NRDC

MARCH 2017
IB: 17-03-A

ISSUE BRIEF

A LOT FOR A LITTLE: RENEWABLE ENERGY, ENERGY EFFICIENCY A GOOD INVESTMENT FOR NEVADA

Nevada should act now to reap the benefits of an advanced clean energy economy. In 2016, the clean energy sector employed 3 million U.S. workers, and solar and wind jobs increased by 25 percent and 32 percent, respectively.[1] The costs of renewable technologies have fallen rapidly since 2009, driven by innovation throughout the supply chain. Since they have no fuel costs, renewable resources and energy efficiency can protect customers from price volatility, often producing lifetime cost savings.

INTRODUCTION

After years as a clean energy leader, Nevada needs to update its renewable energy and energy efficiency policies. The state's renewable portfolio standard no longer drives development of new renewable energy projects. NV Energy's energy efficiency programs now save only half the energy they saved at their peak.

To boost Nevada's clean energy economy, NRDC recommends that Nevada require electricity providers to get 50 percent of their electricity from renewable sources by 2030, with a goal of 80 percent by 2040, and that the state require providers to strengthen efficiency programs in order to save the equivalent of 1.5 percent of annual sales.

NRDC commissioned electricity modeling to understand the impact of these policy proposals on the state and regional energy mix and emissions, and Nevada electricity bills. Our key conclusion is that increasing renewable energy and energy efficiency programs would be a good investment for Nevada. These policies would reduce emissions and increase capital investments in clean energy (in turn, creating jobs), all for a very modest increase in customer electricity bills, or bill savings if natural gas prices increase substantially.

NEVADA SHOULD STRENGTHEN ITS RENEWABLE PORTFOLIO STANDARDS AND ENERGY EFFICIENCY GOALS

Renewable portfolio standards require that electricity providers like NV Energy source a minimum amount of electricity from renewable sources like solar, wind, and geothermal. Energy efficiency standards require that electricity providers save a minimum amount of electricity each year. Providers then run energy efficiency programs that make saving energy easier and cheaper for customers. Twenty-nine states, covering 55 percent of U.S. electricity sales, have renewable portfolio standards[2] and 26 have energy efficiency standards.[3]

Renewable portfolio standards and energy efficiency standards are the most important policies states use to spur clean energy growth. From 2000 to 2016, 60 percent of the increase in renewable electricity production occurred in states with renewable portfolio standards.[4] States with energy efficiency standards save more energy than their neighbors that do not have them.[5] Without these policies, electricity providers would rely more heavily on natural gas generation and electricity demand would grow more quickly. Nevada has seen this happen. The state already spends $700 million annually for out-of-state natural gas for its power plants,[6] and depends on natural gas for 73 percent of its

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electricity production.[7] Although gas prices are currently near historic lows, this reliance leaves Nevada customers vulnerable to price and supply variability.

Nevada has had a renewable portfolio standard since 2001. Its current standard requires electricity providers to source 16 percent of their electricity from renewable sources in 2017, rising to 25 percent by 2025.[8] Yet, the renewable portfolio standard is not currently driving development of new renewable projects, because NV Energy's existing investments, contracts, and bank of old portfolio energy credits mean it is already 91 percent of the way to meeting its renewable energy obligations through 2020.[9]

Nevada does not currently have an energy efficiency standard. Instead, the state's renewable portfolio standard allows electricity providers to count electricity savings toward a portion of their renewable obligation. In 2017, for example, they are allowed to use electricity savings to meet up to one-fifth of their 20 percent renewable energy standard; this provision phases out completely by 2025. The state also uses the utility's resource planning process to determine the size and scope of its energy efficiency programs. In 2015, NV Energy's energy efficiency programs saved about seven-tenths of a percent of its electricity sales,[10] well below savings levels achieved in neighboring states like Arizona and Utah. These two states spent around $20 per-person on electric utility energy efficiency programs in 2014, whereas Nevada spent less than half that amount.[11] In 2015, Arizona Public Service and Tucson Electric Power's programs saved electricity equal to 1.6 and 1.9 percent of their electricity sales, respectively. Back in 2009, NV Energy achieved savings equivalent to 1.5 percent of electricity sales.[12] Nevada's current programs are saving less than half that amount.

This report uses power sector modeling, performed by ICF (see Appendix for more detail), to examine the impact of establishing an energy efficiency standard that requires electricity providers to save the equivalent of 1.5 percent of electricity sales each year (more than double current efforts), and updating the renewable portfolio standard so it requires electricity providers to get 50 percent of their electricity from renewable sources like solar, geothermal, and wind by 2030 (double the current policy).

SCENARIOS ANALYZED

For this analysis, we developed two reference case scenarios to which our policy proposals are compared (Table 2). In addition to our primary Reference Case, which is based on expected natural gas prices, we developed the second Reference Case to examine the impacts of high gas prices, using the "High Oil Price" case in the Energy Information Administration's (EIA) 2016 Annual Energy Outlook (see Table 2).[13] We examined the impacts of the proposed renewable portfolio standard increase, both by itself and in combination with strengthened energy efficiency (EE) standards (see Table 1).

TABLE 1: SCENARIOS ANALYZED

	NV RPS (2030) % of sales	NV EE Savings annual savings as % of sales	Natural Gas Prices
Reference Case A	25%	0.62%	AEO 2016 Reference Case
Reference Case B	25%	0.62%	AEO 2016 High Oil Price Case
Policy Case 1	50%	0.62%	AEO 2016 Reference Case
Policy Case 2	50%	1.50%	AEO 2016 Reference Case
Policy Case 3	50%	1.50%	AEO 2016 High Oil Price Case

TABLE 2: HENRY HUB NATURAL GAS PRICES ($2012/MMBTU)

	2020	2025	2030
Reference Case A	4.90	4.77	4.33
Reference Case B	4.41	4.74	6.91

RESULTS

The modeling outputs from ICF's Integrated Planning Model (IPM®) included power system costs, wholesale electricity prices, electricity generation by fuel type, renewable energy capacity additions, and carbon dioxide emissions. Major results are described below.

THE RENEWABLE PORTFOLIO STANDARD CAN BE MET WITH MODEST IMPACTS ON HOUSEHOLD BILLS

Our results show that 50 percent of Nevada's energy could be sourced from renewable resources by 2030 with small increases in customer bills, particularly if coupled with our proposed increase in energy savings.[14] However, as shown in Table 3, these results are sensitive to technology and fuel price assumptions. If solar costs fall faster or further than projected—which is possible given the industry's past performance in reducing costs—the impacts on customer bills would be even smaller. Our analysis demonstrates that if natural gas prices rise substantially, as discussed below, our preferred set of policies would lower bills.

TABLE 3: BILL IMPACTS OF STRENGTHENING NEVADA'S RPS

Bill Impacts Compared to Reference Case	2020	2025	2030
Policy Case 1: 50% RPS, Current EE	2%	2%	5%
Policy Case 2: 50% RPS, 1.5% EE	1%	1%	2%
Policy Case 3: 50% RPS, 1.5% EE, High Gas	2%	0%	-3%

Our results reaffirm that a clean energy future is more affordable than ever. It has long been cheaper to save energy than to generate electricity from any type of power plant.[15] But since 2009, the costs of electricity from solar and wind have fallen by 85 percent and 66 percent, respectively.[16] Renewable energy is, therefore, becoming increasingly cost-competitive with new fossil fuel-fired power plants across the country, even before accounting for the benefits of reduced pollution.

The cost of accessing Nevada's solar resources has fallen dramatically. NV Energy pays 19.4 cents per-kilowatt hour (kWh) for electricity from Nevada Solar One, which went into operation in 2007, and 13.3 cents per-kWh for electricity from Apex Solar Power, placed in service in 2012, but will pay just 3.4 cents per-kWh for electricity from the Techren Solar 1 project when it goes into service in 2019.[17] Electricity from the Techren project will be cheaper than electricity from a new natural gas-fired power plant, which would likely be between 5 and 8 cents per-kWh.[18] In December 2015, Congress extended the federal tax credits for wind and solar, providing important near-term policy certainty for the clean energy industry. The credits now phase down in value over the next several years; wind projects that start construction by 2019 are eligible for the production tax credit (PTC), and solar projects that start construction by 2021 are eligible for the investment tax credit (ITC).[19] These tax credit extensions, along with the rapidly declining costs, mean that there has never been a better time for Nevada to make big commitments to clean energy.

By increasing its use of renewable resources, Nevada can protect itself from increases in the price of fossil fuels by reducing regional reliance on natural gas.[20] This benefit is highlighted by Policy Case 3, which shows that the increase in renewable energy generation and efficiency savings protects customers from high gas prices and results in bill savings from 2030 and beyond (see Table 4).

THE RPS WILL DRIVE NEW INVESTMENTS IN NEVADA

Our analysis confirms that this proposal would strengthen Nevada's position as a clean energy leader. To meet the 50 percent by 2030 goal, Nevada's electricity providers are projected to build more than 3 gigawatts (GW) of solar capacity by 2030 (see Table 5), producing electricity equivalent to the annual energy use of 540,000 Nevada households,[21] and doubling the state's total renewable generation (see Figures A1–A5). Nevada is already home to more than 8,000 jobs in the solar industry, and ranks second in the nation in solar jobs per capita.[22] Our analysis also finds that raising the RPS would inject over $3 billion of additional capital investments into Nevada's economy between 2017 and 2030. This would in turn spur continued job growth in solar project development, installation, and, potentially, manufacturing jobs.

TABLE 4: CUMULATIVE SOLAR BUILDS (GW)

	2020	2025	2030
Reference Case A: Current EE	0.1	0.1	0.2
Policy Case 1: 50% RPS, Current EE	0.5	1.8	3.7
Policy Case 2: 50% RPS, Current EE	0.5	1.7	3.3

The boost in solar power will also reduce the region's reliance on fossil fuels, and would lead to a decrease in regional natural gas generation of about 5,000 GWh. The strengthened RPS, coupled with increases in Nevada's efficiency standards, will cut carbon pollution by 3.1 million tons in 2030.

ENERGY EFFICIENCY REDUCES CUSTOMER BILLS

Increasing energy efficiency while Nevada increases its renewable portfolio standard would limit any bill impacts: reducing potential customer bill impacts from an increase of 5 percent of 2030 electric bills to an increase of only 2 percent, as shown in Table 4. This cost reduction occurs because, even though solar prices are reaching all-time lows in Nevada, it is still cheaper, on average, to save energy.

RENEWABLES AND ENERGY EFFICIENCY PROTECT NEVADANS FROM POSSIBLE HIGH NATURAL GAS PRICES

Nevada is vulnerable to natural gas price increases because 73 percent of its electricity is from natural gas-fired power plants.[23] Our recommendations replace electricity that would be served by natural gas-fired power plants, which need ongoing fuel, with resources like solar, and reduce overall electricity demand. To test the potential impacts of these recommendations, we ran our reference case and policy case with high gas prices, based on the EIA's High Oil Price case. We found, as shown in Table 4, that if natural gas prices increase, our recommended policies would reduce electricity bills by 3 percent in 2030. Renewable energy and energy efficiency provide Nevada with highly beneficial insurance against high natural gas prices.

CONCLUSION

Our IPM modeling results show that Nevada can reinvigorate its clean energy economy and cut its reliance on fossil fuels at little to no cost. In the process, the state would cut carbon emissions, reduce regional reliance on natural gas, and promote new investments. Nevada is already home to thousands of solar jobs, and has some of the nation's strongest solar resources. Policymakers should capitalize on the opportunity to once again become a leader in the clean energy economy.

APPENDIX

IPM MODEL, ASSUMPTIONS, AND SCENARIOS

The U.S. electricity system is complex and interconnected. A change in one part of the system—like a big increase in solar installations in Nevada, coupled with slower demand growth from increased energy efficiency—changes the decisions of power plant owners and operators throughout the western energy grid, and changes the flow of electricity inside and outside Nevada. By modeling the electricity system, we can forecast the impacts of a policy change like the one NRDC is proposing, taking into account the electricity system's linkages.

MODEL

NRDC's analysis of this proposal was performed by ICF using their Integrated Planning Model (IPM®).[24] IPM® is a detailed model of the electric power system that is used routinely by the electricity industry and regulators, including the Environmental Protection Agency, to assess the effects of environmental regulations and policy. It integrates extensive information on power generation, fuel mix, transmission, energy demand, prices of electricity and fuel, environmental policies, and other factors. The model determines the most cost-effective pathway available for the electricity industry, subject to all resource adequacy requirements and environmental constraints.

ASSUMPTIONS

The Reference Case assumptions were derived from EPA Base Case v5.15,[25] which was the platform used to assess the Clean Power Plan. Several adjustments were made to reflect recent policy and market developments in the power sector. Federal and state policies have been updated, including the December 2015 tax credit extensions for wind and solar. The cost and performance assumptions for wind and solar were updated based on NREL's latest Annual Technology Baseline report as well as recent power purchase agreements executed in Nevada and neighboring states, as shown in Table A1.[26,27] Natural gas price projections were updated based on EIA's AEO 2016 Reference Case.[28] We assumed all renewable energy resources to meet the renewable portfolio standard were built in Nevada. This is reasonable: all projects built to meet today's standard have been located in-state, even though the law only requires that the electricity from portfolio standard projects be delivered into the state.[29] We also applied a constraint on wind and solar generation to approximate the ability of the western grid to accommodate large amounts of variable generation: no more than 30 percent of annual generation can come from variable resources, and no more than 20 percent from either wind or solar alone, in the grid region encompassing Nevada and its neighboring states, excepting Oregon. This too is reasonable: because of the state's strong transmission connections to its neighbors it would be physically possible for the state to export renewable energy produced in Nevada if renewable electricity production temporarily exceeds Nevada's own electricity demand, and grid operators in the west are putting in place institutional changes to make this possible. This limit on variable generation is conservative, and reflects the renewable integration possible without major investments in transmission infrastructure or demand management. Other modelers have examined power system reliability at high penetrations of renewable energy, and found: "The integration of 35 percent wind and solar energy into the electric power system will not require extensive infrastructure if changes are made to operational practices;"[30] and that supply-demand balance of the electricity system could be maintained even at renewable generation levels between 80 and 90 percent.[31] IPM accounts for existing transmission constraints at the zonal level and this analysis assumes that there are not expansions or upgrades of current bulk transmission infrastructure. All assumptions and policy scenarios were developed by NRDC.

TABLE A1 : CAPITAL COSTS OF RENEWABLE ENERGY TECHNOLOGIES

	2016	2018	2020	2025	2030
Utility PV ($/kWdc)	1,740	1,424	1,109	1,000	1,000
Onshore Wind ($/kW)	1,725	1,703	1,681	1,625	1,570
Geothermal ($/kW)	4,552	4,552	4,552	4,552	4,552

TABLE A2: NEVADA MODELING ASSUMPTIONS AND POLICY SPECIFICATIONS

Year	Nevada Load (GWh) (before EE)	Current RPS (excluding EE portion)	Proposed RPS	Proposed EEPS
2020	37,200	19.8%	27%	1.40%
2025	38,800	25%	38%	1.50%
2030	40,300	25%	50%	1.50%

GENERATION MIX IMPACTS

Additional information regarding assumptions about Nevada's electricity load and the policy scenarios are provided in Table A2 on page 4. RPS-covered load is assumed to be 88 percent of state-wide load.

FIGURE 1A: REFERENCE CASE A

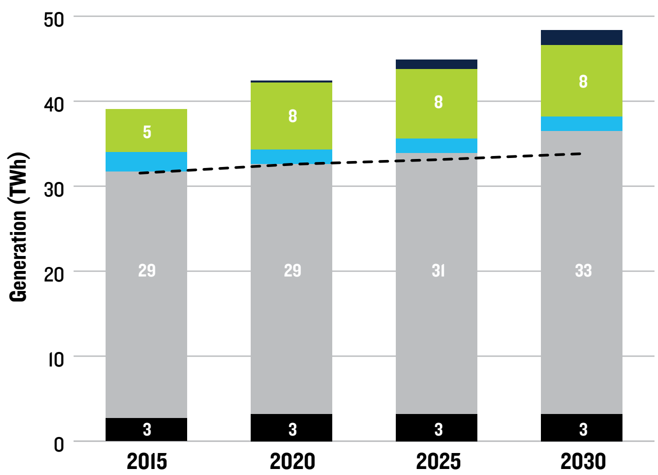


FIGURE 1B: POLICY CASE 1: 50% RPS

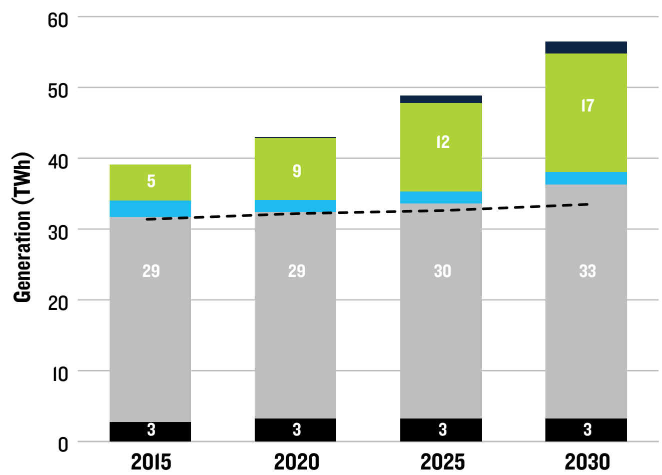


FIGURE 1C: POLICY CASE 2: 50% RPS, 1.5% EE

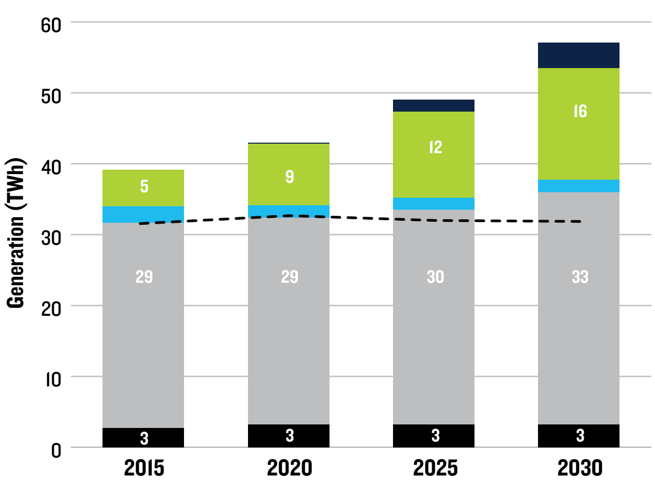


FIGURE 1D: REFERENCE CASE B, HIGH GAS PRICES

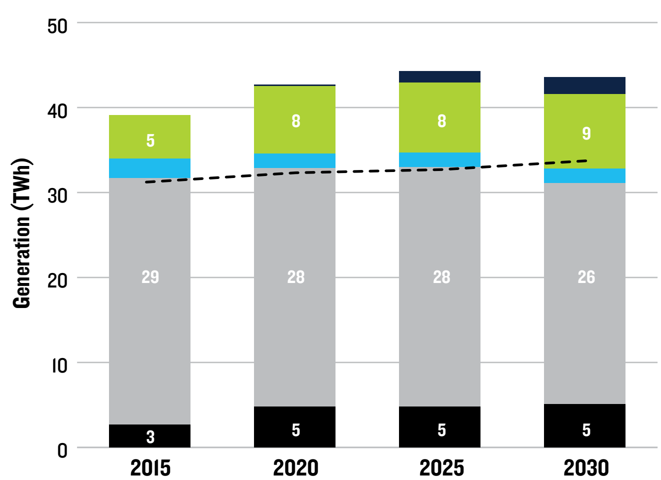
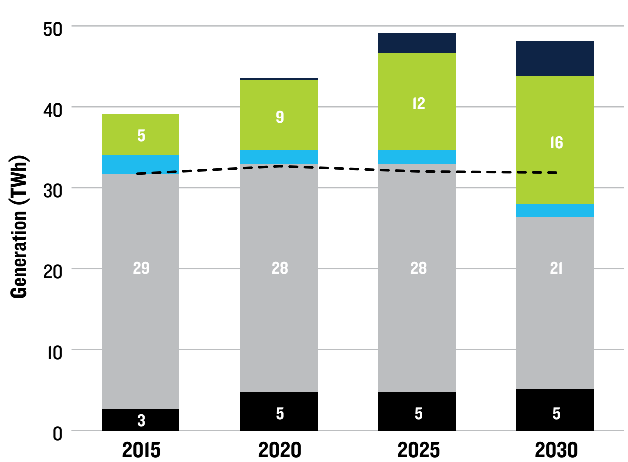
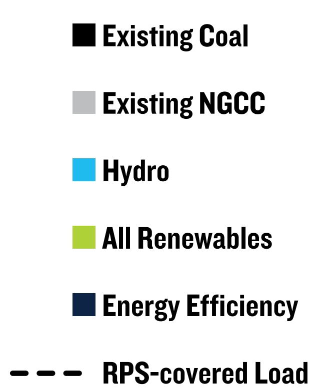


FIGURE 1E: POLICY CASE 3: 50% RPS, 1.5% EE, HIGH GAS PRICES





ENDNOTES

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