

JOB ANALYSIS & FORECAST:



YES ON QUESTION 3

OCTOBER 2016

PREPARED BY:

**RCG
ECONOMICS**

www.rcg1.com

&

DR. ALAN SCHLOTTMANN
UNLV PROFESSOR OF ECONOMICS

October 19, 2016

Mr. Matt Griffin
The Griffin Company
401 S Curry St Carson City, NV 89703

Re: *Re: The Energy Choice Initiative: Question 3 ("the/our Study")*

Dear Mr. Griffin:

The Griffin Company ("the Client") RCG Economics LLC ("RCG") is pleased to provide this report related to the proposed Question 3's ("Q3") effects on Nevada.

Purpose & Need

The Client's specifically requested that RCG identify employment-related benefits associated with the passage of Q3's regarding the creation of an open energy market in Nevada.

Confidentiality

We maintain the confidentiality of all information and documentation received during our work and we abide by all legal requirements regarding the disclosure of information relating to this engagement. Our personnel understand that they are subject to, and will abide by any reasonable confidentiality restrictions. In addition, we treat as confidential, documents or other information made available to us in connection with this engagement. We have taken appropriate steps to segregate all material related to our work in this engagement from other files in our office.

Independence

We do not warrant the results or outcomes of our research on engagements, and our fees are not contingent on the findings. As such, RCG is an independent advisory firm.

RCG Team

The RCG team for this assignment was comprised of John Restrepo, RCG Principal, as project director, Hubert Hensen as project economist and Dr. Alan Schlottmann of the UNLV Economics Department as Technical Advisor. As a point of information, John Restrepo has 37 years of experience as a regional/urban economist, 28 of those years have been in Nevada. Dr. Schlottmann has more than 36 years of experience in preparing regional economics and economic impact analysis as a professor and as consultant to private and public sector organizations throughout the country, with nearly 16 years at UNLV. Dr. Schlottmann has also taught extensively on regional economic benefit analysis methods and procedures.

Confidentiality

Our personnel understand that they are subject to, and abide by any reasonable confidentiality restrictions. In addition, we have treated as confidential, documents or other information made available to us in connection with this engagement. We have taken appropriate steps to segregate all material related to our work in this engagement from other files in our office.

Standard Assumptions & Indemnification

This work scope herein was performed according to the *Standard Assumptions & Limiting Conditions* detailed in the Attachment to this letter.

The Client has agreed to indemnify RCG, its partners, principals and employees, and hold them harmless from and against any and all liabilities or obligations (including, but not limited to, attorney's fees) arising directly from the RCG's services that were the subject of this consulting agreement, except to the extent that RCG's conduct was grossly negligent or fraudulent, and that such conduct was the proximate cause of any injury for which RCG is sought to be held liable.

If you have any questions regarding this engagement letter, please contact John Restrepo at 702-967-3188, ext. 401, or email him at jrestrepo@rcg1.com. Thank you for giving us the opportunity to assist you on this assignment.

Regards,

RCG Economics LLC

RCG Economics LLC

Attachment

Cc: Dr. Alan Schlottmann, Ph.D.

ATTACHMENT
STANDARD ASSUMPTIONS & LIMITING CONDITIONS

1. RCG prepared, from third-party information collected by RCG, as well as our internal econometric models, databases and sources, the Study.
2. The Client is responsible for representations about their plans and expectations and for disclosure of significant information that might affect the ultimate realization of the analyses results.
3. The results of RCG's analyses apply only to the effective date of this letter. The success of the Client's plans will be affected by many related and unrelated economic conditions within a local, regional, national and/or world context. We assume no liability for an unforeseen change in the local, regional or national economies. Accordingly, we have no responsibility to update our report for events and circumstances occurring after the date of our Study.
4. Our Study is based on historical economic benchmark information. Thus, variations in the future could be material and have an impact on our Study conclusions. Even if our Study's hypothetical assumptions were to occur, there will usually be differences between the estimated and actual results, because events and circumstances frequently do not occur as expected, and those differences may be material. These could include major changes in economic and market conditions; and/or terms or availability of financing altogether; and/or major revisions in current state and/or federal tax or regulatory laws.
5. If our Study is reproduced by the Client, it must be reproduced in its entirety.
6. RCG makes no representation or warranty as to the accuracy or completeness of the third party information contained in our Study, and shall have no liability for any representations (expressed or implied) contained in, or for any omissions from, our materials.
7. The working papers for this consulting assignment will be retained in RCG's files and will be made available for your reference. We will be available to support the analyses, as required.
8. Unless otherwise stated in our report, no effort was made to determine the possible effect, if any, of future Federal, State or local legislation, including any environmental or ecological matters or interpretations thereof.
9. We did not perform an audit, review or examination or any other attest function (as defined by the AICPA) regarding any of the third-party historical market, industry and economic benchmarks or demographic information used or included in the report; therefore, RCG does not express any opinion or any other form of assurance with regard to the same, in the context of our Study.

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I. Introduction

The purpose of this report is to provide insights on the potential job impacts of Nevada Ballot Question 3 titled The Energy Choice Initiative (“Q3”). The basic wording of Q3 is relatively short and deals with the “establishment of an open, competitive retail electric energy market”.¹ However, the ballot question has important implications as it calls for a future restructuring of the electricity market in Nevada to reflect an open market structure and proposed to be established by law by July 1, 2023.

The main findings of this report suggest that the direct and indirect effects of Q3 would create significant future economic and job growth for Nevada in the clean energy sector. This assumes that the Legislature, state agencies and other policymakers and stakeholders will properly address the complex process of establishing an open market structure including all issues related to production, transmission and distribution.²

This report cites a series of recent studies that have examined Q3. Rather than reproducing that material, our focus is on Nevada initiatives intertwined with Q3 to potentially lead to significant job creation.

The impetus for Q3 is related to the national movement on electrical sector restructuring with an emphasis on the clean energy sector.³ Historically, an open market approach that reduces barriers to entry in heavily regulated sectors does appear to increase investment across a variety of measures.⁴ In terms of efficiency, as pointed out for example by Lucas and Wolfram (2010) in their historical study on the easing of regulations in the 1990’s for the nuclear power industry, there appears to be an increase in operating efficiency of 10 percent.⁵

¹ Barbara Cegavske, Secretary of State, “*Statewide Ballot Questions 2016*”, State of Nevada 2016, text for Q3 begins on page 34.

² One of this report’s authors, Dr. Alan Schlottmann, worked on implementation difficulties in California’s electrical restructuring, including presentations to the California Legislature. Specifically, Dr. Schlottmann dealt with issues related to market manipulation and regulatory failure. In our opinion, the inclusion of a high quality transmission and distribution system through NV Energy needs to be recognized in Nevada’s discussions.

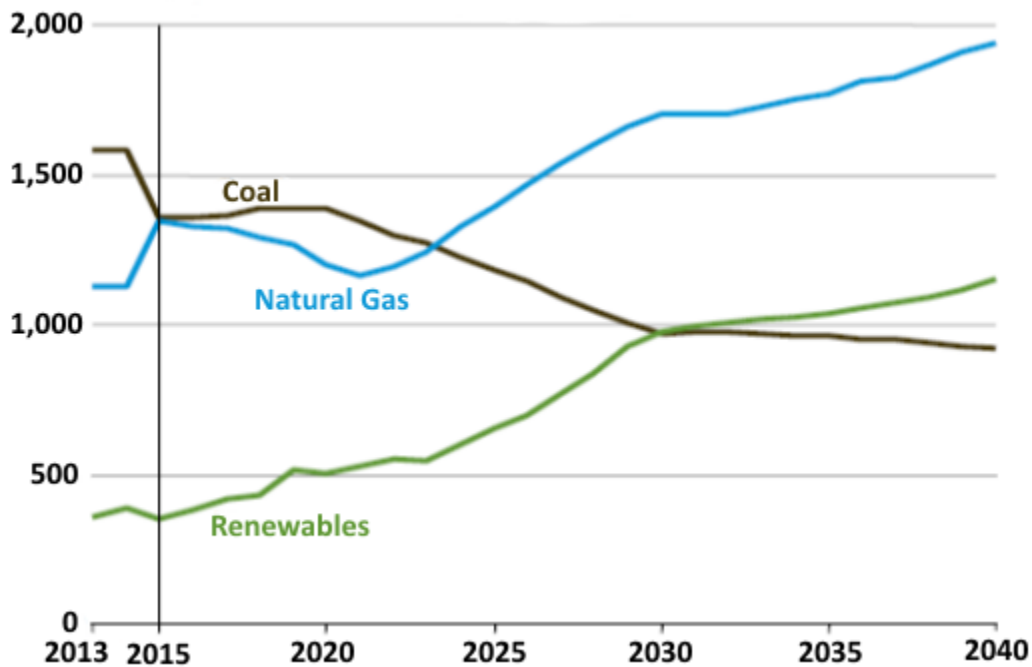
³ A general overview of these trends in clean energy with an emphasis on Nevada is in “*Nevada Jobs Project: A Guide to Creating Advanced Energy Jobs*”, American Jobs Project (2016).

⁴ For example, see the discussion in Alberto Alesina et.al. (2003), “*Regulation and Investment*”, National Bureau of Economic Research (NBER).

⁵ Lucas W. Davis and Katherine Wolfram (2010), “*Deregulation, Consolidation, and Efficiency: Evidence from US Nuclear Power*”, NBER.

The latest national forecasts for electricity production from clean energy by the US Energy Information Administration (“EIA”) have significant potential, even from 2015 levels.⁶ These forecasts show generation from renewables increasing by 99 percent in 2030 and by 152 percent in 2040. Critically, this forecasted change implies electricity generation with renewables surpassing coal generation in 2028, as shown in Figure I-1.⁷

Figure I-1: Net Electricity Generation from Coal, Natural Gas and Renewables in the United States AEO2016 Reference Case: 2013-2040 (in Billion Kilowatt-hours)



Source: U.S. Energy Information Administration

As pointed out by Schub (2016), Nevada’s “home grown” energy is almost entirely renewable energy production.⁸ This is a very important point and is shown in Figure I-2 below.⁹ However, currently, most electricity generation is through fossil fuels, primarily natural gas (see Figure I-3).¹⁰

⁶ See US Energy Information Administration [EIA] (August 2016), “Annual Energy Outlook 2016: With Projections to 2040”, Washington, D. C.

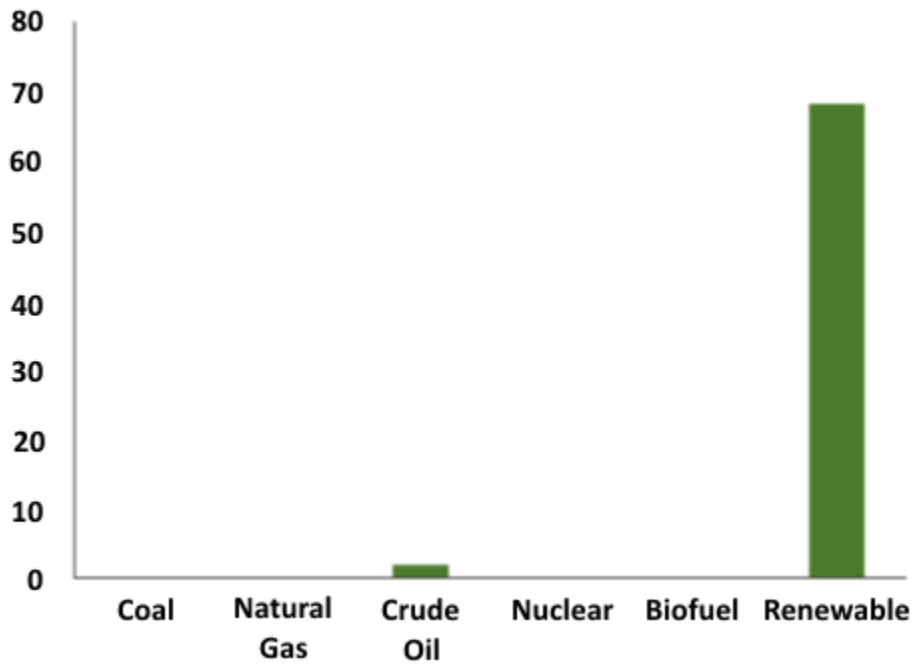
⁷ Figure from EISA, op. cit. p. 18 [page ES-2]

⁸ Jeffrey Schub (June 2016), Executive Director, Coalition for Green Capital, “Findings & Report on Nevada Green Bank Study”, Nevada Governor’s New Energy Industry Task Force, Technical Advisory Committee on Clean Energy Sources.

⁹ Figure I-2 and Figure I-3 from Schub (2016). op.cit.

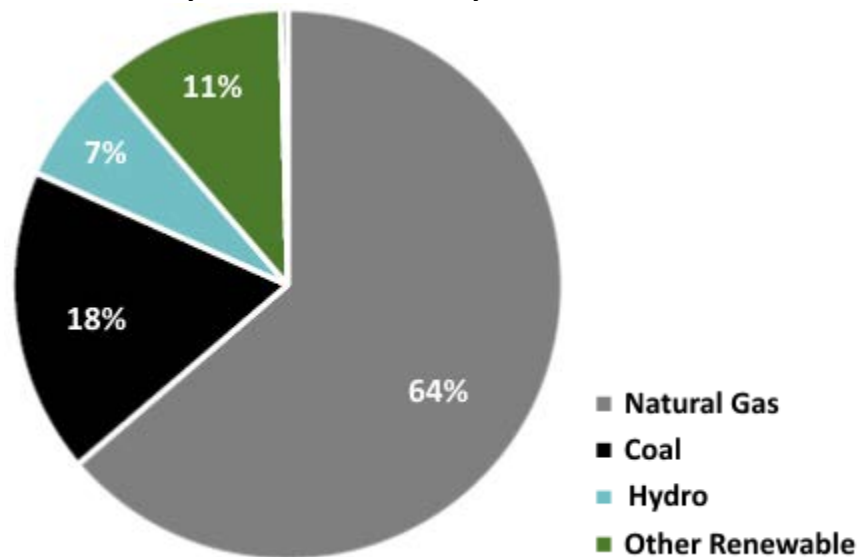
¹⁰ Ibid.

Figure I-2: Energy Resources Produced in Nevada (trillion BTU): 2013



Source: U.S. Energy Information Administration in Schub (2016)

Figure I-3: Electricity Generation in NV, by Source: 2013



Source: U.S. Energy Information in Schub (2016)

This report is organized as follows. Section II discusses Q3 as an extension of existing policy in Nevada. This is followed by a summary of the initiative in Section III. Estimates of significant positive job impacts are shown in Section IV. The final section, Section V, contains conclusions.

II. The Energy Choice Initiative as Part of the Nevada Clean Energy Agenda

As noted above, Q3 is a commitment by Nevada to move to an open market structure in the electrical sector. The Legislature, in conjunction with other agencies, policymakers and stakeholders, will then formulate the details of Nevada's open market structure.

It needs to be recognized that Q3, while it does remove all uncertainty that Nevada is committed to an open market structure, is consistent with existing Nevada initiatives in economic development and workforce investments.

Three observations of major state programs consistent with Q3 are identified and discussed below. Each will be discussed in turn.

- First, the Governor's Office of Economic Development ("GOED") has identified, and is currently focused on, nine key industries for future economic development in Nevada. These key industries represent the major state focus to provide future jobs for the state's workforce and families.¹¹ A strong focus on renewable and sustainable energy is one of the key sectors. Q3 is consistent with this existing major Nevada program. This is important not only for the electricity sector itself, but also as a catalyst for the attraction of new industries to the state as more nationally recognized companies adopt the "triple bottom line" approach (an accounting framework with three parts: social, environmental (or ecological) and financial).¹²
- Second, in order to improve the intersection of workforce training with employment growth, Nevada has implemented a major initiative to coordinate workforce training. Organized as a coordinated set of eight councils (Governor's Workforce Development Board ["GWDB"] Sector Councils), the state is focused on the goal "to identify and address the delivery of industry-specific training and workforce development initiatives in support of the economic development goals of the state."¹³ One of the

¹¹ For example, see the discussion of "Key Industries" at the GOED website.

¹² A readable description of the triple bottom line approach is available at The Economist: (<http://www.economist.com/node/14301663>). Companies with expressed commitments to clean energy include, for example, Apple, Facebook, Google, Microsoft, Switch and Tesla.

¹³ As noted directly at the website of Nevada's Department of Employment Training and Rehabilitation ("DETR"), "The Governor's Workforce Development Board, also known as the State Board, was established as a condition under the Workforce Investment Act, and reauthorized in 2014 under the

Natural Resources Sector Council's specific goals is to assist Nevada on a path to a clean energy economy. Once again, the Q3 initiative is consistent with this existing major Nevada program.

- Third, it needs to be recognized that the Nevada Legislature has already set the stage for Q3 with its prior legislative actions. Dykema (2016) provides an excellent review of major legislative action that is consistent with Q3.¹⁴ The Renewable Portfolio Standard passed in 1997 calls for a 25-percent renewable energy standard by 2025. More recently, in 2013, SB 123 has unambiguously moved Nevada away from coal-fired generation to natural gas and renewables. An open market, as proposed under Q3, should prove useful in facilitating these goals. Current discussions of a Nevada Green Bank only reinforce this observation.¹⁵

In addition, California has made a recent commitment to provide 50% of the state's electricity from renewable energy by 2030.¹⁶ It should be noted that:

- The California public policy of a 50 percent benchmark has positive implications for the potential of exporting clean energy from Nevada.¹⁷ Given the evidence of increased investment in open market structures cited above, Q3 is consistent with the goal of exporting clean energy.

Workforce Innovation and Opportunity Act ("WIOA"). The state-specific operational responsibilities of the State Board are outlined in Governor Sandoval's Executive Orders: 2015-08 and 2016-08.

¹⁴ See the overview in Angie Dykema (2016), *"Nevada: Energy Policy & Planning in an Evolving Energy World"*, Director, Governor's Office of Energy.

¹⁵ As discussed by Jeffrey Shub (June 2016), *op. cit.*

¹⁶ This is part of California's 2030 Climate Commitment as summarized in California Energy Commission (2015), *"Fact Sheet on Renewable Resources for Half of the State's Electricity by 2030"*, State of California.

¹⁷ As noted in American Jobs Project (2016) *op. cit.*

III. Ballot Question 3: The Energy Choice Initiative Proposal

As noted above, the basic ballot question associated with Q3 is relatively short as outlined in Cegavske (2016, P.34):

“Shall Article 1 of the Nevada Constitution be amended to require the Legislature to provide by law for the establishment of an open, competitive retail electric energy market that prohibits the granting of monopolies and exclusive franchises for the generation of electricity?”

The complete ballot measure is shown in Cegavske (2016, p.44). As discussed earlier in this report, the Legislature, state agencies and other policymakers will need to properly address the complex process of establishing an open market structure, including all issues related to production, transmission and distribution.

Cegavske (2016) contains a discussion of submitted points both for passage and against passage.¹⁸ Although the submitted material deals with a range of issues and goes beyond this report, two additional observations are provided below.

Fundamentally, Q3 does commit Nevada to an open market structure in its electricity sector. An open market structure does potentially support conclusions for the future of Nevada’s clean energy sector in two recent reports.

Focusing on their analysis of solar technology, the American Jobs Project (2016) for Nevada suggests that the potential for solar in Nevada is significant.¹⁹ A summary of its observations from the report is shown below (see Table III-1).

¹⁸ Specifically, see bottom of page 35 through page 40.

¹⁹ American Jobs Project (2016), op.cit.

Table III-1: Nevada Strength & Weaknesses Concerning Solar Energy: 2016

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> ✓ Best climate and altitude for solar energy in the United States ✓ Business-friendly tax climate ✓ Strong demand for utility-scale and rooftop solar ✓ Established base of solar energy research 	<ul style="list-style-type: none"> ✓ Uncertainty over net metering rates ✓ Biennial legislative sessions slow legislative action ✓ Aggregate in-state demand for energy is small
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> ✓ Decreasing PV prices ✓ Explosive demand for rooftop solar in neighboring states ✓ California’s new 50 percent renewable energy portfolio requirement will increase demand for solar energy ✓ Recent extension of federal tax credits ✓ Well-positioned to export to other western states 	<ul style="list-style-type: none"> ✓ Other states offer large tax breaks to manufacturers ✓ Neighboring states do more to promote rooftop solar

Source: American Jobs Project, page 18

If an open market structure assists in the development of both Nevada’s solar industry and the other clean energy sectors discussed in the report, the important job implications for Nevada residents and households needs to be recognized. Specifically, the clean energy sector in Nevada is associated with a wide range of skills and job opportunities for the state’s population.

As shown in the analysis by GOED (2015), the top five occupations in the clean energy sector comprise a range of workforce opportunities (see Table III-2). More importantly, these employment categories represent opportunities for a wide range of Nevada households. These occupations are shown below.

Table III-2: Top Occupations in Clean Energy Sector

Description	Employed in Industry Group (2014)	% of Total Jobs in Industry Group (2014)
Office Clerks, General	965	4.1%
First-Line Supervisors of Construction Trades & Extraction Workers	777	3.3%
Construction Laborers	1,618	6.8%
Plumbers, Pipefitters, & Steamfitters	1,756	7.4%
Heating, Air Conditioning, & Refrigeration Mechanics and Installers	1,578	6.6%

Source: GOED

The diverse employment opportunities for Nevada households are important, given the potential for significant job creation associated with the state’s clean energy sector. A common theme in economic impact studies is the so-called “jobs multiplier”.²⁰ The job multiplier represents the total effect on a state (or regional) economy of adding additional jobs in the sector under consideration. It represents the total job effect of the original change in jobs in the expanding sector (so-called direct employment) plus the additional jobs created from other industries in the state supplying goods and services to that expanding sector (referred to as the indirect impact) and the resulting impact throughout a regional economy as these combined positive impacts work through the entire economy (often referred to as induced effects).

This report provides estimates of significant potential job benefits for Nevada in the next section of this report (Section IV).

For comparison and in our opinion, it is important to recognize that the increasing number of studies that assess job impacts of renewable energy facilities, both in the United States and Europe, also lead to a common assessment that the impacts on job creation are large.²¹ The job multiplier for clean energy is significant, particularly in regional economies that have a well-developed industry in clean energy that can support direct employment (leading

²⁰ A recommended review of economic impact models is contained in the volume (available online) by William A. Schaffer titled “*Regional Impact Models*” from the Regional Research Institute, West Virginia University.

²¹ A review of many of these studies (seventeen studies are discussed) is in Jinwon Bae and Sandy Dall’erba (2015), “*The Economic Impact of a New Solar Power Plant in Arizona: Comparing the Input-Output Results generated by JEDI vs. IMPLAN*”, Regional Economics Applications Laboratory (“REAL”), The University of Illinois.

to the indirect impacts referred to above). As noted, Nevada has identified clean energy as a key industry for future development.

Job impact analysis herein generally focuses on economic impacts due to the addition of (long-run) permanent jobs. However, the impact of facility construction in clean energy investments also needs to be recognized.

As an example, consider the construction impacts on Nevada of two alternative solar facilities. The first is a 100MW (megawatt) plant similar to energy facilities from which NV Energy has entered into purchase agreements with and the second is a large 550MW (megawatt) complex similar to the Topaz Solar Farms (in California).²²

Utilizing the Job and Economic Development Impact model, known as “JEDI”, developed by the National Renewable Energy Laboratory (“NREL”), model estimates of the jobs created for construction in Nevada are presented below (see Table III-3).²³ These models were developed specifically to measure the construction impacts of power generation and biofuel plants. The underlying values of the construction parameters are derived from research and data on plant modeling by NREL.

²² For example, see “*Renewable Energy 2015*” (page 1) NV Energy and “*Fact Sheet: Topaz Solar Farms*”, BHE Solar.

²³ As noted at their website, the National Renewable Energy Laboratory, located in Golden, Colorado, is “the United States’ primary laboratory for renewable energy and energy efficiency research and development”.

Table III-3: Summary of Impacts in Nevada due to Renewable Facility Investment, by Power Output (in Megawatts): Base Model [2012]

	100 MW	550 MW
Construction Phase Only	Total Jobs	Total Jobs
Project Development and Onsite Labor Impacts	935	4,759
Construction and Interconnection Labor	663	3,372
Construction Related Services	273	1,387
Equipment and Supply Chain Impacts	659	3,354
Induced Impacts	527	2,683
Total Impacts	2,122	10,796
	Annual Jobs	Annual Jobs
Operational Phase (Annually-Recurring Benefits)		
Onsite Labor Impacts	45	148
Local Revenue and Supply Chain Impacts	27	80
Induced Impacts	10	31
Total Impacts	82	258

Source: JEDI

Although specific to solar energy construction, these facility examples also serve to illustrate the emphasis on clean energy in Nevada and the focused development of the overall Nevada clean energy sector as a key industry. The construction period of each specific project is a significant source of construction related jobs as well as jobs elsewhere in the state.

IV. Estimates of Job Impacts

Given the pace of technological innovation in the clean energy sector and its shorter history as a maturing industry, forecasts of job growth can be variable and subject to critical assumptions. However, studies on investment under regulatory uncertainty in US electricity generation suggest that if Q3 reduces uncertainty in Nevada's long term energy policy, job growth via additional investment would be expected.²⁴

As noted above, the clean energy sector in Nevada is not only a designated key industry for Nevada's future growth, but, in addition, is a major focus of the Governor's workforce development efforts through the GWIB sector councils. Clean energy includes such technologies as geothermal, solar and wind, along with the industries that support them, including transmission.²⁵

As late as 2015, given the uncertainties over clean energy such as solar, GOED was forecasting a negative picture for clean energy for the period. Utilizing Economic Modeling Specialists Intl. ("EMSI") projections, GOED (2015) forecasted a negative annual growth percentage for the clean energy sector over both the immediate short-term and the ten-year forecast period.²⁶

Yet, over the same period, EMSI was forecasting annual positive percent job growth in clean energy for the nation.²⁷ The relative forecasts between Nevada and the nation in clean energy stand in marked contrast. Fortunately, recent data show that the worst case scenario for Nevada did not develop as of 2016.²⁸

²⁴ The regulatory uncertainty in this case is not whether or not Nevada will back away from Renewable Portfolio Standards ("RPS"), but whether Nevada will move to an open market structure. See Kira R. Fabrizio (2013), *"The Effect of Regulatory Uncertainty on Investment: Evidence from Renewable Energy Generation"*, *The Journal of Law, Economics, and Organization*, 29 (4), 765-798. Also see (available online) an earlier presentation by Fabrizio (2011), *"Investments under Regulatory Uncertainty: Evidence from Renewable Energy Generation"*. Additional evidence is presented in Jun Ishii and Jingming Yan (2011), *"Investment under Regulatory Uncertainty: U.S. Electricity Generation Investment 1996-2000"*, Amherst College and Cornerstone Research (available online).

²⁵ The full definition of the clean energy sector is in GOED (2015), pp. 4-5.

²⁶ GOED (2015) op. cit.; Under *"Regional Trends"* (page 2), note the Nevada negative annual forecasts (percentage changes) occur over the period 2014 to 2024.

²⁷ Ibid.

²⁸ The total annual employment for clean energy jobs in Nevada is shown as 23,811 jobs in 2014. Recently, GOED has released 1st Quarter (2016) jobs data in clean energy at 25,600 [GOED, Nevada Renewable & Sustainable Energy (website for Key Industries)].

However, our interpretation is that *uncertainty* over Nevada’s clean energy policy had an implicit negative impact in these forecasts. A negative impact is what would be expected based on the literature cited in this report. Further evidence of this uncertainty in our opinion is provided by the observation that the Legislative Council Bureau could not assess the fiscal impact of Q3.²⁹

If Q3 settles the uncertainty over public policy, then it is reasonable to expect that Nevada, with its well-recognized advantages in clean energy such as solar, will, at minimum, track national forecasts.

Presented below are forecasts of potential job growth from 2023 to 2033. Base-employment in 2023 is more optimistic than the EMSI forecasts in GOED (2015), reflecting our judgment that expectations of an open market would allow a slight annual increase in clean energy jobs of two percent until 2023.

We utilized three recent reports to develop a consensus forecast of job growth over the forecast period of 2023 to 2033. Our estimates of job growth in Nevada’s clean energy sector assume a well and properly designed open market. These three reports are the EISA (August 2016) forecasts, the Department of Energy (2016) energy and employment report, and the Solar Foundations (2016) solar job census.³⁰

Based upon these sources, we present below two scenarios: 1) a base-case of five percent annual growth and 2) a higher potential growth scenario of eight percent.

Each forecasted scenario is shown separately with two alternative results for the job multiplier. Currently, GOED (2015), using analyses from EMSI, has estimated a jobs multiplier in the clean energy sector of 3.51.³¹ This reflects the current composition of the Nevada economy. However, calculations in the recent American Jobs Project (2016) for Nevada show that the multiplier can substantially increase as the Nevada economy develops more breadth and depth in the clean energy sector.³² These results are similar to the larger job multiplier shown in Solar Foundation (2016) for the subsector of solar jobs. With

²⁹ Fiscal Analysis Division of the Legislative Council Bureau, Page 41, Cegavske (2016).

³⁰ EISA (2016) op. cit., Department of Energy (DOE) (2016), “*US Energy and Employment Report*” (with the assistance of BW Research Partnership), and Solar Foundation (2016) ‘National Solar Jobs Census 2015.’

³¹ See GOED (2015), op. cit.; page 2.

³² For example, with respect to solar technology, see page 20, Figure 2 and the discussion.

Nevada’s emphasis on economic development of the key industry of clean energy, an alternative jobs multiplier (“Vibrant Key Industry”) is utilized in each scenario of 4.00 assuming further successful development.³³

Presented below are forecasts of potential total jobs in the clean energy sector across the forecast period of 2023 to 2033.

Table IV-1 presents in summary manner the annual forecasts of total jobs in the clean energy sector, changes in jobs in the energy sector and the total changes in Nevada jobs through the job multipliers.

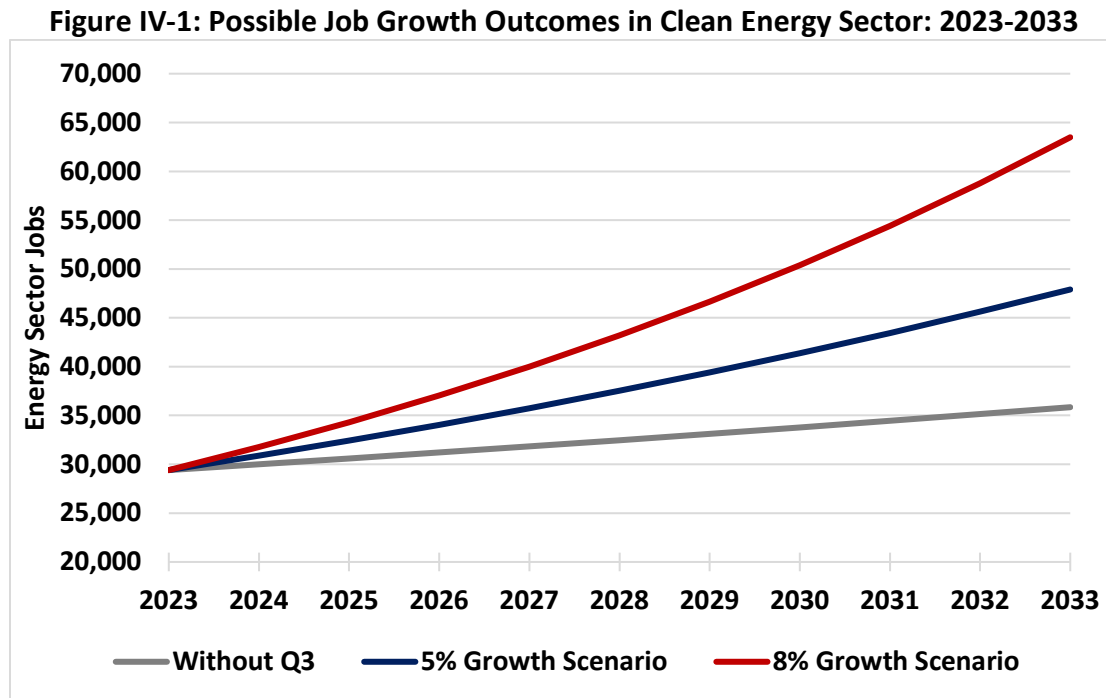
Table IV-1: Forecast of Job Growth in Clean Energy Sector Due to Passage of Question 3: 2023-2033

Year	5% Growth Scenario				8% Growth Scenario			
	Total Clean Energy Jobs	New Clean Energy Jobs	GOED Total New Jobs	Vibrant Key Industry Total New Jobs	Total Clean Energy Jobs	New Clean Energy Jobs	GOED Total New Jobs	Vibrant Key Industry Total New Jobs
2023	29,406				29,406			
2024	30,877	1,470	5,161	5,881	31,759	2,353	8,257	9,410
2025	32,421	1,544	5,419	6,175	34,300	2,541	8,918	10,163
2026	34,042	1,621	5,690	6,484	37,044	2,744	9,631	10,976
2027	35,744	1,702	5,974	6,808	40,007	2,963	10,402	11,854
2028	37,531	1,787	6,273	7,149	43,208	3,201	11,234	12,802
2029	39,407	1,877	6,587	7,506	46,664	3,457	12,133	13,826
2030	41,378	1,970	6,916	7,881	50,397	3,733	13,103	14,933
2031	43,447	2,069	7,262	8,276	54,429	4,032	14,152	16,127
2032	45,619	2,172	7,625	8,689	58,783	4,354	15,284	17,417
2033	47,900	2,281	8,006	9,124	63,486	4,703	16,506	18,811

Source: RCG Economics

³³ As pointed out in Jinwon Bae and Sandy Dall’erba (2015), the well-known economic impact models such as IMPLAN and JEDI are in general agreement as to the size of the job multiplier. In our opinion, the key issue in any of the impact models (EMSI, IMPLAN or JEDI) is to what extent does the existing industry structure in a state enhance the direct development of clean energy by supplying goods and services to an expanding subsector (such as geothermal, solar, etc.). This issue relates directly to the prior discussion in this report on the indirect effects (and induced effects), which are part of the total job multiplier. As noted, the ability to increase a jobs multiplier due to internal growth of supporting industry in a state is well-recognized by Nevada’s economic development strategy.

Figure IV-1 shows the increase in energy sector jobs, based on the two scenarios compared to an optimistic growth scenario of two percent without Q3.



Source: RCG Economics

As shown, clean energy jobs under both growth scenarios increase substantially. There is a potential to more than double jobs in the clean energy sector over the forecast period. Even the conservative forecast (5 percent growth) shows a job increase of 63 percent over the 10-year study period.

The following table presents annual forecasts of changes in labor income in Nevada, based on the job forecasts. The labor income from new jobs was estimated by multiplying the number of new workers by income per clean energy sector worker.³⁴ Then, the IMPLAN multiplier ratio of labor income to jobs was applied to the GOED and “Vibrant” job multipliers to create a pair of labor income multipliers (see Table IV-2).

³⁴ The (direct) annual average wage in the clean energy sector of \$63,900 is taken from GOED [Nevada Renewable & Sustainable Energy (website for Key Industries)]. The labor income effects are estimated by the models cited above in addition to the job multiplier. As noted in Schaffer, op.cit., these estimates are generally referred to as the income multiplier.

Table IV-2: Forecasts of Income Growth from Jobs in Clean Energy Sector Due to Passage of Question 3: 2023-2033

Year	5% Growth Scenario			8% Growth Scenario		
	New Clean Energy Jobs Direct Labor Income	GOED Total New Labor Income	Vibrant Key Industry Total New Labor Income	New Clean Energy Jobs Direct Labor Income	GOED Total New Labor Income	Vibrant Key Industry Total New Labor Income
2023	-	-	-	-	-	-
2024	\$93,953,298	\$212,685,426	\$242,376,554	\$150,325,277	\$340,296,681	\$387,802,486
2025	\$98,650,963	\$223,319,697	\$254,495,381	\$162,351,299	\$367,520,416	\$418,826,685
2026	\$103,583,511	\$234,485,682	\$267,220,150	\$175,339,403	\$396,922,049	\$452,332,820
2027	\$108,762,687	\$246,209,966	\$280,581,158	\$189,366,555	\$428,675,813	\$488,519,445
2028	\$114,200,821	\$258,520,464	\$294,610,216	\$204,515,880	\$462,969,878	\$527,601,001
2029	\$119,910,862	\$271,446,488	\$309,340,727	\$220,877,150	\$500,007,468	\$569,809,081
2030	\$125,906,405	\$285,018,812	\$324,807,763	\$238,547,322	\$540,008,066	\$615,393,807
2031	\$132,201,726	\$299,269,753	\$341,048,151	\$257,631,108	\$583,208,711	\$664,625,312
2032	\$138,811,812	\$314,233,240	\$358,100,559	\$278,241,597	\$629,865,408	\$717,795,337
2033	\$145,752,402	\$329,944,902	\$376,005,587	\$300,500,924	\$680,254,641	\$775,218,964

Source: RCG Economics

As noted, the GOED (2015) forecasts from EMSI were negative, based on existing conditions. However, even if Q3 were to allow Nevada’s clean energy sector to grow at the lower national sector growth rate (the five-percent forecast), this would be a very positive development.

V. Conclusions

The purpose of this report is to provide insights on the potential job impacts of Nevada Ballot Question 3, The Energy Choice Initiative.

As discussed, there are important implications as Q3 calls for a future restructuring of the electricity market in Nevada to reflect an open market structure and to be established by law by July 1, 2023.

This report assumes that the Legislature, state agencies and other policymakers and stakeholders will properly address the complex process of establishing an open market structure, including all issues related to production, transmission and distribution

Based upon this report, the economic literature and modeling herein, several insights are provided:

- The impetus for Q3 is related to the national movement on electrical sector restructuring with an emphasis on the clean energy sector. Historically, an open market approach that reduces barriers to entry in heavily regulated sectors does appear to increase investment across a variety of measures.
- It needs to be recognized that Q3, while it does not remove uncertainty that Nevada is committed to an open market structure, is consistent with existing Nevada initiatives in economic development and workforce investments. This includes both the selection of clean energy as a key industry for Nevada and its workforce development sector councils.
- As late as 2015, given the uncertainties over clean energy, such as solar, forecasts for Nevada's clean energy sector were unfortunately negative. If Q3 settles the uncertainty over public policy, then it is reasonable to expect that Nevada, with its well-recognized advantages in clean energy, will, at minimum, track national growth trend forecasts for the industry.
- Even using conservative national forecasts, the major finding of this report is that the direct and indirect effects of Q3 would create significant future job growth for

both the clean energy sector and Nevada. Jobs in the clean energy sector could basically double over the forecast period with additional significant increases in other new Nevada jobs. In addition, the construction models for solar presented in the report provide evidence of truly significant employment during the construction phase.

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