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 state's path to compliance with the Environmental Protection Agency's (EPA) Clean Power Plan.

Findings

- Nevada (NV) consumes nearly as much electricity as it produces; its retail electricity prices are below the US and regional (Southwest) averages; and it maintains a relatively clean generation profile, dominated by natural gas (which has provided over 67% of in-state generation every year since 2008).
- Coal's share of the power mix fell from 22% in 2008 to 14% in 2013, and over 500MW of coal plants are slated to retire between 2014 and 2017. Meanwhile, renewables have become more important: renewable energy generation grew from 9% in 2008 to 18% in 2013, as the state added 760MW of utility-scale renewable capacity over that period.
- NV saw the only two geothermal projects commissioned in the US in 2014 and we estimate that it is the third largest residential solar market in the country (through the first quarter of 2015).
- In 2013, 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.
- Early action taken by the state has put it on track to exceed its 2030 mass compliance target under the Clean Power Plan (CPP).

Table 1: Key power system metrics, Nevada versus US average, 2013

Metric	Units	Nevada	US average	Comment	Rank
Total retail electricity sales	TWh	35	72	***Below average*** electricity demand	35
Total generation	TWh	36	80	***Below average*** in-state generation	35
Retail electricity sales per capita	MWh/ resident	12.6	11.6	***Above average*** per capita demand	27
Retail electricity prices	¢/kWh	9.0	10.1	***Below average*** electricity prices	30
Generation from gas	%	68	28	***Above average*** use of gas for electricity	3
Generation from gas and renewables	%	86	41	***Above average*** use of gas and renewables for electricity	7
Energy efficiency score	ACEEE index	13.0	19.2	***Below average*** on efficiency efforts	33
Utility energy efficiency budget	% state revenue	1.59	1.13	***Above average*** utility efficiency budget	21
CO2 emissions rate	tCO2/ MWh	0.42	0.52	***Cleaner than average*** generation profile	36
2030 CPP CO2 emissions reductions-mass goal	% cut from 2012	13	23	***Below average*** 'ask' for CPP mass reduction goal	40

Source: Bloomberg New Energy Finance, EIA, US Census Bureau, ACEEE Notes: US ranks are in descending order (ie, 1 being highest, 50 being lowest). For some metrics i t is 'good' to have a high ranking (eg, generation from renewables, energy efficiency score); for other metrics it is 'good' to have a low ranking (eg, retail electricity prices, CO2 emissions rate).

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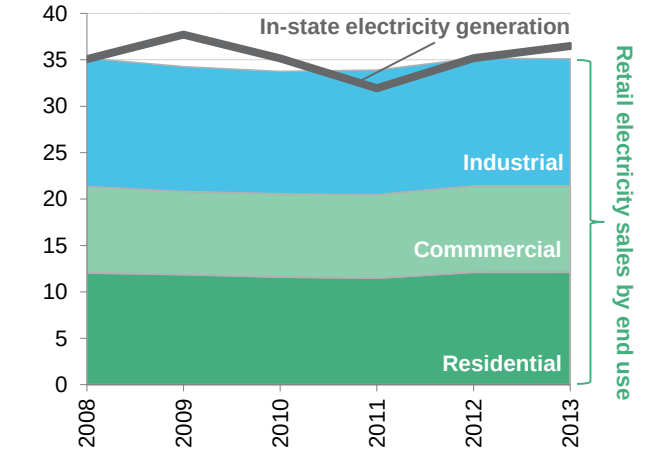
1. BIRD'S EYE VIEW OF NEVADA'S POWER SECTOR

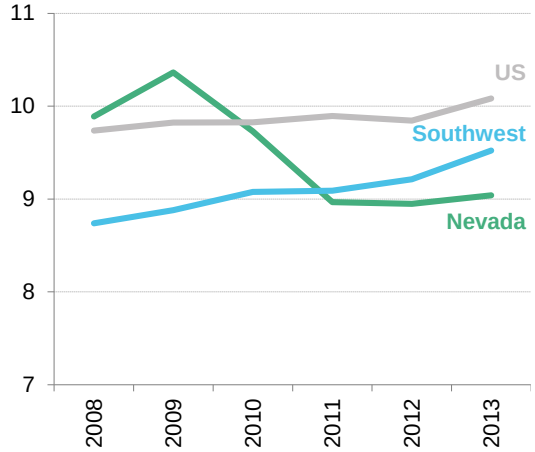
Nevada (NV) consumes nearly as much electricity as it produces (35TWh of consumption versus 36TWh of generation in 2013), with industrial, residential and commercial customers accounting for 39%, 35% and 26% of retail sales, respectively (Figure 1).

Figure 1: NV electricity sales and generation, 2008-13 (TWh)



Source: Bloomberg New Energy Finance, EIA

Figure 2: NV electricity prices relative to regional (Southwest) and US averages, 2008-13 (¢/kWh)

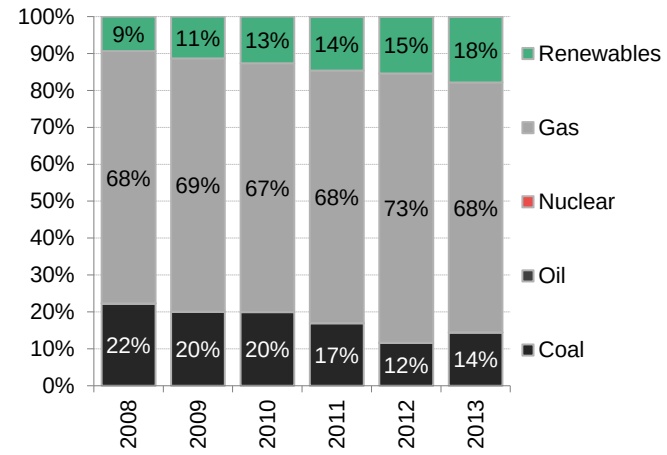


Source: Bloomberg New Energy Finance, EIA Notes: 'Southwest' includes Arizona, Colorado, Nevada, New Mexico and Utah.

Retail electricity prices have fallen since 2009, averaging 9¢/kWh from 2011-13, 9% below 2008 levels in the state, while regional average prices in the Southwest have grown (Figure 2).

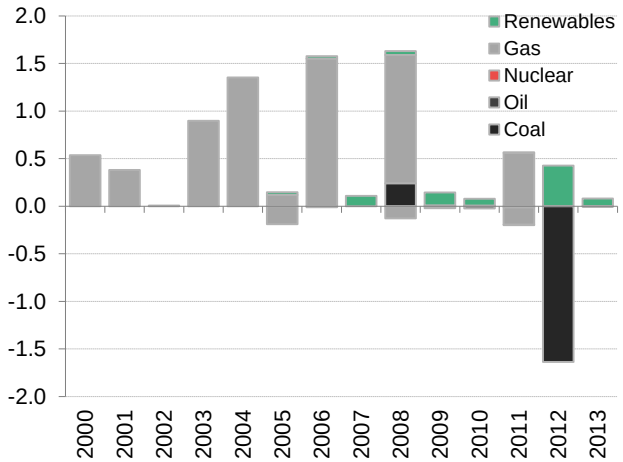
Gas is a staple of NV's power mix: gas-fired plants provided 73% of in-state generation in 2012 (a year of record-low natural gas fuel prices) and have generated no less than 67% of the mix in any year since 2008 (Figure 3). Gas-fired capacity accounted for 70% of the state's fleet in 2013, up from 50% in 2000, owing to the addition of 6.8GW of gas capacity (and the retirement of 1.6GW of coal capacity) over that period (2000-13) (Figure 4).

Figure 3: NV electricity generation mix by technology (%)



Source: Bloomberg New Energy Finance, EIA Note: Oil too small to see on figure. Nevada has no nuclear capacity.

Figure 4: NV utility-scale capacity additions (build, above x-axis) and retirements (below x-axis), 2000-13 (GW)



Source: Bloomberg New Energy Finance, EIA Note: Nevada neither added nor retired any nuclear or oil capacity between 2000 and 2013.

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 systems (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. Total program capacity capped at 3% of peak capacity for all NV utilities.
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 9% in 2008 to 18% of annual generation between 2008 and 2013, driven by geothermal, solar and wind) coal generation trended downwards (it fell from 22% to 14% over that period) (Figure 3). Nevada Power, one of two investor-owned utilities (IOUs) in the state,[1] 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

The amount of gas burned for electricity in NV held steady from 2008-13 (similar to in other states in the Southwest, 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, 2008-13 (Bcfd)

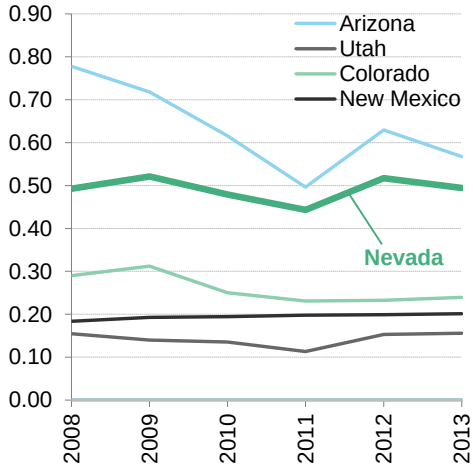


Figure 6: NV natural gas price (citygate), 2008-13 ($/MMBtu)

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.

2.2. Renewables

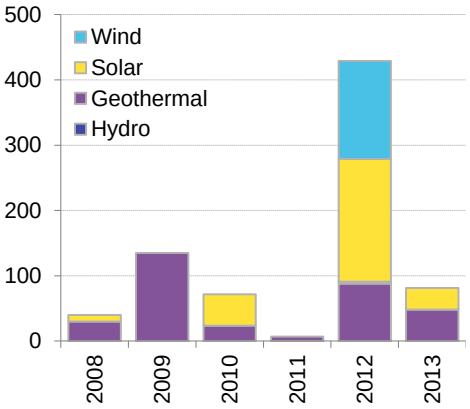
NV has a *mandatory* renewable portfolio standard (RPS) requiring 25% of electricity sales to come from renewables by 2025 and stipulating that a minimum of 1.5% of sales be met by solar (Table 2). In 2013, renewables provided 18% of electricity generation, mostly from hydro and geothermal.

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.

Between 2008 and 2013, NV built 760MW of utility-scale renewables (Figure 7), bringing cumulative installed utility-scale renewable capacity to 2.2GW (Figure 8).

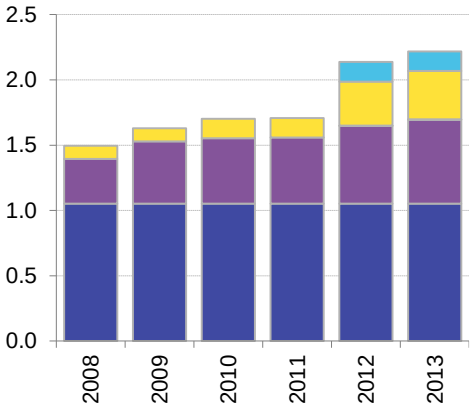
NV has over 500MW of utility-scale wind and solar installed…

Figure 7: NV annual utility-scale renewable capacity additions, 2008-13 (MW)



Source: Bloomberg New Energy Finance, EIA

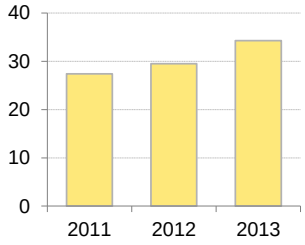
Figure 8: NV cumulative utility-scale renewable capacity, 2008-13 (GW)



Source: Bloomberg New Energy Finance, EIA

…and is currently the third largest residential solar market in the US

Figure 9: NV cumulative installed residential solar PV capacity, 2011-13 (MW)



Source: Bloomberg New Energy Finance, IREC

Notably, while geothermal development has lagged behind other renewables nationally, the technology has had some success in Nevada, home to the only two geothermal projects commissioned in 2014. In addition, the state saw over 30MW of residential PV build through 2013 (not included in Figure 7 or Figure 8, shown in Figure 9) and we estimate that it is currently the third-largest residential solar PV market in the country (as of the first quarter of 2015).[3]

2.3. Energy efficiency

The American Council for an Energy Efficient Economy (ACEEE) scored NV as below-average (5 out of 20) for utility and public benefits programs and policies in 2013. Figure 10 shows NV's annual electricity revenues (black bars, left axis, $bn) and energy efficiency budget (green line, right axis, $m) from 2008 to 2012 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 2013

Figure 10: NV utility electricity revenues (left axis, $bn) and electricity efficiency budget (right axis, $m), 2008-12

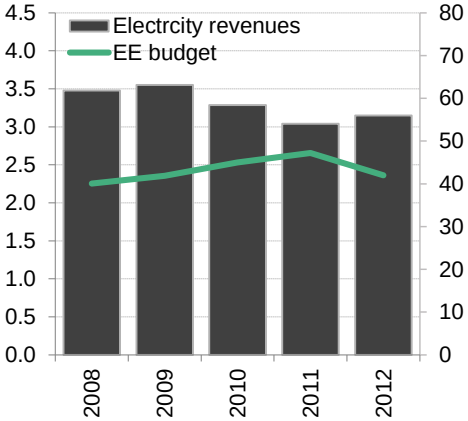
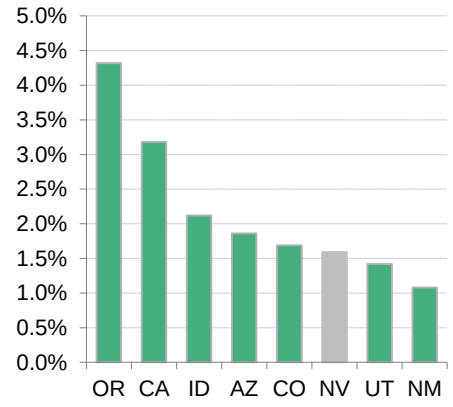


Figure 11: States' utility electricity efficiency budgets as a fraction of state-wide electricity revenue, 2013 (%)



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

3 Bloomberg New Energy Finance, US Residential PV Tracker: Build, Market Share, Prices, April 2015.

Between 2005 and 2012, Sierra Pacific saved over 500GWh of energy through efficiency measures, spending less than $11/MWh saved[4]

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. CLEAN POWER PLAN

Under the Environmental Protection Agency's (EPA) final Clean Power Plan, Nevada's final and interim emission rate goals have become less stringent relative to the goals released in the draft proposal. The final rule requires a 22% reduction in the state's carbon emissions rate to 0.39tCO2/MWh by 2030, whereas the draft rule requires a 2030 emissions rate of 0.29tCO2/MWh. The changes are measured against a 2012 baseline. Nevada's new interim goal to be met on average between 2022 and 2029 is now 0.43tCO2/MWh, increased from 0.32tCO2/MWh in the proposal. The state's interim goal reflects EPA's efforts to provide a "smoother glide path" and eliminate "the cliff" at the start of the program.[5]

The final plan also provides mass targets, which states can choose as their compliance standard instead of emission rate goals. Nevada's interim mass goal is 13MtCO2, and its final goal 12.3MtCO2, representing a 13% cut from its 2012 starting line.

Nevada is already compliant with its 2030 mass-based targets under the CPP.

Nevada's current pipeline of coal-fired power plant retirements and investments in renewable energy mean that the state is already on pace to meet its 2030 mass reduction requirements. The state's renewables pipeline is helped by policies such as a goal of sourcing 25% of electricity from renewables by 2025.

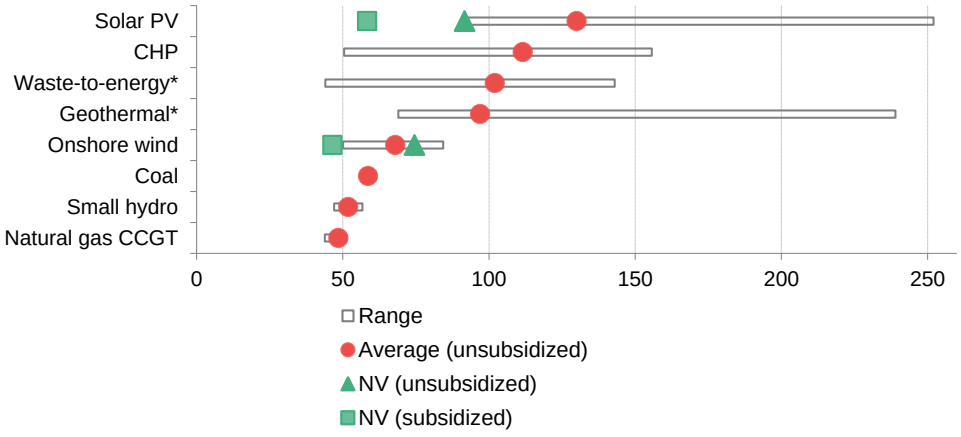
4. OPPORTUNITIES

The Bloomberg New Energy Finance levelised 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 Specifically, Sierra Pacific achieved 524GWh of cumulative energy savings and reduced peak demand by 74MW at a total cost of $49m from 2005-12, according to its IRP for the period 2014-2033.

5 Environmental Protection Agency. (2015). Clean Power Plan: State at a Glance, Nevada. Washington, DC: Retrieved from http://www.epa.gov/airquality/cpptoolbox/nevada.pdf.

Figure 12: Unsubsidized levelised 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 2015 ($/MWh)



*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.*

Wind and solar PV are already, or on the verge of being, economically viable in Nevada

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 CCGT) and are viable after accounting for incentives.
- The state is one of only a few in the US with potential for additional geothermal development, endowed with both a favourable resource potential and the technological know-how of the nation's largest geothermal developer (Ormat Technologies).
- Residential solar PV is arguably 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 wholesale, residential solar PV (not shown in Figure 12) competes against retail electricity rates, which are generally much higher than wholesale rates.
- And other renewables, from waste-to-energy to biomass and hydro, could potentially play larger roles in NV provided stronger support from policymakers and utilities alike.

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.

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.

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