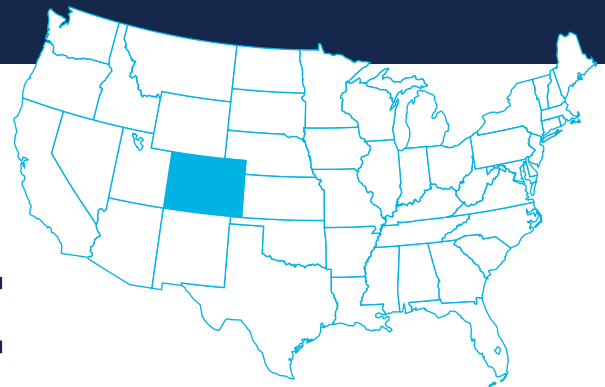




ISSUE BRIEF

COLORADO'S CLEAN ENERGY FUTURE



Opportunities to Cut Carbon Pollution Under the Clean Power Plan

Colorado 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 Colorado to realize more clean energy growth in the coming years is through the U.S. Environmental Protection Agency's Clean Power Plan. Colorado 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 Coloradans health and communities, bringing stronger storms, harsher droughts, and rising temperatures—a point brought home by recent 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 being felt today, and worsening in every region of the United States.

Climate change will hurt Colorado's economy. Lower snowfall could cost the state \$150 million annually in tourism revenue and eliminate 1,900 jobs.² Moreover, recovery from climate-related disasters in 2012 cost American taxpayers more than \$100 billion.³ Coloradans paid an estimated \$1.5 billion in federal taxes to clean up extreme weather events, or \$1,100 per taxpayer, in 2012.⁴ Coloradans understand that climate change is already affecting their health, communities, and economy. In fact, a new bipartisan poll found that 65 percent of Coloradans polled were seriously concerned about climate change, and more than 79 percent considered air pollution in the state a serious problem.⁵

OVERVIEW OF 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 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 now. On June 2, 2014, the EPA proposed the Clean Power Plan, which sets the first-ever standards limiting carbon pollution. Nationwide, 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.⁶

Nationwide, the Clean Power Plan can usher in climate and health benefits worth an estimated \$55 billion to \$93 billion in the year in 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 2030.⁷ 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.⁸

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.

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.

COLORADO'S CARBON POLLUTION TARGET

Every state, Colorado 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 initial plans to meet its pollution target. Investing in energy efficiency and renewable wind and solar power should be a fundamental part of Colorado'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 Colorado is being asked to reduce its pollution intensity 35 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 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; and 4) increasing energy efficiency (cutting energy waste) in homes and buildings and 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 using any combination of policies and resources. The Clean Power Plan puts Colorado in the driver's seat, with flexibility to design a plan based on our energy mix and costs, to chart a low-carbon path forward.

LESS POLLUTION, MORE JOBS, LOWER ELECTRIC BILLS

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 **Colorado would see the creation of 2,700 new jobs** and that the state's households and businesses would **save \$62 million on their electric bills** in 2020.^{9,10}

GRID RELIABILITY IN COLORADO

In the 40 years since the Clean Air Act passed, our country has been able to dramatically reduce pollution while keeping the lights on and costs low. Grid operators 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 15 percent reduction in carbon pollution from power plants.¹¹ Increases in energy efficiency and renewable energy have displaced fossil generation, while lower-cost natural gas generation increasingly has 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 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.¹² 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.¹³ This means that wind and solar need less backup generation than fossil-fuel or nuclear sources. Thanks to management, planning, and improving grid technologies, Colorado can cut pollution, increase energy efficiency, and add renewable energy capacity while maintaining a strong and reliable electric grid.

THE ELECTRICITY SECTOR IN COLORADO TODAY

Figure 1 shows that in 2012 a significant majority—65.7 percent—of Colorado’s electric power came from coal.¹⁴ In 2012 the state spent \$670 million on coal for electricity generation and another \$360 million on gas and fuel.¹⁵ The rest of the state’s generation came from natural gas (20.0 percent), non-hydro renewable sources (11.7 percent), and hydroelectric power (2.9 percent). Around 97 percent of the renewable energy currently generated in the state comes from wind (11.4 percent total).¹⁶ Renewable energy, while

still a small fraction of the total, has grown steadily in recent years, spurred by falling costs and by the Colorado renewable energy standard, which requires a specific percentage of power to be generated from clean sources like wind and solar.

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. Energy efficiency is the lowest-cost “resource,” compared with the costs of building new electricity generation, because

FIGURE 1. COLORADO’S ELECTRICITY GENERATION SOURCES (2001–2013)

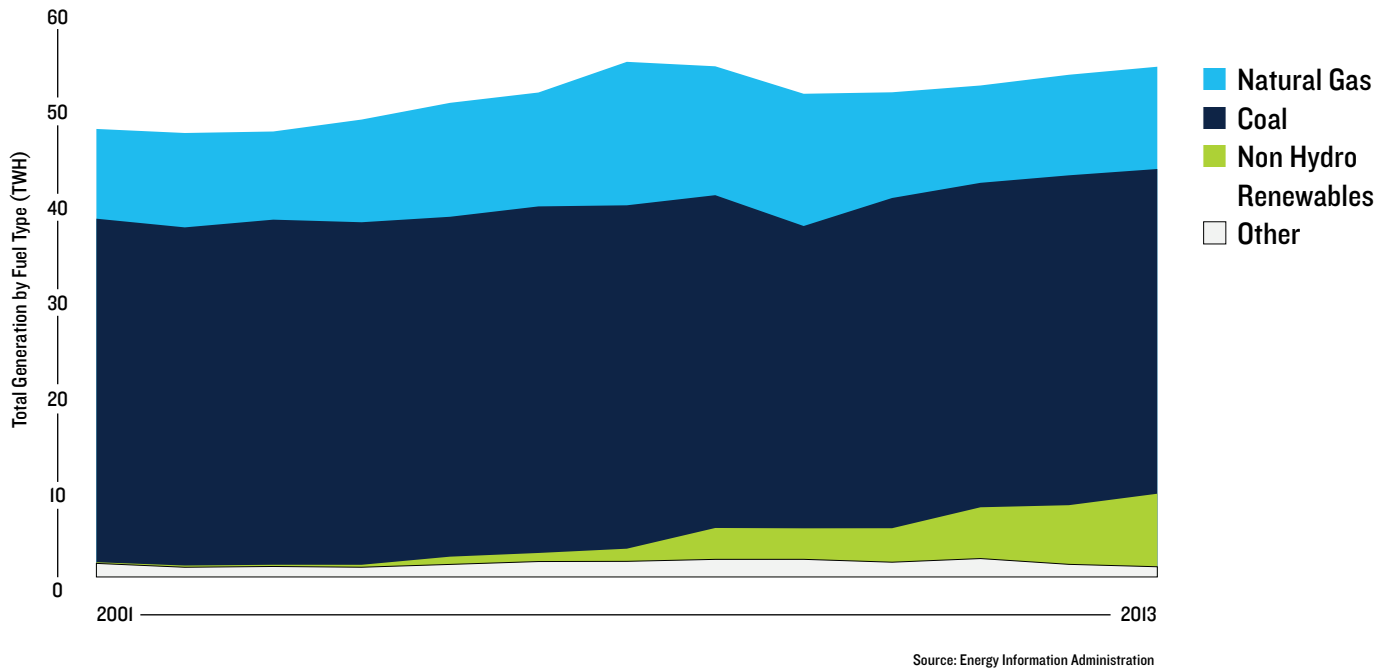
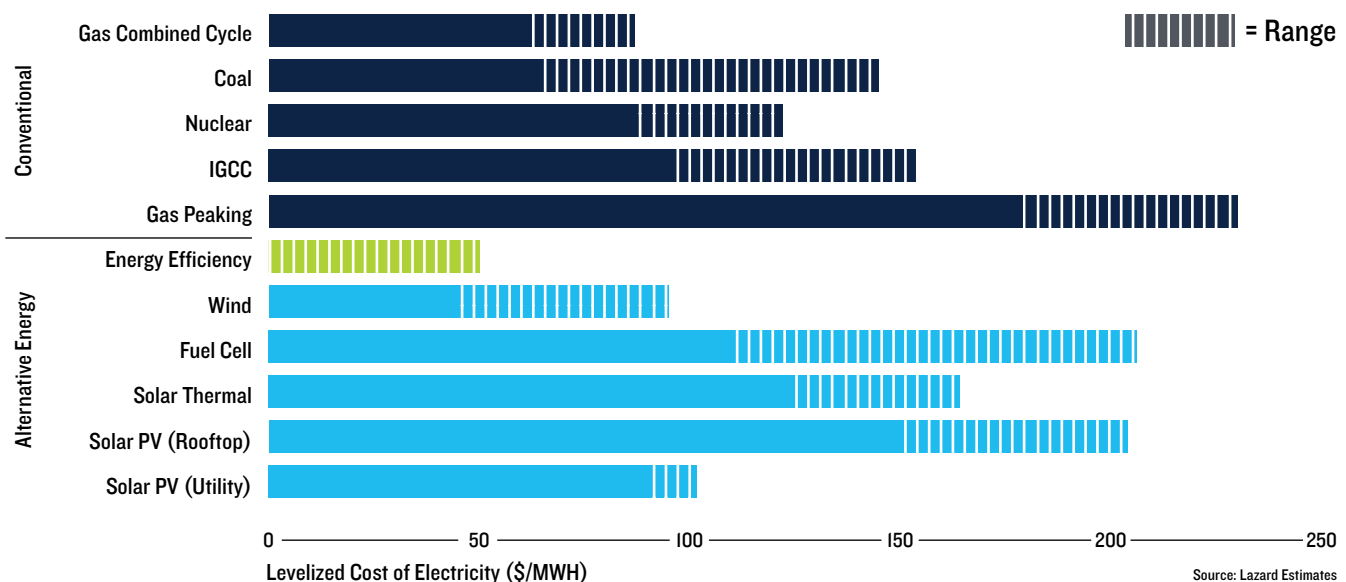


FIGURE 2: COSTS OF ELECTRICITY GENERATION BY SOURCE (\$/MWH)

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



reducing electricity use while providing the same level of comfort eliminates the need for new power plants and their pollution. Investing in efficiency programs to help customers save energy is also competitive with the fuel costs of natural gas power plants and results in lower retail electricity bills for homes and businesses.¹⁷

With technological advances and taller wind turbines that have improved performance, wind power has become competitive with new natural gas plants, and Colorado has some of the best wind resources in the country.^{18,19} Xcel Energy recently proposed, and received approval from the Colorado Public Utility Commission, to buy more wind than required by the state’s renewable portfolio standard (RPS) because it was cheaper than existing gas.²⁰ Solar power also is becoming increasingly competitive as a result of rapidly declining costs for solar panels, and most analysts expect this cost decline to continue over the next decade.²¹ A recent Deutsche Bank report predicts that solar power will be cheaper than average retail electricity prices in Colorado by 2016, even without the support of the Investment Tax Credit.²²

Colorado has very strong renewable energy potential, and state policies have helped utilities begin to develop this potential. Colorado was the first state to pass a voter-approved renewable portfolio standard. After recent amendments, the RPS is now set at 30 percent for investor-

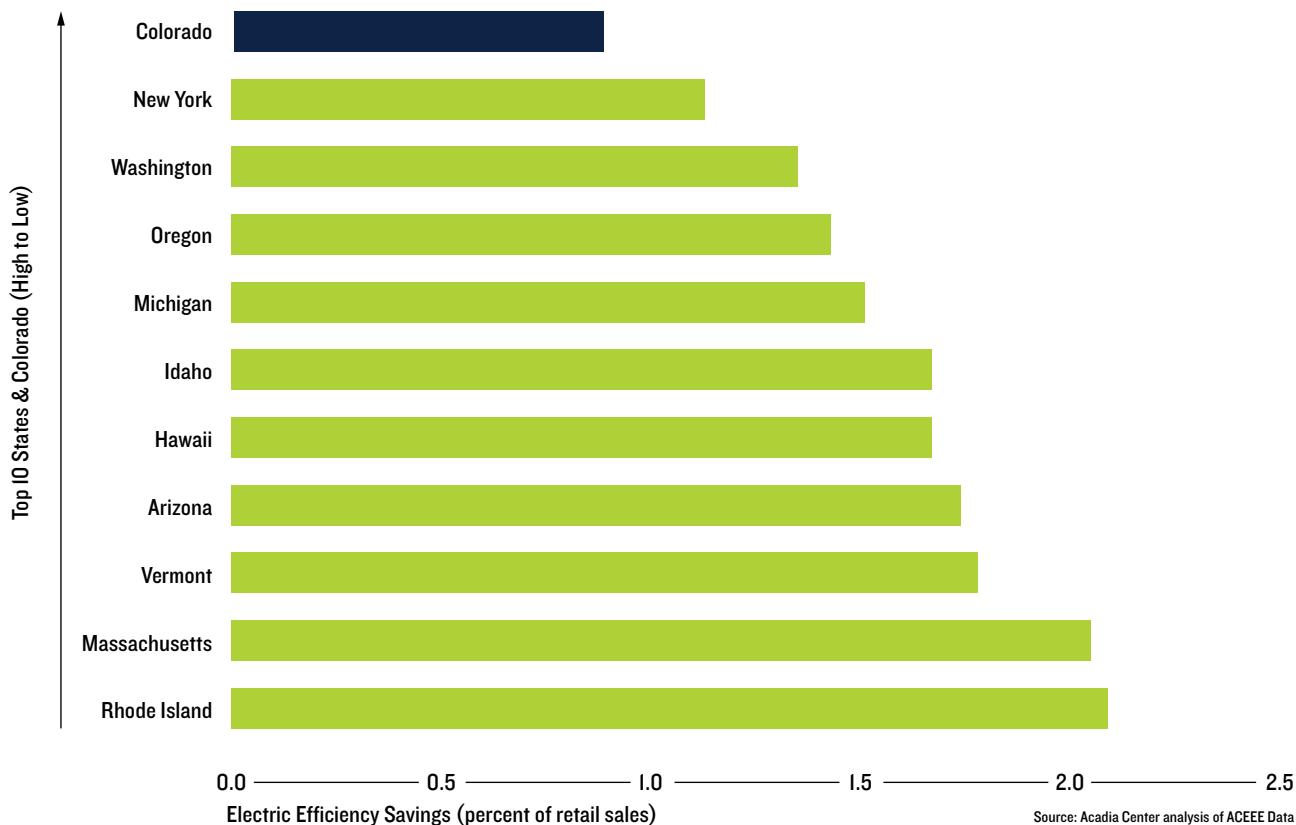
owned utilities and 20 percent for electric cooperatives by 2020—the second-highest standard in the nation.²³

Colorado also has strong energy efficiency standards, but utility investment and performance have not yet reached the high bar set by the standards. The state’s energy efficiency resource standard (EERS) requires an increase in annual energy savings from 0.8 percent in 2011 to 1.35 percent in 2015 to 1.6 percent in 2020.²⁴ Unfortunately, the Colorado Public Utilities Commission flattened investment in energy efficiency last year, and the state is falling behind on its requirements. As shown in Figure 3, Colorado is still well behind the top 10 states for annual energy savings, ranking 18th in the nation in 2013.²⁵ And compared to western states, Colorado trails Washington, Oregon, Idaho, and Arizona on energy savings. Colorado can and should improve its energy efficiency performance and better capitalize on this fast, cheap, and clean energy resource.

Xcel Energy, Black Hills Energy, Tristate Generation, and other utility companies are already running demand-side efficiency programs to cut energy waste in homes and businesses. Expanding these programs could increase customer savings while offering a no-regrets opportunity to speed pollution reductions now. Xcel Energy and Black Hills Energy spent \$332 million on demand-side management programs between 2009 and 2013, offering more than 30 residential and commercial rebate plans, along with home

FIGURE 3. COLORADO'S ENERGY EFFICIENCY RATE

Comparison to the 10 states with the highest energy efficiency rates. Colorado ranked 18th as of 2013.



weatherization and commercial design assistance.²⁶ These programs saved 1.6 million MWh each year, resulting in a total net benefit for customers of \$950 million. Customers save nearly \$3 on their bill for every \$1 invested in Xcel's and Black Hills' energy efficiency programs.²⁷ For 2015, the estimated energy savings from all investor-owned utility energy efficiency programs is approximately 1 percent of retail sales.²⁸ However, there are no energy efficiency program requirements for municipal utilities or rural electric cooperatives. Of the 26 electric cooperatives and 29 municipal utilities in Colorado, only five electric associations and five municipal utilities have demand-side management programs.²⁹

A CLEAN ENERGY FUTURE FOR COLORADO

Colorado's clean energy policies have put the state well on its way to meeting its carbon pollution reduction target under the EPA proposal. With the state's existing policies, Colorado utilities are already on track to meet 75 percent of the reductions required by the EPA target. Full implementation of the state's energy efficiency standards can also help Colorado achieve emissions reductions of about twice what the EPA assumed possible from energy efficiency.³⁰ The state's continued recognition of the importance of clean energy positions the state for success while saving consumers money on their bills, creating jobs, and spurring the local economy.

Colorado can and should continue its leadership in renewable energy, and it has the potential to increase its commitment to energy efficiency development.

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

STATES CAN CHOOSE FROM A RANGE OF POLICY APPROACHES

A smart, effective, and forward-looking Colorado 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.

CONCLUSION

Colorado'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. In the coming years, Colorado will develop a plan to further reduce emissions from its power plant fleet. Colorado has already experienced excellent growth in renewable energy, and energy efficiency is the lowest-cost resource the state can use to both 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 reduce carbon pollution. Colorado may benefit from developing a plan that can be linked with neighboring states. A regional approach presents a number of potential advantages over a single-state plan, such as consumer savings, reduced compliance costs, increased flexibility, and avoided electricity market distortions. Unlike discussions in previous years regarding a regional carbon reduction plan, the Clean Power Plan will provide certainty that every state must act to reduce its carbon pollution by a specific amount.

Colorado's energy future rests in its hands. The Clean Power Plan presents the state with the opportunity to improve public health, foster new economic development, and help stabilize the climate.

TABLE 1. 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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