



ISSUE BRIEF

VIRGINIA'S CLEAN ENERGY FUTURE



Opportunities to Cut Carbon Pollution Under the Clean Power Plan

Since 1607, when the first English settlement was established at Jamestown, Virginia has been viewed as a land of American economic entrepreneurship and opportunity. Today there's an untapped well of economic growth in Virginia that could provide new jobs, expand the economy, and help protect future generations from the worst impacts of a changing climate. That untapped well is Virginia's potential to expand clean energy.

One way for Virginia to realize clean energy growth is through the U.S. Environmental Protection Agency's Clean Power Plan, which will set the nation's first-ever carbon pollution limits on power plants. Virginia can cut a significant amount of its 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 people from the harmful health effects of air pollution, and save them money on their electric bills.

The Commonwealth is already 80 percent of the way toward achieving the EPA Clean Power Plan's carbon reduction goal for the state. The remaining 20 percent can be achieved by pressing ahead with already established state goals to improve energy efficiency and renewable power. Doing so would tap into the state's skilled workforce and take advantage of its world-class universities and technical schools to train the new clean energy workers, all while reducing the threats of climate change.

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

Climate change will be especially costly in Virginia unless we act now to reduce its impact. Sea level rise could damage the state's coastal cities, possibly rendering the homes of more than 35,000 families uninhabitable by the end of the century.² Lyme disease cases doubled between 2006 and 2007 in the state, due to rising temperatures that have expanded tick habitat.³ 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.⁴ The costs of climate change are rising as well. Climate-related disasters in 2012 cost American taxpayers more than \$100 billion.⁵ Virginians were not immune, paying an estimated \$2.3 billion, or \$1,079 per taxpayer, in federal taxes to clean up extreme weather events in 2012 alone.⁶

OVERVIEW OF THE 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 single biggest source of carbon pollution in the United States is the nation's fossil-fuel power plants; they account 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 about 550 million metric tons of carbon dioxide, nationwide, from entering the atmosphere by 2030 and would cut power sector pollution 30 percent below 2005 levels.⁷

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

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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, energy bill savings put more money into consumers' pocketbooks, leading to increased spending on other goods and services—and associated job creation—across the economy.

\$7.3 billion to \$8.8 billion in the year 2030.⁸ 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 energy efficiency will shrink consumers' electricity bills by roughly 8 percent in 2030 nationwide.⁹

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. 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. Because the United States is leading, the world is following.

VIRGINIA'S CARBON POLLUTION TARGET

Every state, Virginia included, has the opportunity to craft its own best plan 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 reduction target. Investing in energy efficiency and renewable wind and solar power would be cornerstones of the smartest and lowest-cost plan for Virginia.

The Clean Power Plan proposal sets a pollution reduction target for each state by assessing four readily available methods (or "building blocks") for cutting pollution in that state. The target is expressed in intensity—pounds of carbon dioxide per megawatt-hour (MWh) of electricity produced—and Virginia is being asked to reduce its pollution intensity 38 percent by 2030. The four building blocks the EPA has used to establish state targets are: 1) making coal-fired power plants more efficient by increasing the amount of electricity they create 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 (reducing energy waste) in homes and buildings.

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 Virginia in the driver's seat, with flexibility to design a plan that captures the best opportunities to reduce pollution, save money, and enhance its workforce.

LESS POLLUTION, MORE JOBS, LOWER ELECTRIC BILLS

Cutting carbon pollution will create benefits to consumers on their electric bills and will boost Virginia'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.¹⁰ This is particularly true in Virginia, where very little energy efficiency opportunity has been captured to date, leaving significant room for growth.

If Virginia ramps up energy efficiency and renewable power to the higher but still relatively modest levels NRDC analyzed, **Virginia would see the creation of 5,600 new jobs** and the state's households and businesses would save **\$1 billion on their electric bills** in 2020.^{11,12}

GRID RELIABILITY IN VIRGINIA

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. Grid operators such as PJM, which operates the grid in Virginia and other mid-Atlantic 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 continues 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 state policies have already resulted in a 15 percent reduction in carbon pollution from power plants.¹³ 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, and 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. Wind power can be used to help stabilize

the grid with high-quality power.¹⁴ Unlike fossil-fuel and nuclear power sources, which can have large, abrupt, and unpredictable changes in electricity output, changes in wind and solar generation tend to be gradual and predictable.¹⁵ This means that wind and solar need less backup generation than fossil fuels or nuclear sources. In fact, increasing renewable energy output sevenfold (35,000 MW) in the PJM power region, which includes Virginia, would increase the needed amount of fast-acting backup electricity by only 340 MW, less than 1 percent of the added renewable energy capacity.¹⁶ 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 if a large fossil-fuel or nuclear power plant unexpectedly breaks down. Thanks to management, planning, and better grid technologies, Virginia can cut pollution, increase energy efficiency, and add renewable energy capacity while maintaining a strong and reliable electric grid.

THE ELECTRICITY SECTOR IN VIRGINIA TODAY

Virginia’s energy mix presents a significant opportunity to increase diversity and lower costs. Figure 1, below, shows that in 2012 Virginia’s energy mix came mainly from nuclear power (41 percent), natural gas (35 percent), and coal (20 percent). Non-hydro renewable energy currently provides only a small fraction of the state’s generation (3.3 percent).¹⁷ While these under-utilized renewable sources carry no fuel costs, Virginia spent almost \$1.3 billion in 2012 to import coal and gas to burn in aging fossil fuel power plants.¹⁸

Virginia also has a large amount of untapped potential when it comes to energy efficiency. The state has an energy savings goal of 10 percent by 2022, but this goal is voluntary, with no requirement for utilities or the state to

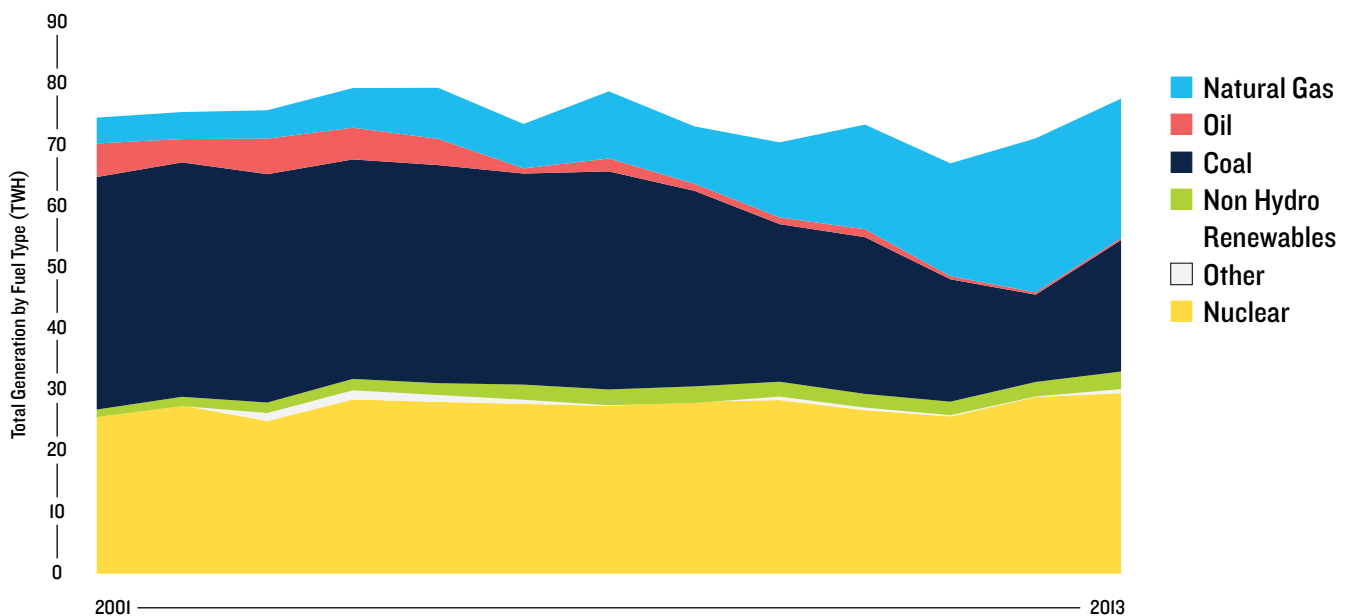
achieve this level of savings for customers.¹⁹ In 2012, annual savings were only 0.03 percent.²⁰ As shown in Figure 2, other states have been able to achieve significantly higher levels of low-cost efficiency, to accrue substantially more customer and energy benefits. Virginia can do the same – meeting the level of energy efficiency suggested in the Clean Power Plan (still well below Virginia’s potential) would reduce the average customer’s bill by 6 to 8 percent.²¹

Energy efficiency is the lowest-cost resource for meeting the state’s carbon pollution reduction goals. As shown in Figure 3, electricity savings can be achieved at costs well below those of building new generation, resulting in lower electricity bills for homes and businesses. Not surprisingly, investments in cost effective energy efficiency could save Virginia businesses \$531 million in 2020 alone.²²

Furthermore, with technological advances, wind power has become competitive with new natural gas plants in many parts of the country.^{23,24,25} Solar power also is cost 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.²⁶

Virginia has significant wind and solar resources at its disposal. A new Deutsche Bank report predicts that solar power will be cheaper than average retail electricity prices in the commonwealth by 2016, meaning that next year, Virginia homeowners and businesses will be able to save money by installing solar panels on their rooftops.²⁷ Fully developed offshore wind leases could power 700,000 Virginia homes and create as many as 11,600 career jobs in Virginia in the next two decades.²⁸ As coal and other fossil power become less and less competitive in the global marketplace, the Clean Power Plan can help bring economic development to Virginia by spurring cheaper, cleaner sources of energy.

FIGURE 1. VIRGINIA'S ELECTRICITY GENERATION SOURCES (2001–2013)



Source: Energy Information Administration

FIGURE 2. VIRGINIA'S ENERGY EFFICIENCY

Comparison to the 10 states with the highest energy efficiency rates. Virginia ranked 47th as of 2013.

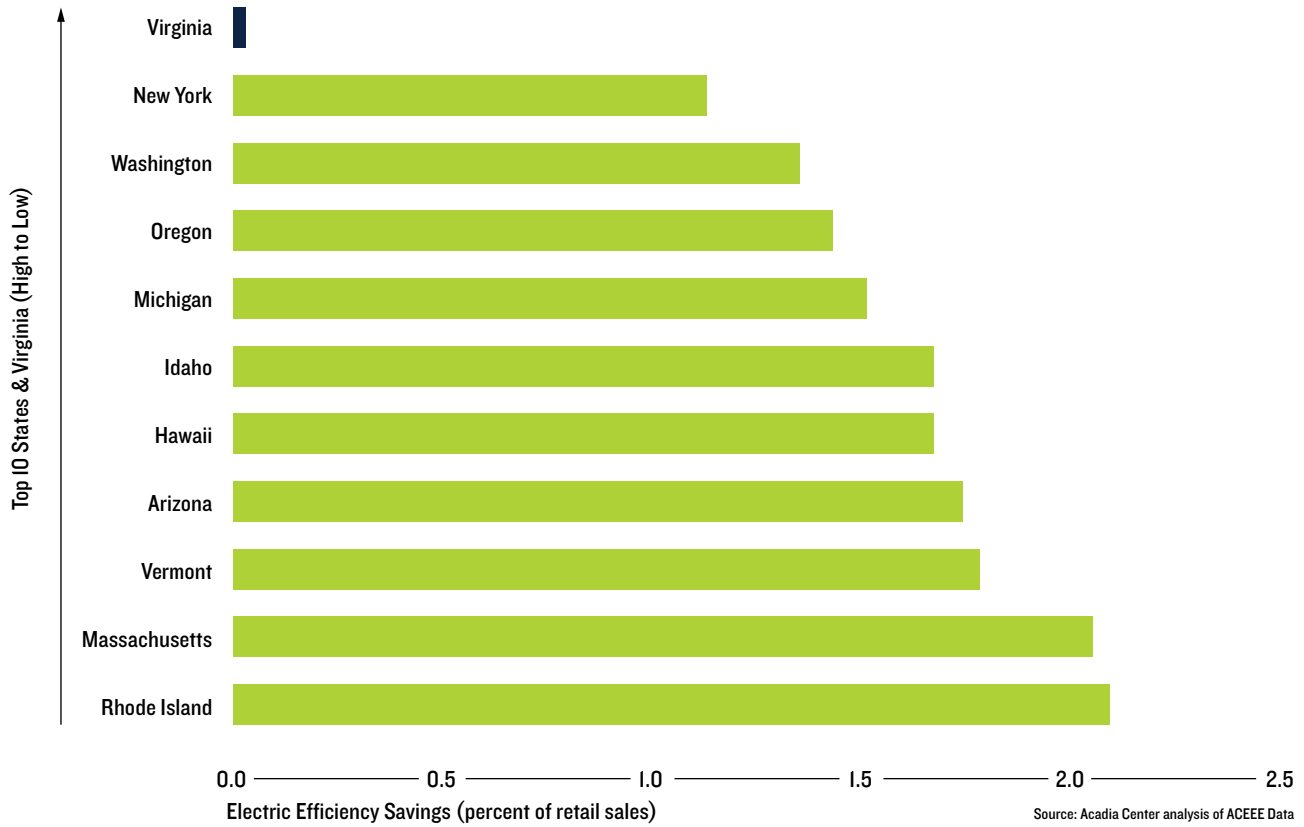
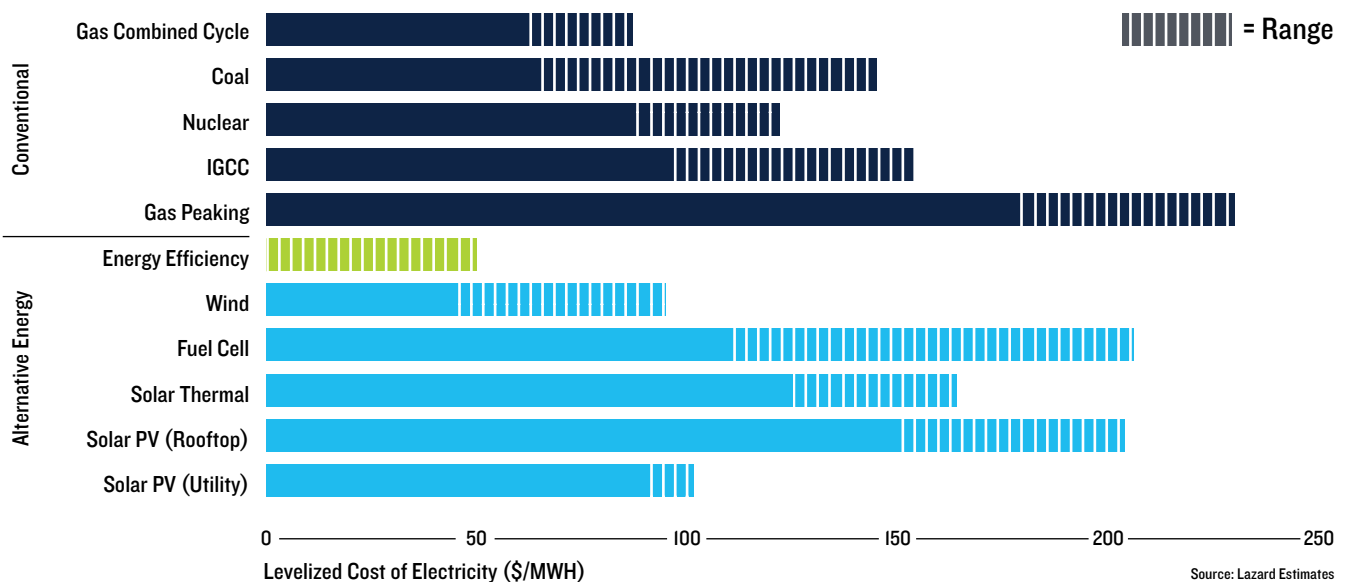


FIGURE 3. COSTS OF ELECTRICITY GENERATION BY SOURCE (\$/MWH)

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



A CLEAN ENERGY FUTURE FOR VIRGINIA

Virginia’s emissions rate target can easily be achieved, thanks in part to already planned power plant retirements and conversions that have been reviewed and approved by the State Corporation Commission. These reductions bring Virginia *almost 80 percent of the way* to reaching the EPA’s Clean Power Plan target.

Virginia could achieve the remaining reductions required through any number of measures, including by meeting just a part of the Commonwealth’s existing efficiency and renewables goals. Indeed, if the state were to meet its already existing voluntary goals—reaching 15 percent of generation from renewable resources by 2025 and decreasing consumption 10 percent through energy efficiency programs by 2022—the state would actually beat the EPA’s emission reductions targets by 20 percent (see Figure 4).

Pollution-free resources like wind and solar would allow even more flexibility for Virginia’s generation fleet under the state’s pollution target and would provide a buffer against potential fuel price volatility. Virginia could also take advantage of strong wind resources in neighboring states to further reduce costs and improve reliability. **Investment in energy efficiency and renewable energy is the key to Virginia’s pollution reductions and clean energy future.**

STATES CAN CHOOSE FROM A RANGE OF POLICY APPROACHES

A smart, effective, and forward-looking Virginia plan can help reduce economic 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 the most economic and environmental benefits as they cut carbon pollution.

CONCLUSION

Virginia’s leaders have an opportunity to create a clean energy economy for the state. Under the proposed Clean Power Plan, states have the flexibility to design their own best, most cost-effective plan to cut carbon pollution. Energy efficiency is the lowest-cost resource Virginia can use to cut carbon pollution and create thousands of new, home-grown jobs.

The Clean Power Plan also provides states the option to pursue partnerships with other states to help reduce carbon pollution in the most efficient ways possible. Regional approaches, by creating a larger clean energy marketplace, present a number of potential advantages over a single-state plan, such as increased consumer savings and further reductions in compliance costs.

Virginia’s energy future rests in its hands. The Clean Power Plan is Virginia’s opportunity to improve public health, foster new economic development, and help stabilize our climate.

FIGURE 4. ONE VIRGINIA PATHWAY TO CUT CARBON POLLUTION

The dashed line represents Virginia’s carbon pollution reduction target of 810 lbs CO₂/MWh.

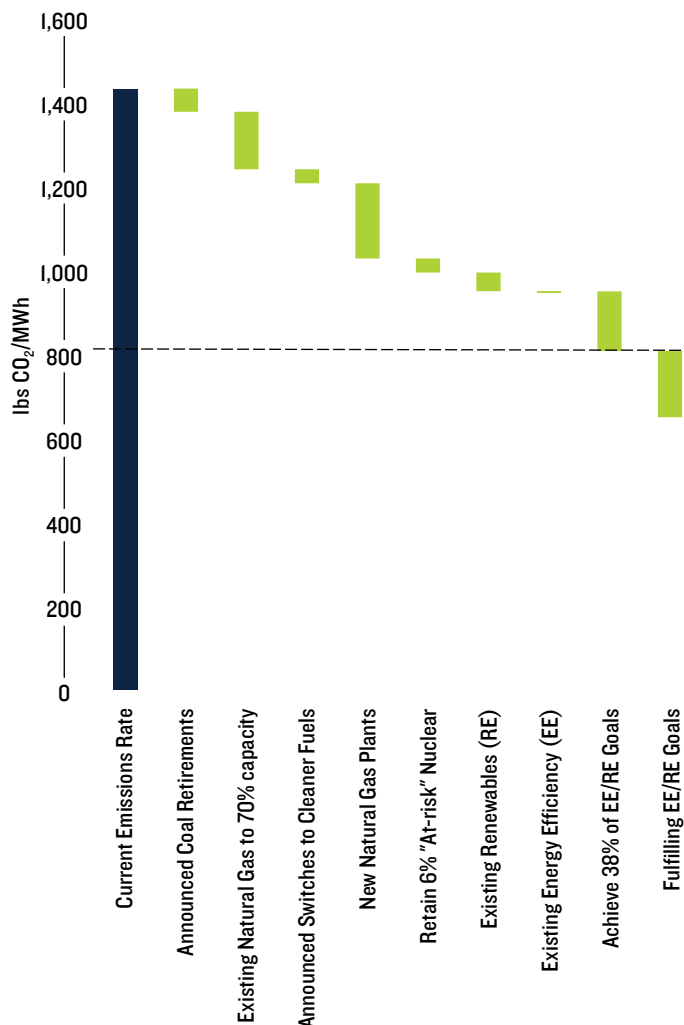


TABLE I. STATE POLICY OPTIONS FOR CLEAN POWER PLAN COMPLIANCE.

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:	<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"> 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 			

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