State energy factsheet: Nevada

Contents

This report provides a fact-based overview of Nevada's power sector. It presents key metrics, highlights recent trends and discusses the outlook and opportunities for clean energy.

Findings

- Nevada (NV) consumes nearly as much electricity as it produces; its retail electricity prices are below the US average; and it maintains a relatively clean generation profile, dominated by natural gas (which has provided over 64% of in-state generation every year since 2010).
- Coal's share of the power mix fell from 20% in 2010 to 7% in 2015, and over 500MW of coal plants are slated to retire through 2021. Meanwhile, renewables have become more important: renewable energy generation grew from 13% in 2010 to 19% in 2015, as the state added 1GW of utility-scale renewable capacity over that period.
- NV saw the only solar thermal project commissioned in the US in 2015. Rooftop solar uptake slowed in the beginning of 2016 due to a change in the state's net metering policy.
- In 2015, NV's investor-owned utilities (IOUs) spent less than utilities in nearby states on energy efficiency, and the state's incremental annual energy efficiency savings have fallen since 2009.

Table 1: Key power system metrics, Nevada versus US average, 2015

Metric	Units	NV	US average	Comment	Rank
Total retail electricity sales	TWh	36	74	***Below average*** electricity demand	33
Total generation	TWh	39	80	***Below average*** in-state generation	35
Retail electricity sales per capita	MWh	12.5	11.7	***Above average*** per capita demand	27
Retail electricity prices	¢/kWh	9.5	10.5	***Below average*** electricity prices	28
Generation from gas	%	74	33	***Above average*** reliance on gas for electricity	3
Generation from gas and renewables	%	93	47	***Above average*** reliance on gas and renewables	6
Energy efficiency score	ACEEE index	12	19	***Below average*** on efficiency efforts	37
Utility energy efficiency budget*	% state revenue	1.3	1.6	***Roughly average*** utility efficiency budget	21
CO2 emissions rate	tCO2/MWh	.37	.49	***'Cleaner' than average*** generation profile	40

Source: Bloomberg New Energy Finance, US Energy Information Administration, US Census Bureau, ACEEE
Notes: US 'average' represents a simple average across all 50 states, with the exception of retail prices and retail sales per capita (both are a weighted average). US ranks are in descending order (ie, 1 being highest, 50 being lowest). For some metrics it is 'good' to have a high ranking (eg, energy efficiency score); for other metrics it is 'good' to have a low ranking (eg, retail electricity prices, CO2 emissions rate).

Nathan Serota

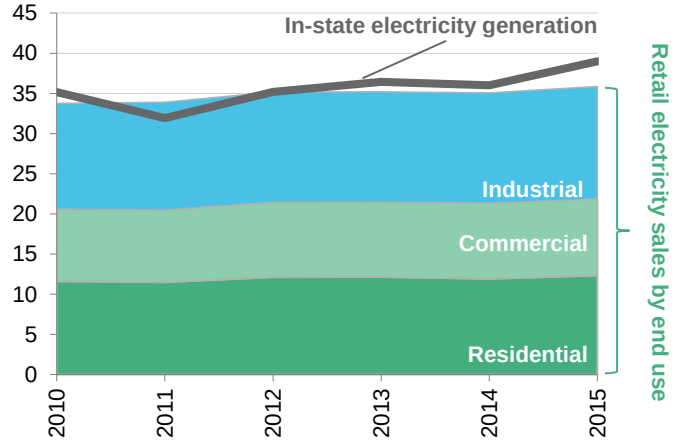
Rachel Jiang

Colleen Regan

1. BIRD'S EYE VIEW OF NEVADA'S POWER SECTOR

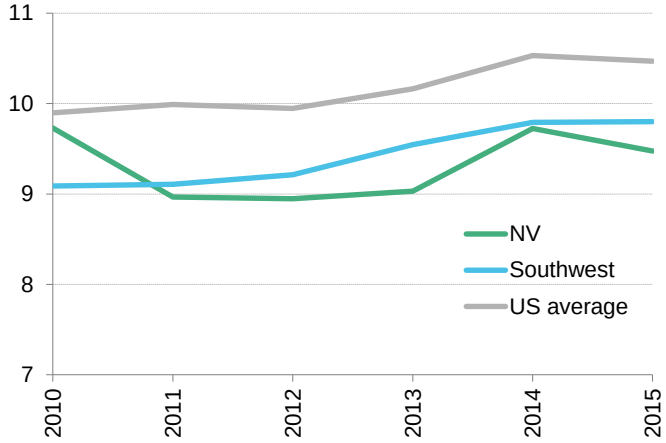
Nevada (NV) consumes nearly as much electricity as it produces (36TWh of consumption versus 39TWh of generation in 2015), with industrial, residential and commercial customers accounting for 39%, 34% and 27% of retail sales, respectively (Figure 1). Net exports have grown in recent years as in-state generation increased at a compound annual growth rate of 2.1% from 2010-2015, while retail sales grew only 1.3% annually over the same time period.

Figure 1: NV electricity sales and generation, 2010-15 (TWh)



Source: Bloomberg New Energy Finance, EIA

Figure 2: NV electricity prices relative to regional (Southwest) and US averages, 2010-15 (¢/kWh)



Source: Bloomberg New Energy Finance, EIA Notes: 'Southwest' includes Arizona, Colorado, Nevada, New Mexico and Utah.

Retail electricity prices have risen slightly since 2011-13, when they averaged 9¢/kWh, but fell slightly year-on-year to settle at 9.5¢/kWh in 2015. Prices remain well below the 2007-10 average of 10¢/kWh, and the national average of 10.5¢/kWh observed in 2015. Nevada is just below the regional average in the Southwest (Figure 2).

Gas is a staple of Nevada's power mix: gas-fired plants provided 74% of in-state generation in 2015 (another year of record-low natural gas fuel prices) and have generated no less than 64% of the mix in any year since 2010 (Figure 3). Gas-fired capacity accounted for 65% of the state's fleet in 2015, up from only 43% in 2001, owing to the addition of 5.2GW of gas capacity (and the retirement of 1.9GW of coal capacity) over that period (2001-15) (Figure 4).

Figure 3: NV electricity generation mix by technology, 2010-15 (%)

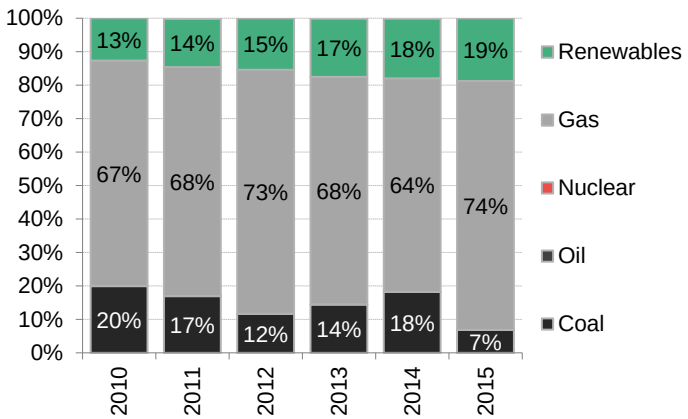
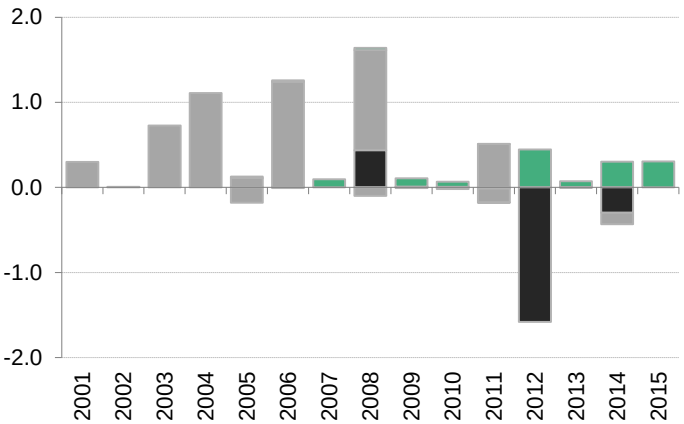


Figure 4: NV capacity additions (build, above x-axis) and retirements (below x-axis), 2001-15 (GW)



Source: Bloomberg New Energy Finance, EIA Note: Oil too small to see on figure. Nevada has no nuclear capacity. Generation only includes production from utility-scale units.

Table 2: NV policies relevant to sustainable energy sectors

Renewables
Renewable portfolio standard (RPS)
Requires investor-owned utilities (IOUs) and retail suppliers to procure 25% of electricity from renewable energy (or energy efficiency, see below) by 2025.
Solar carve out
Requires 5% of annual RPS requirement be met by solar through 2015 (1.2% of sales in 2015); 6% for 2016-2025 (1.5% of sales in 2025).
Net metering
Provides customers with net excess generation (NEG) from eligible systems (<1MW) with a kWh credit on their bill. Currently transitioning from a retail rate credit to a wholesale rate credit.
Emissions Reduction and Capacity Replacement (ERCR)*
Requires Nevada Power to retire (or eliminate ownership of) at least 800MW of coal by 2020 and calls for at least 350MW of renewable energy replacement capacity.
Energy efficiency
Allows IOUs to use energy efficiency savings to meet 25% of RPS requirement in 2014 (20%, 2015-18; fading to zero by 2025). Of this, at least 50% must come from energy efficiency measures installed at the homes of residential customers.

Source: Bloomberg New Energy Finance, DSIRE, Public Utilities Commission of Nevada Notes: (*) Mandated by Senate Bill 123, passed in 2013.

As renewable energy generation grew (from 13% in 2010 to 19% of annual generation in 2015, driven by geothermal, solar and wind) coal generation trended downwards (it fell from 20% to 7% over that same period (Figure 3). Additionally, with just over 500MW of coal-fired capacity scheduled to be retired from 2017-2021, coal's share looks to decrease further. (Nevada Power, one of two investor-owned utilities (IOUs) in the state,[1] announced plans to retire 557MW of coal capacity between 2014 and 2017 (and eliminate its ownership interest in another 255MW by 2020) in order to comply with state legislation passed in 2013 (see Table 2).[2]

2. SUSTAINABLE ENERGY DEPLOYMENT

2.1. Natural gas

As the share of natural gas in the state's electricity mix grew, so too did the amount of gas burned for electricity in NV (similar to neighboring Arizona, as shown in Figure 5). Increased natural gas production flowing out of the Appalachian Basin in the Northeast US has disrupted historical natural gas flows and driven prices down nationwide (including in NV, Figure 6). This drop in gas prices has improved the economics of gas-fired generation.

Figure 5: NV and neighboring states' natural gas consumption from the power sector, 2010-15 (Bcfd)

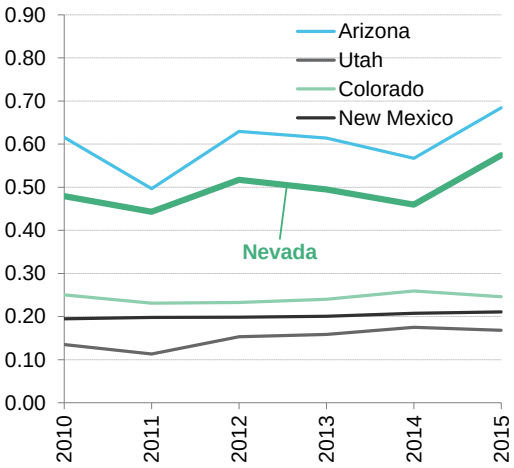
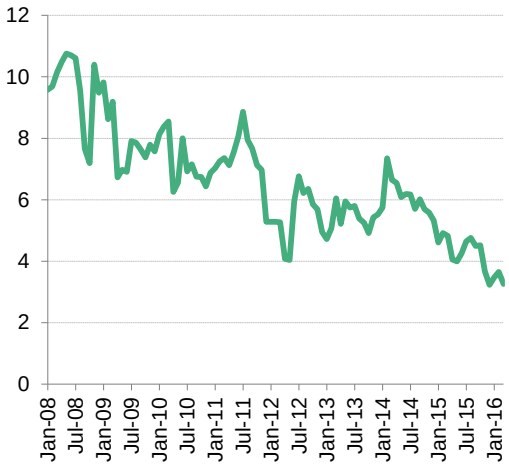


Figure 6: NV natural gas price (citygate), 2010-15 ($/MMBtu)



Source: Bloomberg New Energy Finance, EIA Note: 'Citygate' (Figure 6) refers to the point at which a distribution gas utility receives gas from a natural gas pipeline company or transmission system.

Falling natural gas prices benefit gas-fired electricity generators who often compete with coal-fired power plants based on their fuel costs. As policy-driven retirement decisions and generator economics make coal less attractive, the state will increasingly rely on natural gas, renewables and demand-side resources (such as energy efficiency and demand response) to satisfy its electricity needs – in particular, its acute demand for electricity in the summer.

1 The other is Sierra Pacific Power Company. Both Nevada Power and Sierra Pacific are subsidiaries of parent company NV Energy.

2 Nevada Power Company, Emissions Reduction and Capacity Replacement Plan Summary, May 2014.

2.2. Renewables

Nevada has a *mandatory* renewable portfolio standard (RPS) requiring 25% of electricity sales to come from renewables by 2025 and stipulating that a minimum of 1.5% of sales be met by solar (Table 2). In 2015, renewables provided 19% of electricity generation, mostly from hydro and geothermal. Between 2010 and 2015, NV built 1GW of utility-scale renewables, including 683MW of utility-scale solar PV and 110MW of solar thermal, (Figure 7), along with 146MW of distributed solar (Figure 9), bringing cumulative installed renewable capacity to 2.6GW (Figure 8).

NV has 950MW of utility-scale solar PV and solar thermal installed

Figure 7: NV annual renewable capacity additions, 2010-15 (MW)

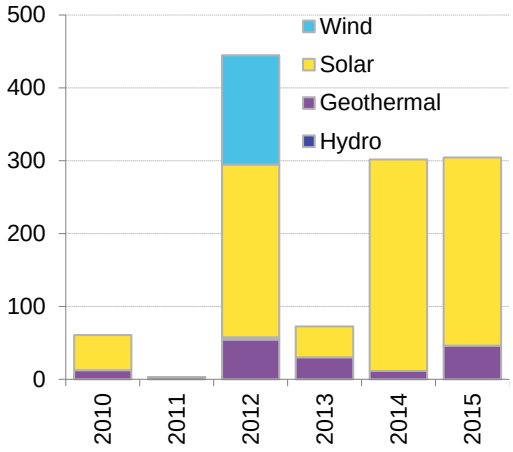
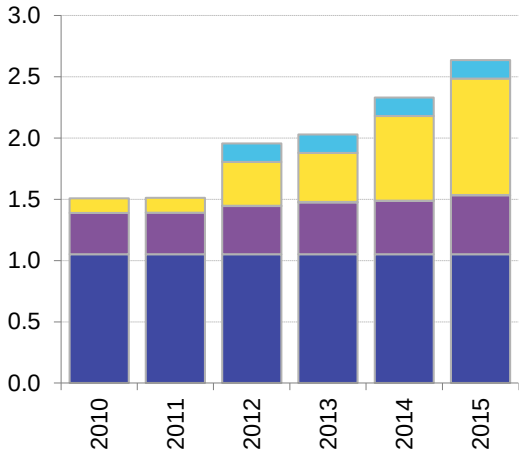
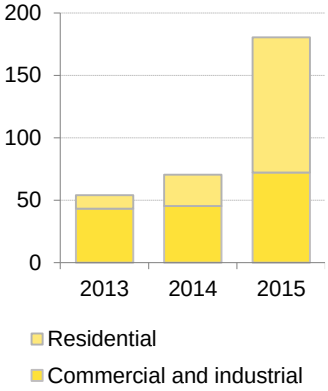


Figure 8: NV cumulative renewable capacity, 2010-15 (GW)



Source: Bloomberg New Energy Finance, EIA Note: includes BNEF data on distributed (ie, residential, commercial, and industrial) solar capacity. Solar numbers are given in DC MW.

Figure 9: NV cumulative installed distributed solar PV capacity, 2013-15 (MW)



Source: Bloomberg New Energy Finance

Notably, while geothermal development has lagged behind other renewables nationally, the technology has had some success in Nevada, home to two of only three geothermal projects commissioned in 2015. Nevada is also one of the only three states to boast solar thermal capacity, and in 2015 it was the lone state to commission a solar thermal project.

Solar PV has been the technology of choice since 2010: in particular, the state saw 27MW of commercial and industrial PV and 83MW of residential PV build in 2015, bringing total installed distributed capacity to 180MW (highlighted in Figure 9). And in 2016, MGM Resorts commissioned the country's largest solar rooftop solar array, at 6.4MW, atop its Mandalay Bay casino in Las Vegas.[3] Meanwhile, NV Energy has recently completed three requests for proposals (RFPs) for renewable energy, the latest of which will result in a new 100MW solar PV project at a historically low contract price of $33/MWh.

An update to the state's net energy metering (NEM) policy in late 2015, however, has already put the brakes on the roll-out of rooftop solar and triggered the departure of solar developers SolarCity, Sunrun and Vivint. Effective 1 January 2016, the ruling by the Public Utilities Commission recalibrated the fixed versus variable rate composition of customer bills, meaning that a smaller share of electric bills can be offset through self-generation. Additionally, compensation for excess production exported to the grid will transition from the full retail rate to the wholesale rate over the next 12 years, roughly equal to a 70% cut. Although the state's action initially moved existing customers over to the new regime, a ruling in September 2016 'grandfathered in' existing customers at the old rates – thus, applying the new rules to future customers only. Nevada had held the

3 This installation is not included in our numbers in Figures 7-9, as 2016 state-wide estimates are not yet available.

position of third-largest residential solar PV market (ie, third-most active in terms of rooftop solar permit applications) in the country, as of the fourth quarter of 2015; in Q1 2016, the state dropped out of the top 10, according to BNEF estimates.[4] However, the NEM debate is not over, and there is potential for further revisions to the policy. To this end, a bill is likely to appear before the legislature in 2017.

2.3. Energy efficiency

The American Council for an Energy Efficient Economy (ACEEE) scored NV as below average (ranking 37th in the country with a 12 out of 50) for its overall energy efficiency programs and policies in 2015. Figure 10 shows NV's annual electricity revenues (black bars, left axis, $bn) and energy efficiency spending (green line, right axis, $m) from 2011 to 2015 and Figure 11 shows how NV stacks up against nearby states on energy efficiency spending.

Utilities in NV spent less on energy efficiency than utilities in nearby states in 2014

Figure 10: NV utility electricity revenues (left axis, $bn) and electricity efficiency spending (right axis, $m), 2011-15

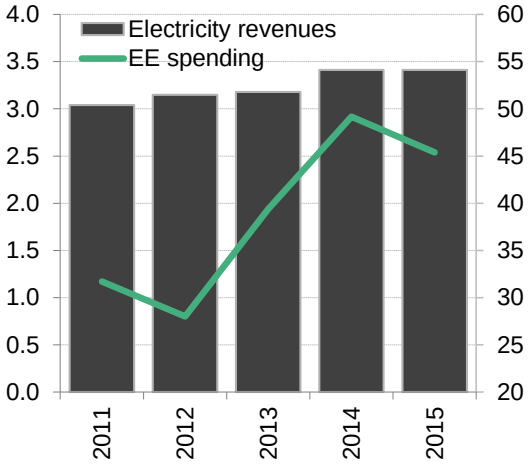
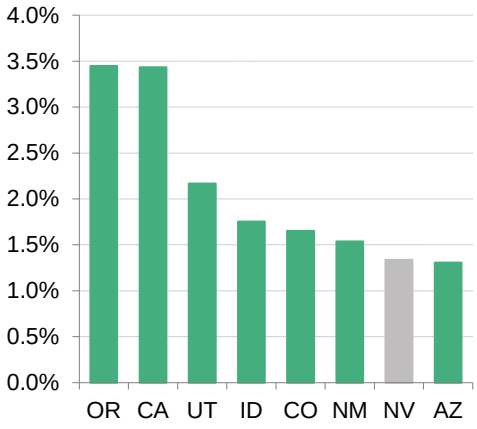


Figure 11: States' utility electricity efficiency spending as a fraction of state-wide electricity revenue, 2015 (%)



Source: ACEEE, Nevada Public Utilities Commission Note: EE budget includes share of budget from BPA incentive dollars.

Between 2005 and 2009, the state's IOUs grew their energy efficiency programs to a level of 1.5% annual savings in 2009. However, annual energy efficiency savings have since dropped to half of this amount, according to ACEEE; and in 2013, the legislature voted to gradually phase out energy efficiency from the state's RPS.

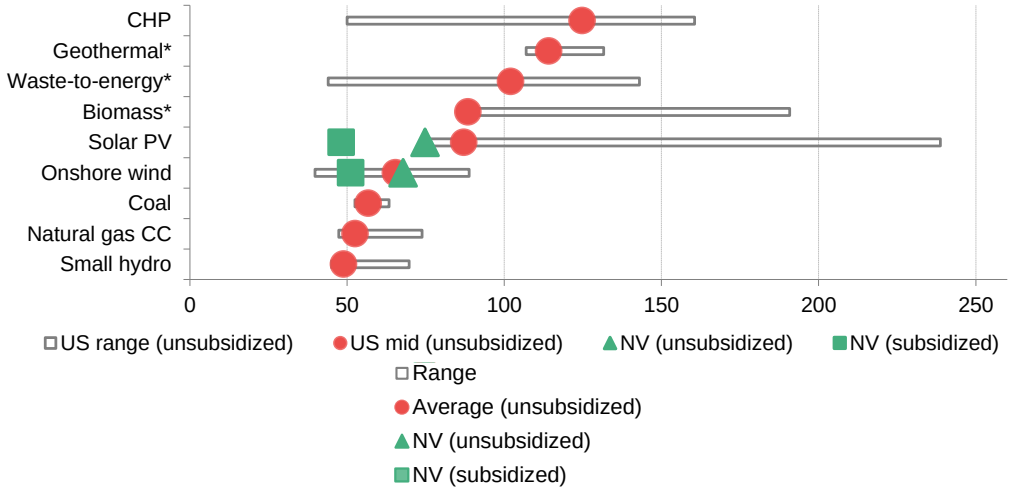
3. OPPORTUNITIES

The Bloomberg New Energy Finance levelized cost of electricity (LCOE) analysis compares the cost of producing electricity from different utility-scale technologies in the US (Figure 12). The red circles show US averages (prior to the inclusion of policy – ie, unsubsidized); the green triangles and squares show subsidized and unsubsidized Nevada-specific LCOEs, respectively, for utility-scale onshore wind and solar PV.

4 Bloomberg New Energy Finance, US Residential PV Tracker: Q1 2016 review, May 2016.

Figure 12: Unsubsidized levelized cost of electricity (LCOE) of select utility-scale technologies in the US compared to subsidized and unsubsidized LCOE of utility-scale onshore wind and solar PV in NV, H1 2016 ($/MWh)

Wind and solar PV are already economically viable in Nevada



*Source: Bloomberg New Energy Finance Notes: *LCOE for waste-to-energy and geothermal in this report are global estimates, as opposed to all other LCOEs in Figure 12, which are either US or NV-specific. Variations in NV versus US average result from variations in capacity factor, capex and financing rates. Bars indicate the range of unsubsidized LCOE for each technology in the US. Key policies such as the $23/MWh Production Tax Credit (PTC) and accelerated depreciated (MACRS) bring down unsubsidized LCOEs to subsidized levels. LCOE for combined heat and power (CHP) is for reciprocating engines with CHP. LCOE for small hydro assumes 58% capacity factor, but this can vary significantly depending on annual rainfall conditions.*

Renewables

- NV has a broad scope of renewable technologies to consider. The LCOE analysis indicates that, in NV, utility-scale wind and solar PV are within striking distance of economic viability without incentives (unsubsidized LCOE encroaching on natural gas combined-cycle turbines). After accounting for incentives, utility-scale solar PV is among the lowest-cost options available in the state; wind is also competitive.
- The state is one of only a few in the US with potential for additional geothermal development, endowed with both a favorable resource potential and the technological know-how of the nation's largest geothermal developer (Ormat Technologies). Other renewables, from waste-to-energy to biomass and hydro, could potentially play larger roles in NV, if provided stronger support from policymakers and utilities alike.
- Residential solar PV was formerly the fastest growing renewable technology in the state, driven by its unique value proposition and market environment. Unlike the utility-scale technologies shown in Figure 12, which sell their output on the wholesale market, residential solar PV (not shown in Figure 12) competes against retail electricity rates, which are generally much higher than wholesale rates. However, the move away from full retail rate compensation and a shift towards higher fixed costs on Nevadans' electric bills has made the calculus for residential PV less favorable, diminishing its growth prospects.
- At the same time, utility-scale renewables may benefit from growing direct energy procurement by corporate consumers. In 2016, MGM Resorts (NV Energy's largest customer) received approval from the state's PUC to opt out of NV Energy's service territory, and has agreed to pay an $87m fee. According to MGM, the desire to procure more renewable energy and to reduce its energy consumption was a key driver of the move. Other casinos, including The

Wynn and Sands, have also filed dockets with the PUC to exit NV Energy's service, but so far have been deterred by the exit fees.

Natural gas

- Nevada's gas-fired fleet is well positioned to benefit from the sea change in US gas markets: with ever-growing production out of the Appalachian Basin (in the Northeast US) crowding out supplies from the west (particularly from the Rockies and San Juan Basin), and without much demand growth in the west, gas prices in Nevada should remain low through 2017.
- Currently, Nevada has seven operational systems that product renewable natural gas, and, according to research from the American Biogas Council, the state has the potential for over 30 additional projects to produce biomethane.

Energy efficiency

- While NV's annual energy efficiency savings and spending have slowed in recent years, the state's utilities are piloting technology-enabled demand-side management programs (eg, NV Energy's recent partnerships with EcoFactor and BuildingIQ focused on residential and commercial demand response, respectively).
- Scaling up such programs can not only play a critical role in helping the state meet its summer peak demand for electricity through demand response (especially as coal-fired capacity comes offline), but it can also lay the infrastructure necessary to return to historical levels of annual energy efficiency savings.

Other opportunities

In February 2016, the governor reconvened the state's New Energy Industry Task Force (first established in 2009) to encourage the continued deployment and integration of renewable energy and storage technologies within the state, alongside energy efficiency and other demand-side measures. The group has specifically been charged with addressing the recent changes to the net metering program. The Task Force's recommendations for the legislature released in May 2016 include the following:

- Enabling Property Accessed Clean Energy (PACE), a method of financing renewable energy or energy efficiency projects by adding an assessment to the building's tax bill, effectively meaning that the property owner does not have to make a large upfront capital outlay.
- Requiring utilities in their integrated resource planning (IRP) processes to prioritize measures that reduce demand, and to increase the supply of technologies that provide the greatest economic and environmental benefits, while simultaneously minimizing carbon and fuel-price risk.
- Granting the authority to the Public Utilities Commission to study decoupling, which would encourage utilities to establish energy efficiency programs.
- Finally, in an amendment to the recommendations, limiting the proportion of electricity derived from fossil fuels to 60% by 2026, ratcheting down to 55% by 2033 and 40% by 2040, for customers of public utilities.

About Us

Subscription details

sales.bnef@bloomberg.net

Contributors

Nathan Serota
Associate, US Solar and Clean Energy Economics

Rachel Jiang
Analyst, US Power and Environmental Markets

Colleen Regan
Head of North American Environmental Markets and Cross-sector Analysis

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