Committing to Renewables in New Mexico

Boosting the State's Economy, Generating Dividends for All

Union of Concerned Scientists

New Mexico is fast approaching an energy crossroads. As cheaper, cleaner, and more efficient resources come online, utilities are closing coal-fired power plants, long the state's primary source of electricity.

This presents an important opportunity for New Mexico to chart a new course and secure significant investments in wind, solar, and other renewable resources. Doing so can help New Mexico build a robust, diversified economic foundation that benefits everyone, including the residents of communities most affected by coal plant closures, for decades to come.

To help policymakers make smart decisions at this juncture, the Union of Concerned Scientists (UCS) has evaluated a commitment to steadily increasing New Mexico's renewable portfolio standard (RPS) from the current target of 20 percent by 2020 to 50 percent by 2030 and 80 percent by 2040. Renewable portfolio standards (also known as renewable electricity standards) are a proven, market-based policy tool that requires utilities to meet a growing share of their retail sales through renewable resources. UCS research finds that New Mexico can meet the strengthened goals reliably and cost-effectively and transition to significantly higher use of renewable energy sources.

Even in the absence of such a policy, our analysis *still* finds that renewables dominate the least-cost energy future. Why, then, does New Mexico need a stronger policy?

While the decline of the coal industry is inevitable, the mix of resources that will replace coal is not. Contrary to our compelling findings about renewables, some New Mexico utilities propose to lean heavily on natural gas and, in some cases, imported nuclear energy in the future—even when doing so goes against the best interests of consumers. Indeed, Public Service Company of New Mexico (PNM), the state's largest power provider, proposes to use and build much more natural gas capacity than is either necessary or cost-effective. That path threatens to lock New Mexico into greater dependence on natural gas generation, which, by replacing one fossil fuel with another, poses significant consumer, public health, and climate risks.

State legislators can defend against that threat by enacting strong policies committing New Mexico to a high-renewables future. Political leaders must act quickly and decisively to help ensure a smooth and beneficial clean energy transition.

New Mexico's Imminent Energy Transition

Energy is deeply engrained in New Mexico's economy. The state has a rich and diverse supply of energy resources, and it capitalizes on them. It ranks in the top 10 nationally for both oil and natural gas production, and it is the seventh-largest energy supplier for the nation overall (EIA 2017a). New Mexico also has significant uranium resources, and is home to two world-renowned research facilities: the US Department of Energy's Los Alamos National Laboratory and Sandia National Laboratories.

> ***While the decline of the coal industry is inevitable, the mix of resources that will replace coal is not.***

Historically, New Mexico's electric-power sector has been rooted in coal, which accounted for more than 70 percent of in-state electric power generation as recently as 2011. But economic competition from cleaner, lower-cost resources is forcing utilities to retire coal plants, as is happening across the country (Cassar 2015). In New Mexico, three of the five coal units at the Four Corners Generating Station closed in 2013. PNM is set to retire two coal units at the San Juan Generating Station at the end of 2017 (SNL 2015). It plans to close the San Juan plant's two remaining coal units in 2022. PNM expects to be completely free of coal generation by 2031 when its contract with the remaining coal units at Four Corners expires (PNM 2017). Those plans put the broader long-term future of the facility in doubt.

Cover photo: US Department of Energy

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Two of the four units at the San Juan Generating Station, located near Farmington, New Mexico, are slated be closed in 2017. PNM has discussed closing the remaining two units in 2022. As coal plants retire, utilities are deciding which energy investments to make to replace them.

This wholesale shift away from coal opens the door for other energy resources to take the lead in powering the state's economy. The key decision facing utility executives and policy-makers is whether to continue New Mexico's dependence on fossil fuels and nuclear or to prioritize the development of homegrown renewable energy instead.[1] The choice will profoundly affect consumers and the economy for years to come, given that investments in energy infrastructure typically last for decades.

Importantly, New Mexico, with some of the nation's best and most diverse renewable energy potential, has the resources for a large-scale build-out of renewables. A 2016 analysis by the National Renewable Energy Laboratory (NREL) found that the state could develop enough cost-competitive renewables to meet more than *260 percent* of its annual electricity sales, all at prices equal to or lower than the current price of electricity (Brown et al. 2016).[2] In addition, utilities and municipal energy providers—including developers outside the state—have proposed a slew of projects, highlighting the technical feasibility and affordability of developing local renewable resources. For example:

- Southwestern Public Service Company is slated to play a major role in a proposal by Xcel Energy, its parent company, to develop 1,230 megawatts (MW) of wind. The company projects that these wind projects, which would span the Texas-New Mexico border, could save the region's customers about $2.8 billion over 30 years (Xcel Energy n.d.).

- Early in 2017, Kit Carson Electric Cooperative, serving 30,000 members in northern New Mexico, cited favorable costs, environmental benefits, and community economic development opportunities when it announced a goal of serving its customers' electricity demand on sunny days with *100 percent* solar energy by 2022 (Kit Carson Electric Cooperative 2017).

- California-based Southern California Edison (SCE) and the Sacramento Municipal Utility District recently inked long-term deals to purchase more than 840 MW from three New Mexico wind facilities—more than doubling the state's total wind power capacity from 2015 levels (AWEA 2017). When completed in late 2017, SCE's $500 million El Cabo wind facility in central New Mexico will have a capacity of 298 MW and inject at least $1.5 million into the local economy each year from land-lease payments and payments in lieu of taxes (Iberdrola Renewables 2016).

1 *PNM proposes to increase its reliance on nuclear power by expanding procurements from Arizona's Palo Verde Nuclear Generating Station.*

2 *Data for economic potential come from Primary Case 3a in NREL's* Estimating Renewable Energy Economic Potential in the United States *(Brown et al. 2016). NREL calculated New Mexico's economic renewable energy resource potential as a subset of the state's overall technical resource potential. Economic potential compared the cost of developing renewables with the typical regional cost of electricity, in this case including a price for carbon dioxide emissions.*

Still, most of New Mexico's renewable energy resources remain untapped. Renewables accounted for just 14 percent of in-state generation in 2016, and last year New Mexico ranked 14th in the nation for total installed solar capacity and 17th for wind (SEIA/GTM 2017; AWEA 2017). And without stronger policies to guide them, major utilities are planning to overinvest in natural gas at the expense of renewables and ratepayers—including during the waning years of federal tax credits, which can provide a boost to renewable project development. For example, PNM's July 2017 integrated resource plan proposes large amounts of natural gas to back up its proposed renewables (PNM 2017).

The UCS analysis makes it clear that PNM's plan for full redundancy of natural gas for renewables is neither necessary nor cost-effective. Such a build-out could prolong dependence on natural gas or strand assets as significant investments go underused or sit idle—or they may even be abandoned should market forces or the implementation of low-carbon policies drive up the price of natural gas (Deyette et al. 2015). A policy-based commitment to clean energy can help New Mexico avoid this gamble on natural gas and its danger of precluding the shared benefits of renewables.

Renewable Portfolio Standards: A Powerful Policy Driver

The New Mexico legislature can ensure that power providers invest in a high-renewables future by strengthening the state's renewable portfolio standard, as proposed recently (New Mexico Senate 2017). For more than 20 years, RPS policies have been a successful, cost-effective driver of renewable energy development across the country, helping to spur innovation, lower technology costs, drive local economic development, attract renewable energy businesses, and curb carbon dioxide (CO_2) and other harmful emissions (Wiser et al. 2016). Today, 29 states and the District of Columbia have RPS policies, covering 56 percent of total US retail electricity sales (Barbose 2017).

New Mexico's current standard—enacted in 2004 and strengthened in 2007—requires power providers to gradually increase their supply of renewable energy sources so that they account for at least 20 percent of retail sales by 2020 (rural electric cooperatives have a lower requirement of 10 percent). The state's electric utilities are in compliance with the target; most are on their way to achieving it ahead of schedule and at an affordable cost to consumers (Barbose 2017).

Sandia National Laboratories

New Mexico has tremendous wind resources, making wind energy a highly cost-effective, clean, and viable electricity technology in the state.

In significantly strengthening its RPS, New Mexico would join at least 13 other leading states, including several that have set targets of 50 percent or higher.

The RPS update proposed during the 2017 legislative session (Senate Bill 312) would steadily increase the requirement to 80 percent by 2040, with midpoint targets of 35 percent by 2025, 50 percent by 2030, and 65 percent by 2035. While the bill did not pass in 2017, legislative leaders expect to consider similar proposals during upcoming sessions. As they do so, they should update other RPS policy provisions to match the more ambitious targets, including reworking the reasonable cost threshold (RCT), which was intended to protect consumers from unreasonable bill increases associated with RPS compliance by limiting investments to less than 3 percent of annual revenue. In practice, however, utility interpretations of how to calculate the RCT have hindered beneficial investments in renewables.

The proposed trajectory for reaching 80 percent renewables is ambitious yet steady, leaving time for the state to implement complementary policies and technologies that could facilitate the integration of a rising share of renewables onto the electricity grid. While no large-scale electricity system in the United States has reached the level of renewables required by the final phase of the modeled policy (except for the Pacific Northwest with its significant quantities of hydropower), many are heading in that direction. Indeed, in many of the states where utilities are approaching their original renewables targets, officials have enacted more ambitious requirements to continue progress toward a high-renewables future. In significantly strengthening its RPS, New Mexico would join at least 13 other leading states, including several—California, Hawaii, New York, Oregon, and Vermont—that have set targets of 50 percent or higher (Barbose 2017).

A growing body of evidence supports the technical feasibility of the pathway to a high-renewables future (see the box on p. 6). Across the board, implementing complementary policies—such as a strengthened energy efficiency resource standard (EERS), which requires utilities to meet a set percentage of their electricity needs through energy efficiency measures—along with a strengthened RPS can also significantly drive down costs for consumers.

As New Mexico's large coal-fired power plants continue to ramp down toward retirement, a strengthened RPS provides a sensible, proven roadmap for utilities and investors to plot a course toward a clean energy economy. Predictable, long-term regulatory certainty can be an effective lever for realizing the transition, while simultaneously providing a powerful check on the alternative: a growing and costly dependence on natural gas.

Methodology

To help New Mexico understand the relative risks and rewards of committing to a high-renewables future, UCS used NREL's Regional Energy Deployment System (ReEDS) to model scenarios with and without increases to the current RPS.[3] ReEDS is a long-term, capacity-expansion model that selects the lowest-cost portfolio of resources needed to meet electricity system demand, grid reliability requirements, and policy constraints (NREL 2017).

We based our analysis on a modified version of ReEDS, updated to reflect the current best understanding of assumptions about future energy technology costs and performance, recent electricity resource construction and retirements, and transmission system availability, among other modifications. To analyze possible contributions from distributed solar photovoltaics (i.e., smaller-scale solar installed on homes and businesses), we integrated the projected build-out from dGen—a separate NREL model that estimates customer adoption of distributed generation—as an input into ReEDS.

Our baseline scenario assumed that the state's RPS would plateau at 20 percent in 2020 and thereafter. To characterize a high-renewables future, we modeled the renewable energy targets in New Mexico Senate Bill 312, which would have steadily increased the current 2020 requirement until it reached 80 percent by 2040. For both scenarios, we assumed that the state's EERS would plateau at 8 percent energy savings in 2020 and thereafter, as under current law. We did not adjust electricity demand to account for the potential of increased electrification of other energy uses, such as the conversion of vehicles from gasoline to electric.

3 *A detailed list of assumptions and inputs, as well as a detailed description of the model, can be found in this report's technical appendix, available online at* www.ucsusa.org/newmexicorenewable.

For both scenarios, we assumed that all the state's coal plants would be retired by 2030. That assumption is in close accordance with PNM's most recent integrated resource plan filing (PNM 2017). We also examined the effects of a slower timeline for retiring coal plants.

To calculate the economic benefits of reducing emissions over time, we calculated the social cost of carbon—the external, nonpriced effects of carbon emissions—based on the findings of the Interagency Working Group on the Social Cost of Greenhouse Gases (2016). We calculated the health and

Feasibility of a High-Renewables Grid

Nationally, consumers, analysts, and policymakers are becoming both more comfortable with and confident about the electricity grid being able to provide reliable power as higher levels of renewables come online. While the integration of more and more renewables will require improvements in the design and coordination of New Mexico's electricity grid, the policy pathway allows for steadily ramping up clean energy. This will give the state ample time to plan and act.

NREL, as well as several regional power markets and research institutes, have generated a wide and growing body of research in this area.[4] Approaches that could facilitate high levels of renewables at the lowest cost and least environmental impact include, among others:

- **Participating in broader energy markets.** The broader an energy market, the better a grid can manage variability in the system. New Mexico has multiple opportunities to join with other areas and coordinate energy use at a wider geographic scale. The most prominent of these opportunities is the Western Energy Imbalance Market that spans several neighboring states.[5] Joining this would enable New Mexico to participate in a real-time energy trading market, promising increased efficiencies and lower costs.

- **Expanding the transmission network.** Transmission lines transfer electricity from where it is generated to where it is consumed. At present, the state's transmission lines are rapidly approaching capacity. Given the concentration of wind resources in eastern New Mexico and the demand centers further west, the state must develop transmission lines quickly. Several projects are in the works, but the permitting and development processes take time.

- **Implementing demand-side management.** Building out a high-renewables future requires the development of supply-side renewable resources; however, the demand side of the equation is nearly as important. In particular, if incentives to shift demand can yield a better match to periods of high-renewables generation—and avoid periods of low-renewables generation—these clean energy resources will be far better able to supply energy needs directly.

Peter Nijenhuis/Creative Commons (Flickr)

Expanding the state's transmission capacity is key to enabling greater amounts of renewable energy on the grid.

- **Improving energy storage.** Renewable resources like wind and solar can generate electricity when the wind blows or the sun shines, regardless of actual demand for energy. Energy storage technologies, such as batteries and compressed air, can ensure that clean energy can meet energy demand even if the need for electricity comes at a time offset from when the energy is produced. Storage technologies are a beneficial resource for integrating higher levels of variable renewable resources onto the electricity grid. Some storage technologies have been in wide use for decades, while others are becoming widely available as their costs plummet.

4 *See, for example, NREL's* Western Wind and Solar Integration Study, Phases 1-3 *(GE Energy 2010; NREL 2013; GE Energy Management 2014), NREL's* Renewables Electricity Futures Study *(2012), the Southwest Power Pool's* Wind Integration Study *(2016), and* Renewables and Reliability from UCS (2015).

5 *The market, launched in 2014, serves consumers in eight Western states. More information is available at* www.westerneim.com.

economic benefits of reducing emissions of sulfur dioxide (SO_2) and nitrogen oxides (NO_x) based on the Environmental Protection Agency's 2015 *Regulatory Impact Analysis for the Clean Power Plan Final Rule* (EPA 2015).

We evaluated potential job creation and associated economic development benefits of investing in renewable energy using NREL's Jobs and Economic Development Impact (JEDI) models for wind, solar, and transmission projects. For each resource, JEDI estimates jobs, earnings, and output in three areas: project development and onsite labor impacts, local revenue and supply chain impacts, and induced impacts (i.e., spending and reinvestment by recipients of direct and indirect funds) (NREL n.d.).

The Renewables Opportunity

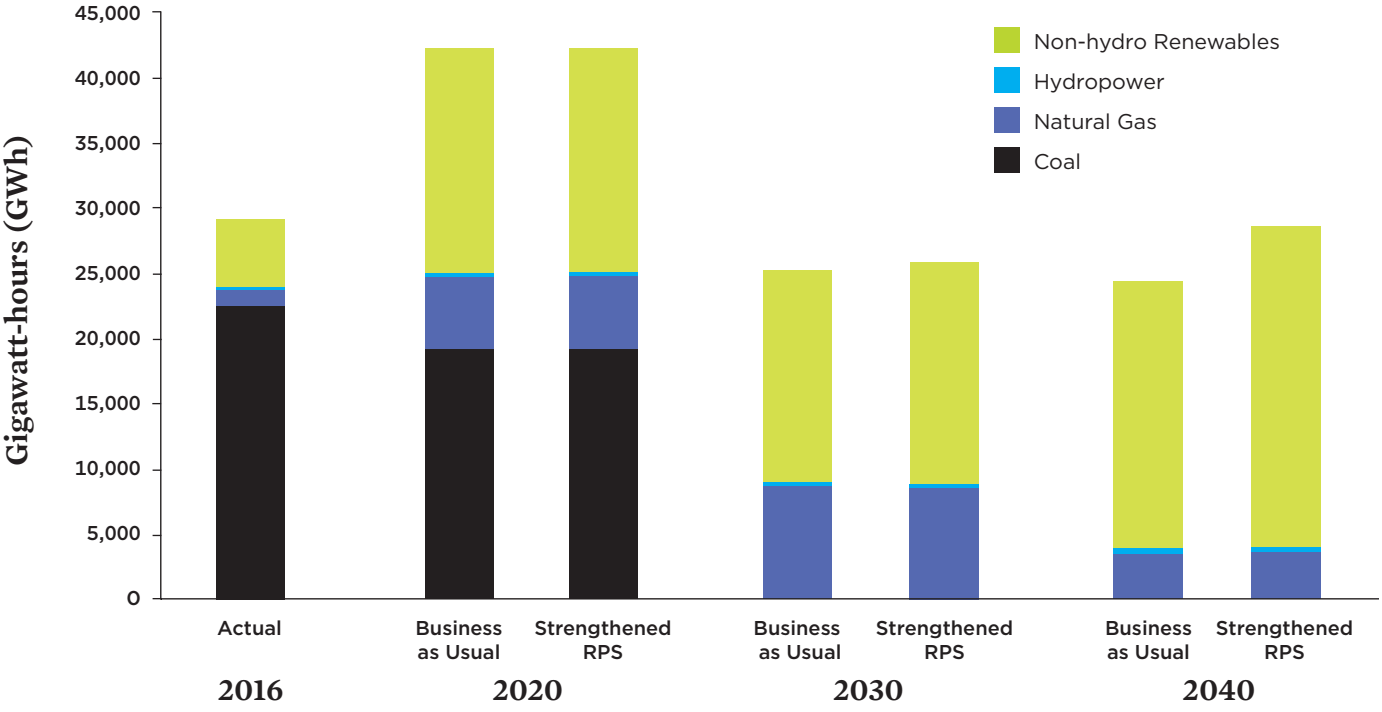
The looming question facing New Mexico is what, and how much, will replace the waning coal sector. Our analysis highlights the opportunity New Mexico has *now*—before coal plants and coal mines have closed, and before new investments are made to replace them—to use state energy policy to chart an *intentional* course toward a more robust, more diversified economic future.

Our findings make it clear that New Mexico can affordably secure significant economic, health, and environmental benefits for decades to come if it proactively commits to a high-renewables future.

Critically, our analysis also reveals that under *both* a business-as-usual scenario and one assuming a stronger commitment to renewables, renewables are the most economically favorable energy choice for New Mexico. Indeed, the state's generation mix looks very similar throughout the forecast period: low-cost renewable energy generation comes online to replace generation from coal and other fossil fuels (Figure 1).

Unfortunately, some on-the-ground investments and action plans of the state's largest utilities contrast with these findings. Instead, they trend toward higher levels of long-lasting investments in natural gas (and, in some cases, nuclear), which can expose customers to excessively high costs over time (Deyette et al. 2015). This dichotomy between utility positions and on-the-ground economics makes clear

FIGURE 1. New Mexico's Evolving Electricity Generation Mix under Business as Usual or a Strengthened Commitment to Renewables



Under both scenarios, the low cost of renewable energy makes it the dominant choice for the state's electricity generation mix if New Mexico fully phases out coal by 2030. Differences in overall levels of generation between the two cases over time can be attributed to changes in levels of electricity imports and exports, especially as coal-fired generators retire. Actual in-state demand is fully met throughout.

the need for a public policy that would ensure the realization of a cleaner, cheaper future while simultaneously defending against the alternative.

ECONOMIC DEVELOPMENT AND DIVERSIFICATION

What would a commitment to a renewable energy future look like? What are the costs and benefits from such a pathway?

As coal plants retire, our analysis indicates that significant amounts of wind- and solar-powered generating capacity will replace them. With a strengthened RPS, 2,200 MW of wind and 870 MW of solar come online between 2017 and 2030, effectively tripling wind capacity and more than doubling solar capacity compared with 2016 (Figure 2). Much of the renewables development occurs by 2021 as developers take advantage of federal tax incentives before their scheduled phase-out (in 2020 for wind and 2021 for solar), highlighting the importance of near-term action. Driven by the compelling near-term economics of sun-setting tax incentives, the same amount of wind is developed through 2030 under the business-as-usual case, although solar lags a bit with 560 MW added.

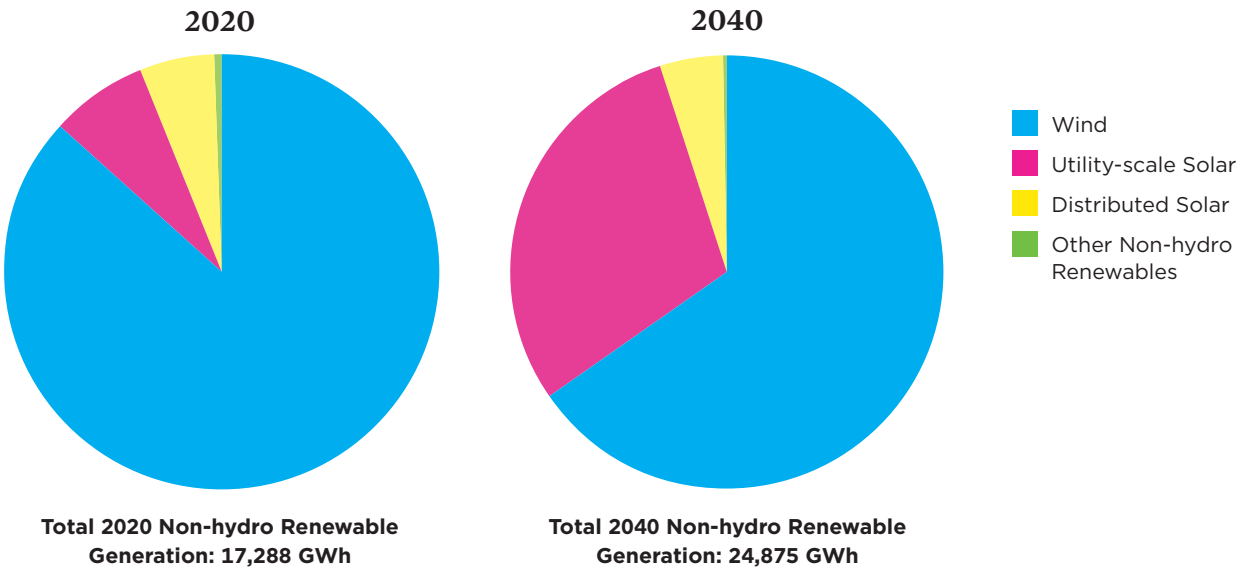
By 2040, as RPS requirements under the policy case steadily increase, renewables reach a total on-the-ground capacity of 3,650 MW of wind and 3,900 MW of solar, of which 700 MW is projected to be distributed solar. By comparison, total capacity under the business-as-usual scenario comes to 3,160 MW of wind and 3,150 MW of solar.

The large-scale build-out of renewables under a strengthened RPS results in more than $6 billion of capital investment by developers throughout New Mexico from 2017 to 2030, with $4.7 billion invested in wind, $158 million in utility-scale solar, and $1.2 billion in distributed solar. Such projects come on the heels of the more than $2 billion already invested by the wind industry alone through 2016 (AWEA 2017). The policy could drive total capital investments in renewable energy between 2017 and 2040 to $7.2 billion, with the additional growth largely due to the significant deployment of utility-scale solar after 2030.

Along with investment dollars, the deployment of renewable energy facilities spurs job growth in diverse sectors directly and indirectly related to the clean energy industry, including construction, operations and maintenance, management, finance, and service. Currently, the wind and solar industries support nearly 5,000 jobs in New Mexico, with solar jobs alone growing 54 percent from 2015 to 2016 (DOE 2017; Solar Foundation 2017).

A strengthened RPS could support an average each year of more than 640 additional direct, local jobs in construction, interconnection, and installation-related fields through 2030.

FIGURE 2. Share of Generation from Different Types of Renewable Resources under a Strengthened RPS



In 2020, the near-term build-out of large amounts of wind means that it dominates renewable energy generation. By 2040, far more utility-scale solar gets built, leading to much larger contributions from solar overall.

Dennis Schroeder/NREL

Clean energy has the potential to generate many good-paying jobs across the state. Indeed, solar jobs alone grew 54 percent in New Mexico from 2015 to 2016.

Direct jobs supported in these fields will be complemented by increased economic activity, which supports additional indirect and induced employment. Accounting for these opportunities, the average annual direct, indirect, and induced employment supported by local construction, interconnection, and installation activities comes to more than 1,800 jobs through 2030. By 2030, an additional 590 jobs—direct, indirect, and induced—would be supported annually by onsite operations and maintenance activities at utility-scale wind and solar facilities; 80 percent of those jobs would be in place by 2020.

Of course, not all these jobs will be in communities most affected by losses in the coal sector, which will be principally in the northwest corner of the state. However, some solar-related jobs could be located there, and the rest of the job growth can help boost the state's economy as it continues recovering from the great recession and the oil and gas glut, and as it adjusts to the coming energy transition.

New investments in transmission capacity needed to accommodate the influx of renewables can generate additional job opportunities for New Mexicans. An average of 940 jobs each year (including direct, indirect, and induced jobs) would be created through 2030 due to the construction and installation of transmission lines. Nearly 175 additional full-time-equivalent jobs would be created annually by 2030 due to the ongoing operation and maintenance of new transmission capacity and other related economic activity.

As a further benefit, the growth in renewables triggered by a strengthened commitment to clean energy will inject new dollars into state and local coffers through increased tax revenue—on the order of nearly $21 million annually by 2030, with the amount in each community depending on local tax rates. Especially given the high volatility associated with revenues from the oil and gas sector, such steady payments can add confidence and stability to local budgets for schools, hospitals, and other critical infrastructure (Morris 2016).

Simultaneously, landowners could reap significant gains from renewable resource development. They typically receive recurring lease payments from project owners when utility-scale wind turbines or solar panels are installed on their property. These payments can be significant. Solar farms generate $100 to $500 per acre per year for host landowners, and each wind turbine generates up to $7,000 to $10,000 annually, depending on its size and output (Leach 2017; AWEA 2017). The wind industry estimates that annual land-lease payments already total $5 million for New Mexico landowners (AWEA 2017). By 2030, our analysis finds, land-lease payments for wind and solar could total as much as $9.5 million annually under a strengthened RPS.

A notable indirect benefit of committing to a high-renewables future is that such action would bolster New Mexico's ability to attract new businesses. Nearly half of all Fortune 500 companies, and more than 70 percent of Fortune 100 companies, have set renewable energy or sustainability targets (AEE 2016). For these companies, it matters which resources power their operations. As a result, the more renewables New Mexico has on the grid, the more attractive it will be for high-value, job-creating businesses. For example, New Mexico's status as a top solar-resource state was an important factor in Facebook's decision to build a data center in the state, creating hundreds of new jobs. A $45 million investment will fund the three new solar facilities that will fully power the new data center (Sverdlik 2017).

> ***By 2030, land-lease payments for wind and solar could total as much as $9.5 million annually under a strengthened RPS.***

Strengthening New Mexico's commitment to a high-renewables future would not preclude the state from further capitalizing on the export of clean energy to neighboring states. As noted, New Mexico developers and communities already benefit from investments in large-scale wind projects that serve California's demand for clean power. With a

strengthened RPS, New Mexico consumers *also* could benefit from access to clean, affordable renewable energy resources.

Committing to a high-renewables future would not by itself conflict with the development and operation of the state's oil and gas sector. The demand for New Mexico's oil resources falls nearly entirely outside the electricity sector, and electric utilities currently use only a small fraction of the significant natural gas produced in the state.[6]

AFFORDABILITY

The projected growth of renewables required by a strengthened RPS, while ambitious, fits with current trends in the energy market. As a result, a strengthened RPS has little impact on customer costs (Figure 3). In the long run, consumer electricity costs fall slightly, despite a slight increase in the near term as coal-fired generators are replaced. To gain the in-state economic development benefits outlined above, consumers initially pay a small price and ultimately share in the costs savings of falling renewable prices.

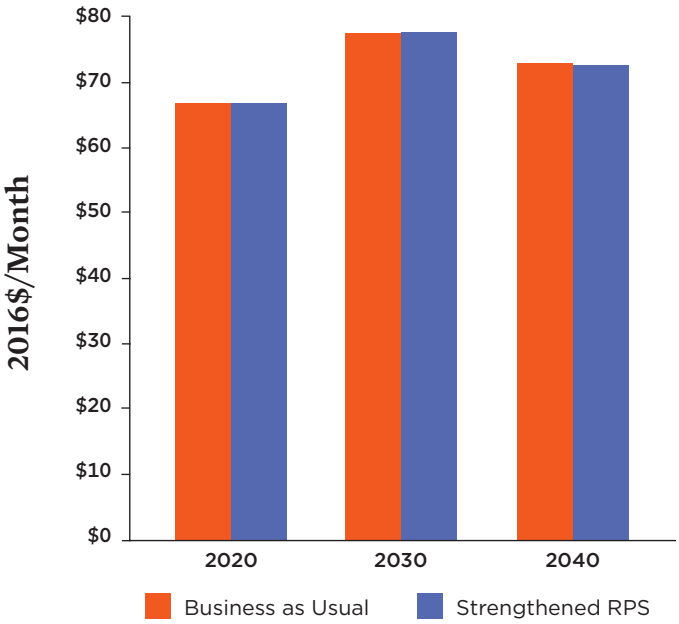
In 2020, monthly costs are effectively identical in the two cases; by 2030, the strengthened RPS leads to costs about 0.2 percent higher (15 cents per month) compared with a baseline without the higher RPS. By 2040, the strengthened commitment to renewables results in costs that are about 0.24 percent *lower* (17 cents per month), largely due to reduced fuel expenditures.

Under the strengthened RPS scenario, the cost for the average New Mexico household will climb no more than a few dollars per month compared with 2016; in most years through 2040, monthly payments are projected to be lower than 2016. For context, from 2010 to 2015, residential rates in the state climbed a total of nearly two cents per kilowatt-hour, equal to an increase in electric bills of more than $12 per month for the average household (EIA 2017b).[7]

One inherent benefit of a strengthened RPS is its ability to significantly reduce customers' exposure to volatility in fuel prices and the accompanying volatility in rates. Natural gas prices can be particularly volatile. The greater the share of renewables in an electricity supply mix, the less the exposure to potentially large price swings.

Still, for such a benefit to accrue to New Mexicans, renewable resources must supply in-state customers, not just be exported to other states. In recent years, as New Mexico has hosted a growing number of renewable energy projects, much of that development has served customers in other states. Of the 1,800 MW of wind projects under construction or in advanced development across the state, at least 1,000 MW is slated for California.

FIGURE 3. Projected Typical Monthly Residential Electricity Costs in 2020, 2030, and 2040



Customers pay virtually the same for electricity whether the RPS is strengthened or not. In both scenarios, a short-term adjustment to large-scale coal plant retirements largely drives the higher costs in 2030. Later, costs return to lower levels.

Out-of-state projects do benefit New Mexicans, generating good local jobs, significant capital investment, and local tax revenues and land-lease payments. However, the ratepayer benefits of such projects accrue to residents of other states. By committing the state to a high-renewables future, New Mexico's leaders can help ensure that all residents join in the benefits.

ENVIRONMENTAL AND PUBLIC HEALTH BENEFITS

The dedicated transition to clean energy resources promises another major economic benefit for New Mexicans: it will significantly reduce adverse environmental impacts. Coal-fired power plants emit dangerous pollutants, causing asthma, heart and lung diseases, and other negative health effects

6 *Oil and gas production can also have environmental and health impacts, as does the consumption of these fuels in sectors outside the electric power industry.*
7 *Although not evaluated in our analysis, increased investments in cost-effective energy efficiency measures have the potential to further decrease bills by lowering the overall amount of energy consumed.*

including premature death. When pollution is reduced, so too are these effects. Not only do people feel better, but they also can save money through lowered health care expenses.

The retirement of coal plants will significantly reduce emissions of SO_2, NO_x, and mercury. Indeed, the modeled coal retirement schedule results in these emissions dropping by more than 40, 45, and 55 percent, respectively, between 2016 and 2025, and virtually 100 percent across the board following the full closure of coal units by 2030. The health benefits from reductions in SO_2 and NO_x alone could save $305 million from 2016 to 2030.

A cleaner electricity future for New Mexico would also mean a dramatic decline in CO_2 emissions. Until 2030 under both scenarios, coal plants generate the overwhelming amount of CO_2 emissions in the electric power sector. Following coal plant closures, natural gas power plants become virtually the only source of power plant carbon emissions in the state. All told, CO_2 emissions would fall from more than 22.8 million metric tons in 2016 to 3.42 million metric tons by 2030 under a strengthened RPS. Under a business-as-usual scenario, the closure of coal plants similarly drives large-scale reductions of CO_2 emissions, falling to 3.46 million metric tons by 2030. Applying the social cost of carbon yields a projected total benefit from these reductions under the RPS scenario of $2.96 billion between 2016 and 2030.

All told, CO_2 emissions would fall from more than 22.8 million metric tons in 2016 to 3.42 million metric tons by 2030 under a strengthened RPS.

Our analysis assumes the continued lack of federal or state carbon-pricing policies. However, given increasingly severe impacts from climate change, the option of putting a price on carbon emissions becomes more likely. As a result, there will continue to be value in monitoring the comparative carbon-emission trajectories of various resource-mix futures, recognizing the value of a decarbonized power sector as a hedge against future regulatory action.

Just as committing to a high-renewables future would improve air quality, it would also secure lasting savings of a

Kari Greer/US Forest Service

Global warming is contributing to more intense wildfires (above, the Whitewater-Baldy Complex fire in 2012). Utilities are pushing to include more natural gas in the state's future energy mix, which would not sufficiently reduce carbon dioxide emissions to avoid the worst consequences of climate change.

vital yet increasingly scarce resource in New Mexico: water. Even though the power sector represents a small share of New Mexico's water use, any saving in this drought-prone state is notable. And with coal as the major driver of electricity-sector water use, its accelerated phase-out means reductions in water use with or without a strengthened RPS. Under both scenarios, by 2030 the state's power sector could see a decrease of nearly 90 percent of annual water consumption compared with today—saving more than 12.3 billion gallons (37,855 acre-feet) of water per year.

CONSIDERING THE IMPACT OF ASSUMPTIONS ON KEY FINDINGS

Our analysis focused on the opportunities that can result from New Mexico's committing to a high-renewables future while assuming a complete phase-out of in-state, coal-fired power plants by 2030. However, we also considered several other scenarios to gain a better sense of which variables might have an outsized influence on the results. Specifically, we considered whether accelerating the phase-out of coal generation would influence the impacts on customers and resource allocation, and how different assumptions about the price of natural gas could shift decisions on resource development.

When we do not assume an accelerated coal-retirement schedule, consumer costs are somewhat lower across the board, regardless of whether the state commits to more renewables or not. However, these differences reach a maximum of about $5 per month around 2030, then stabilize and eventually decline through 2040. In this scenario, a strengthened commitment to renewables results in slightly higher costs than in the absence of such a policy. Still, even when the difference between the two scenarios is at its largest, it totals just a little more than $2 per month.

Differences in assumptions about natural gas prices have the most significant effect on resource decisions when coal plant retirements are not automatically accelerated. Specifically, higher natural gas prices would prolong the use of coal, while lower prices would hasten coal's retirement. This is in line with recent market trends. Because a strengthened RPS limits the amount of natural gas in the system, the difference in consumer electricity costs is less than $2 per month between low and high scenarios for gas prices.

Unfortunately, the model is limited in its ability to consider the deployment of storage technologies and demand-side management approaches to facilitate a high-renewables future. Thus, the predicted implementation costs may overestimate the actual cost of compliance. As a result, any negative impact on consumer bills could be reduced with greater investments in these resources.

Storage technologies like batteries, compressed air energy storage, and thermal storage can all be deployed cost-effectively to ensure that clean energy is available when it is needed most—including at times different from when electricity is generated. Demand-side management approaches, such as demand-response programs and time-varying rate structures, can similarly decrease the costs and increase the efficiency of integrating high levels of renewables onto the grid. As a result, even without being able to model the possible contributions of these technologies meaningfully, it is reasonable to say that the model likely overestimates the cost of integration and the scale and scope of electricity-generating resources required, and hence it is conservative in projecting the economic benefits of a transition to clean energy.

Recommendations

With coal closures on the horizon, the state stands to secure widespread gains for all New Mexicans by committing to a brighter future rather than clinging to a waning past. The UCS analysis finds that by strengthening policies in support of that commitment, such as transitioning to an RPS of 80 percent by 2040, the state can reap significant economic, health, and environmental benefits. And given the near-term expiration of federal tax incentives for renewable resources, the sooner the state signals its vision for the future, the more it will guide utilities to take advantage of these opportunities while they still exist.

Still, a strengthened commitment to renewables is just the start when it comes to building a diversified, forward-looking economy. In particular, New Mexico would be even better positioned to establish itself as—and benefit from being—a clean energy leader if it couples that initiative with a strengthened EERS, favorable economic policies for investing in and developing emerging clean energy technologies, the intentional build-out of transmission and transportation infrastructure, and funding for workforce training

With coal closures on the horizon, the state stands to secure widespread gains for all New Mexicans by committing to a brighter future rather than clinging to a waning past.

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New Mexico legislators have an opportunity to use policy to chart an intentional course toward a clean energy future. One pathway would be to strengthen the state's existing renewable portfolio standard to 50 percent by 2030 and 80 percent by 2040.

and community development initiatives to support a fair and equitable transition away from coal.

With this in mind, we offer four recommendations for policy actions by the legislature and state agencies:

- **While strengthening the state's renewable portfolio standard to 50 percent by 2030 and 80 percent by 2040, the New Mexico legislature should simultaneously eliminate the reasonable cost threshold.** Our analysis illustrates that a high-renewables future is economically beneficial for New Mexico, regardless of policies in place. A strengthened RPS would secure the significant capital investment, tax revenues, and job opportunities afforded by a transition to clean energy, while lessening the risk of a growing reliance on natural gas. In tandem, the legislature should eliminate the RCT. By limiting investments to less than 3 percent of annual revenue, it has proven to be a poor policy tool and a hindrance to beneficial investments in renewables.
- **The New Mexico legislature should strengthen the state's energy efficiency resource standard.** Greater gains would be seen across the board if New Mexico were to simultaneously strengthen the RPS and EERS. Requiring utilities to meet a higher percentage of electricity needs through energy efficiency measures would support wider access to affordable benefits for all.
- **The New Mexico Public Regulation Commission must ensure that the utilities it oversees clearly and fully consider the pathways before them, and that they do not overcommit to natural gas.** The commission can provide a critical check on utilities as they begin to consider a coal-free future. However, the opportunity before New Mexico is only as valuable as the vigilance with which the commission monitors and analyzes utilities' assumptions and perspectives. This includes ensuring that rates relating to distributed renewable resources fairly value the resources for the widespread and diverse

Dennis Schroeder/NREL

New Mexico has tremendous wind resources, making wind energy a highly cost-effective, clean, and viable electricity technology in the state, and the push to clean energy has the potential to bring more good-paying jobs.

benefits they provide, and that they do not unfairly inhibit the development of clean energy resources. The commission also must cast a critical eye on plans for the accelerated build-out of natural gas resources; instead, it should encourage a balanced, restrained approach that avoids the risk of future stranded assets.

- **The state's Energy, Minerals, and Natural Resources Department, which oversees energy development, should use its Energy Roadmap Project to position New Mexico to seize the clean energy opportunities that lie ahead.** The state can do a great deal to facilitate the transition to a high-renewables future. Foremost among these actions are supporting and accelerating the build-out of necessary transmission projects, supporting coal-dependent communities in managing a just transition toward a coal-free future, developing workforce training and transportation initiatives to ensure that all New Mexicans can benefit from the transition to a clean energy economy, and supporting tax credits to bolster the emerging in-state clean energy economy, especially in rural areas. As its website states, the Energy, Minerals, and Natural Resources Department envisions "a New Mexico where individuals, agencies and organizations work collaboratively on energy and natural resource management to ensure a sustainable environmental and economic future." Toward that end, the department's Energy Roadmap Project, which seeks to define the steps to a more diverse energy portfolio while improving economic outcomes, presents a key opportunity for stakeholders to facilitate and further these initiatives (EMNRD n.d.).

As New Mexico grapples with the inevitability of change, it can look away, hoping for the best, or it can actively chart a robust course to a bright, viable, and economically rewarding future. By committing itself to a high-renewables mix of energy resources, New Mexico has a powerful opportunity to choose a future that secures widespread benefits for all.

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Committing to Renewables in New Mexico

Boosting the State's Economy, Generating Dividends for All

> ***New Mexico can affordably secure significant economic, health, and environmental benefits for decades to come if it proactively commits to a high-renewables future.***

In 2011, coal-fired power plants accounted for 70 percent of New Mexico's electricity generation. Since then, unfavorable economics have pushed the coal sector into steep decline. As a result, utilities have retired several large generating units and plan to retire more. This creates an opportunity to chart an intentional course toward a clean energy future. The Union of Concerned Scientists has modeled one approach: steadily increasing the state's renewable portfolio standard to 50 percent by 2030 and 80 percent by 2040. Compellingly, even in the absence of such a public policy, the analysis demonstrates that economics still favors high levels of renewables, not natural gas. Why, then, the need for a policy at all? Because utilities are pushing for far higher levels of natural gas, which increases risks for New Mexico consumers and the climate. By using policy to increase renewables development, the state legislature can ensure New Mexico achieves its best possible energy future.

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