White Paper

Assessment and Recommendations: Alignment of Nevada Economic Development Policy & Energy Policy

Prepared for:

Nevada State Office of Energy and
Governor's Office of Economic Development

DOE Grant DE-EE0005461 Enhancing Commercial Building Retrofits
Through Streamlined Standards and Policy Incentives

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Executive Summary

The authors wish to express their gratitude to all of the team partners and stakeholders who participated in efforts to develop and review the content of this document. The findings and recommendations represent positions that were supported by a majority of the participants or were "compromise" positions. Individual stakeholders, however, have expressed to the authors their lack of support for some of the specific findings and recommendations contained herein. Therefore, it should be noted that participation as a team member or stakeholder does not convey individual support for all aspects of this document.

The process of comparing Nevada Energy Policy and Economic Development Policy was somewhat challenging. While current economic development strategy is mostly embodied or summarized in a policy document ("Moving Nevada Forward: A Plan for Excellence in Economic Development 2012-2014), there is no comprehensive state energy policy document. Rather, energy policy is expressed in various provisions of the Nevada Revised Statutes (NRS), Nevada Administrative Code (NAC) and Public Utility Commission of Nevada (PUCN) rulings.

At the highest level of expression (NRS 701.010 Legislative Findings; state policy), it would appear that energy policy is closely aligned with economic development policy. The areas of policy alignment for both energy and economic development policies can be summarized in the following broad high-level goals:

1) Increase the number of jobs in Nevada.
2) Grow the Nevada economy.
3) Lower energy costs (from what these cost levels might otherwise be) for businesses and residents in Nevada.
4) Increase stability and predictability of energy costs.
5) Reduce environmental impacts related to energy production and consumption, particularly in those circumstances where environmental impacts could adversely affect future growth and/or where reductions in environmental impacts could positively affect future economic growth.

However, the devil is in the details and at the implementation level it appears there are specific elements of state energy policy that deviate from the high-level ideals set forth in NRS 701.010.

For example, two key elements of Nevada's current economic development policy are job creation and economic impact. A shortcoming in many of the economic impact analyses currently presented to support various energy policy decisions is the failure to consider **net** economic impact; specifically, the analyses fail to consider how the rate impacts of various actions feed back into the broader economy.

Rate increases or decreases can have three general types of economic impacts:

1) Effect on utility bills, which affects the rate of economic activity and growth of the state's economy;
2) Effect on utility bills can affect the profitability of existing business operations and therefore their competitiveness and future growth potential; and
3) Effect on the ability of Nevada to attract new businesses and support retention and expansion of existing businesses.

Without tools that analyze all of these economic impacts, energy efficiency has likely been overlooked as a key energy and economic development resource for Nevada. Further, as an expression of policy, Nevada had not established energy efficiency as a high priority resource (for example, as would be evidenced by an integrated resource planning objective of acquiring all cost-effective energy efficiency). It is the opinion of the authors that the greatest omission in Nevada's current energy policy is the failure to promote energy efficiency as the priority resource, or even among the top resources, for meeting Nevada's future energy needs.

Additionally, levels of future risk associated with various energy supply choices seem to typically not be fully considered, or at least no attempt is made to quantify the risks into the economic analyses. Risks can include potential fuel supply disruption, fuel price volatility, and political decisions. At one of the stakeholder meetings held to discuss policy recommendations, one participant asked, "Does anyone present believe there will not be some form of carbon tax within the next decade?" Not one stakeholder present responded. And yet, policy decisions are being made now that do not appear to include a carbon tax as a cost/risk element even though investments are contemplated that will involve fossil fuel-based energy supply sources with useful lives of several decades.

The authors have concluded that the state's high-level economic development and energy goals can be achieved by accomplishing the following more-specific objectives:

1) Increase aggregate electricity consumption in Nevada while reducing individual user's average electricity consumption. This could be accomplished, for example, by attracting more electricity-intensive businesses (i.e. data centers); more residents; increased adoption of electric vehicles; and switching "fuels" where beneficial.
2) Reduce peak demand for electricity relative to total or average consumption to improve the utilization of existing electricity generation, transmission and distribution infrastructure which should translate into lower electricity rates and/or aggregate utility bills for Nevada customers.
3) Reduce average energy consumption (metrics: per capita, per square foot, per employee, per mile traveled). Energy efficiency continues to represent the most cost-effective and lowest-risk means of meeting Nevada's energy needs.
4) Reduce air emissions related to energy production and consumption.
5) Reduce water consumption related to energy production and consumption. Water is considered a precious commodity in Nevada and is one of the resources that can constrain economic development and growth.

To achieve these objectives, the following set of eight policy recommendations has been developed:

1. **Support the adoption and implementation of cost-effective energy efficiency building codes and standards and work to help ensure compliance.**

   New buildings typically will have useful economic lives of at least 30 years, with 50 - 100 years being more representative of the likely range of the expected useful lives. Investment in more energy-efficient building design and equipment from the outset is typically the most thorough and cost-effective approach.

2. **Develop and implement a pilot utility on-bill financing program for energy-efficiency improvements.**

   Utility on-bill financing (OBF) has been a low-risk, low-default mechanism for overcoming two of the major barriers to energy-efficiency improvements: 1) upfront investment and 2) access to financing. Unlike other methods of financing energy efficiency improvements, properly designed OBF can be the "democratizing factor" that opens the potential for energy-efficiency improvements to nearly all consumers. The goal of a pilot project is to demonstrate the beneficial impact of allowing building owners/operators to make energy efficiency improvements without needing to use their own capital for the upfront costs and without applying traditional lending qualification criteria.

3. **Develop and adopt policies and measures to accelerate the acquisition and use of alternative fuel vehicles (AFVs) in Nevada – particularly in metro areas.**

   Increased use of AFV's can assist with several of the specific objectives identified above as important to Nevada policy alignment, specifically:
   - increase aggregate electricity consumption in Nevada;
   - reduce peak demand for electricity relative to total or average consumption;
   - reduce emissions related to transportation (especially in the potential non-attainment basins of Las Vegas and Reno metropolitan areas);
   - reduce carbon footprint of vehicles by reducing vehicle emissions (metrics: tons of carbon emitted);
   - reduce average energy consumption (metrics: per capita, per square foot, per employee, per mile traveled);
   - reduce dependence on foreign transportation fuels; and
   - create jobs involved in the installation of charging and fueling stations.

   Governors from eight states recently announced an initiative to put 3.3 million zero-emission vehicles on the roads in their states by 2025. Nevada was not one of them.

4. **Develop an outreach program to accelerate implementation of energy efficiency improvements in existing Commercial Buildings through a state-supported and well-defined Energy Savings Performance Contracting process.**

   Performance contracting involves an energy service company (ESCO) designing a package of energy cost reduction measures, installing or implementing those cost reduction measures, and guaranteeing the savings that will be achieved by the cost reductions. The owner pays for the package over time using the stream of revenue resulting from the energy cost savings resulting from the guaranteed energy reduction measures. NSOE should lead an effort to increase the awareness of performance contracting by establishing a formalized, systematic method of defining and communicating the correct process to be used by contractors and building owners who employ performance contracts to achieve energy efficiency improvements, with emphasis on risk mitigation.

5. **Implement alternative ways of incentivizing investor-owned utilities (IOUs) to increase their demand side management (DSM) programs.**

   As the American Council for an Energy Efficient Economy (ACEEE) has observed:

   > "The obligation to earn a profit drives utilities to increase revenues by selling more electricity. Given this, investment in energy efficiency raises financial concerns for IOUs. IOUs need to be able to recover the money they invest in efficiency from ratepayers and just like investments in new power plants; they need to be able to earn a return on investments in energy efficiency. Further, the threat of reduced sales if an energy efficiency program is successful threatens to cut into utility profits.
   >
   > In the traditional regulatory structure these concerns hinder a utility's willingness to invest in energy efficiency. No single policy mechanism can adequately remove the existing biases against utility investment in energy efficiency. However, several policies, when used in combination, can properly align financial incentives to remove the major market barriers to energy efficiency. These include cost recovery, decoupling and providing shareholder incentives."

   Nevada has attempted to address these concerns in a couple of ways. In July 2010 the Public Utilities Commission of Nevada (PUCN), directed by 2009 legislation, adopted a lost revenue recovery mechanism providing for annual recovery of NV Energy's efficiency program expenses and its fixed cost revenues lost from the reduced sales caused by the efficiency programs. A previous 5% additional rate of return incentive was eliminated, and instead a party may file a request for an incentive on a program-by-program basis. The lost revenue recovery policy, however, has been more complex to implement and more controversial than was anticipated at the time of its adoption. There is broad sentiment that the current lost revenue recovery mechanism needs to be replaced.

It is recommended that alternative ways of encouraging IOU investment in DSM programs be considered to determine what combination of provisions would best encourage accelerated implementation of energy efficiency/DSM programs in Nevada. Most likely, a combination of approaches is needed: one mechanism to offset the lost recovery of fixed costs that results from successful DSM and another mechanism to share the benefits of successful DSM between ratepayers and the utilities. The decoupling mechanism currently being used in Nevada by Southwest Gas is one candidate for offsetting 'lost revenue'.

6. **Support the Location and Expansion in Nevada of the Supply Chains of Goods and Services for Energy Efficiency**

   As discussed in the description of Current Economic Development Policy in this report, renewable energy component manufacturing, advancing and internationalizing geothermal development and energy efficiency upgrading are targeted by the State as areas for economic opportunity. GOED should expand this strategy to specifically include opportunities in the energy-efficiency supply chain. GOED and/or NSOE may be able to identify grant opportunities that would include promotion of Nevada energy-related businesses.

7. **Utilize better decision support tools when considering energy policy and economic policy decisions.**

   Funding should be pursued to develop an "open" Computable General Equilibrium (CGE) model for use by utilities, the PUCN, and stakeholders in energy decisions. The University Center for Economic Development at the University of Nevada, Reno is completing a background study and roadmap for developing a CGE model for use in estimating economic impacts related to various energy decisions, including fossil-fuels generation, renewable energy electricity generation and energy efficiency programs. This analytical tool would have the capability of comparing the economic and net employment impacts of various policies regarding the mix of fossil fuels, renewable energy resources, and energy efficiency measures to meet electricity needs in Nevada.

   Utilizing a CGE model to compare all energy policy decisions (fossil-fuels, renewable and efficiency) could result in making better-informed policy decisions. Presumably, this would also lead to higher rates of economic growth for the State and to prioritization of lowest-cost lowest-risk resources.

8. **Establish Energy-Efficiency Targets for Nevada, Followed By Recommended Methods for Achieving Those Targets**

   From the recently published "2013 City Energy Efficiency Scorecard" by ACEEE:

   > Energy efficiency may be the cheapest, most abundant and most underutilized resource for local economic and community development. Considerable evidence documents that investments in energy efficiency can improve community self-

reliance and resilience; save money for households, business and anchor institutions, and local governments; create local jobs; extend the life of and reduce the costs and risks of critical infrastructure investments; catalyze local economic reinvestment; improve livability and the local asset value of the built environment; and protect human health and the natural environment through reducing emissions of critical pollutants and greenhouse gases.

At a September 2013 meeting of stakeholders, there seemed to be general consensus that Nevada should establish energy efficiency targets and then consider the various ways of achieving those targets. Methods for achieving energy efficiency targets include various incentives, use of alternatives to the Total Resource Cost test, mandates (with predetermined consequences if goals are not achieved), and/or utilizing some sort of carbon tax and letting market forces allocate energy resources, including energy efficiency. Mandates are already used by many states with Energy Efficiency Resource Standards (EERS) being the most prevalent form for mandating energy efficiency targets. Importantly, states that have implemented EERSs now represent 61 percent of total electricity sales in the U.S.

In the 2013 session, the Nevada Legislature passed AB 428 creating a Legislative Committee on Energy. Since much of Nevada's energy policy is set forth in Nevada Revised Statutes, it is recommended that the energy efficiency goal-setting process be referred to the Legislative Committee on Energy, with support from GOED and NSOE, as well as the involvement of any other entities and individuals the Committee identifies.

Next Steps

The Nevada State Office of Energy is forming working groups to help implement these eight policy recommendations. Next to be developed are time frames, definitions of "success", milestones, and reporting processes. These elements are absolutely necessary for the working groups to achieve meaningful and timely results.

While the working groups take on these tasks, due to time considerations, we encourage the interim Legislative Committee on Energy to engage the working groups and consider any legislation needed to implement these recommendations. The next session of the Nevada Legislature in 2015 can be a "watershed point" for advancing energy efficiency and optimizing the economic benefits of energy efficiency for all Nevadans.

I. Introduction

In October 2011, the Department of Energy awarded a State Energy Program Special Project Grant to the Nevada State Office of Energy (NSOE). The proposal submitted to DOE was designed around a team approach that included NSOE, the Governor's Office of Economic Development (GOED), NV Energy, the Business Environmental Program (BEP) at the University of Nevada, Reno (UNR) and the Nevada Chapter of the Associated General Contractors of America (AGC). NV Energy agreed to provide in-kind match that was key to Nevada receiving this grant award. NSOE subsequently awarded a sub-grant to UNR to conduct research and perform studies in support of the grant's objectives. The purpose of the grant is to analyze and initiate a process to enact methods designed to significantly alter the regulatory and policy-based environment for commercial building energy-efficiency retrofits in Nevada through a paradigm shift in the way that commercial building retrofit projects are evaluated from both an energy-savings and financial return perspective, and in the quantity of projects that are implemented.

The scope of the project includes identifying barriers to implementation of energy efficiency improvements in commercial buildings; reviewing and documenting alignment and conflicts between energy policy and economic development policy; and developing an inter-related and comprehensive set of recommended policies, standards, laws, ordinances, financial incentives and/or practices that will increase the implementation of energy efficiency retrofits in commercial buildings. The process directed by the grant includes vetting of the proposed recommendations with key stakeholders and creating a plan for implementation of the final recommendations. The recommendations should foster implementation of commercial building energy efficiency retrofits on a much grander scale than has been achieved in the state before, particularly in the private sector.

The purpose of this White Paper is to document the results of research and findings related to the grant's objectives and to provide a forum and focus for key stakeholder discussion of alternatives and recommendations presented.

The project timeframe continues through October 2013. Beyond the current White Paper, the project team will continue to make technical recommendations and provide implementation advice in regard to the project scope and objectives. Because the research and stakeholder process has uncovered many additional ideas and suggestions outside the initial project scope and objectives, provisions will also be made by NSOE to concurrently explore and receive feedback on those ideas and suggestions.

II. Current Economic Development Policy and Energy Policy in Nevada (2013)

Much of Nevada's current energy policy was developed prior to the beginning of the Great Recession, while current economic development policy was developed as a result of the Great Recession. Nevada does not have a comprehensive energy plan document. Instead, energy policy is set forth in various parts of Nevada Revised Statutes, Administrative Code and PUCN decisions. Several bills incorporating

significant changes to energy policy and economic development policy were enacted in 2013. While there are some specific connections between Nevada energy policy and economic development policy, like the green building tax incentives, renewable energy and manufacturing tax abatement, revolving loan funds, etc., we have been unable to identify any prior, specific, broad efforts to align these two policy areas. Below are summaries of some of the key aspects of economic development policy and energy policy in Nevada. Significant differences in the economic environment in Nevada in the periods before and since the onset of the Great Recession include:

1) Prior to the Great Recession, demand for electricity was growing in Nevada, so financial analysis for renewable energy projects and energy efficiency projects included "avoided costs for new fossil-fuel generating facilities". Since the inception of the Great Recession, demand for electricity in Nevada has been flat or decreasing.
2) Prior to the Great Recession, job creation was not a significant concern, since Nevada had been among the fastest growing states for several decades. Since the inception of the Great Recession, Nevada has led the nation with the highest unemployment rate.
3) Approximately coincident with the Great Recession, the long-term trend for natural gas prices began to shift from increasing prices to flat/declining prices, partially as result of what was occurring in the economy but, more importantly, as a result of certain technologies (improved horizontal drilling techniques and fracturing of oil and gas-bearing geological structures) being applied to several shale structures in the U.S. and Canada.

Current Economic Development Policy

In February 2012, the Governor's Office of Economic Development (GOED) released its new plan for economic development in the State of Nevada, entitled "Moving Nevada Forward: A Plan for Excellence in Economic Development 2012-2014."[1] The plan presents three goals (Why We're Doing It – p.17):

1) Facilitate job growth (50,000 jobs by 2014 mentioned in the Governor's speech);
2) Help speed the recovery from the current recession, and
3) Foster a long-term vibrant sustainable economy.

The plan targets a number of key industries: *Aerospace Defense, Business IT Ecosystems,* ***Clean Energy*** (emphasis added), *Health & Medical Services, Logistics & Operations, Mining, Materials & Manufacturing, and Tourism, Entertainment & Gambling* (p.32-33).

In the section "Nevada's Assets" the plan cites:

- *National leader in use of geothermal energy* (p.12);
- *National leader in use of solar energy* (p.12); and
- *Nevada ranked #1 for LEED-certified buildings [per capita] (U.S. Green Building Council[2])* (p.13). **Authors' note:** Nevada has more square footage of LEED buildings per capita than any other state.

[1] The full GOED plan can be found at http://nv.diversifynevada.com/documents/state_plan/2012_NVGOED_StatePlan_Full.pdf.
[2] http://greendashboard.dc.gov/Energy/LEEDBuildings

In the section "Liabilities" the plan cites:

- *Higher energy costs than most neighboring states* (p.14).
  Authors' note: In the last few years, Nevada's competitive position appears to have improved – to "the middle of the pack". The following information was provided by NV Energy.

Table 5.6.A. Average Retail Price of Electricity to Ultimate Customers by End-Use, by State, 13-Jun
(cents per Kilowatthour)
Per U.S. Energy Information Administration

	Residential	Commercial	Industrial	Transportation	All Sectors	All Sectors 12-Dec	All Sectors 11-Dec	
Mountain	11.84	9.87	6.97	10.96	9.72	8.37	8.07	This chart represents rates at a point in time.
Arizona	12.18	10.55	7.14	0	10.89	8.98	8.73	As of June 2013, Nevada's average retail price for
Colorado	12.42	10.49	7.7	11	10.34	9.08	9.02	all sectors was 5.1% lower than the Mountain
Idaho	10.19	7.98	6.97	0	8	6.9	6.13	states, 43.2% lower than California, and
Montana	11.06	9.81	5.62	0	8.77	8.36	8.28	11.9% lower than the U.S.
Nevada	11.56	8.38	7.15	8.2	9.22	8.36	7.97	
New Mexico	12.48	10.18	6.91	0	9.86	8.56	8.39	As of June 2013, Nevada's average retail price for
Utah	10.83	9.2	6.57	11.5	8.82	7.41	6.98	industrial customers was 2.6% higher than the
Wyoming	10.77	8.82	6.38	0	7.47	7.23	6.76	Mountain states, 41.6% lower than California
								states, and .3% higher than the U.S.
Pacific	14.82	14.67	8.8	7.49	13.36	10.76	10.29	
								Residential rates in Arizona and Nevada are
California	17.5	16.94	12.25	7.44	16.22	12.83	12.02	higher because of the impact of summer usage on
Oregon	10.16	8.43	5.88	8.93	8.28	8.33	8.23	residential costs to serve.
Washington	8.82	7.62	4.04	8.5	6.81	7.07	7.07	
U.S. Total	12.54	10.7	7.13	10.7	10.47	9.65	9.53	As of June, Nevada's average retail price for residential customers was 2.4% lower than California, and 7.8% lower than the U.S.

Table 5.6.B. Average Retail Price of Electricity to Ultimate Customers by End-Use, by State, Year-to-Date through June 2013
(cents per Kilowatthour)
Per U.S. Energy Information Administration

	Residential	Commercial	Industrial	Transportation	All Sectors	All Sectors 12-Dec	All Sectors 11-Dec	
Mountain	10.97	9.15	6.17	10.18	8.86	8.81	8.63	This chart represents rates charged over a period
								period of time. In this case, January 2013 through
Arizona	11.39	9.71	6.4	0	9.85	9.8	9.71	Jun-13
Colorado	11.55	9.61	7.07	10.54	9.54	9.34	9.39	
Idaho	8.8	7.12	5.76	0	7.21	6.89	6.44	Thru June 2013, Nevada's average retail price for
Montana	10.16	9.46	5.24	0	8.47	8.26	8.23	all sectors was 4.4% lower than the Mountain
Nevada	11.7	8.71	5.66	7.62	8.47	8.94	8.97	states, 38.5% lower than California, and 14.2%
New Mexico	11.44	9.4	6.22	0	8.98	8.82	8.74	lower than the U.S.
Utah	10.07	8.25	5.74	10.17	7.95	7.85	7.13	
Wyoming	9.88	8.48	6.37	0	7.48	7.19	6.58	Thru June 2013, Nevada's average retail price for
								industrial customers was 8.3% lower than the
Pacific	13.14	11.86	7.73	7.34	11.43	11.52	11.01	Mountain states, 46.2% lower than California,
								and 15% lower than the U.S.
California	16.07	13.39	10.51	7.28	13.77	13.75	13.05	
Oregon	9.79	8.36	5.72	8.81	8.3	8.25	8.04	Thru June 2013, Nevada's average retail price for
Washington	8.56	7.73	4.08	8.29	7.02	6.93	6.78	residential customers was 6.7% higher than
								the Mountain states, 27.2% lower than California,
U.S. Total	11.9	10.13	6.66	10.36	9.87	9.87	9.9	and 1.7% lower than the U.S.

Numbers do not include taxes. Nevada's numbers do not include franchise taxes or the UEC. The REPR, TRED and EE rates are included.

However, the relative position of Nevada's electricity rates, according to Site Selection website, is not as favorable as indicated above.[3] The Nevada page on the Site Selector website, updated in January 2013, indicates an average industrial retail electricity rate of $0.0825 per kWh, which is second highest only to California and well above the comparable rate for other states in the western region. Differences between published rates and site selector analyses are explained in a document published by Unique

[3] http://www.siteselection.com/issues/2013/jan/data/Nevada.pdf#search

Infrastructure Group.[4] Factors such as demand, facility, and transmission charges are considered as part of power costs by site selectors.

For energy-intensive businesses (i.e. data centers and manufacturing) considering location in Nevada, 1) the cost of electricity, 2) the accessibility and transparency of that cost information and 3) the long-term stability of rates are of significant concern as key areas where firms need to minimize operating expenses and manage risk. In many cases, tax incentives are needed either in addition to competitive power rates or to offset rate advantages other states or regions may have. While developers of the largest data centers may contact states and utilities to negotiate power rates and incentives, the many small to medium size data centers (1-10 MW) tend to simply select or eliminate locations from consideration based upon public data accessible on the Internet. An industry observer has advised that the cutoff from consideration for electrical rates seems to be below the $0.06/kWh level. Duke power, as an example, uses competitive rates as a factor in trying to attract data centers to its service territory.[5]

GOED identifies some key tactics for implementation of the plan, including the following:

- *GOED and the Governor's Office of Energy will partner to study the necessary **business model for energy exports*** (emphasis added) *and Nevada's capabilities in that area. Also examined will be how Nevada might partner with neighboring states to improve Nevada's energy costs, including a consideration of project development, operations, and transmission.* (p.31)

In the section of the report "Targeted Sectors and Opportunities," GOED provides some specifics in regard to the Clean Energy Sector (p.32):

- *Renewable component manufacturing;*
- *Expanding transmission capacity;*
- *Advancing and internationalizing geothermal development;*
- *Energy efficiency upgrading.*

In the section "Metrics and Accountability" GOED states: "For each of the seven sectors, then, GOED will determine the return on investment by tracking and reporting the following performance measures:

- *Job growth;*
- *Business formation;*
- *Wages and salaries;*
- *Economic impact growth; and*
- *State share of national sector."* (p.60)

[4] http://www.cfroundtable.org/meetings/032511/CFRT%20March-25-2011%20preso.pdf
[5] http://www.duke-energy.com/economic-development/data-centers-site-selection.asp

New legislation in 2013 that has impact on economic development policy as it relates to energy includes the following:

SB 123 (included in this paper as Appendix C): SB 123 calls for NV Energy to close down its coal-fired electricity generation facilities and replace them with renewables and natural gas fired generating facilities. Of note, certain requirements are placed upon the Public Utilities Commission:

> **Sec. 16.** NRS 704.746 is hereby amended to read as follows:
> ~
> *8. The Commission shall, after a hearing, review and accept or modify an emissions reduction and capacity replacement plan which includes each element required by section 7 of this act. In considering whether to accept or modify an emissions reduction and capacity replacement plan, the Commission shall consider:*
> *(a) The cost to the customers of the electric utility to implement the plan;*
> *(b) Whether the plan provides the greatest economic benefit to this State;*
> *(c) Whether the plan provides the greatest opportunities for the creation of new jobs in this State; and*
> *(d) Whether the plan represents the best value to the customers of the electric utility.*[6]

These requirements mostly parallel requirements placed upon the electric utility in evaluating proposals from any new renewable energy facilities. Interestingly, these evaluation requirements were not used in evaluating energy efficiency as a potential resource for consideration in replacing the coal-fired electricity generation.

AB 239 (included in this paper as Appendix D): AB 239 includes quite a few important policy elements, from changes in tax abatements, to permissible uses of money in the Renewable Energy Fund, to providing a low electricity rate as an incentive to attract businesses to the state where this could make a difference in their decision to locate to Nevada, to not requiring renewable generating facilities to be included in a utilities Integrated Resource Plan if the facility is solely to provide electricity outside the State of Nevada, local government planning and approval processes for utility projects. Of greatest significance for economic development policy is the Economic Development Electric Rate Rider Program. Apparently in recognition of the economic development hurdle posed by high electric rates, this legislation allows for rates to be subsidized over the next five years for those commercial and industrial customers interested in locating to Nevada when those customers can demonstrate that the incentive rates are necessary to make Nevada competitive with other potential locations.

[6] Senate Bill No. 123 – Senator Atkinson, p. 17

Current Energy Policy

Nevada energy policy is mostly reflected in various provisions of the Nevada Revised Statutes (NRS) and the Nevada Administrative Code (NAC), as follows:

NRS Chapter 701 – Energy Policy deals with organization of the Nevada State Office of Energy, renewable energy, energy efficiency and energy conservation, and energy development projects. While all of NRS.701 can be found at http://www.leg.state.nv.us/NRS/NRS-701.html, Section 701.010 is included below.

NRS 701.010 Legislative findings; state policy.

1. The Legislature finds that:

(a) Energy is essential to the economy of the State and to the health, safety and welfare of the people of the State.

(b) The State has a responsibility to encourage the maintenance of a reliable and economical supply of energy at a level which is consistent with the protection of environmental quality.

(c) The State has a responsibility to encourage the utilization of a wide range of measures which reduce wasteful uses of energy resources.

(d) The State and the public have an interest in encouraging public utilities to promote and take actions toward energy conservation.

(e) Planning for energy conservation and future energy requirements should include consideration of state, regional and local plans for land use, urban expansion, transportation systems, environmental protection and economic development.

(f) Government and private enterprise need to accelerate research and development of sources of renewable energy and to improve technology related to the research and development of existing sources of energy.

(g) While government and private enterprise are seeking to accelerate research and development of sources of renewable energy, they must also prepare for and respond to the advent of competition within the electrical energy industry and are, therefore, encouraged to maximize the use of indigenous energy resources to the extent competitively and economically feasible.

(h) Prevention of delays and interruptions in providing energy, protecting environmental values and conserving energy require expanded authority and capability within State Government.

2. It is the policy of this State to encourage participation with all levels of government and private enterprise in cooperative state, regional and national programs to assure adequate supplies of energy resources and markets for such energy resources.

3. It is the policy of this State to assign the responsibility for managing and conserving energy and its sources to agencies whose other programs are similar, to avoid duplication of effort in developing policies and programs for energy.

(Added to NRS by 1977, 1163; A 1983, 2092; 1995, 311; 2001, 3263; 2007, 2973)

NRS 701.190 – Preparation of a comprehensive state energy plan was adopted by the State Legislature in 1977, and amended in 1979, 2001, 2009 and 2011. To date, it appears that the Legislature has not provided sufficient resources for the consistent and thorough update of the plan; a current comprehensive state energy plan does not exist.

NRS 701.220 - Adoption of regulations for energy conservation in building; exemptions; applicability and enforcement; procedures for adoption requires the State adopt the most current version of the International Energy Conservation Code (IECC) every three years. Nevada adopted the 2009 IECC in 2011 effective statewide on July 1, 2012. The Nevada State Office of Energy plans to adopt the 2012 Code in 2014.

Recently, the City of Las Vegas changed its codes to eliminate the requirement for building renovation projects to comply with the 2009 IECC. The City would not require certain projects to comply with the energy code adopted by the State of Nevada. All the implications of this have not yet been determined.

Within NRS 701, there are also numerous provisions dealing with renewable energy and energy conservation, including formation of panels and task forces, revolving loan funds, and energy development projects.

NRS 701A - Energy Related Tax Incentives. This chapter of NRS deals with adoption of a green building rating system and then provides for tax exemptions for certain businesses, facilities systems, devices, and renewable energy facilities, and the creation and administration of a renewable energy fund. It calls for partial tax abatement (property taxes) for qualifying buildings and facilities. In the specific area of energy efficiency in the renovation of existing buildings, currently only buildings and structures used by manufacturers can qualify.

NRS 701B - Renewable Energy Programs. This chapter of NRS sets forth provisions of a solar energy systems incentive program, a solar thermal systems demonstration program, a renewable energy school pilot program, a wind energy systems demonstration program, a waterpower energy systems demonstration program, and a green jobs initiative. It sets forth the rules for these various programs, including incentives, cost recovery by the utility and issuance of portfolio energy credits.

Perhaps the most significant provisions in NRS setting forth energy policy are within **NRS Chapter 704 – Regulation of Public Utilities Generally**, which can be found at http://www.leg.state.nv.us/NRS/NRS-704.html. Provisions that are key to Nevada energy policy include:

- **NRS 704.669 Regulation of sale of geothermal energy to public.**
- **NRS 704.701-704.787 Electric Service**, including provisions about setting rates, resource planning, hearing processes, disclosures to customers, net metering, portfolio standards and energy efficiency and conservation programs.
- **NRS 704.9901-704.992 Natural Gas Service** addresses taxes and fees, billing requirements, reporting requirements and programs to support conservation.

Specific details within sections of NRS regarding Electric Service may have greater policy implications for Nevada than any other provisions within NRS. NRS 704.7821 is included in Appendix A in its entirety because of its relevance to Nevada policy. Several key excerpts are presented below.

NRS 704.7821 - Establishment of portfolio standard; requirements; treatment of certain solar energy systems; portfolio energy credits; renewable energy contracts and energy efficiency contracts; exemptions; regulations.

1. For each provider of electric service, the Commission shall establish a portfolio standard. The portfolio standard must require each provider to generate, acquire or save electricity from portfolio energy systems or efficiency measures in an amount that is:

~

(d) For calendar years 2011 and 2012, not less than 15 percent of the total amount of electricity sold by the provider to its retail customers in this State during that calendar year.

(e) For calendar years 2013 and 2014, not less than 18 percent of the total amount of electricity sold by the provider to its retail customers in this State during that calendar year.

(f) For calendar years 2015 through 2019, inclusive, not less than 20 percent of the total amount of electricity sold by the provider to its retail customers in this State during that calendar year.

(g) For calendar years 2020 through 2024, inclusive, not less than 22 percent of the total amount of electricity sold by the provider to its retail customers in this State during that calendar year.

(h) For calendar year 2025 and for each calendar year thereafter, not less than 25 percent of the total amount of electricity sold by the provider to its retail customers in this State during that calendar year.

2. In addition to the requirements set forth in subsection 1, the portfolio standard for each provider must require that:

(a) Of the total amount of electricity that the provider is required to generate, acquire or save from portfolio energy systems or efficiency measures during each calendar year, not less than:

(1) For calendar years 2009 through 2015, inclusive, 5 percent of that amount must be generated or acquired from solar renewable energy systems.

(2) For calendar year 2016 and for each calendar year thereafter, 6 percent of that amount must be generated or acquired from solar renewable energy systems.

(b) Of the total amount of electricity that the provider is required to generate, acquire or save from portfolio energy systems or efficiency measures during each calendar year, not more than 25 percent of that amount may be based on energy efficiency measures. If the provider intends to use energy efficiency measures to comply with its portfolio standard during any calendar year, of the total amount of electricity saved from energy efficiency measures for which the provider seeks to obtain portfolio

energy credits pursuant to this paragraph, at least 50 percent of that amount must be saved from energy efficiency measures installed at service locations of residential customers of the provider, unless a different percentage is approved by the Commission. [**Note: Legislation passed in 2013 phases out the energy efficiency component of the RPS.**]

The remaining key element from the section of NRS on electric service is NRS 704.785, included in Appendix B in its entirety:

NRS 704.785 - Adoption of regulations authorizing electric utility to recover amount based on effects of implementing energy efficiency and conservation programs; limitations.

1. The Commission shall adopt regulations authorizing an electric utility to recover an amount based on the measurable and verifiable effects of the implementation by the electric utility of energy efficiency and conservation programs approved by the Commission, which:

(a) Must include:

(1) The costs reasonably incurred by the electric utility in implementing and administering the energy efficiency and conservation programs; and

(2) Any financial disincentives relating to other supply alternatives caused or created by the reasonable implementation of the energy efficiency and conservation programs; and

(b) May include any financial incentives to support the promotion of the participation of the customers of the electric utility in the energy efficiency and conservation programs.

2. When considering whether to approve an energy efficiency or conservation program proposed by an electric utility as part of a plan filed pursuant to NRS 704.741, the Commission shall consider the effect of any recovery by the electric utility pursuant to this section on the rates of the customers of the electric utility.

3. The regulations adopted pursuant to this section must not:

(a) Affect the electric utility's incentives and allowed returns in areas not affected by the implementation of energy efficiency and conservation programs; or

(b) Authorize the electric utility to earn more than the rate of return authorized by the Commission in the most recently completed rate case of the electric utility.

4. As used in this section, "electric utility" has the meaning ascribed to it in NRS 704.187.

(Added to NRS by 2009, 1391)

NRS 704B – Providers of New Electric Resources. This chapter of NRS sets forth provisions for the development of new electricity generation assets, including definition of who is authorized as a provider to sell electricity to "eligible customers" (commercial or industrial customers with an average annual load of one megawatt or more, or governmental entities providing educational or health care services,

with an average annual load of one megawatt or more). This was adopted during a period of high growth in Nevada when the utilities were importing a significant portion of the power they were providing to customers. Currently there appears to be some question over the interpretation of NRS 704B, particularly about whether companies that might locate new operations in Nevada could qualify as eligible customers, thereby being able to develop new generation facilities and/or import power from out of state without first becoming an NV Energy customer, but simply paying a wheeling fee for the delivery of power using NV Energy transmission infrastructure while also being required to meet Nevada's renewable portfolio standard requirements.

Other portions of Nevada energy policy can be found in **Nevada Administrative Code (NAC) Chapter 704 – Regulation of Public Utilities Generally** and in rulings by the Nevada Public Utility Commission, both of which tend to augment and/or better define what is found in the various sections of Nevada Revised Statutes referenced above.

SB 252 (included in this paper as Appendix E): SB 252 revises the Nevada Renewable Portfolio Standard (RPS) by revising provisions relating to implementation of energy efficiency to comply with a portion of the RPS requirements. While this is primarily energy policy, questions have arisen about the impact of this legislation on electric rates and the implications this will have on job creation and upon the economy.

AB 428 (included in this paper as Appendix F): AB 428 revises provisions of the Solar Energy System Incentives Program, the Wind energy System Demonstration Program and the Waterpower Energy Systems Demonstration Program. It also requires the Public Utilities Commission to open an investigatory docket relating to the costs and benefits attributable to net metering. As with SB 252, these changes are mostly to energy policy, but there are implications for the impact on job creation and the economy of the State. AB 428 also calls for the formation of an Interim Legislative Committee on Energy.

> Sec. 25.4. *1. The Committee may:*
> *(a) Evaluate, review and comment upon matters related to energy policy within this State, including, without limitation:*
> *(1) Policies, plans or programs relating to the production, consumption or use of energy in this State;*
> *(2) Legislative measures regarding energy policy;*
> *(3) The effect of any policy, plan, program or legislation on rates or rate payers;*
> *(4) The effect of any policy, plan, program or legislation on economic development in this State;*
> *(5) The effect of any policy, plan, program or legislation on the environment;*
> *(6) Any contracts or requests for proposals relating to the purchase of capacity;*
> *(7) The effect of any policy, plan, program or legislation which provides for the construction or acquisition of facilities for the generation of electricity;*
> *(8) The effect of any policy, plan, program or legislation on the development of a market in this State for electricity generated from renewable energy;*
> *(9) The infrastructure and transmission requirements of any policy, plan, program or legislation; and*

(10) Any other matters or topics that, in the determination of the Committee, affect energy policy in this State.
(b) Conduct investigations and hold hearings in connection with its duties pursuant to this section.
(c) Request that the Legislative Counsel Bureau assist in the research, investigations, hearings and reviews of the Committee.
(d) Make recommendations to the Legislature concerning the manner in which energy policy may be implemented or improved.[7]

Observations About Nevada Energy Policy and Nevada Economic Development Policy

Implicit in Nevada's prior policy was an assumption that renewable energy should be given "transition priority" as a supply resource over energy efficiency as well as over fossil-fuel generated electricity to the extent that renewable energy supplants fossil-fuel generated electricity. This was reflected in the Renewable Portfolio Standard (RPS) schedule for increasing the percentage of retail electricity provided from renewable sources from 2007 through 2025, including energy efficiency included **as an option** [emphasis added] to meet up to twenty-five percent (25%) of the renewable energy requirement. Legislation passed in the 2013 Legislative session is phasing out energy efficiency as a component of the RPS. It is important to note the findings of the National Action Plan for Energy Efficiency, which used the following criteria to determine whether a state had a policy that recognized cost-effective energy efficiency as a high-priority resource: "A state was considered to have 'completely' established energy efficiency as a high-priority resource, equivalent or superior to supply resources, if there was a clearly established policy to that effect (such as an integrated resource planning objective of acquiring all cost-effective energy efficiency)."[8] Nevada fails to meet that standard.

Energy-efficiency projects proposed by investor-owned utilities (IOUs) as part of their demand-side management (DSM) programs are evaluated in Nevada primarily using a Total Resource Cost (TRC) standard. There is no such evaluation standard for renewable sources of electricity due to the statutory requirements of the RPS. Additionally, for IOUs to receive energy efficiency credit for commercial projects, there must be an equivalent amount of residential energy efficiency measures achieved as set forth in NRS 704.7821, section 2(b). This requirement could constrain NV Energy's efforts to implement energy efficiency in commercial buildings in Nevada.

There appears to be little or no recognition of relative costs of the various sources of energy in support of these preferences. While the value of energy efficiency programs has been analyzed utilizing ***net*** job creation and economic impact, it appears that most of the analyses to determine the value of renewable energy projects have been done using a ***gross*** job creation and economic impact approach. Gross analysis considers only the benefits resulting from the project and does not deduct the foregone benefits of the alternative. For example, in a gross analysis for a renewable energy project, the job creation and economic impact figures would not deduct the number of jobs and the economic impact

[7] AB 428, p.20
[8] National Action Plan for Energy Efficiency Vision for 2025; A Framework for Change, (November 2008), U.S. Department of Energy and U.S. Environmental Protection Agency, Appendix D (p.D-2), www.epa.gov/eeactionplan

that would have resulted from either a natural-gas fired generating facility or from an energy-efficiency alternative to reduce electricity consumption by the same amount, nor would it consider the potentially negative job and economic impacts on the economy of the service region as a whole from higher electricity rates which often accompany the pursuit of renewable energy project development.

In the end, Nevada's key energy policies, reflected through the Renewable Portfolio Standard and the rebates offered through the Incentive Programs, provide preference to renewable energy for a growing percentage of electricity production in Nevada. By comparison, twenty-three states have adopted a stand-alone Energy Efficiency Resource Standard that sets forth annual energy efficiency targets for long-term periods of time (3+ years), achieved through use of energy efficiency measures.[9]

Perhaps the new Legislative Committee on Energy (AB 428) will consider elevating the priority of energy efficiency in Nevada, or at least consider the net job creation and economic impacts of energy efficiency as a resource as compared to renewable energy and fossil fuels.

III. Areas of Alignment and Conflict Between Economic Development Policy and Energy Policy

Areas of alignment: There seems to be policy alignment at the highest levels, such as between the economic development policy goals (as reflected in metrics and accountability) and the state energy policy as set forth in NRS 701.010.

Areas of conflict: There is reasonable question whether the specific provisions and the implicit policy preferences set forth in NRS 704.7821 (the portfolio standards) conflict with both the state's economic development policy and with the high-level energy policy set forth in NRS 701.010.

Cost Comparison

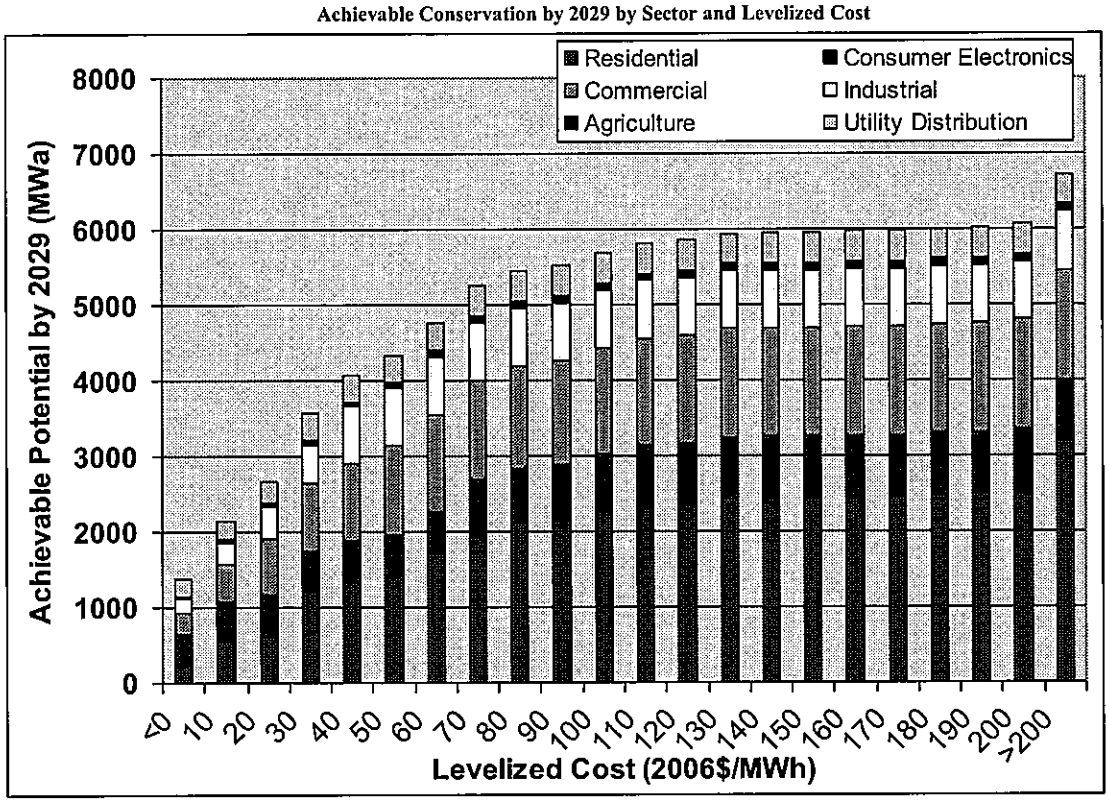
To evaluate the alignment of economic development policy and energy policy, one has to understand the relative costs of providing electrical service. These costs are reflected in utility rates and utility bills, both of which have economic impacts.

From Neal Elliott et al:[10] "For example, efficiency programs can save energy at a cost of about 3 cents per kilowatt-hour (kWh), while building new power plants typically deliver energy at a cost of about 7 cents per kWh (Fredrick et al, 2009)." This estimate represents some of the most cost-effective energy efficiency measures. A better representation of the continuum of technically feasible energy efficiency

[9] "State Energy Efficiency Resource Standards (EERS)", Policy Brief (July 2013), American Council for an Energy Efficient Economy

[10] "A Defining Framework for Intelligent Efficiency", Neal Elliott et al, (2012), American Council for an Energy-Efficient Economy, p.44

measures over the various levels of investment (converted to levelized cost per megawatt hour of annual savings) is presented by the Northwest Power and Conservation Council (Council) in their sixth annual power plan[11], as shown in the following figure:



Source: Sixth Northwest Conservation and Electric Power Plan

While this figure represents achievable conservation in the Pacific Northwest (primarily served by Bonneville Power Administration), the shape of the curve should be quite similar for the State of Nevada – indicating that there is significant energy efficiency (5,500 MW per year)that can be achieved at an investment level of up to $90/MWh ($0.09/kwh) levelized cost equivalent. This graph also shows that in the Northwest, by 2029 energy efficiency could meet (reduce) the demand for 1,400 MW per year at a levelized cost of under $0.01 per kwh.

The Council's conclusions included the following[12]:

> The resource strategy can be summarized in five specific recommendations:
>
> 1. Improved efficiency of electricity use is by far the lowest-cost and lowest-risk resource available to the region. Cost-effective efficiency should be developed

[11] Northwest Power and Conservation Council, "Sixth Northwest Conservation and Electric Power Plan", (February 2010), p. 4-6, http://www.nwcouncil.org/energy/powerplan/6/final/SixthPowerPlan.pdf

[12] Ibid, pp. 3-4

aggressively and on a consistent basis for the foreseeable future. The Council's plan demonstrates that cost-effective efficiency improvements could on average meet 85 percent of the region's growth in energy needs over the next 20 years.

2. Renewable resource development is required by resource portfolio standards in three of the four Northwest states. The most readily available and cost-effective renewable resource is wind power and it is being developed rapidly. Wind requires additional strategies to integrate its variable output into the power system and, in addition, it provides little capacity value for the region. The region needs to devote significant effort to expanding the supply of cost-effective renewable resources, many of which may be small scale and local in nature.

3. Remaining needs for new energy and capacity should be based on natural gas-fired generation until more attractive technologies become available. The resource strategy does not include any additional coal-fired generation to serve the region's needs. Further, the Council's plan demonstrates that meeting the Northwest power system's share of carbon reductions called for in some state, regional, and federal carbon-reduction goals will require reduced reliance on the region's existing coal plants.

4. The challenges of wind integration and the need for additional within-hour reserves initially should be addressed through improvements in system operating procedures and business practices. Changes in wind forecasting, reserve sharing among control areas, scheduling the system on a shorter time scale, and advancing dynamic scheduling can all help address wind integration and contribute to a more efficient use of existing system flexibility. The region is already making significant progress in these areas.

5. Finally, the Council's resource strategy calls for efforts to expand long-term resource alternatives. The region should demonstrate the potential of smart-grid applications to improve the operation and reliability of the regional power system and to access the potential of consumers to provide demand response for the capacity and flexibility of the power system. The region should continue to assess new efficiency opportunities, expand the availability of cost-effective renewable energy technologies, and monitor development of carbon capture and sequestration, advanced nuclear technologies, and other low-carbon or no-carbon resources.

For comparison, EPA published comparable 2010 cost data ranges (levelized cost of energy) for renewable energy as follows[13]: ($/MWh)

- Wind 84-142
- Solar - PV 132-298
- Solar thermal (CSP) 109-335
- Geothermal 59-94

[13] http://www.epa.gov/cleanenergy/energy-resources/renewabledatabase.html

Recent renewable energy projects in Nevada provide electricity to NV Energy at the following costs[14]:

Project	First Year Price	Year Signed	Capacity (MW)	Technology
Tonopah Solar Energy	$134.95/MWh	2010	110	Solar Thermal (w/storage)
Silver State Solar North	$132/MWh	2010	50	PV
Fotowatio Apex Solar	$128.5/MWh	2011	20	PV
Mountain View Solar	$116.5/MWh	2011	20	PV
FRV Spectrum Solar	$111/MWh	2011	30	PV
Spring Valley Wind	$98/MWh	2010	150	Wind
ORNI 32	$92/MWh	2011	51	Geothermal
ORNI 42	$88/MWh	2010	25	Geothermal
ORNI 39	$86/MWh	2010	51	Geothermal
Waste Management NRE	$81/MWh	2010	3.2	Landfill Gas

Pricing is subject to 1% annual escalation after the first year.

The U.S. Energy Information Administration prepares projections of costs of new generation resources. From the 2012 projections for 2017 comes the following table:[15]

Regional Variation in Levelized Cost of New Generation Resources, 2017

	Range for Total System Levelized Costs (2010 $/megawatthour) for Plants Entering Service in 2017		
Plant Type	**Minimum**	**Average**	**Maximum**
Dispatchable Technologies			
Conventional Coal	90.5	97.7	114.3
Advanced Coal	102.5	110.9	124
Advanced Coal with CCS	127.7	138.8	158.2
Natural Gas-fired			
Conventional Combined Cycle	59.5	66.1	81
Advanced Combined Cycle	56.8	63.1	76.4
Advanced CC with CCS	80.1	90.1	108.5
Conventional Combustion Turbine	91.9	127.9	152.4
Advanced Combustion Turbine	77.7	101.8	122.6
Advanced Nuclear	107.2	111.4	118.7
Geothermal	84	98.2	112
Biomass	97.8	115.4	136.7
Non-Dispatchable Technologies			
Wind	77	96	112.2
Solar PV[2]	119	152.7	238.8
Solar Thermal	176.1	242	386.2
Hydro[2]	57.8	88.9	147.6

[1] Costs are expressed in terms of net AC power available to the grid for the installed capacity.

[2] As modeled, hydro is assumed to have seasonal storage so that it can be dispatched within a season, but overall operation is limited by resources available by site and season.

Source: U.S. Energy Information Administration, Annual Energy Outlook 2012, June 2012, DOE/EIA-0383(2012)

[14] Source: Nevada Public Utilities Commission

[15] U.S. Energy Information Administration, "Levelized Cost of New Generation Resources in the Annual Energy Outlook 2012", http://www.eia.gov/forecasts/aeo/pdf/electricity_generation.pdf

As is apparent from comparison of the Levelized Cost of Achievable Conservation (p. 16) in comparison with the cost of other sources of electricity (above), energy efficiency can offer the least expensive (and lowest risk) resource, but various types of energy efficiency need to be individually evaluated. Natural gas fired generation currently is the next least expensive generation resource, with geothermal and conventional coal somewhat higher. While energy efficiency costs are relatively straightforward, many would argue that the cost of fossil-fuel fired electricity generation does not reflect some of the external environmental costs, just as wind and solar do not include the standby generating capacity costs that are necessary when these renewable resources are employed.

NRS 704.7821, section 2.(a) includes specific goals for solar of five percent for years 2009-2015 and six percent for years 2016 and thereafter, in spite of the fact that solar continues to be the most expensive of the primary sources of renewable energy. While the cost of solar continues to trend down, questions about PV efficiency in environments where temperatures are higher than at the national testing facility (southern Nevada versus Colorado) have recently arisen.

Currently it appears that NV Energy is the only entity in Nevada tracking and reporting reductions achieved through energy efficiency (from their Demand Side Management (DSM) program). There is no statewide system for tracking savings from transitioning to the 2009 IECC, from LEED buildings, from electric cooperatives, etc. The DSM numbers are not insignificant, as shown below:

Nevada Power Company DSM Portfolio		2006	2007	2008	2009	2010	2011	2012
DSM Programs Demand Reduction (KW)	Year	22,667	30,168	42,995	48,201	35,411	33,544	100,618
	Cumulative	42,340	72,508	115,503	163,704	199,115	232,659	333,277
DSM Programs Energy Savings (MWh)	Year	145,320	193,406	303,325	332,596	238,758	220,717	102,928
	Cumulative	212,791	406,197	709,522	1,042,118	1,280,876	1,501,593	1,604,521
DSM Program Budget ($000)	Year	$20,494	$23,166	$44,902	$47,610	$38,722	$38,596	$35,538

Sierra Pacific Power Company DSM Portfolio		2006	2007	2008	2009	2010	2011	2012
DSM Programs Demand Reduction (KW)	Year	14,319	8,721	30,934	19,006	17,186	7,938	23,371
	Cumulative	21,463	30,184	61,118	80,124	97,310	105,248	128,619
DSM Programs Energy Savings (MWh)	Year	70,328	59,518	103,936	102,806	89,439	57,474	27,819
	Cumulative	115,885	175,403	279,339	382,145	471,584	529,058	556,877
DSM Program Budget ($000)	Year	$4,513	$4,103	$8,371	$9,853	$9,211	$6,307	$5,630
	* Includes estimates for 2012 based on Targets							

Combined NPC & SPPC DSM Portfolio		2006	2007	2008	2009	2010	2011	2012
DSM Programs Demand Reduction (KW)	Year	36,986	38,889	73,929	67,207	52,597	41,482	123,989
	Cumulative	63,803	102,692	176,621	243,828	296,425	337,907	461,896
DSM Programs Energy Savings (MWh)	Year	215,648	252,924	407,261	435,402	328,197	278,191	130,747
	Cumulative	328,676	581,600	988,861	1,424,263	1,752,460	2,030,651	2,161,398

It is interesting to note the change in the trajectory of investment in DSM and the coincidence of the switch in the energy-efficiency incentive program for NV Energy from enhanced return on investment to lost revenue recovery that became effective in 2010 as a result of 2009 legislation.

When the DSM energy efficiency is considered as part of the portfolio for meeting electricity needs, as shown below, it is apparent that energy efficiency continues to provide a growing proportion of the electricity "generating capacity" and portfolio in Nevada. However, it is still less than the contribution

from renewable, and certainly less than the amount of electricity generated by NV Energy's coal-fired plants, which are now planned to be phased out and replaced by gas-fired generation and renewables.

Nevada Electricity Portfolio Overview										
Capacity		Coal	Petroleum	Nat. Gas	Other Gases	Hydro	Other Renewables[b]	Subtotal	EE - DSM[c]	Total
2010 Electrical Generating Capability (MW)[a]		2,873	45	6,996		1,051	456	11,421	296	11,717
	%	24.5%	0.4%	59.7%	0.0%	9.0%	3.9%		2.5%	100.0%
2011 Electrical Generating Capability (MW)[a]		2,873	45	7,419		1,051	459	11,847	338	12,185
	%	23.6%	0.4%	60.9%	0.0%	8.6%	3.8%		2.8%	100.0%
Demand		Coal	Petroleum	Nat. Gas	Other Gases	Hydro	Other Renewables[b]	Subtotal	EE - DSM[c]	Total
2010 Portolio Performance (GWh)[a]		6,997	11	23,688	6	2,157	2,287	35,146	1,752	36,898
	%	19.0%	0.0%	64.2%	0.0%	5.8%	6.2%		4.7%	100.0%
2011 Portolio Performance (GWh)[a]		5,391	15	21,785	7	2,197	2,956	32,351	2,031	34,382
	%	15.7%	0.0%	63.4%	0.0%	6.4%	8.6%		5.9%	100.0%

Notes:

[a] All above data except EE-DSM (Energy Efficiency Demand Side management) is from U.S. Energy Information Administration "Electric Power Monthl

[b] Other renewables includes wood and wood-derived fuels, other biomass, geothermal, solar thermal and photovoltaics and wind.

[c] Energy efficiency (demand reduction and energy savings) figures represent only the amounts from the NV Energy Demand Side Management programs. Not included are energy efficiency savings from any energy efficiency measures not receiving a subsidy from NV Energy that would qualify the measure for inclusion in the DSM tracking. Therefore energy efficiency may be significantly understated.

Job Creation

While rate impact (i.e. present worth of revenue requirements) is one aspect that is considered by the Public Utilities Commission of Nevada (PUCN) for the power-generation and energy efficiency programs, and job creation is another consideration, the impact of rate changes on overall job creation and retention, not just in the energy sector, should be emphasized. Rate changes can have three general types of economic impacts:

1) Rates, and their effect on utility bills, can affect the amount of money expended on energy within the state's economy, thereby increasing or decreasing the amount of money spent in other sectors of the economy. Expenditures in different industry sectors have different levels of economic impact.
2) Rates, and their effect on bills, can affect the profitability of existing business operations, and therefore their competitiveness and their rates of growth.
3) Electricity rates can affect the ability of Nevada to attract new businesses and support retention and expansion of existing businesses.

The impact of electricity rates on business attraction, retention and expansion will vary by industry, determined by sensitivity to electricity rates relative to other factors determining location.

There are a number of studies establishing a basis for net job creation and positive economic impact from energy efficiency (i.e. David Roland-Holst[16], and Casey Bell[17]). Specific to Nevada, the recent

[16] David Roland-Holst, "Energy Efficiency, Innovation, and Job Creation in California", (2008), Center for Energy, Resources and Economic Sustainability

Southwest Energy Efficiency Project (SWEEP) report by Howard Geller[18] includes estimates of the economic impact of energy efficiency implementation in Nevada (High Efficiency Scenario) using an input-output model (IMPLAN) that estimates **net** impacts:

Year	Net Jobs Gain	Change in Wage and Salary Compensation (million $)	Change in Gross State Product (million $)
2015	1,820	$92	$91
2020	4,680	$246	$284
Notes: Dollar figures are in millions of 2010 dollars while employment reflects actual job count.			

All of these studies estimate the economic impact (including job creation) from the energy efficiency implementation (direct, indirect and induced), and deduct the impact resulting from funds being redirected away from other activities. For example, in the Geller analysis, while there are projected gains in 11 industrial sectors (i.e. Services, Construction, Retail), two sectors (Other Mining and the Electric Utility) have net job losses, reductions in wage and salary compensation, and result in reductions in gross state product within their specific sectors. But the bottom line of these analyses is that the net impacts of energy efficiency are always positive.

On the other hand, there appears to be considerable controversy over the net job creation and economic impact associated with renewable energy projects. Many of the studies done on job creation and economic impact of renewable energy projects have only examined gross impacts. A 2012 NREL study[19] included the following explanation and footnote:

> The analysis employs the Jobs and Economic Development Impacts (JEDI) models to estimate the *gross* jobs, earnings, and economic output supported by the construction and operation of solar photovoltaic (PV) and large wind (greater than 1 MW) projects funded by the §1603 grant program.*
>
> *As a gross analysis, this analysis does not include impacts from displaced energy or associated jobs, earnings, and output related to existing or planned energy generation resources (e.g., jobs lost in the operation of natural gas or coal plants due to the need for less electricity production from these plants, given increased generation from wind) or increases or decreases in jobs related to changes in electric utility revenues and consumer energy bills, among other impacts.

Within Nevada, the Nevada Policy Research Institute has been critical of subsidies for "clean energy," although their specific examples all involve renewable energy rather than energy efficiency. In an article by Kyle Gillis[20], the complaint leveled is that the investment in renewable energy projects has resulted in a cost of $4.6 million per permanent job created, while increasing electricity rates for all rate payers.

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[17] Casey Bell. "How does energy efficiency create jobs?" (2012) American Council for an Energy-Efficient Economy

[18] Howard Geller, "The $20 Billion Bonanza: Best Practice Electric Utility Energy Efficiency Programs and Their Benefits for the Southwest", (2012), p.145, http://www.swenergy.org/programs/utilities/20BBonanza.htm,

[19] Daniel Steinberg, Porro and Goldberg, "Preliminary Analysis of the Jobs and Economic Impacts of Renewable Energy Projects Supported by the §1603 Treasury Grant Program" (2012), National Renewable Energy Laboratory, http://www.nrel.gov/docs/fy12osti/52739.pdf

[20] Kyle Gillis, "$1.3 billion in "clean energy" subsidies produce 288 permanent jobs, quadruple cost of electricity in Nevada", (2012), Nevada Journal

NPRI was highly critical of SB 123, saying that it would impose significant rate hikes on ratepayers and result in negative economic impact and job loss.[21]

There has been criticism in other states that the econometric analyses used to support renewable energy legislation do not recognize all of the costs associated with the renewable energy projects.

Rate Impact and Economic Impact

The present worth of revenue requirements for various energy proposals is part of the Nevada PUC evaluation process. In other words, what change in revenues will be required by the utility company to compensate for the present value of current and future expenditures (both capital costs and operating expenses) in order for their investors to maintain the same return on investment? This analysis results in a rate impact.

As mentioned above, rate changes can have three general types of economic impacts:

1) Effect on utility bills, which affects the rate of economic activity and growth of the state's economy;
2) Effect on utility bills can affect the profitability of existing business operations, and therefore their competitiveness and future growth; and
3) Effect on the ability of Nevada to attract new businesses and support retention and expansion of existing businesses.

The first type of impact is the easiest to include in an input-output or other type of economic model. It is essentially a funds-flow analysis based upon aggregate utility bills. The second and third types of impacts are more difficult to model because they result from sensitivity to electric rates. It is difficult to segregate this effect from other factors influencing long-term growth in a state or region, and therefore more difficult to determine appropriate algorithms that reflect these factors over time. Nonetheless, these appear to be real factors affecting long-term economic development.

There currently is not a common analytical tool utilized to estimate and compare the economic impact and job creation that might result from policy decisions related to energy efficiency, renewable energy and conventional (fossil-fuel) energy projects in Nevada – and that includes how rate impacts affect future economic performance. Of course, there should be other considerations besides estimated economic impacts and job creation, such as those described below.

[21] Geoffrey Lawrence, "NV Energy plan would impose big, new hidden costs on ratepayers", Nevada Policy Research Institute, 2013, http://www.npri.org/issues/publication/nv-energy-plan-would-impose-big-new-hidden-costs-on-ratepayers

Other Considerations

Risk mitigation through diversity of energy sources. If electric utilities, and therefore utility customers, are too reliant on a single source of energy (i.e. natural gas), the economy is at risk of significant damage if something occurs to affect either the supply and/or the price of that energy source. For example, in addition to all of the problems associated with radioactive contamination, Japan today has only two nuclear power plants in operation (of the 54 nuclear power plants that supplied 30 percent of Japan's electricity prior to the March 2011 earthquake and tsunami). Prior to the natural disaster, Japan was planning on increasing its dependence upon nuclear power for up to 50 percent of its electricity needs. Now all of that is being reconsidered, and in the meantime, electricity consumption across the country has been significantly curtailed. Another example of risk for a particular energy source is the volatility of natural gas prices in the U.S. between 1998 and 2012. During this period, average monthly natural gas wellhead prices rose from around $2 per million Btu's in 1998 to around $8 in 2000, dropped back to just above $2 in 2002 before escalating to around $11 in late 2005, dropped below $6 in 2007 and then peaked again around $11 in 2008 before dropping back under $2 in 2012 and then rising more than 50 percent again to $3.35 by the end of the year. Electric utilities looked at coal-fired generation as a "safe haven" during some of these periods of rapid escalation of natural gas prices.

As these two examples demonstrate, natural disasters and economic events can both pose risks. These risks can be mitigated through diversity of sources of energy, the ability to "switch" relatively quickly from one source to another, stockpiling inventories of fuels, distributed generation, and a variety of other strategies. These strategies need to be balanced against cost, for if the cost of risk mitigation is too great, it may have impacts on money retained within the state and business profitability as mentioned previously.

Carbon tax or cap-and-trade. Another risk, from a financial or economic impact perspective, is the potential for cost escalation and/or restriction of the use of fossil fuels. Rising sea levels and climate change are likely to result in political decisions leading to restrictions on use and/or increased costs associated with fossil fuels – with the greatest restrictions and/or price increases likely to be associated with carbon dioxide (CO_2) emission levels.

Already, the first mandatory, market-based CO_2 emissions cap and reduction program for the electric power sector was established by the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont. These nine states joined together in 2003 to create the Regional Greenhouse Gas Initiative (RGGI) and first auctioned CO_2 emissions allowances in 2008. According to the RGGI website, the states have been investing more than half of the total CO_2 allowance proceeds in energy efficiency, including grants for large-scale efficiency projects in commercial and industrial facilities.

In 2006, California passed Assembly Bill 32, the Global Warming Solutions Act, which also called for creating a market-based system for reducing emissions of greenhouse gases (GHG) from the electric power sector and others. The legislation calls for emissions to be reduced to 1990 levels by the year

2020. The first auction of emission allowances occurred in 2012. California is working with British Columbia, Ontario, Quebec, and Manitoba through the Western Climate Initiative to develop a harmonized cap and trade program.

These efforts to cap and reduce CO_2 emissions are likely to proliferate at the state level in the absence of a federal plan. Such efforts could occur during the lifetime of any new electricity generating facilities coming on line from this point forward, so some "risk factor" should be ascribed to new or reconditioned fossil-fuel generating facilities. In the Sixth Northwest Conservation and Electric Power Plan, a scenario of carbon costs escalating from $0 at present in the Northwest to $47 per ton by 2030 was employed to reflect a reasonable representation of the cost uncertainty associated with carbon fuels. During a June 2013 auction of CO_2 allowances by RGGI, the clearing price was $3.21. In California, an August 2013 auction of greenhouse gas allowances reported a clearing price of $12.22 for 2013 vintage allowances.

Natural gas supply concerns (production levels, transmission and storage capacity). The recent low prices for natural gas reflect, in large part, the increase in supply that has occurred as a result of the use of hydraulic fracturing techniques (fracking) utilized to release natural gas from shale structures, compounded by a warmer winter. Rachel Young, Elliott and Kushler recently reported: *"The warmer winter of 2011 and 2012 caused a significant increase in the working storage of natural gas."*[22] Young, et al, go on to point out: *"High levels of storage help meet potential increases in demand; however, the amount of storage may not be enough to ensure that all demands are met. Even if production levels are high enough to prevent price spikes, there are still distribution constraints."*[23] Debra Gallo, Director of State Government Regulatory Affairs for Southwest Gas Corporation, recently indicated that Nevada did not have any near-term pipeline capacity issues (October15, 2012 telephone interview). She did point out that there are some geographic areas of Nevada currently without existing gas distribution infrastructure.

Shifts in transportation energy use, impacts on the economy and on commercial building energy efficiency. If a broad interpretation of commercial building energy efficiency includes improving how people and goods and services get to and from commercial buildings, as part of the energy footprint of these buildings, then transportation-related considerations should be part of this project. Certainly the shifts in transportation fuels will have economic impacts, which will affect demand for economical commercial building space in Nevada, thereby coming full circle to implementation of energy efficiency in commercial buildings. Great use of electric vehicles is projected to increase baseload demand for electricity, which will have an effect of making energy efficiency in commercial buildings easier to justify using the TRC (Total Resource Cost) standard.

There will be shifts in electricity demand and natural gas demand as the result of the transition from gasoline and diesel-powered vehicles to Alternative Fuel Vehicles (AFVs). In an article by Steve

[22] Rachel Young, Elliott, and Kushler, "Saving Money and Reducing Risk: How Energy Efficiency Enhances the Benefits of the Natural Gas Boom", American Council for and Energy-Efficient Economy (2012), p.9, http://aceee.org/files/pdf/white-paper/saving-money-reducing-risk.pdf

[23] Ibid

Hargreaves published in CNN Money, based upon interviews with 500 utility company executives, the following was reported: *"**Bullish on electric cars:** Utility executives believe electric cars will eat up 7% of the nation's power supply by 2025. To use that much juice, Black & Veatch estimates there would need to be 65 million electric cars on the road. Last year under 20,000 were sold."*[24]

One of the major considerations is air quality in the two major metropolitan areas of Nevada. A significant portion of the ozone in the Las Vegas and Reno metro areas is from tailpipe exhaust. "The estimated greenhouse emissions rates for the composite PEVs(Plug-in Electric Vehicles) and average light duty truck are about 55% of those for gasoline vehicles."[25] As coal-fired power plants are retired, the comparative advantage of PEVs will improve. Further, most of the fossil-fuel power plants generating electricity are located outside the Las Vegas and Reno air basins. This result mitigates the risk to future economic growth posed by non-attainment status in the two largest metropolitan areas of the State. Natural-gas powered vehicles are being utilized extensively at the Port of Los Angeles, primarily due to their lower emissions compared to gasoline and diesel-powered vehicles.

"According to a study on behalf of the California Energy Commission, natural gas vehicles can reduce greenhouse gas emissions by 29 percent compared to gasoline vehicles and up to 22 percent when compared to diesel vehicles".[26] Natural gas vehicles also have an octane rating of 120(+) per the Alternative Fuels Data Center/US Department of Energy – Energy Efficiency & Renewable Energy versus an octane rating 84 to 93 for gasoline engines.[27] A higher octane rating allows a vehicle's engine to make better use of the fuel resulting in better performance.

Electric vehicles are more energy efficient than their equivalent internal-combustion-engine counterparts, so will result in lower average energy consumption per capita and per mile driven. "PEVs are found to be more efficient overall (well-to-wheels), requiring about 60% of the energy per mile that is needed by gasoline vehicles."[28]

With Nevada being the most urbanized state in the U.S. and with both of the state's major metropolitan areas having air quality issues, there is a significant possibility that Nevada could be a leader in the adoption of AFVs. The implications of these changes on the general economy, and on electricity peak demand, capacity and costs should be considered.

The required infrastructure for AFVs will result in job creation, primarily from the installation of electric vehicle supply equipment (EVSE, aka: charging stations), natural gas vehicle refueling appliances (VRA), and home refueling appliances (HRA). If Nevada could leverage a focus on AFV's into attraction of some

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[24] Steve Hargreaves, "'Significant' rise in electric bills seen", (June 2012), CNN Money, http://money.cnn.com/2012/06/04/news/economy/electric-utility-bills/index.htm?iid=HP_LN

[25] Colorado Electric Vehicle and Infrastructure Readiness Plan, p.97

[26] TIAX Report – "Full Fuel Cycle Assessment: Well-To-Wheels Energy Inputs, Emissions, and Water Impacts," (2007) (Prepared for California Energy Commission)

[27] http://www.afdc.energy.gov

[28] Ibid, p. 96

portion of the AFV infrastructure and/or vehicle research and development, manufacturing and/or technical support, the resultant economic impact and job creation could be very significant.

Additionally, if the transition to PEV's includes provisions that cause recharging to occur primarily during periods of off-peak electricity demand, the potential result is greater sales of electricity without the need for additional investment in generating, transmission and distribution infrastructure. This will allow for the recapture of, and return on electric utility infrastructure investment being spread over a larger number of kilowatt hours, which should result in lower electricity rates than would otherwise occur.

Water Consumption. Water is one of the natural resources that either is or has the potential to be a constraint on economic development and growth in Nevada. Water is also very closely tied to most methods of the production of energy. Below is a summary of water consumption associated with various sources of meeting the demand for electricity:[29]

Biomass:
- Typical plant is closed loop cooling with wet towers with majority lost to evaporation 500-600gal/MWh
- Dry cooling is 100 gal/MWh though most new facilities are wet cooling

Coal:
- 61% have closed loop cooling and 39% have open loop cooling
- Closed loop cooling uses 500-600 gal/MWh with most lost to evaporation
- Open loop cooling uses 300 gal/MWh with most lost to evaporation

Nuclear:
- 62% of US plants have closed loop cooling with 38% open loop cooling
- Closed loop cooling uses 700-1100 gal/MWh with most lost to evaporation
- Open loop cooling uses 20,000-60,000 gal/MWh with ~400 gal/MWh lost to evaporation (predominantly once through cooling)

Natural Gas:
- 60% have closed loop cooling with 31% using wet cooling towers (numbers aren't clarified why they don't add up to 100% in the study)
- Dry cooling draws 100 gal/MWh and loses 50-70 gal/MWh
- Wet cooling draws 230 gal MWh and loses 180 gal/MWh

Wind:
- None

[29]Source: U.S. EIA http://www.civilsocietyinstitute.org/media/pdfs/091912%20Hidden%20Costs%20of%20Electricity%20report%20FINAL2.pdf

Solar:

- PV – none
- Concentrated Solar varies depending on the technology as the number in the study is significantly higher than the project from Solar Reserve in Tonopah.

Energy Efficiency:

- None

Energy-related primary businesses. The Governor's Office of Economic Development is aware that the location of energy industry manufacturing and infrastructure can significantly influence the state's economy and job creation. GOED has been actively supporting efforts to attract and/or grow energy companies' operations, other than just generation, to Nevada. This would include production of energy-efficiency equipment and technologies, renewable energy equipment, and the location of company headquarters (and all the administrative functions associated therewith). For example, Nevada has been on the forefront of M&V innovation in several ways. NV Energy has been moving towards more detailed data collection with the installation of new meters that allow for tracking and reporting of electricity consumption in short time increments (15 minutes). The smart meter program in NV Energy's service territory puts Nevada ahead of much of the nation. ADM Associates, a consulting firm providing energy efficiency program evaluation and research, is a national leader in M&V. The firm has an office in Reno (one of five offices), and Don Dohrmann, one of the firm's founders, resides and works in Reno. On its website, ADM cites some of its most important innovations:[30]

- ADM Associates, Inc. developed the first hourly building energy simulation model, based on DOE-2 algorithms.
- ADM Associates, Inc. developed the Variable Degree Method for the United States Department of Energy. This methodology was the basis for the ECM development for the compliance method for Title 24 for small buildings.
- ADM Associates, Inc. developed several state-of-the-art methodologies for conducting end-use metering, data retrieval, and data processing.
- ADM Associates, Inc. developed a system for modeling 8,760 hour, annual load shapes by end-use and building type.

Some entities have developed web-based systems that allow customers to track energy use on individual circuits. There are devices that can track energy consumption by installing measurement devices "at the plug". Load IQ, a Nevada-based company spun out of the Desert Research Institute, has developed unique equipment and software (and filed for patent protection) for tracking energy use by numerous individual devises and systems on a single circuit.[31] With support from the U.S. Department of Energy, NIREC, and a variety of other partners, Load IQ has deployed their systems in a number of different structures. Recently, the Electric Power Research Institute (EPRI) completed a project with Load IQ. Pacific Northwest national laboratory (PNNL) is currently in the process of evaluating a spectrum of Non-Intrusive Measurement Devices, including the Load IQ equipment, to assess their accuracy.

[30] http://admenergy.com
[31] http://www.loadiq.com/

Resource Action Programs, based in Sparks, Nevada, provide Energy Efficiency school kits and education programs for utilities throughout the U.S. ElectraTherm and General Energy Efficiency, both based in Reno, Nevada, are representative of other companies based in Nevada that are providing energy-efficiency products throughout the world.

Production of fossil fuels within the state, should exploration efforts lead to the discovery and development of significant reserves, could also significantly change the economics of energy in Nevada, as it has in other states producing fossil fuels. In each of these instances, the energy-related infrastructure increases the amount of funds spent within the state and slows the rate of economic leakage outside of the state's economy.

Summary of Areas of Policy Alignment and Conflict:

The areas of policy alignment for both energy and economic development policies can be summarized in the following broad high-level goals:

1) Increase the number of jobs in Nevada.
2) Grow the Nevada economy.
3) Lower energy costs for businesses and residents in Nevada.
4) Increase stability and predictability of energy costs.
5) Reduce environmental impacts related to energy production and consumption, particularly in those circumstances where environmental impacts could adversely affect future growth and/or where reductions in environmental impacts could positively affect future economic growth.

These broad high-level goals can be achieved by accomplishing the following more-specific objectives:

1) Increase aggregate electricity consumption in Nevada while reducing average electricity consumption (more electricity-intensive businesses (i.e. data centers); more residents; increased adoption of electric vehicles; switch "fuels" where beneficial.
2) Reduce peak demand for electricity relative to total or average consumption to improve the utilization of existing electricity generation, transmission and distribution infrastructure which should translate into lower electricity rates and/or aggregate utility bills for Nevada customers.
3) Reduce average energy consumption (metrics: per capita, per square foot, per employee, per mile traveled). Energy efficiency continues to represent the most cost-effective and lowest-risk means of meeting Nevada's energy needs.
4) Reduce emissions related to energy production and consumption. Las Vegas received re-designation as attainment for the 1997 ozone National Ambient Air Quality Standard (NAAQS) from EPA. That 8-hr. standard was 80 ppb. The 2008 NAAQS is 75 ppb, and Washoe and Clark County have both been designated attainment for that standard. However, Clark County had a bad ozone season in 2012 with 19 exceedances. EPA is now considering studies which indicate health effects at lower levels, so it is possible the 2014 rule will be 70 ppb at the highest and

may be lower. The proposed standard, which would identify the range they are considering and seek public comment, is due out in 2013.

5) Reduce water consumption related to energy production and consumption. Water is considered a precious commodity in Nevada and is one of the resources that can constrain economic development and growth.

IV. Recommendations

The following recommendations are presented as ways to accomplish specific objectives set forth above, and thereby achieve the broad high-level goals. For each recommendation, there is an "implementation" suggestion. These are intended to be relatively general in nature. The Nevada State Office of Energy has indicated that it wishes to be responsible for the revising and providing greater detail to the implementation suggestions following publication of this white paper.

1. **Support the adoption and implementation of cost-effective energy efficiency building codes and standards and work to help ensure compliance.**

   New buildings typically will have useful economic lives of at least 30 years, with 50 - 100 years being more representative of the likely range of the expected useful lives. If these structures are not built utilizing the best practical technologies for energy efficiency and healthy, productive environments, these are lost opportunities. Whereas buildings can be retrofitted and some equipment can be upgraded later at a reasonable cost, the incremental cost to upgrade the building envelope and key operating systems is typically significantly greater than incorporating investments in more energy-efficient design and equipment from the outset. Moreover, more efficient new building stock will increase the "market pressure" on owners of older buildings both to lower operating expenses and to improve the environments (occupant comfort, better lighting, etc.). New energy efficiency building codes are applicable to those portions of existing commercial buildings that are remodeled, and most of the "skills" needed for construction of new energy-efficient buildings should easily translate to refurbishing of existing buildings.

   New buildings represent increased energy demand, so energy efficiency included in building design and construction does not result in reduction of existing energy demand but rather a reduction in the amount of additional energy that will be needed.

   The pushback that typically occurs from the development and construction industries against stricter building codes, which can increase initial construction costs, could be mitigated by better data collection by the real estate industry in regard to energy efficiency measures and net operating costs as they relate to building values. This data would allow real estate appraisers to better recognize the value associated with energy efficient buildings, which in turn would assist with financing the incremental costs associated with building codes that result in improved energy efficiency.

   Nevada should continue to support adoption of the IECC on a three-year cycle, as well as to develop some measures to enforce implementation by local jurisdictions.

   Implementation: This recommendation can be implemented by the Nevada State Office of Energy (NSOE) pursuant to NRS 701.220. However, in order for NSOE to continue its responsibility for the

adoption and implementation and enforcement of new building codes in Nevada, legislative action is likely to be needed to provide necessary funding.

Much was accomplished by NSOE in its adoption and support for implementation of the 2009 IECC utilizing federal funds that came to Nevada through the U.S. Department of Energy. However, this was the first time that energy efficiency codes were adopted at the State level, the federal funding was "one-time" funding, and much remains to be done. Going forward, NSOE will need to:

a. Provide training for design and construction professionals for new energy efficiency codes (2012 IECC and beyond);
b. Implement compliance tracking, which is a major concern for most states adopting new energy codes, and Nevada is no exception. Nevada needs to adopt and fund energy savings verification protocols for conservation measures, practices and programs when current verification methods appear problematic or expensive or verification methods do not exist; and
c. Develop a comprehensive library of estimates of savings from conservation measures and savings evaluation and measurement protocols.

These efforts will require a commitment of additional resources for the NSOE, not only for the adoption of new energy codes, but more importantly, to provide the support and training necessary for widespread implementation of the new codes. Recommended minimum funding for these efforts is $112,900 annually, although $150,000-$180,000 would probably be a better range looking forward. (See Appendix B for budget details). If not funded through the General Fund, a potential source of funding for this would be a public benefits charge on utility bills (not preferred by the utilities). This would best be implemented through legislation.

Pacific Northwest National Laboratory published a draft report estimating job creation associated with adoption and implementation of new energy codes in Nevada.[32] Based upon only residential construction at a rate of 6,400 new housing units state-wide per year, the job creation estimate was 1,365 full-time construction jobs associated with implementation of the new codes and 115 new jobs created annually thereafter for each year that the new codes are implemented as a result of future consumer spending being redirected from paying utility bills to other spending that has greater economic impact within the state. If a window of only 10 years is considered, the recurring job creation would be 1,150 new jobs as a result of energy savings for a combined total of 2,515 jobs resulting from each year's energy codes budget. The investment for NSOE to continue with its adoption of, and implementation support for new building codes, therefore, is less than $45 per new job created each year and subsequent decade of continuing job creation – at current homebuilding levels. As demand for new housing ramps up from its recession-level base, the cost per job will decrease proportionately. Because the analysis for commercial and industrial construction involves a significantly broader range of building sizes, uses and construction

[32] "Potential Job Creation in Nevada as a Result of Adopting New Residential Building energy Codes", Pacific Northwest national Laboratory (2012), http://www.energycodes.gov/adoption/analysis/jobs

alternatives, PNNL did not conduct a parallel analysis for commercial/industrial construction. However, the economic advantages of incorporating energy efficiency from the design stage should be in the same order of magnitude.

NSOE will need to determine how to respond to the recent action by the City Council of the City of Las Vegas in regard to not supporting the statewide adoption of the 2009 IECC. Part of the consideration will be determining what liability Nevada and Las Vegas may have in regard to ARRA funds accepted that required both adoption of the 2009 IECC and reaching a certain level of compliance by 2017. Another portion might be determining what liability exposure the City, developers, design professionals and contractors may have for not complying with the State energy codes.

2. **Develop and implement a pilot utility on-bill financing program for energy-efficiency improvements.**

A conundrum of energy efficiency is that those who "cannot afford" to implement energy efficiency to retrofit existing buildings can be the very customers who essentially pay for the energy and money savings achieved by others. This has led to the Bureau of Consumer Protection questioning and sometimes opposing energy efficiency programs in Nevada. From the Sixth Northwest Conservation and Electric Power Plan: "The nature of efficiency improvement is that the total cost is recovered over a smaller number of sales. Average cost per kilowatt-hour sold will increase, but because the total consumption is reduced, average consumer electricity bills will be smaller. Consumers who choose not to improve their efficiency of use could see their bills increase. However, if the region does not capture the efficiency, the higher cost of new generating resources will increase everyone's bills."[33]

Utility on-bill financing (OBF) can overcome two of the major barriers to energy-efficiency improvements: 1) initial investment and 2) access to financing. Unlike other methods of financing energy efficiency improvements, properly designed OBF can be the "democratizing factor" that opens the potential for energy-efficiency improvements to nearly all consumers. The goal of a pilot project, therefore, is to demonstrate the beneficial impact of allowing building owners and facility operators to make energy efficiency improvements without needing to use their own capital for the upfront costs.

The most successful financing programs for energy efficiency incorporate these key principles: a) qualifying processes are simple and do not act as barriers; b) the net result of energy efficiency implementation and the financing obligation is the same or lower monthly utility costs to the business; c) structure of the obligation and billing/collection processes are designed both for simplicity and to keep default rates as low as possible; d) participating utilities are not burdened

[33] Northwest Power and Conservation Council, "Sixth Northwest Conservation and Electric Power Plan", (February 2010), p. 10-5, http://www.nwcouncil.org/energy/powerplan/6/final/SixthPowerPlan.pdf

with regulatory processes designed for financial institutions, e) contractor participants are prescreened and continuously monitored to minimize bad recommendations and substandard work; f) the utilities are adequately rewarded for their expenditures and investment.[34]

It is recommended that a Nevada OBF electricity energy efficiency pilot program be implemented for small commercial customers. Key features should include:

1) Qualifying process:
   a) Customer must have been in business for at least one year;
   b) Customer must have not been 60 days or more in arrears on their utility bill during the last six months and must be current at the times of application for, and approval of, OBF;
   c) The projected average monthly dollar savings from the proposed energy-efficiency improvements must be equal to or exceed the fully amortized loan payment, so that no participant increases their monthly operating expense (which typically requires a low, or zero, percent interest rate).

   Note that these recommendations do not include a property appraisal. In Nevada, this is significant since many properties have negative, zero or very little equity. Also, these processes recommended for the pilot OBF do not involve typical bank-loan qualifying processes which are often burdensome, time consuming and extend the approval process over a long period.

2) Financial obligation and collection process:
   a) The obligation goes with the meter/billing address. It is an on-tariff program.
   b) The "invoice" for payment is included on the utility bill (one bill, one payment).
   c) Non-payment can result in termination of service.
   d) Partial payments are prorated between utility charges and the finance charges.
   e) There is a UCC fixture filing on all the equipment financed by the program.

   Risk is typically reduced by keeping repayment terms at 5-7 years or less. The intent of these recommendations is that the current occupant and any future occupants who will benefit from energy-efficiency savings will also become responsible for repaying the investment required to achieve those savings until the obligation is fully repaid. Until the obligation is fully repaid, the customer's average monthly utility bill will be no higher than it would have otherwise been, with significant reduction in the bill after the obligation is fully satisfied. Through this process, loan losses should be insignificant. Since monthly utility bills remain at historic levels after the upgrades, there should be little to no disincentive for a new customer to purchase or lease that property and assume the debt obligation.

[34] National Action Plan for Energy Efficiency - Vision for 2025: A Framework for Change, U.S. DOE and U.S EPA (2008). "Utility and other program administrator incentives for energy efficiency savings reviewed and established as necessary."

3) Regulatory environment: The participating utility(ies) shall not be classified/treated as financial institutions and subject to regulations pertaining thereto, such as truth in lending laws, etc.

4) Contractor approval and oversight:
   a) The utility will be responsible for maintaining a list of qualified contractors, with published transparent processes for being approved and for remaining on the list, and conversely, for removal from the list. Being on the list shall be construed as a privilege and not as a right.
   b) Standardized processes will be established and published for evaluating proposed projects, overseeing/evaluating work, and commissioning projects when finished (prior to payment to the contractors). Measurement and verification (M&V) processes will be established including a period of time prior to project implementation to establish baseline building performance. Contractors will need to provide proof of appropriate bonding, and the processes might include some contract retention percentage until post-installation M&V confirms actual performance of the energy-efficiency improvements.

      If the utilities are going to be key participants in the billing and collection of on-bill payments, then they need to have control over the other significant aspects of the project that are key to insuring good project design and installation, and conversely, avoiding and/or mitigating poor project design and installation. Utilities have the unique expertise to establish contractor qualifications and to maintain contractor approval and oversight. The costs to the utility associated with this effort need to be recoverable.

5) Capitalizing the pilot program:

   It is recommended that a pilot program be implemented for small commercial customers (ex., under 400,000 kWh) at an initial level of $1M per year for three years. Assuming average project sizes of $5,000, this funding should be sufficient for approximately 200 participants per year. A very low, or zero, percent interest rate should be applied to the OBF repayment under the pilot. For purposes of simplicity, the initial pilot should focus on one or two industry types. Convenience stores and small grocery stores are two recommended industry candidates.

   Funding can come from one or a mix of the following potential sources:
   a) NSOE funds (i.e., some portions of the revolving loan fund and/or the renewable energy fund);
   b) NV Energy funds, using only ratepayer funds from commercial building ratepayers;
   c) Bank Community Reinvestment Act (CRA) funds ; and/or
   d) Other appropriate sources.

Currently, NV Energy funds the Sure Bet Direct Install program for small commercial customers at a level of approximately $500,000 per year. The program provides direct financing of up to 90 percent of total energy efficiency project costs and assists approximately 100 customers per year currently. If the program were modified to provide direct financing (i.e., subsidy) at a lower level 25-30 percent instead, the balance on the projects could be financed using OBF. The lower subsidy would allow NV Energy to provide partial funding to capitalize the OBF loan pool.

Ideally, the $1M level of initial capital for the pilot project will be sufficient to allow for a number of projects in different regions of Nevada and testing at leased and non-leased properties. Based on experience with OBF in other states, consideration may also be given to allowing for the participation of a small number of public buildings, but not so many that the pilot project capital is all used on a small handful of large projects.

6) Benefits to NV Energy: Nearly every entity involved in promoting energy efficiency recognizes that utility companies can be key to implementation of energy efficiency. For an implementation model that involves the utilities to work well, there must be a financial incentive to the utilities for their participation. Utilities are in the business of selling energy. If efficiency is to be considered as another resource, then the financial treatment of efficiency must be similar to the treatment of the production, transmission and distribution of energy. Direct costs incurred must be recovered and investments made must be receive a return on the investment commensurate with the risk and the expected/approved rate of return on investment to shareholders.

Implementation: Enabling legislation or PUCN authorization; NV Energy and NSOE participation in the development of guidelines, rules and regulations with PUCN oversight and approval.

Legislation may be required to allow the Public Utilities Commission of Nevada (PUCN) to authorize Nevada electric utilities to implement a pilot on-bill financing program. An initial target participation rate should be established and a date should be set by which the program becomes fully operational.

3. **Develop and adopt policies and measures to accelerate the acquisition and use of alternative fuel vehicles (AFVs) in Nevada – particularly in metro areas.**

Higher use of AFV's can assist with several of the specific objectives identified above as important to Nevada policy alignment, specifically:

- increase aggregate electricity consumption in Nevada;
- reduce peak demand for electricity relative to total or average consumption;
- reduce emissions related to energy production and consumption (especially in the potential non-attainment basins of Las Vegas and Reno metropolitan areas);

- reduce average energy consumption (metrics: per capita, per square foot, per employee, per mile traveled);
- reduce dependence on foreign transportation fuels;
- reduce carbon footprint of vehicles by reducing vehicle emissions (metrics: tons of carbon emitted); and
- create jobs involved in the installation of charging and fueling stations.

This may be "a natural" for Nevada, which is the most urbanized state in the country. Even without new economic or population growth, AFV's will increase the demand for natural gas and electricity. For the electric system, this can address the issue of flat electricity demand reducing the avoided-cost justification for energy efficiency. This increase in natural gas and electricity consumption may be accomplished with minimal impact on peak demand – thereby resulting in better utilization in system infrastructures. Since a significant portion of the ozone in the Las Vegas and Reno metro areas is from tailpipe exhaust, increased use of AFV's will significantly improve the air quality in these metro areas. These results mitigate the risk to future economic growth posed by non-attainment status in the two largest metropolitan areas of the state.

Below are some of the specific steps that Nevada could take to accelerate AFV adoption:

- Adoption of VRA/NRA (natural gas vehicle refueling appliance and home refueling appliance) and EVSE (electric vehicle supply equipment) requirement in applicable governing codes.[35] "Encouraging the adoption of EVSE requirements in building codes can save money, ensure new building stock is EVSE-ready, and indirectly encourage the existing building stock to become PEV-ready too. Pre-wiring or installing EVSE during construction is significantly cheaper than retro-fitting old buildings due to the potential for retrenching, rewiring or

[35] As a starting point for EVSE language, here is language from Lancaster, California:
"Electric Vehicle Charging Stations (EVCS). New residential development shall provide for EVCS in the manner prescribed as follows:
A. Garages serving each new single-family residence and each unit of a duplex shall be constructed with a gang box (4 inches by 4 inches) connected to a conduit linking the garage to the electrical service, in a manner approved by the building and safety official, to allow for the future installation of electric vehicle supply equipment to provide an EVCS for use by the resident.
B. In new multiple-family projects of 10 dwelling units or less, 20% of the total parking spaces required (all of the 20% shall be located within the required covered parking) shall be provided with a gang box (4 inches by 4 inches) connected to a conduit linking the covered parking spaces or garages with the electrical service, in a manner approved by the building and safety official, to allow for the future installation of electric vehicle supply equipment to provide EVCSs at such time as it is needed for use by residents. EVCSs shall be provided in disabled person parking spaces in accordance with state requirements. (footnote continued on following page)
[27] (continued) C. In new multiple-family projects of more than 10 dwelling units, 10% of the total parking spaces required (all of the 10% shall be located within the required covered parking) shall be provided with a gang box (4 inches by 4 inches) connected to a conduit linking the covered parking spaces or garages with the electrical service, in a manner approved by the building and safety official. Of the total gang boxes provided, 50% shall have the necessary electric vehicle supply equipment installed to provide active EVCSs ready for use by residents. The remainder shall be installed at such time as they are needed for use by residents. EVCSs shall be provided in disabled person parking spaces in accordance with state requirements."

upgrades to electrical panels."[36] An EVSE provision should include demand-response (DR) capability, time-of-use rate structure and/or other provisions to cause the charging of PEVs to primarily occur during periods other than peak demand.

- Individuals or entities selling electricity for electric vehicle charging or natural gas for vehicle fuel shall not be subject to utility regulation. For example, in California, such a provider is protected as follows: "A corporation or individual that owns, controls, operates, or manages a facility that supplies electricity to the public exclusively to charge light-duty battery electric and plug-in hybrid electric vehicles, or compressed natural gas vehicles, is not defined as a public utility."[37]

- A requirement that public entities that own or operate five or more vehicles have a goal of a minimum of 20% alternative fuel vehicles, and that they conduct a total-cost-of-ownership analysis prior to making vehicle purchase decisions. This analysis should include a cost discount or premium related to risk associated with fuel cost volatility and/or future risk.

- Provide incentives (rebates) for VRA, HRA and EVSE purchase and installation for existing building stock including single family residences, multi-family housing, and commercial buildings. The source of funds could be a portion of the sales tax on AFV's, VFA's/HR's and EVSE's.

- A goal for EVSE equipped public parking at state, county and city facilities, airports and mass-transit locations, beginning at 1% of parking spaces and increased annually to exceed the estimated Nevada PEV registration percentages by 1%.

- Reduce the registration fees for AFV's. Make the registration-fee reductions proportionate to the reduction in the emissions footprint for these vehicles compared to their gasoline and diesel-powered ICE counterparts. Justification is that gasoline and diesel-powered ICEs have a public health cost associated with air quality that they do not pay, which impact will be mitigated by AFVs.

Implementation: Legislation

[36] Ibid p. 66
[37] California Public Utilities Codes, p. 216

4. **Develop an outreach program to accelerate implementation of energy efficiency improvements in existing Commercial Buildings through a state-supported and well-defined Energy Savings Performance Contracting process.**

   A Performance Contract, also called a Guaranteed Energy Savings Contract, is a design-build process with a single point of responsibility. An Energy Service Company (pre-qualified by the state) designs and proposes a package of energy cost reduction measures, installs or implements those cost reduction measures, and guarantees the savings that will be achieved by the cost reductions. The owner pays for the package over time using the stream of revenue resulting from the guaranteed energy reduction measures.

   To ensure that commercial building owners understand the Performance Contracting process and to ensure that energy efficiency savings from a Performance Contract are realized by the owners, the NSOE should take the lead in establishing a formalized, systematic method of defining and communicating the correct process to be used by contractors and building owners who employ Performance Contracts to achieve energy efficiency improvements, with emphasis on risk mitigation. NSOE efforts should include:

   - Reviewing and ensuring effective legislation for a Performance Contracting program implementation for commercial buildings;
   - Establishing a point-of-contact within the NSOE for Performance Contracting guidance and information;
   - Providing training and education on Performance Contracting, as well as guidelines and template documents for use by commercial building owners;
   - Issuing a RFP to pre-qualify Energy Service Companies and Third Party Consultants, maintaining lists of the prequalified companies, and communicating the results to commercial building owners.

   Implementation: Website, outreach, marketing, and training, facilitated by the NSOE in partnership with the Nevada Chapter of the Energy Services Coalition http://www.energyservicescoalition.org.

5. **Implement alternative ways of incentivizing investor-owned utilities (IOUs) to increase their demand side management (DSM) programs.**

   As the American Council for an Energy Efficient Economy (ACEEE) has observed:

   > "The obligation to earn a profit drives utilities to increase revenues by selling more electricity. Given this, investment in energy efficiency raises financial concerns for IOUs.. IOUs need to be able to recover the money they invest in efficiency from ratepayers and just like investments in new power plants; they need to be able to earn a return on investments in energy efficiency. Further, the threat of reduced sales if an energy efficiency program is successful threatens to cut into utility profits.

> In the traditional regulatory structure these concerns hinder a utility's willingness to invest in energy efficiency. No single policy mechanism can adequately remove the existing biases against utility investment in energy efficiency. However, several policies, when used in combination, can properly align financial incentives to remove the major market barriers to energy efficiency. These include cost recovery, decoupling and providing shareholder incentives."[38]

Nevada has attempted to address these concerns in a couple of ways. In July 2010 the Public Utilities Commission of Nevada (PUCN), directed by 2009 legislation, adopted a lost revenue recovery mechanism providing for annual recovery of NV Energy's efficiency program expenses and its fixed cost revenues lost from the reduced sales caused by the efficiency programs. A previous 5% additional rate of return incentive was eliminated, and instead a party may file a request for an incentive on a program-by-program basis. The lost revenue recovery policy, however, has been more complex to implement and certainly more controversial than was anticipated by most people at the time of its adoption. Questions have been raised about attribution of reductions in electricity consumption to DSM programs rather than to other potential causes (weather, the economy, non-DSM measures, etc.).

What incentive(s) would best encourage DSM while preserving acceptable returns for the utilities, result in the best impact for ratepayers and result in the best outcome for Nevada's economy and job creation? The challenge is that each alternative will have different outcomes and be perceived differently by the various stakeholders.

It is recommended that alternative ways of encouraging IOU investment in DSM programs be considered to determine what combination of provisions would best encourage accelerated implementation of DSM programs in Nevada. Most likely there is needed a combination of one mechanism to offset the lost revenue recovery of fixed costs that results from successful DSM and another mechanism to share the benefits of successful DSM. The decoupling mechanism currently being used in Nevada by Southwest Gas is one candidate for offsetting 'lost revenue'. There is broad sentiment that the current lost revenue mechanism needs to be replaced.

Implementation: Legislation designed by the PUCN to remove the requirement for the 'lost revenue recovery" followed by PUCN regulation to implement a better incentive program.

[38] "Overcoming Market Barriers and using Market Forces to Advance Energy Efficiency", American Council for an Energy-Efficient Economy (March 2013), p. xi.

6. **Support the Location and Expansion in Nevada of the Supply Chains of Goods and Services for Energy Efficiency**

   As mentioned in the description of Current Economic Development Policy in this report, renewable energy component manufacturing, advancing and internationalizing geothermal development and energy efficiency upgrading are targeted by the State as areas for economic opportunity. GOED should expand this strategy to specifically include opportunities in the energy-efficiency supply chain. Perhaps GOED and/or NSOE could look for grant opportunities that would include promotion of Nevada businesses in this area.

7. **Utilize better decision support tools when considering energy policy and economic policy decisions.**

   The University Center for Economic Development at the University of Nevada, Reno is completing a background study and roadmap for developing a Computable General Equilibrium (CGE) model for use in estimating impacts related to various energy decisions, including fossil-fuels generation, renewable energy electricity generation and energy efficiency programs. This analytical tool would have the capability of comparing policies regarding the mix of fossil fuels, renewable energy options and energy efficiency to meet electricity needs in Nevada.

   Energy is a crucial element of any economy. In addition, energy markets suffer from many types of market failures. Because of this, governments have intervened with many types of energy policies from monopoly regulation and oversight to creating cap and trade markets for air pollutants to setting of renewable portfolio standards. In order to find the most efficient and effective government interventions, economists have created a wide variety of models used to investigate economic impacts, costs and benefits of these policy interventions. One very successful model in the realm of energy economic models is the computable general equilibrium model. The pervasiveness of energy in the economy and the complex interaction that can come about from a change in energy prices, taxes or availability make the computable general equilibrium model a natural match for investigating the big picture outcomes of policy interventions. This is because the computable general equilibrium model is capable of modeling complex feedbacks and interactions amongst multiple sectors, product markets, labor and capital markets and government actions.

   On the other hand, linear Input-Output models have several shortcomings, such as no supply constraints, they don't reflect rice changes, and there is no substitution of inputs.

From Inter-American Development Bank's website:[39]

> **A CGE model is** one of the most rigorous, cutting-edge quantitative methods to evaluate the impact of economic and policy shocks -particularly policy reforms- in the economy as a whole. Because of its nature, this tool is significantly useful for policy design.
>
> CGE modeling reproduces -in the most possible realistic manner- the structure of the whole economy and therefore the nature of all existing economic transactions among diverse economic agents (productive sectors, households, and the government, among others). Moreover, **CGE analysis, in comparison to other available techniques, captures a wider set of economic impacts derived from a shock or the implementation of a specific policy reform** . . . In that sense, the CGE approach is especially useful when the expected effects of policy implementation are complex and materialize through different transmission channels.

Ian Sue Wing makes the following statement about the benefits and limitations of using a CGE model:[40]

> The advantage of this approach is its ability to measure policies' ultimate impact on aggregate welfare in a theoretically consistent way, by quantifying the change in the income and consumption of the representative agent that result from the interactions and feedbacks among all of the markets in the economy. Yet this very facility is at the root of the "black box" criticism raised in the introduction, as it creates the temptation for some policymakers and analysts to treat CGE models as a sort of economic crystal ball. Yet CGE models' usefulness in policy analysis owes less to their predictive accuracy, and more to their ability to shed light on the economic mechanisms through which price and quantity adjustments are transmitted among markets. Therefore, while on a superficial level CGE models can be thought of as a pseudo-empirical tool to quantify the impacts of imposing or removing policy distortions in a "what-if" manner, they should properly be regarded as computational laboratories within which to analyze the dynamics of the economic interactions from which these impacts arise (Francois 2001).

The UNR development team has experience in developing CGE models for analysis of water markets, and could apply this expertise to energy decisions. Specific objectives are:

a. To validate the IMPLAN input-output model data for development of a CGE model and to collect the necessary energy and emissions data for Nevada;
b. To develop CGE models for static analysis of energy projects in the State of Nevada; and

[39] http://www.iadb.org/en/topics/trade/understanding-a-computable-general-equilibrium-model,1283.html
[40] Ian sue Wing, "Computable General Equilibrium Models and Their Use in Economy-Wide Policy Analysis" (2004), MIT Joint Program on the Science and Policy of Global Change, http://web.mit.edu/globalchange/www/MITJPSPGC_TechNote6.pdf

c. To develop a dynamic state of Nevada CGE Model (the NV EE-CGE); for analysis of energy projects in the State of Nevada and regions of the state as desired.

Utilizing a CGE model to compare all energy policy decisions (fossil-fuels, renewable and efficiency) could result in making better-informed policy decisions. One would hope that this would lead to higher rates of economic growth for the State and to prioritization of lowest-cost lowest-risk resources.

Recommendation: Funding should be pursued to develop an "open" CGE model for use by utilities, the PUCN, and stakeholders in energy decisions. A problem with some of the proprietary models is that other interested entities can't check on assumptions, algorithms used, and other considerations in reaching "findings". Such a decision support tool, if available to all interested parties, will help to avoid duplication of effort and coordination of model parameters.

Implementation: The background study and roadmap should be completed in the 4th quarter of 2013, and will be published by UNR and released to NSOE. UNR will reach out to NV Energy and the Public Utilities Commission of Nevada to engage them in advisory roles regarding future model development.

8. Establish Energy-Efficiency Targets for Nevada, Followed By Recommended Methods of Achieving Those Targets

From the recently published "The 2013 City Energy Efficiency Scorecard:"

> Energy efficiency may be the cheapest, most abundant and most underutilized resource for local economic and community development. Considerable evidence documents that investments in energy efficiency can improve community self-reliance and resilience; save money for households, business and anchor institutions, and local governments; create local jobs; extend the life of and reduce the costs and risks of critical infrastructure investments; catalyze local economic reinvestment; improve livability and the local asset value of the built environment; and protect human health and the natural environment through reducing emissions of critical pollutants and greenhouse gases."[41]

Establishing Energy Efficiency Targets

At a September 2013 meeting of stakeholders, there seemed to be general consensus that Nevada should establish energy efficiency targets and then consider the various ways of achieving those targets.

[41] Eric Mackres, Johnson, Downs Cluett, Vaidyanathan and Shultz, "The 2013 City Energy Efficiency Scorecard,", American Council for an Energy-Efficient Economy, 2013, p. vii

Key questions for Nevada include:

1) Who should be involved in the process of setting energy efficiency targets?
2) What should that process entail? And,
3) How quickly can energy efficiency targets be established?

Who should be involved in the process? Since much of Nevada's energy policy is set forth in Nevada Revised Statutes, and since legislation passed in 2013 (AB 428) establishing a Legislative Committee on Energy, this process should be referred to this Legislative Committee, with support from GOED and NSOE, as well as the involvement of any other entities and individuals the Committee identifies.

What should the process entail? Our recommendation is that, ultimately, this process would have the benefit of the CGE model as a decision support tool, with the benefit of estimates of impacts on utility rates, the economy and job creation. However, until this tool is developed for Nevada, there are some other methods that could be used to establish energy efficiency targets for the State.

a) Carry-over from the Renewable Portfolio Standard: Since the RPS allowed for up to 25% of the renewable targets to be met through energy efficiency prior to the passage of SB 123, the energy efficiency component of retail electricity sales could become stand-alone targets:

Time Frame	Renewable Component	Energy Efficiency (25% of RPS)
2013-2014	18% +	4.5% or more
2015-2019	20% +	5.0% or more
2020-2024	22% +	5.5% of more
2025 and thereafter	25% +	6.25% of more

b) Emulate targets set by other nearby states: The American Council for and Energy-Efficient Economy (ACEEE) published a paper recently entitled "State Energy Efficiency Resource Standards (EERS)", which is the most common way of expressing a state energy efficiency target.[42] It states that twenty-five states have enacted long-term binding energy saving targets (including Nevada – prior to recognition that SB 123 removed the energy efficiency component of the RPS). In this region, Arizona, California, Colorado, New Mexico, Oregon and Washington all have energy efficiency targets, as follows:

Arizona — Electric and Nat. Gas IOUs, Co-ops (~59%)
Electric: Annual savings targets began at 1.25% of sales in 2011, ramping up to 2.5% in 2016 through 2020 for cumulative electricity savings of 22% or retail sales, of which 2% may come from peak demand reduction.
Natural Gas: ~0.6% annual savings for cumulative savings of 6% by 2020.

California — Electric and nat. Gas IOUs (~79%)
Electric: ~0.85% annual savings through 2020.
Demand reduction of 4,541 MW through 2020.
Natural Gas: Annual reduction of 0.40% in 2014.

[42] "State Energy Efficiency Resource Standards", ACEEE, July 2013

Colorado	Electric and Nat. Gas IOUs (~57%) Electric: Black Hills follows PSCo savings targets of 0.8% of sales in 2011, increasing to 1.35% of sales in 2015 and 1.66% of sales in 2019. Natural Gas: Savings targets commensurate with spending targets (at least 0.5% of prior year's revenue).
New Mexico	Electric IOUs (68%) Electricity: 5% reduction from 2005 total retail electricity sales by 2014, and an 8% reduction by 2020. 2020 targets were lowered by 10% as part of compromise legislation that established fixed rider tariff for energy efficiency programs. Utilities must acquire all cost-effective and achievable energy efficiency resources.
Oregon (100%)	Electric: Targets are equivalent to 0.8% of 2009 electric sales in 2010, ramping up to 1% in 2013 and 2014. Natural Gas: 0.2% of sales in 2010 ramping up to 0.4% in 2014.
Washington	Electric IOUs, Co-ops, Muni's (~81%) Biennial and Ten-Year Goals vary by utility. Law requires savings targets to be based on the Northwest Power Plan, which estimates potential annual savings of about 1.5% through 2030 for Washington utilities. All cost-effective conservation required.

c) Emulate states served by MidAmerica Energy (i.e. Illinois and Iowa)

Illinois	Electric and Nat. Gas Utilities with over 100,000 customers (~89%) Electric: 0.2% annual savings in 2008, ramping up to 1% in 2012, 2% in 2015 and thereafter. Annual peak demand reduction of 0.1% through 2018. Natural Gas: 8.5% cumulative savings by 2020 (0.2% annual savings in 2011, ramping up to 1.5% in 2019). Energy efficiency measures may not exceed an established cost-cap.
Iowa	Electric and Nat. Gas Statewide Goal (100%), set in 2009 Electric: Varies by utility from 1-1.5% annually by 2013. Natural Gas: Varies by utility from 0.74-1.2% annually by 2013. The next round of targets are under discussion, to be finalized by the end of 2013.

How quickly can energy efficiency targets be established? AB 428 sets forth a time frame for the Legislative Energy Committee to meet, as follows (Section 25.3. 1.) "Except as otherwise ordered by the Legislative Commission, the members of the Committee shall meet not earlier than November 1 of each odd-numbered year and not later than August 31 of the following even-numbered year at the times and places specified by a call of the Chari or a majority of the Committee." Based upon this time frame, energy efficiency targets for Nevada could be recommended by the Legislative Energy Committee to the next Nevada Legislature (2015).

In future years, after a CGE decision support tool is developed and found to be useful (i.e. "approved" by the PUCN), the Legislative Energy Committee could review and revise energy efficiency targets based upon a number of key considerations including economic, environmental and health impacts and risk mitigation.

Methods for Achieving Energy Efficiency Targets

Alternative methods for achieving energy efficiency targets include various incentives, mandates, or utilizing some sort of carbon tax and letting market forces allocate energy resources, including energy efficiency.

Incentives typically include such options as providing energy utilities with enhanced return on investment or bonuses for achieving and surpassing energy efficiency targets. Arizona set energy efficiency goals and then offered utilities a bounty (ten percent of the value of the energy cost savings) for exceeding 125 percent of the state-set efficiency goals. One utility earned a $2.5 million bonus in 2009[43]. Many states help provide financing options, including on-bill repayment, energy saving performance contracting (ESCOs), and property assessed clean energy (PACE).[44] If only incentives are used, it will be very important to have systems to track energy efficiency results to compare against targets. If targets are not achieved, steps would be needed to increase existing incentives or add new incentives.

Mandates are used by many states. Energy Efficiency Resource Standard (EERS) seem to be the most prevalent form of energy efficiency mandate, with states setting binding targets representing 61% of electricity sales in the U.S.[45] Important for the implementation of any mandate is to predefine consequences if goals are not achieved.

> Without a CGE model, the best approach in the near term would likely be to review what other states have been able to achieve and then select a package of incentives and/or mandates that seem to fit Nevada's circumstances. Unfortunately, as we've seen in the past, people can utilize static models to come to very different conclusions with the same underlying circumstances.

Next Steps

NSOE is forming working groups to help implement the policy recommendations. The groups and designated group leaders are set forth in the table below. To be developed are time frames, definitions of "success", milestones, and reporting processes. These elements are absolutely necessary for the working groups to achieve meaningful and timely results.

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[43] "An Energy Efficiency Primer for Governors", National Governors Association, September 2013, p. 10
[44] Ibid, p. 13
[45] "State Energy Efficiency Resource Standards", ACEEE, July 2013, p.1

	WORKING GROUPS											
		Energy Office	NV Energy	SW Gas	SWEEP	UNR	BCP	PUC	GOED	AGC	Washoe Co	NREA	S. Well
1	Support the adoption and implementation of cost-effective energy efficiency building codes and standards and work to help ensure compliance.	X			X				X	X *			
2	Develop and implement a pilot utility on-bill financing program for energy-efficiency improvements.	X	X	X	X	X *	X	X				X	
3	Develop and adopt policies and measures to accelerate the acquisition and use of alternative fuel vehicles (AFVs) in Nevada – particularly in metro areas.	X	X	X					X *				
4	Develop an outreach program to accelerate implementation of energy efficiency improvements in existing Commercial Buildings through a state-supported and well-defined Energy Savings Performance	X *			X					X			
5	Consider alternative ways of incentivizing investor owned utilities (IOUs) to increase their demand side management (DSM) programs.	X	X	X	X *		X	X					
6	Support the Location and Expansion in Nevada of the Supply Chains of Goods and Services for Energy Efficiency	X	X	X					X *				
7	Utilize better decision support tools when considering energy policy and economic policy decisions.	X	X	X	X	X *	X	X					
8	Investigate the Potential Impacts of an Energy Efficiency Resource Standard (EERS) in Nevada.	X	X	X	X *						X	X	X
	* Group Leader												

While the working groups take on these tasks, due to time considerations, we encourage the Legislature Interim Energy Committee to consider legislation needed to implement these recommendations. The next session of the Nevada legislature in 2015 will be critical to optimizing the economic benefits associated with energy efficiency for Nevadans. It will be a "watershed point" for energy efficiency state policy options.