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NEVADA'S ELECTRIC POWER SYSTEM AND THE CLEAN POWER PLAN

The U.S. Environmental Protection Agency (EPA) will soon release the final rule for carbon emissions from existing power plants, called the Clean Power Plan (CPP). The rule represents the next step in the process of carbon regulation that began with the Supreme Court's determination in 2007 that carbon dioxide (CO_2) qualifies as an air pollutant subject to regulation by EPA under the Clean Air Act.[1]

Under Section 111(d) of the Clean Air Act, EPA will set air pollutant standards for each state based on what EPA determines to be the "best system of emission reduction" (BSER). In its proposal, EPA determined the BSER based on state specific potentials for emission reductions from four "Building Blocks" that include both traditional smokestack controls as well as "beyond the fence line" measures, namely improving the efficiency of coal plants, increasing dispatch of existing natural gas plants, deploying renewable and nuclear power generation, and reducing demand by means of energy efficiency.[2]

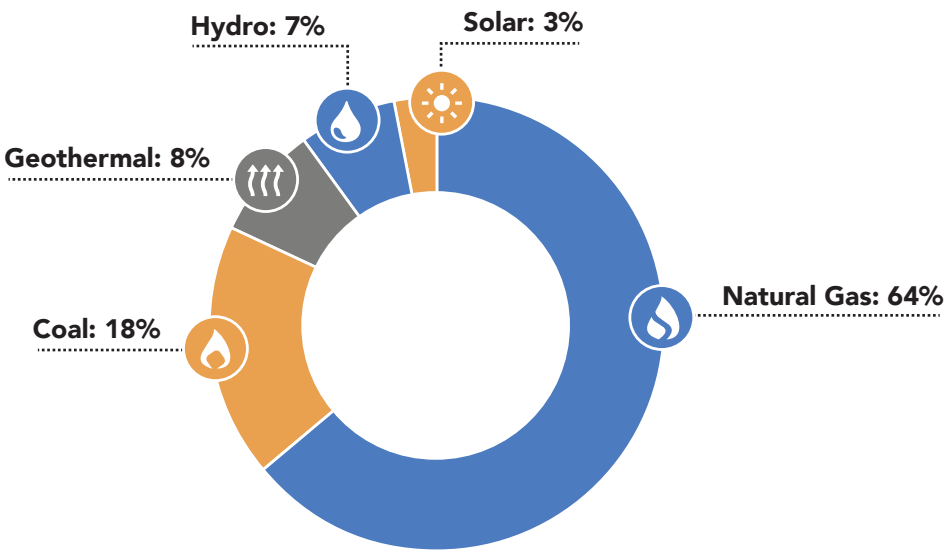
Although Nevada's emission rate target is set by the Building Blocks, there is no requirement that the state use those specific measures for compliance. Rather, in developing a compliance plan to achieve the interim (2020-2029) and final (2030-2032) targets, the state is free to use other technologies and policy tools. This gives Nevada an opportunity to design a plan that is best suited to the resources and needs of its unique power system.

Nevada has a vertically integrated electricity system regulated by the Public Utilities Commission of Nevada (PUCN), and allows electric choice for customers with demand greater than 1 MW.[3] The state's two investor-owned utilities (IOUs), Nevada Power and Sierra Pacific Power, both operate through their parent company NV Energy; together, they serve 95% of residential customers in the state and account for 85% of electricity consumption.[4,5]

A Strong Foundation

Nevada has shown that a state can successfully reduce its emissions while maintaining reliable, affordable electricity. Carbon emissions in the state have gone down 43% from 2005 to 2012, and at an average retail price of 8.95 cents/kWh in 2012, electricity in Nevada is less expensive than the national average.[6,7] While the state is well-positioned to export some of its renewable resources, Nevada is currently a net importer of electricity, with out-of-state electricity totaling over 7 million MWh in 2012.[8]

Nevada's Electricity Generation Mix (2014)



Source: AEE PowerSuite

The state's power sector is dominated by natural gas, which supplies 64% of the state's generation. Nevada's substantial geothermal, hydroelectric, and solar resources together account for 18% of Nevada's total net electricity generation, the same amount as coal.[9] In 2013, the state had approximately 1,200 MW of non-hydro renewable energy capacity, dominated by geothermal (566 MW) and solar PV (424 MW).[10] In 2014, Nevada ranked third nationally for solar installations, with 339 MW of capacity added.[11] Under current policy, Nevada has committed to retiring 800 MW of coal by the end of 2019, with replacements including 350 MW of renewable energy.[12]

Ranking seventh nationally in grid modernization in 2014, Nevada has also made significant investments in smart grid, energy efficiency, and demand-side resources.[13] These investments are already having an effect: between 2013 and 2014, Nevada's average duration of power outages declined from over 3 hours to 17 minutes.[14] Still, more needs to be done. Outages in Nevada in 2014 lasted a total of more than 16 hours and affected 164,000 people. Outages are not only disruptive but also expensive, with an annual estimated cost to the U.S. economy of $150 billion.[15]

All these improvements in Nevada's electricity system have helped to lower the state's carbon emissions. With a flexible design that allows states to select technologies and services for compliance that best suit the needs of the state, the Clean Power Plan will allow Nevada to continue to modernize its electric power system for the benefit of consumers and the economy. In this way, Nevada can further reduce emissions, maintain affordability, and increase reliability.

In October 2015, NV Energy is slated to join the Energy Imbalance Market (EIM) operated by the California Independent System Operator (CAISO). The EIM makes use of CAISO's 5-minute real-time market capabilities, and enables participating balancing areas to buy and sell resources, improve reliability, and reduce reserve requirements while minimizing curtailments of wind and solar. The utility anticipates that gross benefits will range from $8 million to $12 million in 2022.[16]

The interim and final emission rate targets for Nevada may change in the final rule, but the options for compliance will largely stay the same. Many of the things that the state is already doing will help it meet the final emission rate target set by EPA.

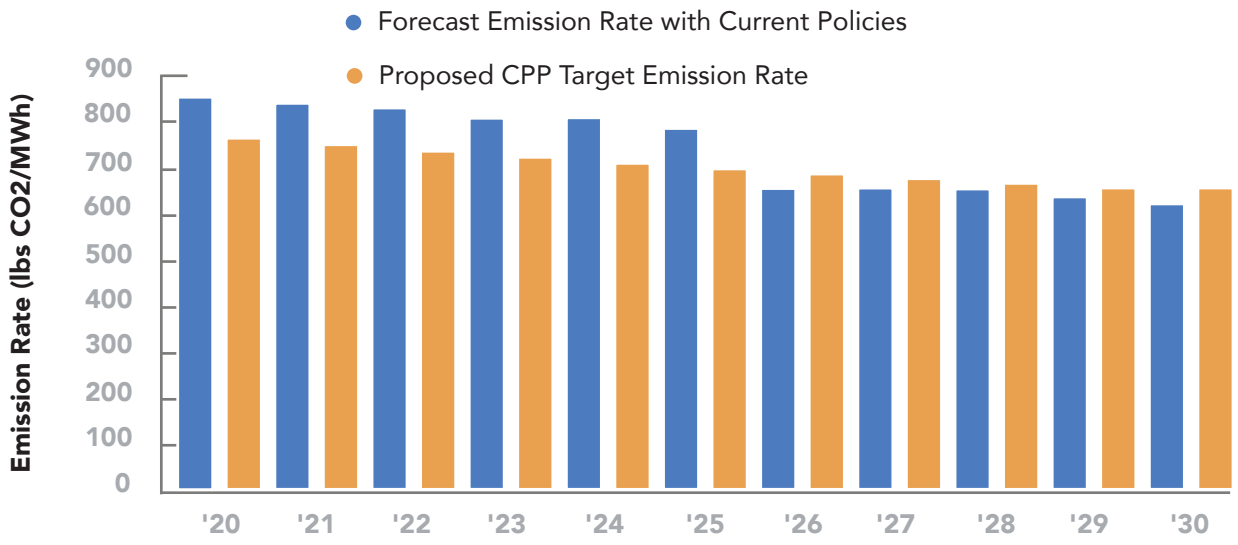
Proposed Targets for Nevada (from draft Clean Power Plan)			
Adjusted Starting Rate[17]	**Interim Target (average 2020 – 2029)**	**Final Target (2030 – 2032)**	**Total Reduction Required (2032)**
988 lbs CO_2/MWh	697 lbs CO_2/MWh	647 lbs CO_2/MWh	341 lbs CO_2/MWh (33%)

On Track to Exceed Proposed Emission Rate Target

Nevada has already made changes to its power system that will reduce emissions from the 2012 baseline and exceed the proposed target set by EPA. In SB 123 (2013), the state made commitments to retire 800 MW of coal capacity.[18] As a result, Nevada utilities are already planning to replace coal capacity with low-carbon natural gas and renewables. These planned changes are already driving down the state's emission rate. As the chart below shows, if Nevada continues to implement its current policies, the state will reduce its emissions beyond what is required by the proposed rule.[19] Whatever the target set by the final rule, Nevada will have a good start.

Nevada is on track to achieve over 100% of total proposed reductions simply by what it is already doing.

Current State Policy will Exceed Emission Reduction Requirements



Source: Western Resource Advocates

How Advanced Energy Can Help

As Nevada develops its compliance plan, it can consider a host of options provided by advanced energy technologies and services to reduce its carbon emissions and help the state achieve other electric system and economic objectives. Many of these strategies are already being successfully implemented in Nevada, and could be scaled up to achieve further emission reductions.

Nevada has had a renewable portfolio standard (RPS) in place since 1997, and has consistently increased the requirements, which now stand at 25% by 2025, a portion of which can come from energy efficiency.[20] This policy has driven strong growth in the renewable industry but the state lags behind national leaders in energy efficiency because efficiency lacks its own portfolio standard in the state and is gradually phased out as a compliance option under the RPS.

The state's clean energy sector employed nearly 24,000 workers in 2014, according to Governor's Office of Economic Development.[21] Nevada's leadership in the industry was a key factor in bringing Tesla's $5 billion "Gigafactory" to the state. Tesla spokesman Ricardo Reyes said, "For us, the workforce availability is pivotal."[22] Tesla's factory is currently under construction, and will employ an estimated 6,500 workers.[23]

Grid Modernization Technologies	
Demand Response	Demand response brings down peak load, which can directly reduce emissions by over 1% nationally, and moderates energy prices for everyone.[24] NV Energy runs a successful residential DR and efficiency program called mPower, which credits customers for reducing energy use during times of peak demand.[25] The program was used to reduce demand during 28 peak events in summer 2013, and achieved an 85% approval rating. NV Energy plans to expand the program to additional residential and commercial customers, to reach a total of 358 MW of capacity by the end of 2015.
Advanced Metering Infrastructure (AMI)	99% of Nevada customers already have smart meters, and NV Energy plans to cover its entire service territory.[26,27] These meters improve reliability and reduce operating costs for the utility. As of 2013, smart grid technology had already resulted in annualized savings of $35 million for NV Energy.[28] The data and control provided by AMI enables utilities and consumers to better manage energy use, helping to reduce emissions.
Energy Storage	Energy storage allows higher penetration of variable renewables, offsets emissions from older, dirtier plants for meeting peak demand, and relieves grid congestion when demand is high and transmission and distribution equipment losses are highest. Incentives in Nevada helped to attract a $5 billion "Gigafactory" to manufacture batteries for electric cars, homes, businesses and utilities. An independent analysis by the Governor's office estimates that the factory will generate $100 billion in economic benefits and create approximately 20,000 jobs in the next 20 years.[29]
Distribution Automation	Distribution automation helps optimize voltage conservation and reactive power (needed for motors and transformers to start up), integrate more distributed generation, and increase energy efficiency throughout the system without action on the part of customers, all of which helps to reduce emissions. This has the added benefit of improving the reliability of the grid.[30]

Energy Efficiency

Utility Energy Efficiency	Ramping up current utility efficiency efforts to 1% annual savings over the next five years would be enough to achieve 36% of the state's proposed emission reductions, and save consumers $3.4 billion by 2030.[31]
Energy Service Company (ESCO) services	The non-utility sponsored efficiency savings from the ESCO market are nearly equal in size to utility programs nationally.[33] Continued growth in the ESCO market in Nevada could help the state achieve as much as 8% of its emission reductions while saving local governments, schools, and hospitals $654 million.[34]
Building Codes	Every three years, the Nevada Governor's Office of Energy automatically adopts the latest International Energy Conservation Code (IECC) standard as part of its building code.[35] By 2030, building code energy standards will save the state an estimated $180 million annually.[36] If the state were to continue this policy and achieve better compliance rates from local governments, it could achieve 31% of its emission reductions under the proposed rule, and save a total of $3.4 billion by 2030.[37]
Behavioral Efficiency	Using Advanced Metering Infrastructure (AMI) combined with behavioral efficiency services has been shown to reduce energy usage and drive down prices for everyone. Behavioral efficiency in Nevada can achieve 1% of the state's proposed reductions and save consumers $207 million by 2030.[38]

Energy Efficiency Policies

Nevada lacks an efficiency standard analogous to the state's portfolio standard for renewables. Driven by changes to the state's RPS in 2005 that allowed energy efficiency to contribute a portion of the RPS, Nevada has a history of successful utility-run energy efficiency programs. As energy efficiency has been phased out of the RPS, NV Energy has pursued efficiency less aggressively. Reviving the previous commitment to energy efficiency, Nevada could start to catch up to neighboring states like Arizona, which has an annual energy efficiency savings requirement of 2.25%.[32]

Renewable Energy and Energy Storage

Wind	Although Nevada has only one commercial-scale wind farm, wind provided 2% of electricity generated in the state in 2013.[39] Wind could supply much more of Nevada's electricity—up to 60% if the state reaches its technical capacity of approximately 7 GW of wind.[40,41]
Solar	Theoretically, a 100 mile by 100 mile square of Nevada desert equipped with solar panels could power the entire country with electricity.[45] With technical potential of over 3,750 GW, Nevada still plenty of room to grow from the 886 MW of solar today.[46] Nevada ranks first in solar jobs per capita, with 5,900 jobs in 2014, up 146% from 2013. This huge growth outstripped job growth in the state's economy 53 times over.[47]
Geothermal	Nevada is the second-largest producer of geothermal power in the country, with a capacity of 566 MW across 22 operating plants.[48]

Renewable Energy Policies

Nevada's RPS has been consistently expanded to its current requirement of 25% by 2025. This policy has helped make the state into a solar powerhouse, with 886 MW of solar energy installed as of 2014.[42] Export of renewable power could benefit the state economy.[43]

Renewable Projects

The 110 MW Crescent Dunes Concentrating Solar Project in Tonopah is able to provide solar energy even when the sun is not shining. The project stores solar energy in the form of molten salt, which can turn a steam turbine when demand is high. The project can produce enough electricity to power 75,000 homes and will provide an estimated $73 million in local and state tax revenues over 20 years while supporting 45 permanent, full-time jobs.[44]

ENDNOTES

1. In the landmark 2007 case Massachusetts vs. EPA, the Supreme Court ruled that carbon dioxide is an air pollutant subject to regulation under the Clean Air Act, and EPA is therefore required to administer guidelines for emission reduction, http://www.supremecourt.gov/opinions/06pdf/05-1120.pdf. Since that ruling, the Supreme Court has upheld EPA's authority to regulate carbon emissions on two separate occasions, including American Electric Power Company vs. Connecticut and in Utility Air Regulatory Group vs. EPA, which upheld EPA's authority to regulate emissions from stationary sources, http://www.supremecourt.gov/opinions/13pdf/12-1146_4g18.pdf and http://www.nytimes.com/2014/04/30/us/politics/supreme-court-backs-epa-coal-pollution-rules.html.
2. For a more in depth look at how the Building Blocks were established and applied to individual states in the Proposed Rule, see EPA TSD: GHG Abatement Measures. http://www2.epa.gov/sites/production/files/2014-06/documents/20140602tsd-ghg-abatement-measures.pdf
3. http://www.leg.state.nv.us/71st/bills/AB/AB661_EN.html
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6. U.S. Electric Power Industry Estimated Emissions by State (EIA-767, EIA-906, EIA-920, and EIA-923) http://www.eia.gov/electricity/data/state/. In 2005, CO2 emissions in Nevada were 26,198,706 metric tons. They fell to 14,929,193 metric tons in 2012.
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10. http://www.acore.org/files/pdfs/states/Nevada.pdf
11. http://www.seia.org/state-solar-policy/nevada
12. This requirement is separate from the 25% requirement for renewable energy generation under the state's RPS, but RECs generated by the replacement generation can be applied to the RPS. Senate Bill 123 (2013).
13. Nevada ranked seventh on GridWise's 2014 Grid Modernization Index. http://www.gridwise.org/uploads/reports/GWA_14_GridModernizationIndex_11_17_14Final.pdf
14. 2013: http://img.en25.com/Web/EatonElectrical/2013%20US%20Blackout%20Tracker%20Annual%20Report.pdf; 2014: http://powerquality.eaton.com/blackouttracker/default.asp?id=&key=&Quest_user_id=&leadg_Q_QRequired=&site=&menu=&cx=3&x=19&y=3
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16. https://www.caiso.com/Documents/NV_Energy-ISO-EnergyImbalanceMarketEconomicAssessment.pdf
17. Includes 5.8% of existing nuclear generation that EPA deems to be at-risk of retirement, and existing 2012 renewable generation.
18. http://powersuite.aee.net/bills/nv-sb-123-77?bill_search_id=61101
19. Western Resource Advocates (2014). Data compiled from EPA and utility Emission Reduction and Capacity Requirement (ERCR) planning.
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24. Navigant Consulting, Carbon Dioxide Reductions from Demand Response (Nov. 25, 2014), prepared for the Advanced Energy Management Alliance (AEMA) and included in AEMA's comments to EPA on the Clean Power Plan. http://aem-alliance.org/study-finds-significant-greenhouse-gas-savings-demand-response-group-urges-epa-incorporate-clean-power-plan/
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30. https://www.smartgrid.gov/sites/default/files/doc/files/Distribution Reliability Report - Final.pdf
31. ACEEE State and Utility Pollution Reduction (SUPR) Calculator http://aceee.org/state-and-utility-pollution-reduction-supr
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33. Up 10% from 2013, the U.S. ESCO market produced approximately $611.2 million in revenue in 2014, not including HVAC equipment ($4 billion nationally). The entire ESCO market is expected to continue growing at a rapid pace, reaching $10.6-$15.3 billion in total revenue by 2020. See Advanced Energy Now 2014 Market Report, http://info.aee.net/advanced-energy-now-2014-market-report
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