CLEAN JOBS NEVADA 2017

OCTOBER 2017

PRESENTED BY

Environmental Entrepreneurs

Clean Energy Project

ABOUT

ABOUT E2

Environmental Entrepreneurs (E2) is a national, nonpartisan group of business leaders, investors, and professionals from every sector of the economy who advocate for smart policies that are good for the economy and good for the environment. Our members have founded or funded more than 2,500 companies, created more than 600,000 jobs, and manage more than $100 billion in venture and private equity capital. For more information, see www.e2.org or follow us on Twitter at @e2org. E2 is a partner of the Natural Resources Defense Council (NRDC).

ABOUT CEP

Clean Energy Project, Inc. (CEP) is a nonprofit, nonpartisan organization dedicated to powering the clean energy economy through education and engagement with policy leaders, community leaders and citizens on the benefits of fully developing a clean energy economy. The goal of CEP is to grow the clean energy economy and create jobs in Nevada and the West through policy development. CEP compiles and promotes the economic benefits of investments in energy efficiency and renewable energy through public education events, outreach and media. We do this by partnering with businesses and business focused organizations, federal, state and local government, and community organizations. CEP focuses on the "business of clean energy" and is a technology neutral organization. For more information, see www.cleanenergyprojectnv.org.

ABOUT OUR RESEARCH AND ANALYSIS PARTNERS

BW Research Partnership is a full-service, economic and workforce research consulting firm with offices in Carlsbad, California, and Wrentham, Massachusetts. It is the nation's leading provider of accurate, comprehensive clean energy research studies, including the National Solar Census, wind industry analyses for the National Renewable Energy Laboratory and the Natural Resources Defense Council, and state-level clean energy reports for Massachusetts, Illinois, Vermont, Iowa, and Florida, among others.

The **Economic Advancement Research Institute (EARI)** is a nonprofit research organization focused on economic mobility and regional competitiveness. EARI is primarily focused on studying the impact of policies and systems on economic growth and prosperity across all income levels. EARI has conducted numerous labor market analyses that address key economic sectors with high probability to provide opportunities to underrepresented and disadvantaged populations.

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Cover: A construction worker secures tubing to a control box connected to the solar array at Nellis Air Force Base in Clark County. (U.S. Air Force photo by Senior Airman Larry E. Reid Jr.)

INTRODUCTION

There are more than 31,000 clean energy jobs in Nevada.

The Clean Jobs Nevada 2017 report is part of E2's ongoing effort to better understand the economic and employment impacts of energy efficiency and renewable energy in the state and identify policies that would drive additional job creation.

Along with our partners at the Las Vegas-based Clean Energy Project, our analysis of the size and scope of Nevada's clean energy economy shows **more than 31,000 Nevadans** work in the state's clean energy sector.

Clean energy jobs in the state grew **9.5 percent** over the previous year—far higher than the state's overall job growth and the latest evidence of the significant role the clean energy sector has in the state's broader economy.[i]

Nevada clean energy jobs can be categorized either by industry—energy efficiency, renewables, clean vehicles, etc.—or by value chain—i.e., the type of work done within a particular industry to bring a product or service to market.

By industry, most Nevada clean energy workers—about **16,000**—work in energy efficiency, a category that encompasses a broad range of jobs including construction workers, electricians, engineers, software developers and marketing professionals who all spend some of their time on energy efficiency projects.

The vast majority of the **14,500** Nevadans who work in renewable energy industries are involved in solar in fields like installation and maintenance. Nevada is one of the top states in the country for solar energy jobs, with utility-scale arrays like those at Crescent Dunes and Nellis Air Force Base, as well as smaller, commercial-scale developments like the 26,000-panel rooftop array at the Mandalay Bay Convention Center.

Looking at the clean energy sector value chain, about three in four workers are either in construction or the trades, while utility workers and those employed in the professional services are also well represented in the state's clean energy economy.

Solar is the dominant renewable energy sector. It accounts for nearly 10 percent of the state's overall electricity; Nevada now ranks fourth among all states in terms of the amount of solar installed;[ii] and the Silver State ranks No. 1 by far in solar megawatts per capita.[iii] Additional solar devlopment—and associated jobs—are possible as the state is poised to complete its transition away from coal-fired electricity.[iv]

More renewable energy development on Nevada's public lands, which when done responsibly can maximize clean energy production and protect Nevada's outdoor recreation industry, could also create more solar jobs.

Wind is not a large employer in the state, but about 100 people work in geothermal, which can help balance the electric grid in a solar-heavy state.

About 550 people work in advanced transportation, including advanced fuel jobs and jobs in clean vehicle technologies that help our cars and trucks go further for less money—an important factor in a state where driving distances can be far and electric vehicle (EV) infrastructure is scaling up.

Tesla's new "gigafactory" in Sparks has added even more jobs in clean vehicles and energy storage. According to Nevada's Office of Economic Development, the number of people who work in that factory alone could eventually **top 10,000**—more than 50 percent higher than initial estimates. (As of February 2017, after E2's survey was taken, the factory had 1,000 workers, 90 percent of whom are Nevadans. About 2,500 construction workers are on-site, and 60 percent of these workers hail from Nevada.)[v]

Fewer than 100 people work in smart grid jobs, which help make our electricity system more flexible and renewable-friendly.

The rapid clean energy job growth that Nevada has seen across multiple industries is part of a broader national shift. Businesses, utilities, power companies and everyday Americans increasingly recognize the economic benefits of energy efficiency and renewable energy. Across the United States, more than **3 million people** now work in clean energy and clean transportation.[vi]

In Nevada, there are clean energy jobs—and vast clean energy potential—in every Silver State county, with economic opportunity available to both blue-collar and white-collar workers.

Clean Jobs Nevada 2017 shows that the clean energy sector offers a robust path to grow the state's economy. There are at least 2,100 clean energy jobs in each of the state's four congressional districts—with two districts accounting for a combined 25,000 clean energy jobs. There are also clean energy jobs in each of the state legislature's 21 Senate districts and 42 Assembly districts.

Clean Jobs Nevada relies on databases and survey data from Nevada employers. More on the report's methodology can be found at the end of the report.

MAIN FINDINGS

OVERALL CLEAN ENERGY JOBS AND GROWTH RATE

CLEAN ENERGY JOBS

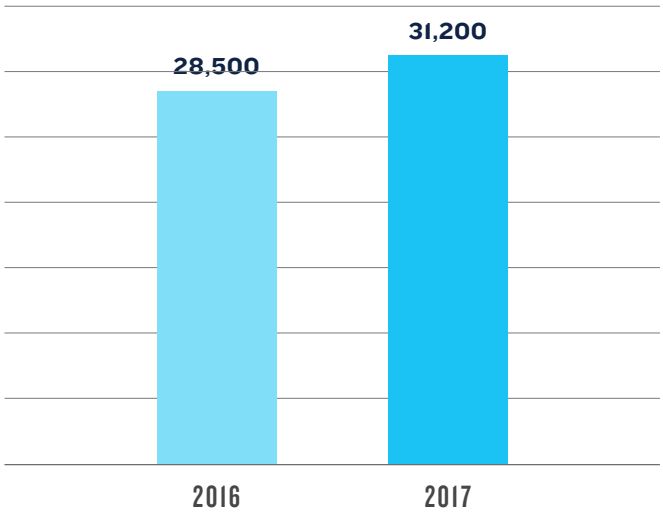
31,194 +2,700 SINCE 2016

GROWTH RATE

9.5%

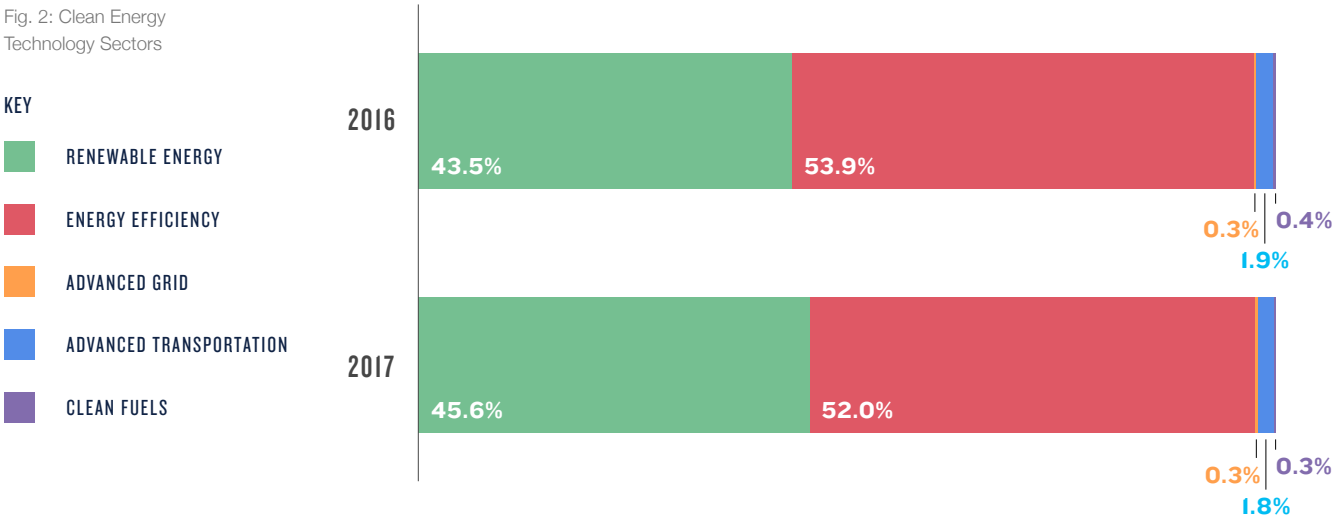
Nevada has 31,194 clean energy jobs—defined as those positions where at least some portion of time is spent on renewable energy generation, energy efficiency, advanced grid, advanced transportation, or clean fuels. This represents an increase of 2,700 jobs over the 12 months prior, for a 9.5 percent growth rate. By comparison, the state's overall non-farm labor force grew by about 3 percent.[vii]

Fig. 1: Clean Energy Jobs in Nevada By Year



As the following chart shows, the percentage of clean energy jobs within each industry remained relatively constant year over year.

Fig. 2: Clean Energy Technology Sectors



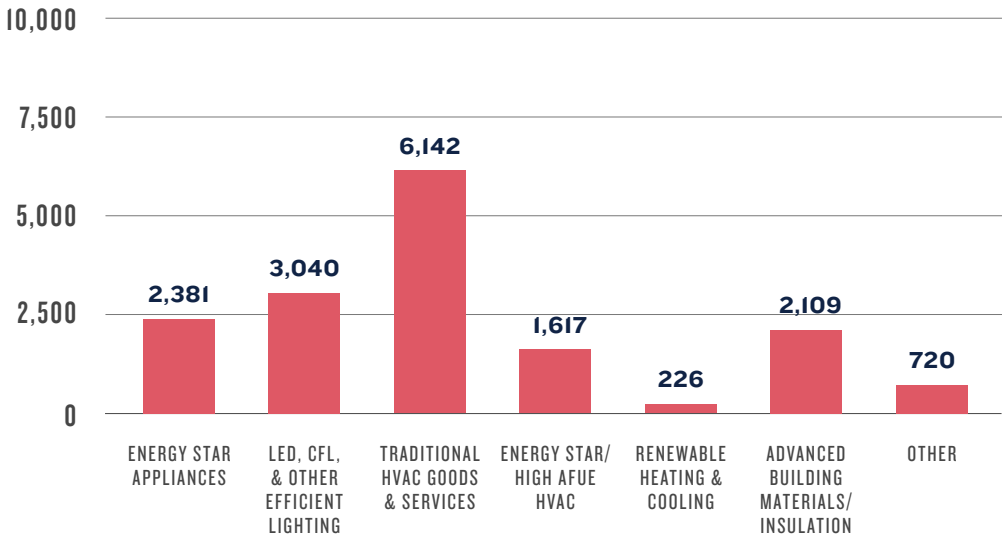
CLEAN ENERGY JOBS BY INDUSTRY

ENERGY EFFICIENCY JOBS

As was the case last year, energy efficiency provides the bulk of clean energy employment in Nevada, with more than **16,000 jobs**. The industry's largest segment is traditional heating, ventilation and air conditioning (HVAC) goods and services, followed by energy efficient lighting, ENERGY STAR appliances and advanced building materials, such as insulation.

Investing in energy efficiency benefits the economy directly through increasing jobs in efficiency research and development, manufacturing, and building efficiency upgrades; and indirectly through energy cost savings that can be reinvested into the state's economy, creating new jobs.

Fig. 3: Energy Efficiency Jobs Breakdown by Subsector



ACRONYM KEY

LED: Light-Emitting Diode

CFL: Compact Fluorescent Lamp

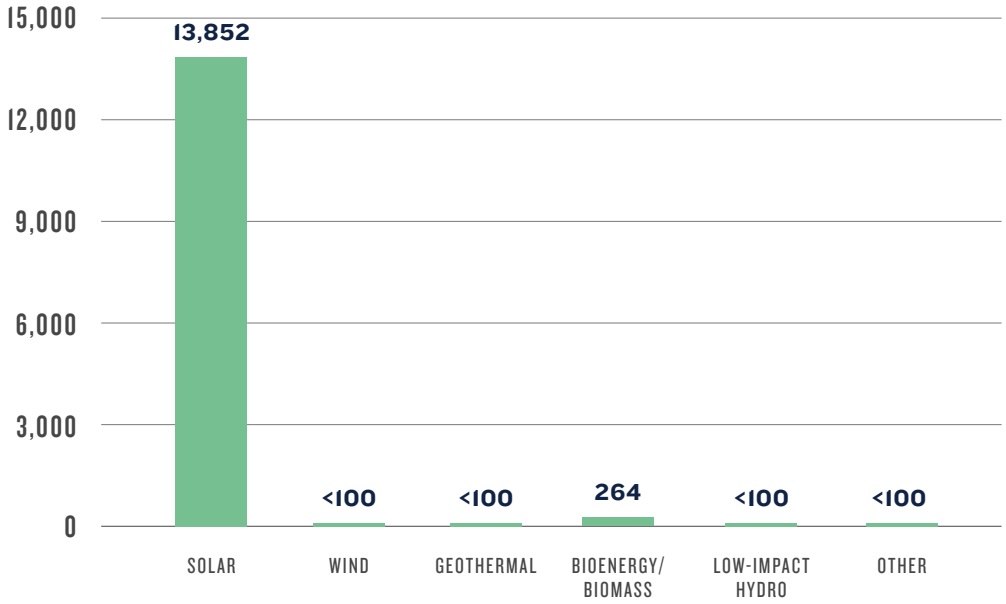
AFUE: Annual Fuel Utilization Efficiency

HVAC: Heating, Ventilation and Air Conditioning

RENEWABLE ENERGY JOBS

The vast majority of the roughly 14,500 renewable energy jobs are in the solar industry.

Fig. 4: Renewable Energy Jobs Breakdown by Subsector



As E2's Nevada's Clean Energy Future[viii] report noted, the utility NV Energy has contracted for electricity from large solar projects at record-low prices. In July 2015, NV Energy received power purchase agreement (PPA) offers from large solar power projects at less than 4 cents per-kWh. [ix] At prices this low, energy from new solar projects in Nevada is cheaper than energy from new natural gas-fired power plants; in some cases it may be cheaper to build a new solar farm than to operate and fuel an existing natural gas plant.

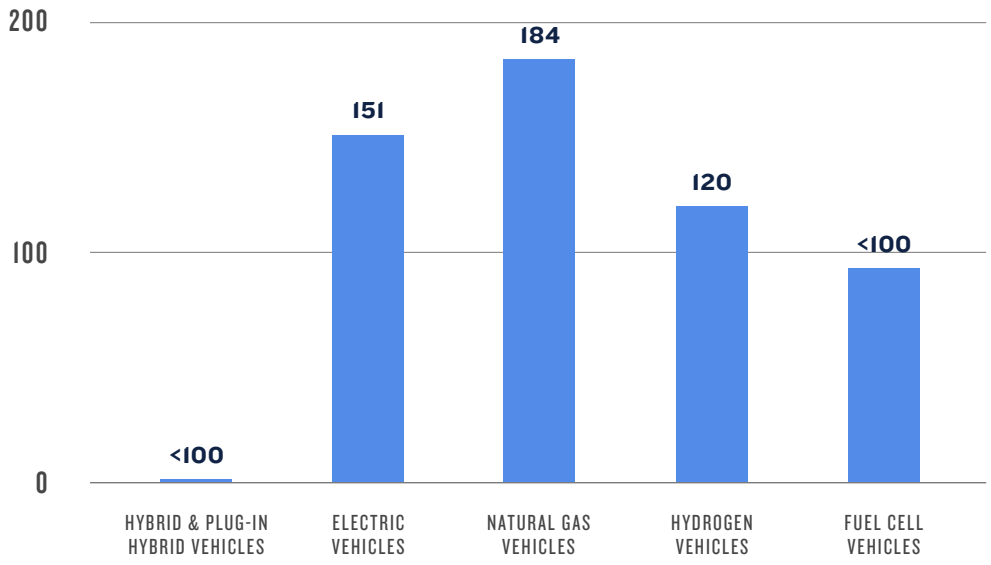
It's a similar story in residential solar. Given Nevada's retail electricity rates, the energy, grid and environmental benefits that rooftop solar provides from both existing and new net-metering customers in the state are now likely sufficient to justify the net-metering incentive.

Additionally, despite employing fewer than 100 people, Nevada has strong geothermal resources that can complement solar growth. In today's cost environment, geothermal electricity is more expensive than solar, and the integration costs of solar are low. However, as the percentage of electricity Nevada generates from solar increases, geothermal can play an important role as a zero-carbon technology that can help balance the grid—and create jobs.

ADVANCED TRANSPORTATION JOBS

Advanced transportation (including parts and maintenance) employs 549 workers. The largest segments of these are:

Fig. 5: Advanced Transportation Jobs Breakdown by Subsector



FUELS AND SMART GRID JOBS

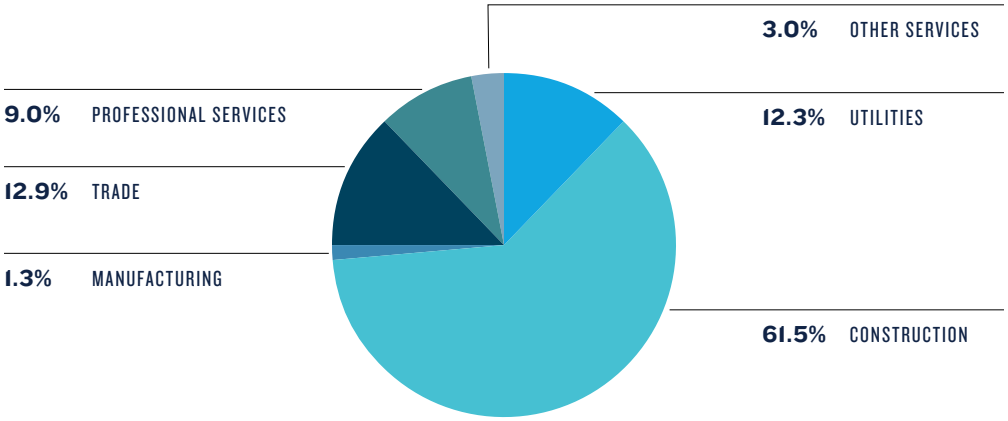
In Nevada, about 100 people work in the fuel sector, with most in woody biomass, an industry whose climate impact must be closely monitored since some biomass industry practices (such as burning whole trees for fuel) emit more carbon than coal.[x]

Fewer than 100 Nevadans work in the highly technical smart grid industry helping to modernize our electric grid and keep it secure.

CLEAN ENERGY VALUE CHAIN

Clean energy workers are employed in a variety of industries throughout the value chain. Approximately 19,169 Nevadans working within the clean energy industry are employed in the construction sector, doing things like making our homes, buildings, offices and schools more energy efficient. This represents about 61 percent of total clean energy employment. About 13 percent work in trades while 12 percent work in the utilities sector.

Fig. 6: Clean Energy Value Chain



CLEAN ENERGY EMPLOYMENT BY COUNTY, METRO AREA AND CONGRESSIONAL/LEGISLATIVE DISTRICT*

CLEAN ENERGY JOBS ARE SPREAD ACROSS NEVADA

Data from across the state shows the breadth and depth of clean energy jobs in Nevada. Clark County is top-ranked in the state with 20,900 total clean energy jobs, while counties spread across the state, including Elko, Churchill and Washoe, all fared well.

In terms of metropolitan areas, Las Vegas is first with nearly 50,000 jobs, while Reno and Carson City are also hubs for Nevada clean energy jobs.

While Las Vegas clearly has the largest number of jobs, Nevada's rural areas are also home to thousands of clean energy jobs, and there is a tremendous economic development opportunity for the less urban parts of the state, including jobs constructing utility-scale solar and geothermal projects.

The data also shows that the distribution of clean energy jobs cross political boundaries. Indeed, there are clean energy jobs in every Nevada congressional and state legislative district.

EMPLOYMENT BY COUNTY**

Table 1: Top 10 Counties for Clean Energy Employment

RANK	COUNTY	CLEAN ENERGY EMPLOYMENT	RENEWABLE ENERGY GENERATION EMPLOYMENT	ENERGY EFFICIENCY EMPLOYMENT
1	Clark County	20,900	9,400	10,800
2	Washoe County	6,100	2,700	3,100
3	Carson City	1,400	500	600
4	Elko County	900	300	400
5	Douglas County	800	300	400

Fig. 7: Heat Map of Clean Energy Employment by County

KEY

- 1–250
- 251–500
- 501–1,000
- 1,001–5,000
- 5,001–10,000
- >10,001

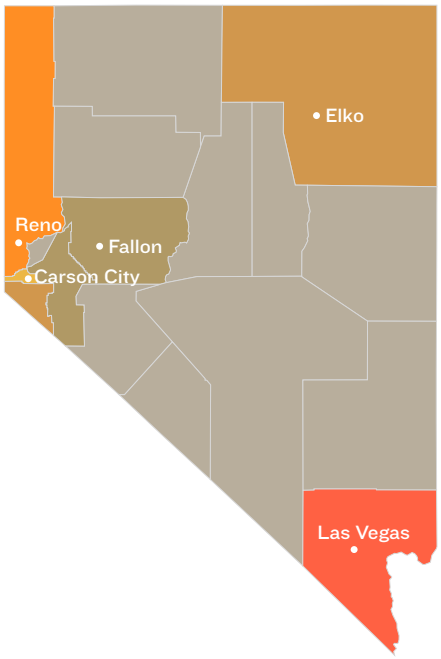


Table 2: Total Clean Energy Employment for All Nevada Counties

COUNTY	CLEAN ENERGY EMPLOYMENT
Carson City	1,400
Churchill County	500
Clark County	20,900
Douglas County	800
Elko County	900
Esmeralda County	1–250
Eureka County	1–250
Humboldt County	1–250
Lander County	1–250
Lincoln County	1–250
Lyon County	300
Mineral County	1–250
Nye County	1–250
Pershing County	1–250
Storey County	1–250
Washoe County	6,100
White Pine County	1–250

* Jobs rounded to nearest 100 (unless fewer than 250 jobs).

** Though not included in these charts, Clean Energy Employment also includes Advanced Grid, Advanced Transportation, and Clean Fuels.

EMPLOYMENT BY METRO AREA

Table 3: Total Clean Energy Employment for All Metro Areas

RANK	METRO AREA (MSA)	CLEAN ENERGY EMPLOYMENT	RENEWABLE ENERGY GENERATION EMPLOYMENT	ENERGY EFFICIENCY EMPLOYMENT
1	Las Vegas-Paradise, NV MSA	20,900	9,400	10,800
2	Reno-Sparks, NV MSA	6,100	2,700	3,100
3	NV Nonmetropolitan Area	3,100	1,300	1,500
4	Carson City, NV MSA	1,400	500	600

EMPLOYMENT BY DISTRICT

Table 4: Total Clean Energy Employment for All Congressional Districts in Nevada

CONGRESSIONAL DISTRICT	CLEAN ENERGY EMPLOYMENT	RENEWABLE ENERGY GENERATION EMPLOYMENT	ENERGY EFFICIENCY EMPLOYMENT
1	15,400	6,900	7,900
2	10,100	4,500	5,200
3	3,900	1,700	1,900
4	2,100	900	1,000

Table 5: Total Clean Energy Employment for Senate Districts

SENATE DISTRICT	CLEAN ENERGY EMPLOYMENT
1	2,200
2	2,200
3	4,800
4	1–250
5	3,500
6	1,600
7	1,200
8	1,300
9	1,100
10	2,000
11	1–250
12	1,300
13	4,600
14	800
15	600
16	1,900
17	1,500
18	1–250
19	1,100
20	1–250
21	1–250

Table 6: Total Clean Energy Employment for Assembly Districts

ASSEMBLY DISTRICT	CLEAN ENERGY EMPLOYMENT	ASSEMBLY DISTRICT	CLEAN ENERGY EMPLOYMENT
1	500	22	800
2	1,400	23	1–250
3	1,700	24	2,600
4	600	25	1,300
5	400	26	700
6	1,700	27	1–250
7	1,100	28	1–250
8	3,000	29	1–250
9	400	30	1,400
10	2,200	31	1–250
11	800	32	600
12	1,800	33	1,000
13	1–250	34	600
14	1–250	35	1–250
15	1,700	36	1–250
16	1–250	37	1–250
17	1–250	38	800
18	1,000	39	1,200
19	500	40	1,000
20	500	41	1–250
21	700	42	1–250

POLICIES MATTER

There are a number of steps policymakers in Carson City and Washington, D.C., can take, right now, to help create thousands more clean energy jobs in Nevada.

STATE POLICY RECOMMENDATIONS

- If voters approve Energy Choice in 2018, ensure that all electricity retailers in the market get a minimum amount of their electricity from renewable sources, and that a designated entity is empowered and funded to run energy efficiency programs.
- Implement Senate Bill 150 and Assembly Bill 223 in a manner that requires electricity providers to run robust energy efficiency programs, including programs targeted to low-income customers.
- Using Senate Bill 145, implement the Electric Vehicle Infrastructure Demonstration Program, encourage EV infrastructure in critical market segments like multifamily residential and workplaces, and ensure that electricity rates encourage customers to charge EVs at optimal times and consider EV rebates.
- Support continuation of the governor's tax abatement programs for clean energy development.

FEDERAL POLICY RECOMMENDATIONS

Nevada's federal representatives need to support the state's strong and growing clean energy economy by encouraging smart policies in Congress and in the Trump administration. Here are three policies they should pursue:

- As Congress begins to consider tax reform, it must maintain the Production Tax Credit (PTC) for wind, the Investment Tax Credit (ITC) for solar, and tax credits supporting other renewable technologies that currently extend through 2021. Clean energy industries that pump billions of dollars into Nevada's economy depend on the certainty that come with these tax policies. Lawmakers should also include energy efficiency credits that were allowed to sunset in 2016 in any new tax legislation. These are 179D and 45L in the tax code.
- Congress should properly fund R&D investments in innovation and efficiency at EERE, ARPA-E and loan guarantee offices/programs at U.S. Department of Energy. These programs fuel innovation and encourage global competitiveness both for Nevada companies and for the country as a whole. Allowing cuts proposed in the administration's FY18 budget and in the House of Representatives' Energy & Water FY18 bill to become law would be harmful for the state.
- Nevada lawmakers must stand for sensible and effective automobile fuel efficiency standards developed by the U.S. Environmental Protection Agency and the U.S. Department of Transportation. These standards drive innovation in the automotive sector, resulting in companies like Tesla and the jobs it is creating in Nevada and elsewhere. They also reduce harmful emissions from Nevada's air while saving consumers money at the pump.

CONCLUSION

With about 31,000 clean energy jobs and massive potential for more energy efficiency and renewable energy generation, especially solar, Nevada is a national powerhouse in clean energy.

Clean energy workers are now spread across the state. They're in red districts, blue districts, urban areas like Las Vegas and Reno and more rural areas like Elko County.

By passing stronger clean energy policies now, elected officials in Carson City and Washington, D.C., can help create more jobs and ensure a more promising future for all Nevadans.

APPENDIX

METHODOLOGY

Data for this year's report is derived from the comprehensive BW Research Energy Employment Index (EEI) administered in 2015 and growth estimates based on sub-technology industry mix and publicly available employer reported growth estimates from the 2017 U.S. Department of Energy (DOE) United States Energy and Employment Report (USEER).

For state-level growth estimates, BW Research utilized six-digit North American Industry Classification System (NAICS) incidence for clean energy sub-technologies. This "industry mix" was developed by analyzing completed survey incidence nationally for all clean energy sub-technologies. For example, the six-digit NAICS industries below cover all firms that reported solar-related employment in 2016:

NAICS	DESCRIPTION
221114	Solar Electric Power Generation
237110	Water and Sewer Line and Related Structures Construction
237130	Power and Communication Line and Related Structures Construction
238210	Electrical Contractors and Other Wiring Installation Contractors
238220	Plumbing, Heating, and Air-Conditioning Contractors
332312	Fabricated Structural Metal Manufacturing
333414	Heating Equipment (except Warm Air Furnaces) Manufacturing
334413	Semiconductor and Related Device Manufacturing
334512	Automatic Environmental Control Manufacturing for Residential, Commercial, and Appliance Use
335121	Residential Electric Lighting Fixture Manufacturing
335312	Motor and Generator Manufacturing
335999	All Other Miscellaneous Electrical Equipment and Component Manufacturing
423610	Electrical Apparatus and Equipment, Wiring Supplies, and Related Equipment Merchant Wholesalers
523930	Investment Advice
541110	Offices of Lawyers
541310	Architectural Services
541330	Engineering Services
541370	Surveying and Mapping (except Geophysical) Services
541612	Human Resources Consulting Services
541614	Process, Physical Distribution, and Logistics Consulting Services
541618	Other Management Consulting Services
811211	Consumer Electronics Repair and Maintenance
811219	Other Electronic and Precision Equipment Repair and Maintenance
811310	Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance

Estimated growth by sub-technology used industry mix U.S. Bureau of Labor Statistics (BLS) publicly reported growth from 2015–2016 averaged with reported national sub-technology growth (from 2017 DOE USEER). The derived growth estimates were applied to 2015 employment numbers and aggregated by technology and total clean energy employment for final 2016 jobs numbers.

Though the BLS Quarterly Census of Employment and Wages (QCEW) datasets track energy employment across traditional production, transmission, and distribution subsectors, the current structure of the NAICS assigns a portion of the nation's energy and energy efficiency work into broad categories of non-energy specific industries, such as construction, wholesale trade, and professional services.

Identifying energy-related employment within broad NAICS industry sectors is particularly important for understanding employment trends across emerging renewable energy and advanced fuel technologies and infrastructures, such as solar, wind, geothermal, biomass, storage, and smart grid. Since rising deployment of efficiency-related technologies has carved out new opportunities for firms in traditional trades to research, manufacture, or install energy efficient products and upgrades, parsing out this employment is especially useful to determine the level of job growth across the nation's energy efficiency subsectors. However, energy efficiency and other clean energy workers are not exactly captured through traditional NAICS alone. For example, a subset of semiconductor manufacturers produces solar panels, while others assemble computer components or medical equipment. Even though the NAICS classifications include a "solar electric generation" subsector, important elements of the solar value chain, such as research, installation, manufacturing, sales, and distribution are embedded within these other broad NAICS categories. While federal labor market data alone presents an incomplete picture of the clean energy workforce, inclusion of these additional manufacturing or construction industries in their entirety would result in exaggerated employment figures, while their exclusion underestimates the clean economy and its workforce.

The 2015 Index was the result of a rigorous survey effort of traditional and clean energy establishments across all 50 states. Final employment figures were extrapolated based on the QCEW.

The 2017 USEER methodology relies on the most recently available data from the U.S. Bureau of Labor Statistics Quarterly Census of Employment and Wages (QCEW, Quarter I), together with a detailed supplemental survey of business establishments across the United States designed and conducted by BW Research Partnership on behalf of the U.S. Department of Energy. DOE conducted a comprehensive review of the methodology underlying the 2017 USEER and consulted with the BLS for consistency.

ENDNOTES

i. https://energy.gov/downloads/2017-us-energy-and-employment-report

ii. https://www.seia.org/state-solar-policy/nevada-solar

iii. https://www.seia.org/research-resources/top-10-solar-states

iv. http://www.sierraclub.org/sites/www.sierraclub.org/files/NSPP-TSPP-Composite-Study-Sep2016.pdf

v. https://lasvegassun.com/news/2017/feb/24/more-jobs-projected-at-teslas-northern-nevada-giga/

vi. https://www.e2.org/wp-content/uploads/2017/02/E2_CleanEnergyJobs_National.pdf

vii. https://www.bls.gov/eag/eag.nv.htm

viii. https://www.e2.org/wp-content/uploads/2016/12/E2-NV-Clean-Energy-Future_FINAL_2.pdf

ix. http://www.mercurynews.com/2015/07/07/buffett-scores-cheapest-electricity-rate-with-nevada-solar-farms/

x. https://www.nrdc.org/media/2017/170629

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