated to meet the goals of the Clean Power Plan. Iowa's tremendous wind resources, potential for solar, and long history of energy efficiency could allow the state to both cut carbon pollution and create thousands of new, homegrown jobs.

Iowa's energy future rests in its own hands. Iowa will need to submit an initial state plan to the EPA in 2016 to demonstrate how it will reduce carbon emissions from its power plant fleet. The Clean Power Plan presents Iowa with the opportunity to improve public health, foster new economic development, and help stabilize our climate.

FIGURE 4: ONE PATHWAY TO MEET IOWA'S POLLUTION REDUCTION TARGET

The dashed line represents Iowa's carbon pollution reduction target of 1,301 lbs CO_2/MWh.

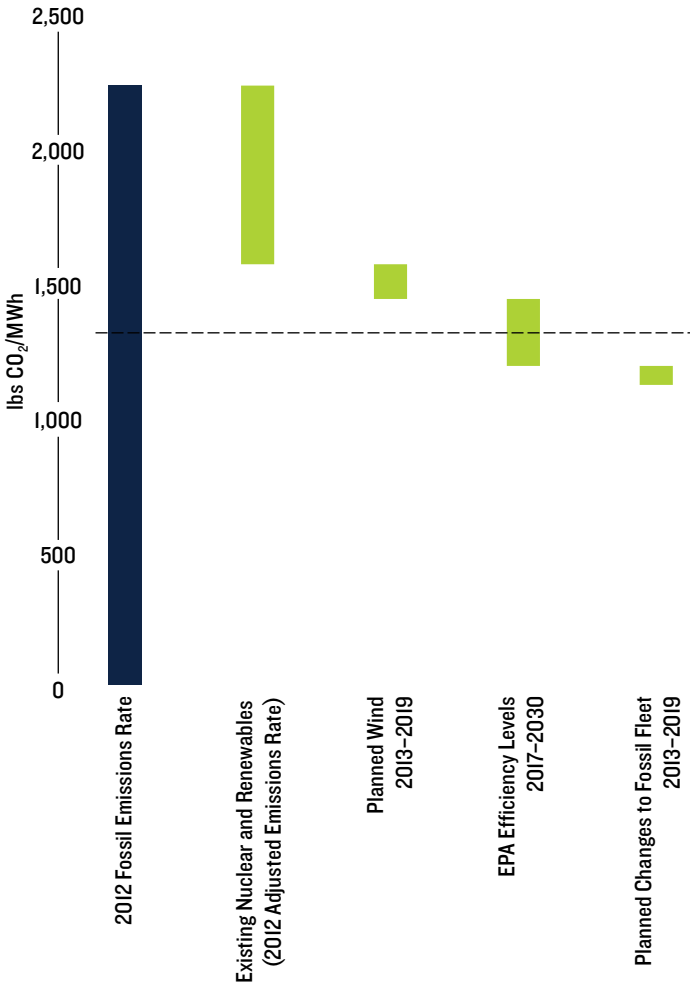


TABLE I. STATE POLICY OPTIONS FOR CLEAN POWER PLAN COMPLIANCE.
States have ample flexibility under the Clean Power Plan to choose the best method to reduce pollution.

	Flexible Intensity-based	Mass-based with Trading	Carbon Fee	Portfolio/Resource Standards
Environmental Goal, Units, & Outcome	State has emissions intensity goal in pollution per unit of electricity generated (lbs/MWh)	State has emissions limit in total, fixed amount (tons), regardless of amount of electricity generation	State establishes a carbon fee ($/ton) at price estimated to deliver the emissions goal; price is fixed but emissions outcome is uncertain	State sets minimum requirements for efficiency and renewable resources at levels estimated to deliver the emissions goal
Market Structure & Trading	Fossil power plants that pollute above the intensity standard must buy credits from others that operate below the standard	State agency issues allowances (tons) equal to the emissions limit; allowances can be auctioned or allocated; fossil power plants have to hold an allowance for every ton of emissions	State agency estimates the carbon fee ($/ton) needed to achieve the emissions goal; revenue could be returned to utility customers through rebates, energy efficiency investments, or other state goals	Eligible resources are identified (i.e., efficiency and renewables) and energy (MWh) is tracked using generator certificate tracking systems; the distribution utilities need enough certificates to show they are meeting the required standard
Electric System Reliability	All of these market-based approaches provide significant flexibility for plant operators, grid operators, and regulators to ensure that reliability requirements are met. If a plant is needed in the short term it can keep operating by buying allowances or credits or by paying a fee. A unit could be designated as "must-run" for reliability reasons until the reliability constraint is addressed, and other facilities would adjust their performance to accommodate the output from that plant.			
Regional Approaches:	There are significant benefits associated with states pursuing consistent regional approaches to compliance. The primary benefits are: 1) LOWER COST—A larger market should be more efficient and reduce costs 2) EQUAL TREATMENT—Generators, market participants, and consumers should face consistent market signals, costs and benefits 3) IMPROVED ENVIRONMENTAL OUTCOME—Regional approaches avoid different price signals across a market region and on either side of state boundaries. This would help avoid emissions leakage and higher national emissions than anticipated 4) REMOVE OR REDUCE RELIABILITY CONCERNS—A larger market and additional flexibility further reduces reliability concerns			

ENDNOTES

1 National Climatic Data Center, *State of the Climate: Global Analysis—Annual 2014*, December 2014, www.ncdc.noaa.gov/sotc/global/2014/13.

2 Midwestern Regional Climate Center, "Climate Change and Variability in the Midwest," 2014, http://mrcc.isws.illinois.edu/mw_climate/climateChange.jsp#.

3 Daniel Lashof and Andy Stevenson, "Who Pays for Climate Change? U.S. Taxpayers Outspend Private Insurers Three-to-One to Cover Climate Disruption Costs," Natural Resources Defense Council (hereinafter NRDC), May 2013, www.nrdc.org/globalwarming/files/taxpayer-climate-costs-IP.pdf.

4 NRDC, "Carbon Pollution Standards Fact Sheet: Iowa," May 2014, http://www.nrdc.org/air/pollution-standards/files/cps-state-benefits-IA.pdf

5 U.S. Environmental Protection Agency (hereinafter EPA), "Regulatory Impact Analysis for the Proposed Carbon Pollution Guidelines for Existing Power Plants and Emission Standards for Modified and Reconstructed Power Plants," June 2, 2014, www2.epa.gov/sites/production/files/2014-06/documents/20140602ria-clean-power-plan.pdf.

6 EPA, "Fact Sheet: Clean Power Plan," www2.epa.gov/carbon-pollution-standards/fact-sheet-clean-power-plan, accessed December 15, 2014.

7 EPA, "Fact Sheet: Clean Power Plan Overview," www2.epa.gov/carbon-pollution-standards/fact-sheet-clean-power-plan-overview, accessed December 15, 2014.

8 In NRDC's analysis, performed prior to the release of the Clean Power Plan, Iowa's 2020 and 2025 carbon pollution targets were 1,485 and 1,194 lbs/MWh, respectively, whereas the EPA's proposed interim (2020–2029) average target is 1,341 lbs/MWh. However, the targets are not directly comparable; for example, in the NRDC analysis new sources were covered under the standard, whereas in the EPA's proposal they are not covered. At the national level, NRDC's proposed targets were more ambitious, resulting in a 36 percent reduction in CO_2 emissions below 2005 levels by 2020.

9 NRDC, "New Carbon Pollution Standards Can Save Households $13 Billion on Electric Bills, Create 274,000 Jobs," May 2014, www.nrdc.org/air/pollution-standards/state-benefits.asp.

10 U.S. Energy Information Administration, "U.S. Energy-Related Carbon Dioxide Emissions, 2013," September 2014, www.eia.gov/environment/emissions/carbon/.

11 National Renewable Energy Laboratory, "Variable Renewable Generation Can Provide Balancing Control to the Electric Power System," NREL/FS-5500-57820, www.nrel.gov/docs/fy13osti/57820.pdf.

12 NRDC, "Power Grid Reliability Fact Sheet," December 2014, www.nrdc.org/air/pollution-standards/files/power-grid-reliability-FS.pdf.

13 American Wind Energy Association (hereinafter AWEA), "Wind Energy Helps Build a More Reliable and Balanced Electricity Portfolio," February 12, 2015, awea.files.cms-plus.com/AWEA%20Reliability%20White%20Paper%20-%202-12-15.pdf.

14 Nivad Navid, "Reserve Requirement Identification with the Presence of Variable Generation," presentation, UVIG Spring Technical Meeting, San Diego, April 26, 2012, variablegen.org/wp-content/uploads/2012/12/Navid-Reserve_Calculation.pdf.

15 AWEA, "Iowa Wind Energy," August 2014, awea.files.cms-plus.com/FileDownloads/pdfs/Iowa.pdf.

16 Ibid.

17 U.S. Energy Information Administration, "Net Generation by State by Type of Producer by Energy Source" (EIA-906, EIA-920, and EIA-923), www.eia.gov/electricity/data/state/.

18 Ibid.

19 Union of Concerned Scientists, "Burning Coal, Burning Cash: Ranking the States That Import the Most Coal," January 2014, www.ucsusa.org/sites/default/files/attach/2014/08/Burning-Coal-Burning-Cash-2014-Update-National-Findings.pdf.

20 AWEA, "Iowa Wind Energy."

21 National Renewable Energy Laboratory, "U.S. Renewable Energy Technical Potentials: A GIS-Based Analysis," July 2012, www.nrel.gov/gis/re_potential.html.

22 Solar Foundation, "State Solar Jobs: Iowa," last updated November 2014, pre.thesolarfoundation.org/solarstates/iowa.

23 Ibid.

24 NRDC, "Carbon Pollution Standards Fact Sheet: Iowa," May 2014, http://www.nrdc.org/air/pollution-standards/files/cps-state-benefits-IA.pdf

25 Lawrence Berkeley National Laboratory, "2013 Wind Technologies Market Report," August 2014, emp.lbl.gov/publications/2013-wind-technologies-market-report.

26 Herman K. Trabish, "Experts: The Cost Gap Between Renewables and Natural Gas 'Is Closing,'" Greentech Media, May 6, 2014, www.greentechmedia.com/articles/read/The-Price-Gap-Is-Closing-Between-Renewables-and-Natural-Gas.

27 Mike Barnard, "2013 Wind PPA Prices in US Interior Averaged 2.1 cents/KWH," *CleanTechnica*, May 8, 2014, cleantechnica.com/2014/05/08/2013-ppa-prices-us-interior-averaged-2-1-centskwh-windpower-2014-part-2/.

28 U.S. Department of Energy, "Photovoltaic System Pricing Trends: Historical, Recent, and Near-Term Projections," Sunshot, October 2014, www.nrel.gov/docs/fy14osti/62558.pdf.

29 Tom Randall, "While You Were Getting Worked Up over Oil Prices, This Just Happened to Solar," *Bloomberg Business*, October 29, 2014,

www.bloomberg.com/news/2014-10-29/while-you-were-getting-worked-up-over-oil-prices-this-just-happened-to-solar.html.

30 American Council for an Energy-Efficient Economy, "2014 State Energy Efficiency Scorecard," October 2014, www.aceee.org/state-policy/scorecard.

31 Database of State Incentives for Renewables & Efficiency, "Iowa: Energy Efficiency Standard," last updated November 2012, http://programs.dsireusa.org/system/program/detail/4537.

32 Cadmus Group, "The Assessment of Energy and Capacity Savings Potential in Iowa," February 2012, efs.iowa.gov/cs/groups/external/documents/docket/mdaw/mty5/~edisp/139264.pdf.

33 Scenarios described here and presented in Figure 4 are based on analysis performed by the Iowa Environment Council using the Synapse Compliance Tool, submitted as a public comment on the EPA's Clean Power Plan, www.iaenvironment.org/documents/2015/IEC%20111%28d%29%20Comments%20and%20Appendix.pdf.

34 Katharine McCormick, "The Benefits of Wind Energy in Iowa: A Valuable Reliable Crop for this Agricultural State," NRDC Switchboard, October 2014, switchboard.nrdc.org/blogs/kmccormick/the_benefits_of_wind_energy_in.html.