Nevada Policy Research Institute
analysis

The Economic Effects of Session 2013's SB123

Analysis reveals higher electricity rates, job losses will result from implementation

by Paul Bachman and Michael Head

Executive Summary

In the coming years, Nevada residents will come face-to-face with the state's energy policy as Senate Bill 123 is implemented. The law was passed by the 2013 Legislature and requires NV Energy to shut down its remaining coal-fired power plants by the year 2020.

In this analysis, the Beacon Hill Institute at Suffolk University looks into the economic implications of implementing the renewable energy bill. Using its State Tax Analysis Modeling Program — a five-year model programmed to simulate changes in the economy such as taxes and costs — researchers at Beacon Hill were able to estimate the shift in employment, disposable income, energy costs and more that will occur as SB123 is implemented.

As Nevada shifts to renewable energy sources in the coming years, energy rates for individual consumers as well as business and industry will increase, leading to eventual job losses in the thousands. In 2020, SB123 will cost the state over $100 million and lead to 2.8 percent increases in electricity.

By the time of full implementation, residential customers are estimated to pay an additional $40 each year for energy as a direct result of SB123. Commercial ratepayers are projected to face an additional $170 in energy costs each year, while industrial customers are expected to face rate hikes of $9,450.

In response to the increased cost of energy, 2,630 jobs are projected to be lost by 2020. And, as families and businesses adjust their spending behavior to account for higher energy bills, real disposable income within the state is projected to decline by $226 million per year and investments may drop by at least $29 million annually, though costly renewable energy projects may offset this loss somewhat.

Introduction

On June 11, 2013, Nevada adopted Senate Bill (SB) 123 that would close down the remaining coal-fired power plants controlled by NV Energy. The law stipulates that 800 megawatts (MWs) of coal capacity must be closed by 2020 and replaced with 350 MWs of renewable electricity generation technologies and 550 MWs from other sources.[1]

According to the U.S. Department of Energy's Energy Information Administration, in 2012 Nevada had 1075 MWs of coal capacity. Therefore, SB123 calls for closing 75 percent of the state's coal-fired capacity, the majority which was derived by the 557 MWs units at the Reid Gardner power station in Moapa.[2]

As of December 31, 2014, NV Energy closed 300 MWs of capacity from three generating units at Reid Gardner and the company intends to close the forth unit scheduled in 2017. NV Energy has also committed to divest from the Navajo Generating Station near Page, Ariz., by 2019. In all, the utility plans to end its association with 812 MWs of coal fired generation by 2020.[3]

Problematic plans

NV Energy plans to replace the lost capacity by buying two gas fired power plants (LV Cogen Unit 2 and Sun-Peak Generating) for $147 million and acquiring the proposed 350 MW Moapa Solar Energy Center solar near the site of the Reid Gardner power station. However, these plans have become problematic.

The Nevada Utility Commission twice rejected the Moapa Solar Energy Center plan. The commissioners voting against the plan cited cost of the plan, the lack of need for the electricity and lack of strong economic impact.[4] According to the Commission, when the Nevada Bureau of Consumer Protection asked NV Energy to model a combustion gas turbine in 2018 to in lieu of the Moapa project, the results showed that the turbine would only run for 2 hours in 2040 and idle the rest of the time.[5]

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1 Nevada Senate, Senate Bill 123, http://www.leg.state.nv.us/Session/77th2013/Bills/SB/SB123_EN.pdf

2 Sean Whaley, "NV Energy proposes shutting three of four Reid Gardner coal-fired units," *Las Vegas Review-Journal*, May 2014 http://www.reviewjournal.com/business/energy/nv-energy-proposes-shutting-three-four-reid-gardner-coal-fired-units.

3 Ibid.

4 Cy Ryan, "Commission rejects $438 million plan to build solar plant in Moapa Valley," *The Las Vegas Sun*, October 29, 2014, http://www.lasvegassun.com/news/2014/oct/29/reid-says-rejection-solar-plant/

5 Public Utilities Commission of Nevada, Docket 14-05003 http://pucweb1.state.nv.us/PDF/AXImages/Agendas/21-14/5463.pdf, (October 24, 2014):2.

The Commission's draft order identifies the essence of many state renewable energy laws. "It is simply a transfer of wealth from ratepayers to all of the entities that benefit from the construction and operation of the Moapa project."[6] This puts NV Energy in a bit of a bind since SB123 calls for the building of 350 MWs of new renewable energy to replace the lost coal plants.

Another issue with the plan is that NV Energy already had a contract to buy the power from the LV Cogen 2 plant, according the Federal Energy Regulatory Commissions (FERC) purchase filings. According to the filing,

> "From January 2004 through December 2013, Nevada Power purchased capacity and energy from LV Cogen II pursuant to the terms of a tolling agreement. For the summer of 2014, Nevada Power entered into a short-term tolling power purchase agreement with LV Cogen II for up to 224 MW of capacity and energy, and agreed to suspend the provisions of its tolling agreement with LV Cogen I for the same time period."[7]

If NV Energy has been purchasing the electricity generating capacity from the Cogen II for the past decade, then how does the purchase replace the capacity of Reid Gardner plant to Nevada's electricity generating resources? This is a bit like renting a 1,000 square foot house for a decade and then purchasing the house and claiming you added 1,000 square feet to you living space with the purchase.

Nevertheless, it appears that ownership of the assets satisfies the letter of the law. This fact points to the Commission's argument that the new generation is unnecessary. SB123 still requires NV Energy to acquire 350 MWs of renewable energy generation capacity.

The Beacon Hill Institute at Suffolk University (BHI) estimates the costs of SB123 and the impact on the state's economy. To that end, BHI applied its STAMP® (State Tax Analysis Modeling Program) to estimate the economic effects of SB123s.[8] We report the dollar values in 2012 Net Present Value dollars using a 3 percent discount rate. Table 1 displays the cost estimates and economic impact data for 2020.

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[6] Ibid, 2.

[7] U.S. Federal Energy Regulatory Commission, Docket No. EC14-84-000, Order Conditionally Authorizing the Acquisition and Deposition of Jurisdictional Facilities, http://www.ferc.gov/CalendarFiles/20141029152459-EC14-84-000.pdf, (October 29, 2014): 3.

[8] Detailed information about the STAMP® model can be found at http://www.beaconhill.org/STAMP_Web_Brochure/STAMP_HowSTAMPworks.html and http://beaconhillinstitute.blogspot.com/2014/05/in-defense-of-stamp-as-tax-modeling-tool.html.

In order to estimate the impact of S.B. 123, we need to make some assumptions about how NV Energy will comply with the law. First, we assume that acquisition of the gas fired plants Cogen I, Cogen II and Sun Peaking will simply replace the electricity that NV Energy was purchasing from the existing owners, so that this transaction is essentially a wash. Second, we assume that NV Energy will eventually win approval for 350 MWs of solar energy projects from the Nevada Utility Commission and the energy will come online in 2020 as the law requires.

We estimate that SB123will cost Nevada $101 million in 2020 and drive up electricity prices in Nevada by 0.25 cents per Kilowatt hour, or 2.8 percent.

These increases in energy prices would inflict harm on the Nevada economy. The state economy would shed 2,630 jobs by 2020. The job losses and price increases would combine to reduce real incomes as firms, households and governments spend more of their budgets on energy and less on other items, such as home goods, entertainment and clothing. As a result, real disposable income would fall by $226 million per year by 2020. Furthermore, annual investment in the state would fall by $29 million. The investment loses are mildly offset by the need to increase investment in other electricity technologies.

Table 1: The Cost and Economic Impact of S.B. 123 on Nevada (2012 $)

Net benefits (cost)	
Total net cost to Nevada in 2020 (millions $)	101
Total net cost to Nevada 2015 - 2025 (millions $)	617
Electricity price change (cents per kWh)	0.25
Percent change (%)	2.8
Total Employment (Jobs)	-2,630
Investment ($ millions)	-29
Real Disposable Income ($ millions)	-226
Cost to ratepayers in 2020	**($)**
Residential Ratepayer	40
Commercial Ratepayer	170
Industrial Ratepayer	9,450

The bottom of Table 1 shows how SB123 will affect the average annual electricity bills of households and businesses in Nevada. In 2020, the law is expected to cost families an additional $40 per year; commercial businesses $170 per year; and industrial businesses $9,450 per year.

Conclusion

The passage of SB123 requires NV Energy to close 812 MWs of coal generation capacity and replace it other generation technologies, including 350 MWs of renewable generation capacity. Nevada will experience higher electricity costs than it otherwise would without this new generation.

The Nevada Public Utility Commission called the Moapa Solar Energy Center solar plant unnecessary and "a transfer of wealth from ratepayers to all of the entities that benefit from the construction and operation of the Moapa project."[9] This analysis applies to almost all state renewable energy policies because the renewable energy technologies have proved more expensive and unreliable in the past and will likely prove so in the future.

The higher electricity costs harm the state's industrial base. The state will experience declines in employment, wages, disposable income and investment upon implementation of the policy. Nevada policymakers need to be aware of these consequences that come with SB123.

Methodology

To calculate the cost of SB123, we need to compare the cost of the new solar plant required by the law with the value of that new electricity to Nevada's electricity grid. First, we transform the nameplate capacity from MWs into Megawatt hours (MWhs). To do so, we multiply the nameplate capacity by the potential production per year, which is 24 hours multiplied by 365 days in a year and the actual capacity that was produced per year in 2012 (17 percent for solar and 30 percent for coal).

With this calculation in place, we looked at the cost to provide a MWh of each type of renewable energy, or the Levelized Cost of Electricity (LCOE) versus the value of that MWh, or the Levelized Avoided Cost of Electricity (LACE).[10] Using annual projections of the Southwest Powerpool / North LCOE and LACE Reference case we were able to determine the economic value of the 350 MWs of solar power. The solar LACE numbers were only presented for 2017 onwards. To complete our study we needed data for the years 2015 and 2016. To approximate the avoided cost in these years, we calculated the annual growth rate displayed in the data for years 2017 through 2030 and worked backwards.

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[9] Public Utilities Commission of Nevada, Draft application of NV Energy, Docket No. 14-05003 (October 24, 2014) http://pucweb1.state.nv.us/PDF/AXImages/Agendas/21-14/5463.pdf.

[10] Energy Information Administration, "Assessing the Economic Value of New Utility-Scale Electricity Generation Projects," *(July 2013) http://www.eia.gov/renewable/workshop/gencosts/pdf/lace-lcoe_070213.pdf.

We calculated the difference between the LCOE for solar power against the LACE of the conventional coal plant. We use the 2015 values for 15 MW project at the Nellis Air Force Base and the 2020 values for the additional 335 MWs that are require by 2020.

The total cost of the policy divided by the amount of electricity consumed in the state yields a percent cost of the policy.

STAMP Simulations

BHI utilized its STAMP (State Tax Analysis Modeling Program) model to identify the economic effects and understand how they operate through a state's economy. STAMP is a five-year dynamic CGE (computable general equilibrium) model that has been programmed to simulate changes in taxes, costs (general and sector-specific) and other economic inputs. As such, it provides a mathematical description of the economic relationships among producers, households, governments and the rest of the world. It is general in the sense that it takes all the important markets, such as the capital and labor markets, and flows into account. It is an equilibrium model because it assumes that demand equals supply in every market (goods and services, labor and capital). This equilibrium is achieved by allowing prices to adjust within the model. It is computable because it can be used to generate numeric solutions to concrete policy and tax changes.[11]

We simulated these changes in the STAMP model as a percentage price increase on fuel to measure the dynamic effects on the state economy. The model provides estimates of the proposals' impact on employment, wages and income in Nevada. Each estimate represents the change that would take place in the indicated variable against a "baseline" assumption about the value that variable for a specified year in the absence of the cap-and-trade policy.

In order to estimate the economic effects of the policy we used a compilation of six STAMP models to garner the average effects across various state economies: New York, Pennsylvania North Carolina, Indiana, Kansas, and Washington. These models represent a wide variety in terms of geographic dispersion (Northeast, Southeast, Midwest, the Plains and West), economic structure (industrial, high-tech, service and agricultural), and electricity sector makeup.

Using three different utility price increases – 1 percent, 4.5 percent and 5.25 percent – we

[11] For a clear introduction to CGE tax models, see John B. Shoven and John Whalley, "Applied General-Equilibrium Models of Taxation and International Trade: An Introduction and Survey," Journal of Economic Literature 22 (September, 1984): 1008. Shoven and Whalley have also written a useful book on the practice of CGE modeling entitled Applying General Equilibrium (Cambridge: Cambridge University Press, 1992).

simulated each of the six STAMP models to determine what outcome these utility price increases would have on each of the six states' economy. We then averaged the percent changes together to determine the average effect of the three utility increases. Table 6 displays these elasticities, which were then applied to the calculated percent change in electricity costs for the state as discussed above.

Table 6: Elasticities for the Economic Variables

Economic Variable	Elasticity
Employment	-0.022
Investment	-0.018
Disposable Income	-0.022

We applied the elasticities to percentage increase in electricity price and then applied the result to state level economic variables to determine the effect of the policy. These variables were gathered from the Bureau of Economic Analysis Regional and National Economic Accounts as well as the Bureau of Labor Statistics Current Employment Statistics.[12]

Ratepayer Effects

To calculate the effect of the policy on electricity ratepayers, we used EIA data on the average monthly electricity consumption by type of customer: residential, commercial and industrial.[13] The monthly figures were multiplied by 12 to compute an annual figure. We inflated the 2012 figures for each year using the regional EIA projections of electricity sales.[14]

We calculated an annual per-kWh increase in electricity cost by dividing the total cost increase — calculated in the section above — by the total electricity sales for each year. We multiplied the per-kWh increase in electricity costs by the annual kWh consumption for each

[12] For employment, see the following: U.S. Bureau of Labor Statistics, "State and Metro Area Employment, Hours, & Earnings," http://bls.gov/sae/. Private, government and total payroll employment figures for Nevada were used. For investment, see "National Income and Product Account Tables," U.S. Bureau of Economic Analysis, http://www.bea.gov/itable/. See also BEA, "Gross Domestic Product by State," http://www.bea.gov/regional/. We took the state's share of national GDP as a proxy to estimate investment at the state level. For state disposable personal income, see "State Disposable Personal Income Summary," BEA, http://www.bea.gov/regional/.

[13] Energy Information Administration, "Electric Sales, Revenue, and Average Price," at http://www.eia.gov/electricity/sales_revenue_price/.

[14] Energy Information Administration, "Table 94. Electric Power Projections by Electricity Market Module Region," http://www.eia.gov/forecasts/aeo/tables_ref.cfm.

type of ratepayer for each year. For example, we expect the average residential ratepayer to consume 12,070 kWh of electricity in 2020 and the expected percent rise in electricity is 2.8 percent of the baseline residential electricity price of 11.77 cents per kWh in the same year. Therefore, we expect residential ratepayers to pay an additional $40 in 2020.

About the Authors

Paul Bachman is Director of Research at BHI. He manages the institute's research projects, including the development and deployment of the STAMP model. Mr. Bachman has authored research papers on state and national tax policy and on state labor policy. Each year, he produces the institute's state revenue forecasts for the Massachusetts legislature. He holds a Master of Science in International Economics from Suffolk University.

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The Beacon Hill Institute at Suffolk University in Boston focuses on federal, state and local economic policies as they affect citizens and businesses. The Institute conducts research and educational programs to provide timely, concise and readable analyses that help voters, policymakers and opinion leaders understand today's leading public policy issues.

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