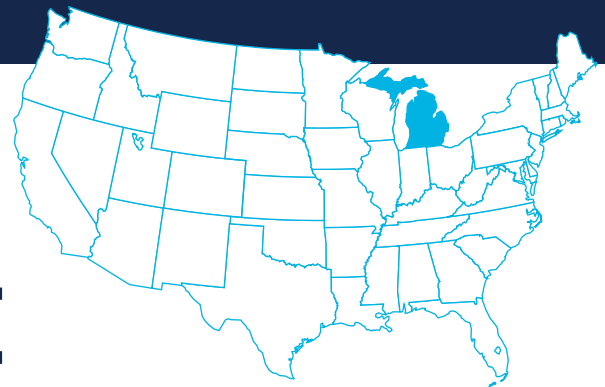




## ISSUE BRIEF

# MICHIGAN'S CLEAN ENERGY FUTURE



## Opportunities to Cut Carbon Pollution Under the Clean Power Plan

Michigan 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 Michigan to realize clean energy growth is through the U.S. Environmental Protection Agency's Clean Power Plan. Michigan can cut a significant amount of carbon pollution by improving energy efficiency in homes and buildings and by expanding the amount of power it gets from renewable sources like the wind and sun. These investments will create new clean energy jobs, protect our health from harmful air pollution, and save people money on their electric bills.

Climate change is a clear and present danger to Michiganders' 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.<sup>1</sup> The National Climate Assessment, a recent report from 13 federal agencies, warned that human-induced climate change impacts are being felt today, and worsening in every region of the United States.

People living in Michigan have already experienced economic and public health hardships due to changing weather patterns. In 2012, more than 97 percent of Michigan's \$60 million tart cherry crop was destroyed in an intense April freeze after an unseasonably warm March.<sup>2</sup> Higher temperatures have also increased the range and timing of pollen production, which can worsen or trigger asthma attacks. The Michigan Department of Community Health has reported that the rate of hospitalizations for allergic disease surged by more than 60 percent from 2001 to 2010.<sup>3</sup> Children, the elderly, and the poor are most vulnerable to climate change impacts, including

health problems related to heat stress, bad air quality, and extreme weather events.<sup>4</sup> The costs of climate change are rising as well. Climate-related disasters in 2012 cost American taxpayers more than \$100 billion.<sup>5</sup> Of that total, Michiganders paid \$2.4 billion in federal taxes—or \$1,100 per taxpayer—to clean up extreme weather events in 2012.<sup>6</sup>

### 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 would prevent about 550 million metric tons of carbon dioxide from entering the atmosphere by 2030, and would cut power sector pollution 30 percent below 2005 levels.<sup>7</sup>

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 an 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.<sup>8</sup> 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 agency estimates this projected increase in smarter energy use will shrink consumers' electricity bills by roughly 8 percent in 2030 nationwide.<sup>9</sup>

**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 to make 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.**

Putting carbon pollution limits on power plants also will give the United States leverage in the international community to elicit strong commitments from other nations 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.

### MICHIGAN'S CARBON POLLUTION TARGET

**Every state, Michigan 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 Michigan'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 Michigan is being asked to reduce its pollution intensity 31 percent by 2030. The four building blocks the 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 obligations in any way they choose. The Clean Power Plan puts Michigan 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 creates benefits to consumers on their electric bills and creates a boost to Michigan'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 do even more to create jobs and reduce consumer energy bills.

With a stronger standard than the EPA's initial proposal, made possible by ramping up energy efficiency and

renewable power, the NRDC analysis found that **Michigan would see the creation of 6,900 new jobs** and that the state's households and businesses would **save \$1 billion on their electric bills in 2020**.<sup>10,11</sup> Because of these benefits to consumer electric bills and to the state's job growth, NRDC recommended that the EPA require more pollution reductions nationally than currently in the Clean Power Plan proposal.

### GRID RELIABILITY IN MICHIGAN

For 40 years, our country has been able to dramatically reduce pollution under the Clean Air Act while keeping the lights on and costs low. Regional electric grid operators like MISO and PJM, which both operate portions of Michigan's grid, routinely 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 producers and grid operators to ensure adequate electricity supplies.

Moreover, since 2005, changes in the nation's power supply and shifts in state policies have already resulted in a 15 percent reduction in carbon pollution from power plants.<sup>12</sup> Increases in energy efficiency and renewable energy have displaced fossil generation, and lower-cost natural gas plants have increasingly displaced coal-fired power plants. The grid has easily accommodated these changes through management and planning. This bodes well for our ability to maintain electricity reliability as we cut 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. A Michigan Renewable Portfolio Standard requiring 32.5 percent of the state's electricity to be generated from clean sources, like wind and solar, by the year 2030 would have no grid reliability impacts and little to no customer bill impacts.<sup>13</sup> By investing in cleaner energy solutions and diversifying the state's energy portfolio, Michigan, and especially the Upper Peninsula, will be less susceptible to the threats of price hikes or power outages caused by overdependence on coal. Wind resources can also be used to help stabilize the

grid with high-quality power.<sup>14</sup> Unlike fossil-fuel 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.<sup>15</sup> This means that wind and solar need less backup generation than fossil-fuel or nuclear sources. In fact, increasing renewable energy output sevenfold (35,000 MW) in the PJM power region would increase the needed amount of fast-acting backup electricity by only 340 MW, less than 1 percent of the added capacity.<sup>16</sup> For comparison, the PJM region currently maintains 3,350 MW of expensive, fast-acting backup sources—enough to power 3.3 million homes—to ensure that it can keep the lights on in case a large fossil-fuel or nuclear power plant unexpectedly breaks down. Thanks to management, planning, and improvements in grid technologies, Michigan can cut pollution, increase energy efficiency, add renewable energy capacity, and address reliability issues and bill increases occurring in the Upper Peninsula due to its heavy reliance on coal.

### THE ELECTRICITY SECTOR IN MICHIGAN TODAY

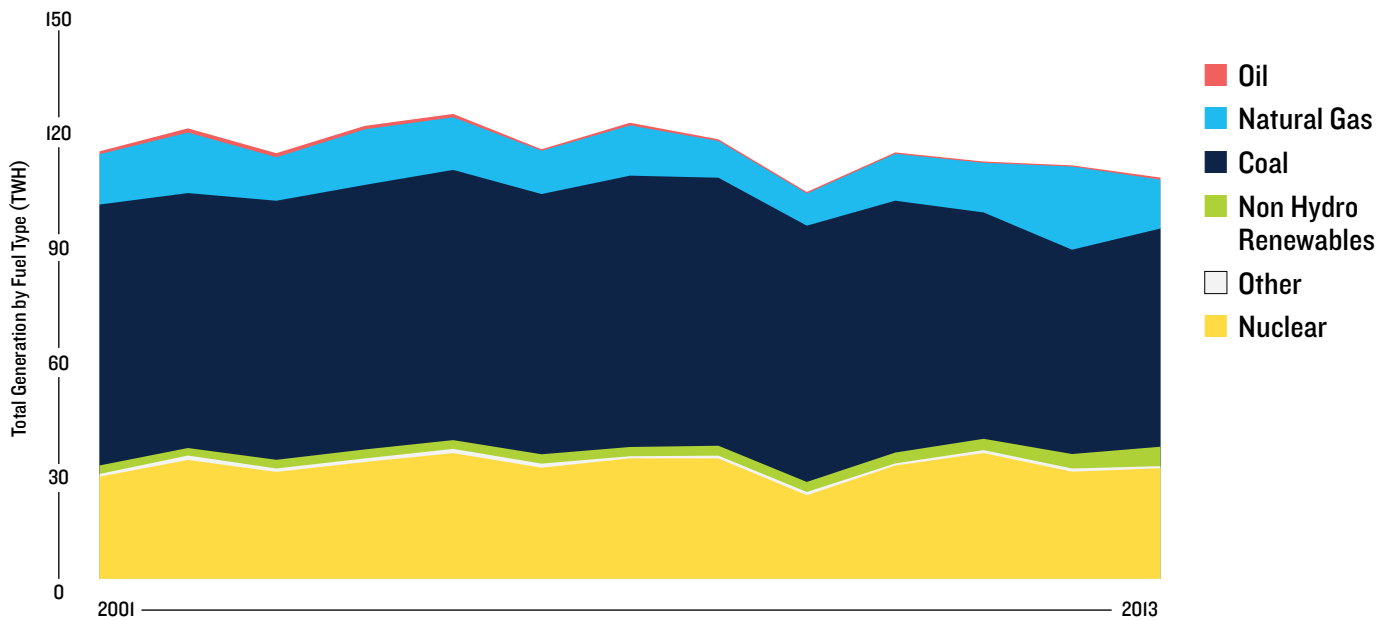
Figure 1 shows that in 2012 almost half—49.1 percent—of Michigan’s electric power came from coal. Nearly all the rest was generated from natural gas (20.1 percent) and nuclear sources (25.9 percent).<sup>17</sup> Michigan has no in-state coal resources and imported around \$1.56 billion in coal from neighboring states and the Great Plains in 2012 alone.<sup>18</sup> However, Michigan does have strong renewable energy potential within its borders. Lake Michigan provides one of the best wind resources in the country, with 59,000 MW of onshore and 423,000 MW of offshore wind capacity potential.<sup>19</sup> The state has developed this resource rapidly,

with wind generation expanding from less than 2,000 MWh in 2004 to more than 2.5 million MWh in 2013—a growth factor of more than 1000 in just one decade.<sup>20</sup> While Michigan has had strong renewable energy growth in recent years, non-hydro renewable energy still provided only 4.8 percent of the state’s electricity in 2013.<sup>21</sup>

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, including Michigan, 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 building new generation, resulting in lower electricity bills for homes and businesses. Further, with technological advances and taller wind turbines that improve performance, wind power has become competitive with new natural gas plants in many parts of the country.<sup>22,23</sup> Solar power also is 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.<sup>24</sup> Additionally, a recent Deutsche Bank report predicts that rooftop solar power will be cheaper than average retail electricity prices in Michigan by 2016, even without the 30 percent federal tax credit.<sup>25</sup>

Michigan has taken steps to embrace clean energy as a tool to rebuild and strengthen the state economy. In October 2008, the state passed Public Act 295, which reestablished utility energy efficiency programs through an Energy Efficiency Resource Standard (EERS) and put in place a 10 percent Renewable Portfolio Standard (RPS) for 2015. These programs have produced large benefits for Michigan, and they can serve as cornerstones for compliance with the Clean Power Plan and Michigan’s energy future.

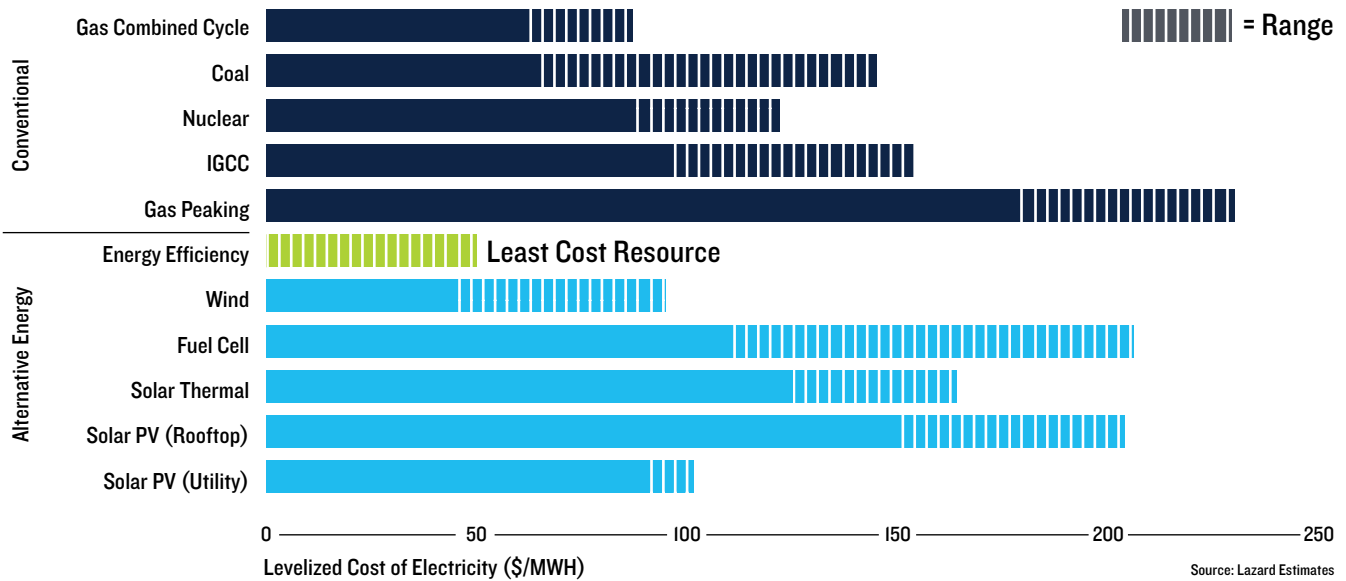
**FIGURE 1: MICHIGAN’S ELECTRICITY GENERATION SOURCES (2001–2013)**



Source: Energy Information Administration

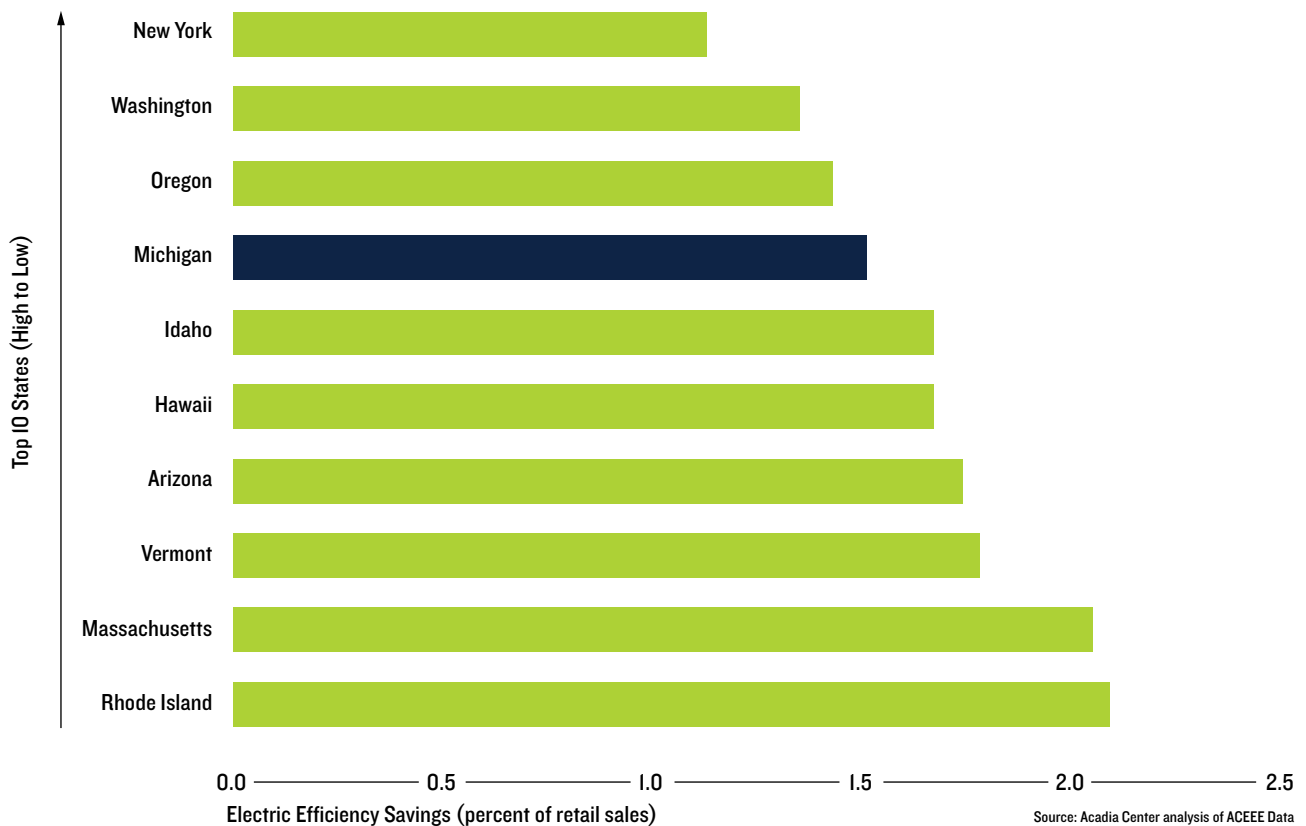
**FIGURE 2: COSTS OF ELECTRICITY GENERATION BY SOURCE (\$/MWH)**

Energy efficiency is the cheapest of all energy resources. Wind and utility solar PV are competitive with new natural gas combined cycle plants.



**FIGURE 3. MICHIGAN'S ENERGY EFFICIENCY RATE**

Comparison with the 10 states with the highest energy efficiency rates. Michigan ranked seventh as of 2013.



As shown in Figure 3, Michigan's energy efficiency programs resulted in an annual net incremental savings of 1.5 percent in 2013, placing the state seventh in the nation for utility energy efficiency program performance. These utility programs have produced both large energy savings and consumer savings. The first three years of the energy efficiency programs reduced energy use by more than 7.7 million MWh—enough to power 900,000 Michigan homes for a year—and produced more than \$800 million in net benefits for customers.<sup>26</sup> In addition, the efficiency measures installed through the EERS are expected to reduce annual carbon emissions by approximately 6.8 million tons in 2015 and up to 11.4 million tons in 2025.<sup>27</sup>

In addition, the state's Renewable Portfolio Standard has spurred more than \$2.3 billion in new investments and created new clean energy jobs since its enactment.<sup>28</sup>

**Michigan ranked seventh among the states for wind-related jobs in 2014, employing between 2,000 and 3,000 permanent workers.<sup>29</sup>** The state has already installed 1,350 MW of wind capacity, placing it 15th in the nation.<sup>30</sup> In 2013 alone, Michigan added 175 MW of new wind capacity, the third-largest amount of new capacity added that year in the country.

## A CLEAN ENERGY FUTURE FOR MICHIGAN

Michigan's current renewable energy and energy efficiency programs put the state in a good position for compliance with the Clean Power Plan. It already has an energy efficiency standard of 1 percent of annual sales, as well as a renewable energy standard to achieve 10 percent by 2015. These standards give Michigan a head start on clean energy adoption and carbon pollution reductions. In addition, two Michigan utilities, Consumers Energy and DTE Energy, are already running demand-side efficiency programs to cut energy waste in homes and businesses. Michigan can build on this progress as it creates its carbon pollution reduction plan. By expanding the energy efficiency programs and renewable standards, the state can cost-effectively reduce carbon pollution while building local economies and creating new jobs.

**Investment in energy efficiency and renewable energy is the key to Michigan's pollution reductions and its clean energy future.**

## STATES CAN CHOOSE FROM A RANGE OF POLICY APPROACHES

A smart, effective, and forward-looking Michigan 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

Michigan's leaders have an opportunity to chart a 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. Energy efficiency is the lowest-cost resource Michigan can use to both cut carbon pollution and create thousands of new, home-grown jobs.

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

**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:	<p>There are significant benefits associated with states pursuing consistent regional approaches to compliance. The primary benefits are:</p> <ol style="list-style-type: none"> <li>1) LOWER COST—A larger market should be more efficient and reduce costs</li> <li>2) EQUAL TREATMENT—Generators, market participants, and consumers should face consistent market signals, costs and benefits</li> <li>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</li> <li>4) REMOVE OR REDUCE RELIABILITY CONCERNS—A larger market and additional flexibility further reduces reliability concerns</li> </ol>			

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