Union of oncerned Scientists

FACT SHEET

HIGHLIGHTS

The Clean Power Plan presents a historic opportunity to reduce global warming pollution from the U.S. electricity sector. The plan sets state-specific targets for cutting power plant carbon pollution, leading to a nationwide reduction of approximately 32 percent below 2005 levels by 2030. It also provides a valuable near-term opportunity to accelerate the transition to a clean energy future—already under way in New Mexico by spurring investment in greater amounts of renewable energy and energy efficiency.

New analysis by the Union of Concerned Scientists shows that strengthening New Mexico's clean energy policies, together with a robust carbon emissions trading program, provides a cost-effective pathway for the state to not only cut global warming emissions but also deliver significant health and economic benefits for all of its residents.

Meeting the Clean Power Plan in New Mexico

A Robust Pathway for Securing a Clean Energy Future

The Clean Power Plan (CPP), finalized in August 2015 by the U.S. Environmental Protection Agency (EPA), sets the nation's first-ever limits on carbon dioxide (CO₂) emissions—the primary contributor to global warming—from power plants (see Box 1, p. 3). Each state is assigned its own goal for reducing such emissions, and New Mexico's is 4.1 million tons, or 24 percent below 2012 levels, by 2030 (EPA 2015a). New Mexico is well positioned to meet this target, given its current transition from coal generation to clean energy.

New analysis by the Union of Concerned Scientists shows an accelerated transition—based on stronger renewable energy and energy efficiency policies together with a vigorous carbon emissions trading program-constitutes a costeffective pathway, or what we call a "Clean Path Case," for New Mexico. This course toward a clean energy future will not only help cut global warming emissions but also reap significant health and economic benefits for all New Mexicans. For example, our Clean Path Case will:

- Yield 2,400 megawatts (MW) of new wind and solar capacity by 2030, which could stimulate more than \$2.7 billion in capital investments¹
- Reduce the typical household's electricity costs by 4.3 percent in 2030 compared with a Reference Case, resulting in annual savings of about \$33
- Generate \$115 million in average annual revenue during the 2022 to 2030 period from the sale of carbon allowances
- Provide health and economic benefits through 2030—by decreasing CO₂, sulfur dioxide (SO₂), and nitrogen oxides (NO₂) pollution—worth some \$223 million cumulatively



New Mexico has developed 1,080 MW of wind power, including the 50 MW Macho Springs facility (above) in Luna County, and has another 330 MW under construction. Increased renewable energy development will help the state meet Clean Power Plan targets while also generating economic benefits.

New Mexico's Clean Energy Transition

Carbon-intensive fossil fuels currently dominate the power sector of New Mexico; in 2014, 63 percent of the state's electricity generation came from coal and nearly 28 percent from natural gas (EIA 2015a). Most of the state's remaining generation (nearly 9 percent) was provided by renewable energy sources such as wind, solar, and geothermal (EIA 2015a).

Though still accounting for most of the state's electricity generation, the dominance of New Mexico's aging and inefficient coal power plants, as in many other states, is in decline. Insufficient pollution controls to protect public health, and serious economic competition from cleaner, lower-cost resources such as renewable energy and natural gas, are leading to coal plant retirements across the country (Cassar 2015). In New Mexico, three coal generators at the Four Corners Generating Station were closed in 2013, and an additional two coal generators at the San Juan Generating Station are expected to retire in 2017 (SNL Financial 2015). Moreover, regulators will review two remaining coal units at the San Juan plant by 2018 to determine whether they should also be shut down after 2022 and replaced with cleaner energy sources (Walton 2015).

As New Mexico slowly moves away from coal, investments in the state's renewable energy resources are increasing. In 2014, New Mexico ranked 10th in the nation for cumulative installed solar capacity, with more than 150 MW coming online in the 2012–2014 period alone (SEIA 2015). New Mexico has also developed 1,080 MW of wind power and has another 330 MW under construction (AWEA 2016).

All this development activity has largely been spurred by New Mexico's renewable portfolio standard (RPS)—

a requirement that utilities derive 20 percent of their power from renewable sources by 2020. Twenty-eight other states have also adopted RPS policies, which have proven to be one of the most successful and cost-effective means for stimulating renewable energy growth in the United States (Heeter et al. 2014).

New Mexico has also promoted energy efficiency in homes, businesses, and industry as another effective and affordable strategy for shifting from carbon-intensive fossil fuels. In 2014, efficiency investments in the state successfully lowered retail electricity sales by 0.54 percent (Gilleo et al. 2015). This effort was driven largely by an important state commitment: New Mexico's adoption of an energy efficiency resource standard (EERS) in 2008. Updated in 2013, the EERS requires electricity providers to implement efficiency programs that reduce electricity demand 10 percent below 2005 levels by 2020 (Gilleo et al. 2015).

Though still accounting for most of the state's electricity generation, the dominance of New Mexico's aging and inefficient coal power plants, as in many other states, is in decline.



Nearly two-thirds of New Mexico's power is generated from coal, but cleaner and less expensive renewable energy and natural gas will comprise a growing percentage of the state's electricity mix as aging, inefficient coal plants retire (including two of the four units at the San Juan Generating Station, above).

How New Mexico Can Meet Its Clean Power Plan Goals

Under the CPP, New Mexico's 2030 target is for the state's power sector (old and new power plants combined) to produce total emissions in that year that are 24 percent lower than in the baseline year of 2012. In terms of mass, this overall target translates into a series of targets: 14.3 million tons² per year on average in the interim period from 2022 through 2029, and 13.2 million tons in 2030 (EPA 2015b).

New Mexico is well positioned to cost-effectively achieve its overall target by investing in many of the CPP's carbon-reduction options (as described in Box 1) and by participating with other states in a well-designed emissions trading program. Administering such a program by auctioning off emission allowances would also allow New Mexico to generate revenues that could be used to benefit all of its residents. Further, by complementing its CPP compliance plan with strengthened policies that support renewable energy and energy efficiency, New Mexico could accelerate its clean energy transition while increasing consumer, economic, and public health benefits.



Home energy performance contractors prepare to air seal and insulate a single-family home. A CPP compliance plan that prioritizes efficiency efforts such as this can benefit all New Mexico residents.

The Union of Concerned Scientists examined the likely economic and environmental impacts of New Mexico's compliance with the CPP by modeling the above combination of robust policies. We found that this approach, called the

вох 1

The Clean Power Plan

The CPP, developed by the EPA under the authority of the federal Clean Air Act, aims to reduce CO₂ emissions from the U.S. electricity sector—the nation's largest contributor to such global warming emissions—by an estimated 32 percent below 2005 levels by 2030. The EPA set differing targets among the states, however, because each state has a unique mix of electricity generation resources—and also because local technological feasibility, cost, and emissions-reduction potential vary across the country.

The plan provides a number of options for cutting carbon emissions so that each state can develop a compliance strategy most suited to its own electricity-supply mix, resource availability, and policy objectives. These options include investing in renewable energy, energy efficiency, natural gas, or nuclear power, while shifting from coal-fired power. States are free to combine these carbon-reduction options in a flexible manner to meet their targets. States can also join together in multistate or regional agreements to find the lowest-cost options for reducing their CO_2 emissions, including through emissions trading programs.

The EPA has given states a choice between a rate-based emissions target (measured in pounds of ${\rm CO_2}$ per mega-

watt-hour of electricity generated) and a mass-based target (measured in short tons of CO₂ emitted by generating units). To avoid undermining the environmental integrity of the target, states must also address the potential for "leakage," or emissions that might arise because of a shift from existing to new fossil fuel-fired power plants (which are not covered under the CPP). One way that the EPA suggests the states should address leakage is through the adoption of a massbased target with a "new-source complement," which represents an increase in a state's emissions target based on an estimate of new power plants required to meet additional electricity demand after 2012. A mass-based target that includes CO₂ emissions from both new and existing power plants is the most straightforward way of bringing all power plants under an emissions cap and ensuring an accurate accounting of the emissions that contribute to climate change.

States must submit a final compliance plan, or an initial plan with a request for an extension of up to two years, by September 6, 2016. However, a February 2016 Supreme Court ruling put a stay on CPP implementation until legal challenges to the rule have been resolved. States may continue to develop their compliance plans in the interim.

Complementary Clean Energy Compliance Pathway, or "Clean Path Case," provides greater environmental, economic, and health benefits for the state, as compared with each of two other scenarios: a "Reference Case," in which no new state or federal policies (including the CPP) are implemented beyond those in place as of October 2015; and a Clean Power Plan Compliance Pathway, or "CPP Only Case," that includes interstate trading of allowances but no additional complementary renewable energy and energy efficiency policies (see Box 2, p. 7, for more details on our methods and assumptions).

Clean Path Case Accelerates New Mexico's Transition to Low-carbon Electricity

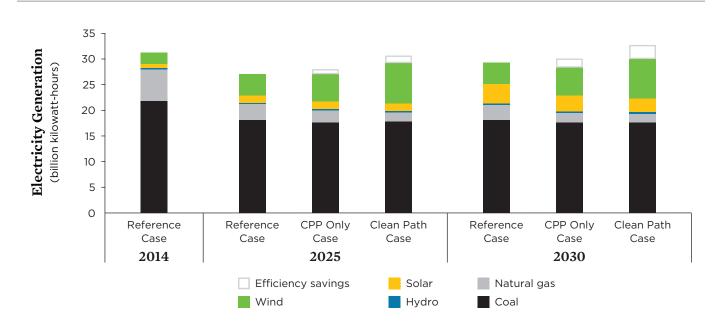
With the CPP and stronger renewable energy and energy efficiency policies to complement it, New Mexico can accelerate its shift toward cleaner, low-carbon energy resources. Indeed, even under the Reference Case scenario, New Mexico continues to reduce its dependence on coal-fired power generation, which is 17 percent lower in 2030 than in 2014 (Figure 1). Natural gas–fired power generation also decreases by more than 50 percent under the Reference Case from the reduced use of less competitive natural gas plants. Renewable

energy generation—led by wind and solar power—increase to 27 percent of generation by 2030 as power suppliers fulfill and eventually surpass the state's existing RPS policy. However, New Mexico's electricity exports under the Reference Case decrease by 84 percent in 2030, representing a substantial loss in revenue for the state's power industry.³

By contrast, both the CPP Only Case and the Clean Path Case result in cleaner, more diversified generation mixes. Under the CPP Only Case, renewable energy accounts for more than 30 percent of the power supply in 2030, while savings from energy efficiency investments are equivalent to 7 percent of total electricity sales in that year.

Even greater clean energy deployment occurs under the Clean Path Case, spurred by the stronger RPS and EERS policies combined with the CPP. By 2030, energy efficiency savings reach 11.4 percent of total electricity sales, while wind and solar power combine to supply nearly 35 percent of New Mexico's total generation.⁴ Relative to the Reference Case, generation from coal and natural gas plants are 2 percent and 43 percent lower in 2030, respectively. Further, as a result of its increased renewable energy and energy efficiency investments, New Mexico is able to largely preserve its status as an electricity exporter while retaining much of the revenue that export sales provide. Compared with the Reference Case, electricity

FIGURE 1. The Clean Path Case Diversifies New Mexico's Electricity Mix



Compliance with the Clean Power Plan, complemented by renewable energy and energy efficiency policies—constituting the "Clean Path Case"—helps New Mexico build a more diversified portfolio of clean energy resources and achieve a quicker transition from coal and natural gas.

The Clean Path Case cumulatively drives more than \$2.7 billion in renewable energy investments in New Mexico, as well as \$766 million in energy efficiency improvements.

exports under the Clean Path Case are 3.2 times as much by 2030, though they are still 32 percent lower than 2014 levels.

To provide for the wind and solar generation under the Clean Path Case, New Mexico builds 1,333 MW of wind capacity and more than 1,000 MW of solar capacity above current levels by 2030, including 766 MW of rooftop solar on homes and businesses. By 2030, the Clean Path Case cumulatively drives more than \$2.7 billion⁵ in renewable energy investments in New Mexico, as well as \$766 million in energy efficiency improvements.

A Cleaner Energy Supply Is Affordable

The clean energy growth in New Mexico spurred by the Clean Path Case is not only achievable but also affordable. The Clean Path Case policies (which focus on new renewable energy projects, energy efficiency programs, and a price on carbon) even lead to very modest customer savings over the Reference Case over the forecast period. The average monthly electricity bill for a typical household under the Clean Path Case is 1.7 percent lower than in the Reference Case in 2022, amounting to an annual savings of about \$13. And although monthly bill savings under the Clean Path Case are less by 2025 (0.4 percent decrease, or approximately \$3 per year), the case soon returns to stronger consumer savings.

Compared with the Reference Case, the Clean Path Case's energy policies ultimately lead to 4.3 percent lower electricity bills by 2030 for a typical residential customer, or \$33 in savings that year (Figure 2, p. 6). This is because (a) the cost to operate most renewable energy facilities is much lower than that of fossil fuel plants, (b) energy-efficient buildings and appliances cost less to operate, and (c) more renewable energy and efficiency helps diversify the electricity mix and limit the potential impacts from increases in natural gas prices. Also, the Clean Path Case leads to an average annual consumer electricity-bill savings of 5.3 percent compared with the CPP Only Case from 2022 to 2030, primarily as a result of greater investments in energy efficiency from a stronger EERS.

In our analysis of the three cases, we also examined some of the broader financial impacts on the electricity system in

New Mexico—including net effects on electricity bills for all customer classes, investments by participants in energy efficiency programs, and net costs for power generators and distributors. In 2022, there is a net cost of \$8 million, or 0.4 percent of total electricity system costs, to implement the policies outlined in the Clean Path Case (as compared with the Reference Case). But, as in the residential example above, these policies generate financial savings over time and ultimately pay for themselves. In 2030, the net savings are more than \$33 million—a decrease of 1.4 percent in total electricity system costs—and these savings continue to grow, substantially, in the years that follow.

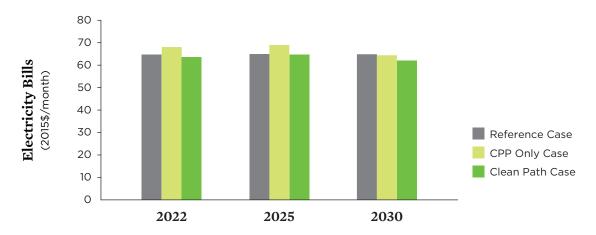
Our analysis also shows that a national mass-based emissions trading program with auctioned allowances would help New Mexico generate significant revenues. By setting a carbon cap and issuing allowances equal to its CPP targets, auctioning those allowances, and participating in an interstate carbon trading program, New Mexico could generate average annual revenues of \$115 million per year from 2022 to 2030 under the Clean Path Case. These revenues could be used to further reduce consumer electricity bills or be reinvested for the benefit of the state's residents. Investment options could include: additional deployment of renewable



These solar-panel canopies, which provide shade for parked vehicles and generate electricity for the VA Medical Complex in Albuquerque, are just one way in which New Mexico is reaping the benefits of solar power. Accelerating the growth of renewable energy to help meet the state's emissions reduction targets could stimulate more than \$2.7 billion in capital investments by 2030, according to UCS analysis.

Meeting the Clean Power Plan in New Mexico

FIGURE 2. Clean Energy Saves New Mexico Residents Money



The Clean Path Case leads to consumer electricity bills in 2030 that are 4.3 percent lower on average than in the Reference Case. Energy efficiency helps consumers save electricity, and more renewable energy helps diversify the electricity mix and limit potential impacts from increases in natural gas prices. Because of greater investments in energy efficiency from a stronger EERS, the Clean Path Case results in average annual consumer electricity-bill savings of 5.3 percent, compared with the CPP Only Case, throughout the forecast period.⁶

energy and energy efficiency resources; power grid infrastructure improvements; climate-resilient water resource planning; assistance to communities to address issues of environmental justice and equity; and worker training and other economic-transition support for communities adversely affected by the state's shift from coal.

Public Health and Economic Benefits from Less Pollution

Under both the CPP Only Case and the Clean Path Case, New Mexico fully achieves its interim and final CO_2 emissions-reduction requirements set by the CPP. These two policy cases also help cut other air pollutants, including SO_2 and NO_x . Under both cases, in 2030 the SO_2 and NO_x emissions are projected to be nearly 3 percent lower than in the Reference Case.

Reducing NO_x , SO_2 , and CO_2 emissions leads to tangible health and economic benefits. NO_x and SO_2 are contributors to smog and soot, which exacerbate asthma and other heart and lung diseases and can result in significant disability and premature death from such causes (EPA n.d.). CO_2 emissions contribute to global warming, which leads to extreme weather such as heat waves, droughts, and heavy downpours, and to other climate impacts including more frequent and destructive wildfires that can impair human health and safety.

Using the same methodology applied by the EPA in its impact assessment for the CPP, we estimated the monetary savings from reducing these pollutants. The combined carbon and health benefits of the avoided emissions of ${\rm CO}_2$, ${\rm SO}_2$, and ${\rm NO}_x$ under the Clean Path Case are valued at \$28 million on average each year from 2015 to 2030. This annual benefit adds up to a total of \$223 million for the entire time period, which is nearly five times greater than the total cumulative electric-system costs (\$49 million) of complying with the Clean Path Case policies.

To fully benefit state residents, New Mexico stakeholders should create a CPP compliance plan that not only prioritizes energy efficiency and renewables, but also generates revenue through interstate carbon emissions trading. BOX 2

Methodology

We used a modified version of the Regional Energy Deployment System (ReEDS)-a power-sector model developed by the National Renewable Energy Laboratory—to analyze various possible versions of New Mexico's compliance pathway. ReEDS determines through simulation the electricitysupply mix that would meet electricity demand in the future (through 2050) throughout the contiguous United States at the lowest overall system cost while meeting reliability, environmental, and other legal requirements. The assumptions in our version of the model are based on information used by the Energy Information Administration for the Annual Energy Outlook 2015 (EIA 2015b), supplemented by data from the recent Wind Vision and SunShot Vision studies (DOE 2015; DOE 2012). We also updated the model's data for existing power plants to include recent retirements and plants under construction (see the technical appendix, online at www. ucsusa.org/CleanPowerPlanNewMexico, for more information).

For this analysis, we first modeled a Reference Case with no new state or federal policies beyond those in place as of October 2015. Our Reference Case also does not include CPP compliance, which was finalized in August 2015. We then compared the Reference Case with two policy cases, each of which had achieved nationwide CPP compliance, and focused here on New Mexico-specific results. While the CPP offers "flexible" compliance options—i.e., a wide range of potential strategy mixes—for each state (see Box 1), for our analysis we investigated just these two sets of options for CPP compliance: a Clean Power Plan Compliance Pathway—or "CPP Only

Case"; and a Complementary Clean Energy Compliance Pathway—or "Clean Path Case."

For the CPP Only Case, we modeled the CPP mass-based targets including both existing and new fossil fuel-fired power plants (see the discussion on leakage in Box 1). We assumed that each state has the option to meet its CPP target by trading carbon allowances with any other state. We also assumed that all states, as part of their compliance strategy, invest in energy efficiency at a level that achieves an electricity-sales decrease of at least 1 percent per year from 2022 to 2030.9

The Clean Path Case includes the same elements as the CPP Only Case, but in addition it complements CPP compliance with policies that explicitly support renewable energy and energy efficiency.¹⁰ For New Mexico, we assumed that the state strengthens and extends its mandatory EERS and RPS in 2018 such that:

- Energy efficiency savings gradually increase until they reach 1.5 percent of statewide electricity sales per year in 2022 and each year thereafter
- Renewable generation (including hydro) accounts for nearly 24 percent of sales in 2022 and grows to 31 percent of sales in 2030

Under the Clean Path Case, we also assume that other states with policies to support renewable energy and energy efficiency will continue them and that a few states will add policies or expand their existing requirements.

Recommendations

Achieving the Clean Path Case's full range of benefits will require policy makers and regulators to work together with utilities, electricity generators, advocates, regional transmission organizations, and other stakeholders to develop a CPP compliance plan that prioritizes renewable energy and energy efficiency and generates revenue through interstate carbon emissions trading. Toward these ends, the Union of Concerned Scientists offers the following recommendations:

- 1. The New Mexico Environment Department (NMED) should develop a strong mass-based CPP compliance plan. The NMED has already begun a process for gathering public comments and information to aid in the creation of a compliance plan that works for the state. In building this plan, the NMED should prioritize
- renewable energy and energy efficiency, and it should develop a mass-based emissions trading program that includes both new and existing sources and allows for interstate trading of carbon allowances. A mass-based approach offers a lower administrative burden, has a long history of successful implementation, and provides the greatest certainty for true achievement of an emissions budget. Such an approach is also better able to incorporate additional carbon-mitigation efforts that must eventually be undertaken for other parts of the economy.
- The New Mexico legislature should authorize the state to auction carbon allowances as part of the NMED's emissions trading program. Revenues generated from the auctions should be directed toward programs that benefit all residents, reduce carbon emissions, and



With well-designed policies and careful planning and coordination, New Mexico can greatly increase its clean energy resources, cost-effectively comply with the emissions reductions required by the Clean Power Plan, and reap important economic and public health benefits in the process.

promote equitable approaches to transitioning to a low-carbon economy.

- 3. The New Mexico legislature should enact strong clean-energy policies. The legislature should extend and expand its current RPS, which is set to level off at 20 percent in 2020. Several states have committed to targets of at least 40 percent by 2030, a more credible goal for accelerating the clean energy transition. New Mexico's EERS should also be increased and extended beyond 2020 in conformance with leading EERS states, which require utilities to reduce electricity use by 1.5 to 2 percent each year.
- 4. New Mexico electricity providers should work to diversify their electricity portfolios, prioritizing lowcost renewables and efficiency. These steps will help cut consumer electricity bills and further curb harmful emissions from power plants.

With well-designed policies and careful planning and coordination, New Mexico could greatly enhance its clean energy resources, cost-effectively comply with the emissions reductions required by the Clean Power Plan, and reap important economic and public health benefits. And with a robust emissions trading program, New Mexico could generate significant carbon revenues that could be used to support high-quality jobs in renewable energy and energy efficiency, strengthen disadvantaged communities, make buildings and infrastructure more resilient, and boost economic development in regions dependent on the fossil fuel economy. These benefits would help ensure a sound and prosperous future for all New Mexicans.

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ENDNOTES

- 1. Unless otherwise indicated, all dollar amounts are expressed in 2015 dollars.
- 2. "Tons" in this document refers to the U.S. short ton (2,000 pounds).
- 3. The generation mix, including the levels of imported and exported electricity, are the result of the model's calculations for meeting electricity demand in New Mexico and across the country at least cost, subject to reliability and other constraints, based on assumptions described in our technical appendix, online at www.ucsusa.org/CleanPowerPlanNewMexico.
- 4. Note that these figures are for generation, not total electricity sales, as indicated by the RPS assumption in Box 2 (p. 7).
- 5. Assuming a 7 percent discount rate, based on recommendations outlined in OMB 2014.
- 6. Electricity costs in the Reference Case are based on the monthly consumption of 600 kilowatt-hours (kWh) for a typical residential nonelectric heating customer. In the CPP Only Case and Clean Path Case, average monthly consumption is lower in 2030 (560 kWh and 538 kWh, respectively) because of these cases' more extensive energy efficiency programs.
- 7. The health benefits are calculated from the Regional Particulate Matter $(PM_{2.5})$ Benefit per Ton Estimates reported in OAQPS 2015. See the technical appendix, online at www.ucsusa.org/CleanPowerPlanNewMexico, for values and additional information.
- 8. This is the net present value from 2022 through 2030 using a 7 percent discount rate, based on recommendations outlined in OMB 2014.
- 9. The energy efficiency assumption is a proxy for state or utility action; it is needed because the ReEDs model does not include choices on energy efficiency. States with stronger mandatory EERS policies are assumed to continue meeting their respective targets.
- 10. The CPP also includes a Clean Energy Incentive Program (CEIP), which offers states incentives for early development of renewable energy and energy efficiency. A portion of the generation that meets the RPS and EERS requirements we modeled in the Clean Path Case may qualify for the CEIP, but we did not model the impact of the program, or the benefits that early crediting would have on the cost-effectiveness of qualifying clean energy projects.

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