MINUTES OF THE
SENATE COMMITTEE ON COMMERCE, LABOR AND ENERGY
SUBCOMMITTEE ON ENERGY

Seventy-ninth Session
February 24, 2017

The Subcommittee of the Senate Committee on Commerce, Labor and Energy was called to order by Chair Pat Spearman at 10:36 a.m. on Friday, February 24, 2017, in Room 2144 of the Legislative Building, Carson City, Nevada. The meeting was videoconferenced to Room 4404B of the Grant Sawyer State Office Building, 555 East Washington Avenue, Las Vegas, Nevada. Exhibit A is the Agenda. Exhibit B is the Attendance Roster. All exhibits are available and on file in the Research Library of the Legislative Counsel Bureau.

SUBCOMMITTEE MEMBERS PRESENT:

Senator Pat Spearman, Chair
Senator James A. Settelmeyer
Senator Patricia Farley

STAFF MEMBERS PRESENT:

Marji Paslov Thomas, Policy Analyst
Bryan Fernley, Counsel
Daniel Putney, Committee Secretary

OTHERS PRESENT:

Rose McKinney-James, Energy Works, LLC
Jennifer Taylor, Executive Director, Clean Energy Project
Rebecca Wagner
Tom Polikalas, Southwest Energy Efficiency Project
Robert Johnston, Western Resource Advocates
Adam Browning, Executive Director, Vote Solar
Ray Bacon, Nevada Manufacturers Association
Steven T. Polikalas
John Friedrich, Climate Parents

CHAIR SPEARMAN:
The Legislature continues to pursue comprehensive energy policies. The key principles remain the same—less expensive, cleaner and sustainable energy sources for our communities and customers. This includes equitable rates, equal opportunity for energy savings, lower fuel costs and scaling energy resources at the lowest cost to ratepayers through optimal use of grants and financing. This Legislative Session, we will continue to examine energy needs in Nevada. We will identify opportunities to reduce rates for ratepayers while balancing the needs of the utilities. We want to ensure reliable power availability, and we want to mitigate public and environmental impacts of Nevada's energy use. I have heard repeatedly from my constituents that our energy market is not performing; probably seven out of ten people had the same message for me.

There will be discussions on redesigning the electricity market and improving the regulatory structure so that it facilitates the adoption of technological innovations and rapid changes. We will also look at evolving threats to grid security, integration of intermittent and distributed clean energy resources, and energy solutions for all residents and businesses in our State.

We are in a competitive economic environment. If we want investments in our State to result in growth and jobs, we need to indicate through our actions the direction we are going.

ROSE MCKINNEY-JAMES (Energy Works, LLC):
I served as the Obama-Biden transition team lead for the Federal Energy Regulatory Commission working on a variety of federal issues to include grid resilience and cybersecurity. Over the course of this work, I have witnessed the maturation and evolution of energy policy in Nevada. In those days, we secured most of our energy through long-term contracts, and we imported resources, primarily coal. Today, Nevada is a very different place, and we are focused on identifying the best way to secure economic benefits from our natural resources. As you can see from page 3 of my presentation titled "Introduction to Energy 101" (Exhibit C), we have compared electricity generation in some of the Western states. You can see the sources of energy Nevada uses.

Starting in the late 1990s, Nevada secured a national leadership role in the development of these energy policies. I appreciate the challenge of working to balance the varied interests at play. We frequently use the term subsidy to

describe this balancing act, and the analyses to determine how best to address costs and benefits are complicated and time-consuming. We continue to discuss the best approach, and we acknowledge that discussions regarding our grid, reliability and resilience are key factors. A reliable energy delivery system requires cyber resilience. According to a U.S. Department of Energy report, "The Nation's security, economic prosperity and the well-being of our citizens depend on a reliable energy infrastructure." As such, a top priority for the Office of Electricity Delivery and Energy Reliability is to make the Nation's electric power, oil and natural gas infrastructures resilient to cyber threats.

While 2016 resulted in a significant public discourse related to solar policy to include debates around subsidies and customer choice, as we enter 2017, energy policy topics expand to include energy efficiency, productivity, transportation, transmission, grid management, cybersecurity, economic development and job creation, green buildings, renewable resources, battery technology, storage, and incentives. All of these topics are embedded in the energy discussion, with opportunities to advance technology and innovation. Each topic has a distinct impact on the development of our energy policy. Long-term planning for energy consumption is addressed through a process called integrated resource planning. Energy consumption is measured by load and purpose, and this consumption may be used to heat, cool and light buildings. Energy consumption in Nevada consists of customers of NV Energy, co-ops, municipal utilities and general improvement districts.

Nevada has a long history related to the deployment and development of renewable energy resources. We established this policy as a State priority in the early 1990s, and at that time, geothermal energy was a significant resource in our State. In 1995, the Legislature declared that "indigenous resources should be considered a focus of our economic diversification efforts." This established a new focus for energy policy in our State I believe remains consistent today. In 1997, the Legislature acted on this new focus by passing a measure that established our first renewable energy portfolio standard (RPS). This required the State energy mix to include renewable resources. The RPS is a regulatory mechanism that requires utilities to use renewable energy or renewable energy credits to account for a certain percentage of their retail electricity sales or generating capacities.

Recently, in an effort to reach a broader range of socioeconomic interests, states have initiated discussions around community shared and subscription solar energy. Frequently, new measures are designed to promote incremental changes using pilot and demonstration programs. Energy as an industry is capital intensive, requiring access to financial markets to support daily operations, trading and investment programs. Access to financial markets requires maintaining an investment-grade credit rating. Financing for these projects requires sophisticated transactions. No renewable energy project can move forward without financing and power purchase agreements. Both are based on the project's ability to secure permits. The Legislature has acknowledged this challenge by passing several statutes. According to the 2009 Office of Energy's annual Status of Energy in Nevada Report, State officials were of the opinion that Nevada had successfully adopted the policies necessary to encourage development of our renewable energy resources. The next critical step in the process was addressing transmission. Access to transmission was a priority and the key to developing the market and creating export opportunities.

JENNIFER TAYLOR (Executive Director, Clean Energy Project):
The Clean Energy Project (CEP) is a 501(c)(3) with deep roots in Nevada's clean technology revolution. We are Nevada's premier advocacy organization to educate civic, community and business leaders on the importance of smart, forward-looking energy policies that strengthen the State's economy and improve its environment. The CEP is the business voice of Nevada's clean energy economy. We have nearly 500 businesses supporting comprehensive clean energy policies. We have more than 125 local small businesses that have implemented efficiency measures to reduce their carbon footprints. We have broad corporate support, and we are a trusted voice on clean energy policies, including having a seat on the Technical Advisory Committee on Clean Energy Sources for the New Energy Industry Task Force. Small business is an important part of the energy discussion. In 2016, per the U.S. Small Business Administration, Nevada's 2013 Small Business Profile was about 40.9 percent of the private workforce. That is a significant part of both our economy and the voices that should be weighing in on clean energy policies. Additionally, polling from last summer showed us our small businesses are highly trusted voices in discussions about economic diversification, economic opportunities and energy.

In 2008, we all suffered from a recession in Nevada, and in trying to come out of that, a study by Brookings Mountain West was issued in 2011. The study discussed how Nevada could right the economic ship. Governor Sandoval has recognized the role the development of clean energy and technology can play in Nevada's economy. In addition to the Brookings report—which provided key sectors to develop to strengthen, diversify and stabilize our economy—the Governor issued a number of documents last year further supporting energy as a goal for Nevada's economic diversification and opportunities. The Governor created the New Energy Industry Task Force, which, in part, was charged with developing clean energy sources and supporting distribution, generation and storage of energy. He issued his Strategic Planning Framework for 2016 through 2020, which included the charge that Nevada become the leading producer and consumer of clean and renewable energy. He also set forth to reduce the percentage of fossil fuels imported into Nevada over the next ten years. The Governor's charges will create jobs in the clean energy sector, which supports over 8.1 million jobs worldwide. The U.S. wind and solar industries support more than 300,000 jobs; energy efficiency accounts for nearly 1.9 million U.S. jobs. In looking at the Governor's Strategic Planning Framework, he has called for workforce development and jobs that will mirror the above numbers but for Nevada. Along with 16 other bipartisan governors, he signed the Governors' Accord for a New Energy Future, which discussed how these states would commit to diversifying their energy generation, expanding their clean energy sources, modernizing their energy infrastructures, encouraging clean transportation plans and securing a stronger national energy future.

At the end of last year, through some of the decisions at the Public Utilities Commission of Nevada (PUCN), we saw there was regulatory alignment with the Governor's goals. Chair Reynolds in the general rate case decision in December 2016 noted that Nevada is at a crossroads where traditional thinking is colliding with new technology and disruptive business models. New ways of looking at old energy problems are emerging.

Page 4 of my presentation titled "Energy 101: It's about the Economy …" (Exhibit D) displays logos of companies that have renewable energy or sustainability goals that fall within the sectors outlined on page 4. Under the Governor's call for a new energy future in Nevada, we could create policies to mirror these companies' values and attract them to our State. Nevada leads the

Nation in geothermal and solar development potential. We have an opportunity under the Governor's direction to diversify our energy mix. Eighty-two percent of our electricity is generated using natural gas or coal, which means despite our geothermal and solar energy potential, less than 18 percent of our electricity comes from renewable resources. Nevada does not produce natural gas or coal, so these resources must be imported from neighboring states to power our homes and businesses. The cost of importing these resources is about $600 million annually, not including fuel for vehicles.

Businesses are demanding clean energy. Seventy-one percent of Fortune 100 companies and 43 percent of Fortune 500 companies have goals for renewable energy and sustainability. Some companies have goals of 100 percent clean energy consumption. Such companies are going to look for states with strong clean energy policies to mirror their core values when these companies are looking to move or expand. However, companies are not the only institutions demanding access to clean energy. BlackRock, Inc., which is the world's largest asset manager, has said all investors should factor climate change into their decision-making processes and doing so would mean not having to accept lower returns. When BlackRock started enhancing its data mining on investments, there was a need to calculate emissions as a percentage of a company's sales to reduce risk to investments. BlackRock found that firms working to cut their carbon footprints performed better than their competitors that did not make such changes.

Page 6 of Exhibit D includes quotes from Microsoft and Salesforce showing these companies' needs and initiatives to have direct access to clean energy. This business drive for renewable energy means the states with the most to gain are those that let corporate America make its own decisions on energy purchases with direct access to renewable and advanced energy. When our policies mirror the core values of these companies, it is a win-win for Nevada. Innovative and robust clean energy policies signal to companies that Nevada is open for business for private investment, clean energy development and the resulting economic growth.

We have seen renewable energy spur fantastic in-State investment. Utility-scale projects have brought $6.6 billion in capital investments and more than 4,300 jobs since 2011. The Governor recently greenlighted the Silver State South Solar Energy Center, which exports to Southern California Edison. People

will say, "Why is that energy not coming to us in Nevada?" However, it is important to remember the Governor's Strategic Planning Framework says Nevada will be both a leading consumer and producer of clean energy. Every economy wants and needs something to export.

Page 8 of Exhibit D shows where Nevada is in terms of renewable energy development to date. Nevada has the greatest development potential for geothermal energy, the majority of which is in northern Nevada. This potential has been recognized through Nevada's work in the Department of Energy's Frontier Observatory for Research in Geothermal Energy (FORGE), which will be a dedicated site where scientists and engineers develop tests, accelerate breakthroughs, and enhance geothermal system technologies and techniques. The development of this site was a competitive process through which Nevada has ultimately become one of two finalists. The FORGE team includes Reno-based Ormat Technologies, Inc., Sandia National Laboratories and the University of Nevada, Reno (UNR). As one of the finalists, Nevada's FORGE team will share $29 million over several years to fully equip, test and certify its underground labs for the competitive third phase of the FORGE effort, after which one of the sites will be chosen as FORGE's permanent headquarters. The goal of the FORGE project is to develop enhanced geothermal systems capable of producing more than 100 gigawatts of renewable energy-generating capacity. Nevada, while having the greatest development potential, ranks second in the Nation behind California. While the FORGE project is not developing a site for generation, it is working to enhance geothermal development, and it would provide UNR with fantastic opportunities and optics.

The Energy Choice Initiative passed with an overwhelming margin. In some Assembly districts, the passage rate was upwards of 80 percent. The Initiative declared that our electricity markets will be open and competitive so that all electricity consumers have meaningful choices in providers and are not forced to purchase from one provider. Even though this Initiative has to pass again in 2018 to amend our State's Constitution, there is one section that allows or supports continued work on clean energy policies this Session. This is paragraph (c) of section 3, which states,

> Nothing herein shall be construed to invalidate Nevada's public policies on renewable energy, energy efficiency and environmental

> protection or limit the Legislature's ability to impose such policies on participants in a competitive electricity market.

This means Nevada is still open for business in clean energy investment and development, and creating robust clean energy policies now could lay the foundation for a fully restructured market by 2023. Regardless of this restructured generation market, it is going to be critical to work with our existing utility to have a stable, experienced manager of our grid.

A proposed policy you will be seeing is Senate Bill (S.B.) 65.

SENATE BILL 65: Revises provisions related to the filing by certain electric utilities of an integrated resource plan. (BDR 58-167)

During one of the first meetings of the New Energy Industry Task Force's Technical Advisory Committee on Clean Energy Sources, the PUCN's Director of Regulatory Operations presented an overview of existing energy law, including a discussion of how the PUCN evaluates the long-term integrated resource plan that is submitted every three years by the utility. The utility's plan includes a proposal for meeting the needs of customers by either adding new supply resources like power plants or offering energy efficiency programs that reduce demand. In this discussion, the Director indicated there were factors the PUCN may evaluate such as economic and environmental benefits, but the PUCN had not been provided clear legislative direction on the prioritization of factors other than to analyze least cost and best fit.

Ultimately, the Task Force made a recommendation, now embodied in S.B. 65, that establishes clear legislative direction for the PUCN to adequately evaluate the costs and benefits of clean energy sources. *Nevada Revised Statutes* (NRS) 704.746 allows the PUCN preference to planning that provides the greatest economic and environmental benefits to the State. However, this NRS section is permissive; it uses the word may. The primary focus has been on least cost analysis. The Task Force felt this focus undervalued economic and environmental benefits of clean energy sources, did not adequately assess fuel price risk and carbon price risk of overreliance on natural gas-fired generation, which we have in Nevada, and did not diversify Nevada's energy portfolio. Senate Bill 65 would change the word may to shall, building in a requirement that economic and environmental benefits to the State be considered.

Additionally, this proposed legislation broadens participation by interested stakeholders to be part of hearings on the adequacy of the utility's plan to increase its supply of electricity or decrease the demands on its system.

Energy storage is not a new concept. What has driven the discussion behind storage is the technology that allows us to capture and store renewable energy. The Tesla Powerwall is only a piece of the storage pie. There are a lot of applications for storage, including commercial, residential and utility-scale storage. Nevada has not created a set of policies to address storage, but our State is not alone. Only a few other states—including California, New York, New Jersey and Hawaii—have implemented policies on storage.

Senate Bill 204 would move Nevada toward storage policy by requiring the PUCN to investigate and determine on or before October 2018 whether it is in the public interest to establish by regulation a requirement for the procurement of energy storage systems by an electric utility; whether storage systems would integrate renewable energy resources into the transmission and distribution grid; and how to improve reliability of the grid, reduce the emission of greenhouse gases, and measure the benefits and costs of energy storage systems.

SENATE BILL 204: Requires the Public Utilities Commission of Nevada to investigate and establish a requirement for certain electric utilities to procure energy storage systems under certain circumstances. (BDR 58-642)

Tesla, the Gigafactory and lithium-ion batteries have become buzzwords in storage because of the market opportunities. The combination of manufacturing scale and incremental technology advancement for lithium-ion is driving down the cost of storage, from more than $1,000 per kilowatt-hour in 2010 to less than $500 per kilowatt-hour today. Leading lithium-ion battery suppliers are signaling prices to fall to the range of $150 to $250 per kilowatt-hour by the end of the decade, a fall that would open up a wide range of grid storage applications. If battery costs were to fall to the $100 to $150 per kilowatt-hour range, North American market potential could be at 35 to 60 gigawatts by 2030. This type of drastic shift in pricing is similar to the increased commercialization of solar we saw as prices fell roughly 80 percent over the past decade. Lithium-ion's rapid commercialization comes from it being viewed as a high-efficiency, high-energy-density source accompanied by its falling

costs. The PUCN and the Federal Energy Regulatory Commission have investigatory dockets on storage that take a look at the definition and evaluation of storage for planning, how to value storage, and what policies might be driving the market.

Page 13 of Exhibit D shows the example of Villa Trieste, a subdivision of about 180 homes in Las Vegas. Villa Trieste is a behind-the-meter project in partnership between NV Energy and Pulte Homes under a Department of Energy grant. The project is, in part, intended to test and integrate technologies like storage and photovoltaic (PV) energy, evaluate the grid benefits of premise-based systems, and develop a distributed energy resources roadmap for new customer energy solutions.

Page 14 of Exhibit D shows Oncor's System Operating Services Facility in Lancaster, Texas, which is a telecom center that has to remain operational at all times. The microgrid the Facility uses was developed by Schneider Electric and various project partners. Energy storage is the backbone of this system, and the same can be said for many microgrids. The Facility was built in six months, is grid-tied and has four interconnected microgrids, nine distributed generation resources, two solar PV arrays, a microturbine, two energy storage systems and four generators. The total load at peak capacity is 900 kilowatts. This system can run on storage as long as it has additional energy sources from the solar arrays. Schneider Electric has also been working with other critical infrastructure. The corporation announced more microgrid projects on February 1, 2017, for Montgomery County, Maryland. These microgrids will ensure there is more reliable and efficient power to improve resiliency and security for Montgomery County following major storms and other natural disasters.

Page 15 of Exhibit D shows SolarCity and Tesla's project on the island of Ta'u. This island was previously powered by diesel. The project consists of a microgrid of 1.4 megawatts with 5,328 solar panels. This is enough solar generation to power nearly 100 percent of the island. The microgrid is enabled by 60 Tesla Powerpacks that can store solar energy at night, and the microgrid can run the entire island on solar for 3 days. The system recharges fully with only seven hours of daylight. Ta'u has about 600 residents and is located about 4,000 miles from the West Coast, which means the island was entirely dependent on diesel generators for power prior to the microgrid.

REBECCA WAGNER:
I want to give a Western states' energy perspective and discuss what is happening in our neighboring states as it relates to regional energy markets. I note we use the term energy market interchangeably for a lot of things right now, but I am specifically referring to the wholesale energy market.

The energy imbalance market (EIM) is a platform created by the California Independent System Operator (ISO) for real-time bulk power trading. Utilities have to constantly balance supply and demand to ensure reliability, so they balance by supply creation from their own power plants, long-term power purchase agreements and market purchases. These utilities have a lot of tools to do this balancing, but when they started adding more variable renewable energy resources like solar and wind throughout the West, the balancing became more challenging. The EIM has proven to be one of the least cost, most efficient ways to address the large integration of renewable energy resources. This market is becoming the lowest cost energy source. It provides utilities with greater reliability because there is more visibility into the system, and it has created a dynamic where Western utilities, utility commissioners and governors' energy offices are all working together. Our utility, NV Energy, has joined the EIM, and now we have seen a whole host of utilities around the West join. The market is demonstrating economic benefits to ratepayers, especially in Nevada where the State can procure inexpensive power. Alternatively, NV Energy has a fairly modern fleet of natural gas systems that can be used to help California and other participating utilities address ramps and other issues.

The Salt River Project and the Los Angeles Department of Water and Power are contemplating joining the EIM. Utilities, utility commissioners and state energy offices are recognizing the value of regional collaboration in regard to more effectively dispatching their systems and delivery of electricity.

We have been exploring in the West what it would look like if we moved beyond a real-time market, which the EIM is, to a day-ahead market. We want to know what the value proposition would be for states and ratepayers and how this new system would more efficiently deliver electricity at lower costs.

CHAIR SPEARMAN:
Can you share an example of how the EIM might work in terms of an energy strategy within an energy strategy for the State?

MS. WAGNER:
What we have focused on most recently are the PacifiCorp utilities—located in Washington, Oregon, Idaho, Wyoming and Utah—becoming part of the California ISO. The focus has been on the value proposition for these utilities' membership. Many individuals wondered why NV Energy would not be a part of the ISO because of the utility's close electric ties to California. Membership opens up more transmission access to the West and creates a great opportunity for Nevada to export more renewable energy resources. That is where the value proposition comes in for Nevada—providing the highway into the load center, which has an enormous RPS, but also the opportunity for us to build projects in Nevada for export. This has been the evolution of Nevada's energy over the last several years, which was unheard of when I first started because we did not want to export any of our energy. We now see the value of export. The larger context of having an accessible and fluid market creates a better dynamic for development of electric resources in Nevada.

Colorado and Wyoming utilities are now looking at joining an ISO or regional transmission organization, specifically the Southwest Power Pool. These states find working together with a common tariff is less expensive for them, and this collaboration makes more sense regarding transmission planning. We still have the ongoing effort with the California ISO and how that could be integrated into other systems.

Grid monitorization is a Department of Energy term for updating infrastructure. Our electric infrastructure, both transmission and distribution, is aging. This is the same technology we have used forever. While we still use electricity, we use it differently—we consume it at different times and for different purposes. Customers are now becoming more engaged with how and when they use their electricity in an effort to control their own costs. This behavior is largely driven by a digital economy. Nevada is a hub for large data centers, which are huge energy consumers, and that changes the dynamics of our electric system. We need to have a more updated, flexible system—a smart grid. This provides more visibility into consumer behavior. We also have opportunities where the utility can control load through different appliances, a process that saves ratepayers money by not having them purchase power at the highest point in the market.

The resiliency aspect of grid monitorization is important. After Superstorm Sandy on the East Coast, the fact that electricity could not be restored for

weeks highlighted the need for our distribution and transmission systems to be more resilient. Customers expect access to the Internet, the ability to charge their phones and other things that are part of our digital economy. Grid resilience sets the stage for what is next. We do not know all of the technologies that are on the forefront of development.

CHAIR SPEARMAN:
If something catastrophic were to happen to our aging grid, do you have any idea how much that would cost our State's economy?

MS. WAGNER:
That is impossible for me to answer, but I can say depending on where the interruption of power is, such as on the Las Vegas Strip, the effects are extraordinary. The Strip is the population center and center of our economy. The longer the outage and the inability to restore power exacerbate these negative effects.

CHAIR SPEARMAN:
Should we consider grid monitorization this Session?

MS. WAGNER:
Yes, not only for preparing for what is next but also for making sure our economy is not disrupted as a result of cyberattacks or natural disasters.

SENATOR SETTELMEYER:
At times, we are in a situation where we can produce extra power through renewable energy resources and sell it to the California ISO, but at the same time, the ISO wants to sell to us. What are we going to do with all of this excess power if our State does not need it and the ISO does not want to buy it?

MS. WAGNER:
The simple answer is storage. The broader the footprint, the better off we are. There are times where, because the geography of California and Nevada are so similar, we are going to be producing solar energy at the same time. Our State may take on some of California's energy to meet our peak load, but then it becomes too much. Our State is an exporter of energy pursuant to contracts between California and Nevada utilities. If NV Energy is in a situation where it has to both accept and keep producing energy, being within a market gives the

utility the opportunity to sell its excess to the Pacific Northwest or find another source of demand. Right now, it becomes wasteful not having anywhere to store the excess.

SENATOR SETTELMEYER:
I can see that, especially in relation to if we had more states connected, we could send excess energy to other states like New York when they needed it. I can see how California and Nevada peak at about the same time. Most large businesses, however, have contingency plans for when the power goes out. Most of these businesses are advocating for more independence because they already have generators. In recent events, we have been fortunate enough to use old-school technology like generators to help people who need power. It is going to require a solution of all aspects going forward. There is no one solution that has any chance of surviving.

MS. WAGNER:
Absolutely. It is an all-of-the-above strategy. We are solving different problems in different places, from rural areas of the State to the Strip.

TOM POLIKALAS (Southwest Energy Efficiency Project):
The Southwest Energy Efficiency Project (SWEEP) is a nonprofit organization working on energy policy in six states. We are working on a number of policies and programs related to efficiency in the building, commercial and residential sectors. We work on transportation and hope some of the State's excess power will be put to use in electric vehicles and the electrification of transportation. We work closely with municipalities, state governments and sometimes utilities.

Energy efficiency is a broad topic, but it is essentially using better technology to accomplish the same goal. One example is the use of light-emitting diodes to replace incandescent lightbulbs. Through efficiency, we could save energy and money in sectors such as heating, cooling, air conditioning and lighting. Efficiency is a much less costly option than generating new energy. Many studies showcase that we could be saving billions of dollars over a decade. For Nevada specifically, efficiency could save consumers $3.4 billion over a decade.

We are building on a track record of success: NV Energy has many outstanding programs. Nevadans are using less electricity now than in the 2008 time frame, and we are becoming more productive in our energy use. When we save energy,

whether it be in our homes or businesses, that provides the opportunity of spending money in the local economy. Nevada is already becoming a hub of energy efficiency manufacturing, particularly in Senator Settelmeyer's district. Johns Manville, Rmax and Deceuninck North America in Fernley—shown on pages 6, 7 and 8, respectively, of my presentation titled "Energy Efficiency in Nevada" (Exhibit E)—are three examples. We would like to encourage the growth of companies like these.

We are looking at retrofitting older buildings. The installation of more efficient equipment creates jobs, primarily in the construction sector. Sometimes these jobs can be learned fairly quickly. By using less power, we are saving water and reducing emissions. We can take a look at incorporating these factors into how we evaluate efficiency in resource planning.

Page 12 of Exhibit E shows a study highlighting Nevada's $3.4 billion economic benefit and other states' economic benefits by pursuing energy efficiency.

We saw a ramp-up of NV Energy's efficiency programs in the 2006-2009 time frame. Over time, NV Energy became a leader in the states where SWEEP operates. The utility produced the largest savings for its consumers around the 2008 time frame. We are taking a look at reviving some of the programs that were discontinued, such as incentives for new energy efficient construction or retrofits.

Page 14 of Exhibit E provides a snapshot of NV Energy's electricity savings from 2006-2014. In 2008-2009, NV Energy produced the greatest savings. Nationally, however, Nevada has some room for improvement. Our State is thirty-seventh on the 2016 American Council for an Energy-Efficient Economy Scorecard, shown on page 15 of Exhibit E.

CHAIR SPEARMAN:
One thing we struggle with is how to educate the consumer. This lack of information usually slows the adoption rate of energy legislation. Do you have any suggestions on how to educate the consumer? If the consumer does not understand the savings life cycle of the product, then he or she tends to immediately opt for a less expensive product.

MR. POLIKALAS:
There are going to be a number of ways in which we try to address the education problem. We have targeted key sectors like the construction industry. In terms of consumer demand, there is both a challenge and opportunity in reaching that sector. I allude to the need to build upon the excellent partnerships we have, such as the partnerships among our State's utilities, the State energy office, SWEEP and other entities. Some efforts are underway, but there is certainly ample opportunity to improve upon these efforts.

SENATOR FARLEY:
As an owner of a commercial building and residential property, I agree that energy efficiency is important. As we improve buildings to keep our value and maintain our assets, a lot of people are starting to look into retrofitting. Buyers and banks see retrofitting as a positive thing to do to one's property. Retrofitting is a great way to continue the efficiency message.

MR. POLIKALAS:
Sometimes property owners see the opportunity to implement a technology that will save energy and money, but the lack of financing can be a deterrent. It is important to look at how life cycle savings are gained if efficiency products cannot be bought up front.

SENATOR SETTELMEYER:
How do we get the average consumer to participate in these energy efficiency programs? This is the first meeting of the Subcommittee on Energy after the historic vote on the Energy Choice Initiative, yet there are no regular people here.

MS. MCKINNEY-JAMES:
I can assure you there are significant efforts underway to ensure we educate our fellow consumers. To the extent people are watching on the Internet and participating on social media, I believe you will find there is a strong interest in energy choice.

MR. POLIKALAS:
There are a variety of things policymakers can do to optimize the energy opportunities ahead of us. We can look at energy efficiency's place in integrated resource planning. We can look at a fair test to compare the cost of energy

efficiency programs against the cost of bringing in new energy supplies. Some states have set energy efficiency goals and provided utilities with financial incentives to achieve and exceed those goals. The profit motive is very important, so there are possibilities in using the profit motive to save and generate energy. We also believe there is a tremendous opportunity to help low-income Nevadans save energy and money because they are typically living in less efficient apartments or homes. These low-income individuals are spending a much higher percentage of their disposable income on energy costs. After saving money on energy, these individuals can then spend their savings in the local economy, helping to create jobs in retail and local goods and services.

I have submitted additional informational materials to the Subcommittee (Exhibit F and Exhibit G).

ROBERT JOHNSTON (Western Resource Advocates):
Western Resource Advocates (WRA) is a regional nonprofit environmental law and policy organization operating in the interior West. Western Resource Advocates is dedicated to preserving the West's land, air and water resources. The Clean Energy Program of WRA works to transition electricity production away from fossil fuels toward clean, renewable energy and advance energy efficiency to prevent catastrophic climate change, improve air quality and protect public health.

Nevada's RPS requires an electric utility or other provider of electric service to generate or acquire renewable energy or save electricity in an amount not less than a specified percentage of the total amount of electricity sold by the utility to its retail customers during a calendar year. Nevada's RPS provides for the establishment of a system of portfolio energy credits (PECs) that may be used by a utility to comply with the RPS. Generally, the utility is entitled to one PEC for every kilowatt-hour of energy generated by a renewable energy system or saved by an efficiency measure. The current RPS for Nevada Power Company and Sierra Pacific Power Company is 20 percent and stays at 20 percent through 2019. The RPS increases to 22 percent from 2020 through 2024, and then it increases to 25 percent for 2025 and subsequent years, shown on page 3 of my presentation titled "Nevada's Renewable Portfolio Standard" (Exhibit H).

The RPS was last addressed by the Legislature with S.B. No. 252 of the 77th Session. Prior to the passage of this bill, an electric utility could meet up to 25 percent of its RPS for a compliance year with credits earned from energy efficiency measures. Per the bill, the 25 percent energy efficiency credit carve-out is being phased out. It is currently 20 percent through 2019 and will fall to 10 percent from 2020 through 2024. From 2025 onward, the credit carve-out will be eliminated. Page 4 of Exhibit H shows this phase-out visually.

There are more PECs in Nevada than kilowatt-hours of renewable energy, so the amount of renewable energy PECs available to an electric utility for RPS compliance in a calendar year is not an accurate indicator of the amount of kilowatt-hours of renewable energy generated during that calendar year. There are three main reasons for this discrepancy: the 2.4 multiplier for credits from certain solar PV generation, granting credits for kilowatt-hours used for station use or parasitic load that are never delivered to the grid and the ability to use banked credits from prior years.

Nevada's RPS is not currently driving the transition to renewable energy. Nevada Power Company's RPS compliance outlook showed it would not require more renewable energy for RPS compliance until 2025. Sierra Pacific Power Company would not require more renewable energy until 2021. The utilities make an annual compliance filing, usually in the first week of April, so we will soon see the end reports for compliance year 2016. Page 7 of Exhibit H shows the 2015 compliance report for Nevada Power Company and its forecast for subsequent years.

CHAIR SPEARMAN:
According to the 2015 study titled "Evaluating Renewable Portfolio Standards for In-State Renewable Deployment: Accounting for Policy Heterogeneity" and three other studies I have seen, states with an RPS do not do as well as states without one with respect to growing the renewable energy industry. From your chart, there are more credits than expansion in renewable energy resources.

MR. JOHNSTON:
These credits can build up. Nevada currently has a level RPS through 2019, so to the extent utilities are exceeding the RPS, they can build up a bank of credits. When the RPS increases to 22 percent in 2020, these utilities can coast for several years by using their credit banks. One thing that can change these

credit numbers is if a utility sells credits to a corporation with corporate sustainability goals, such as Switch or Apple, so that the corporation can claim it is 100 percent renewable.

It is unquestionable the RPS has driven a tremendous amount of renewable generation additions in California. Iowa, although it does not have an RPS, has a lot of renewable energy, which is the result of strong state policy in favor of developing wind resources.

CHAIR SPEARMAN:
The RPS is benign; it depends on what the standard is supposed to be and how aggressive it is in each state. When we focus on growing the renewable energy industry, with respect to our RPS, we accomplish the goal. The goal is not credits. The goal of the RPS, when it began, was to grow the renewable energy industry. It does not look like that is what we are doing so far.

MR. JOHNSTON:
I agree. Renewable energy credits are only a currency to enable and drive development of renewable energy. There are situations, however, when the credits become a game—how to get the most amount of credits for the least amount of energy. Western Resource Advocates is interested in seeing the growth of renewable energy.

Page 8 of Exhibit H shows the same report as on page 7 but for Sierra Pacific Power Company.

Page 9 of Exhibit H shows NV Energy's projected fuel mix. The chart includes hydroelectric generation through Hoover Dam, but under Nevada's RPS, this energy generation is not counted toward RPS compliance. Coal use has been decreasing. Natural gas and renewable generation are also represented on the chart. About 13.5 percent of energy came from renewable resources in 2016, with 73.4 percent of energy from natural gas. By 2030, the projected fuel mix is 25.1 percent from renewable resources, with 63.9 percent of energy from natural gas. The 2030 fuel mix would be fully compliant with Nevada's current RPS.

Page 10 of Exhibit H shows RPS comparisons by state. Nevada is not alone in having an RPS. Twenty-nine states plus Washington, D.C., and three territories

have renewable standards. Another eight states plus one territory have renewable goals. The chart itself compares 17 states—along with Washington, D.C.—that have an RPS of 20 percent or higher. There is a lot of variation among states as to how these standards are applied, which utilities are covered, how credits are calculated and what type of generation qualifies as renewable, so it is not as easy as comparing an RPS percentage across states.

CHAIR SPEARMAN:
I calculated Nevada's renewable energy growth based on page 9 of Exhibit H. Moving from 13.5 percent renewable energy generation in 2016 to 25.1 percent in 2030 is only an 11.6 percent difference. That is not robust.

MR. JOHNSTON:
I agree. Page 9 of Exhibit H represents projections of the utilities. The RPS is not driving a transition to renewable energy. There has been renewable energy added in recent years, and there are projects in the pipeline right now. These projects, however, are largely driven by two factors: (1) the requirement of S.B. No. 123 of the 77th Session for 350 megawatts of new renewable resources, 315 megawatts of which have already been approved by the PUCN, and (2) corporations buying renewable energy credits in pursuit of their sustainability goals.

SENATOR SETTELMEYER:
How does Nevada compare to other states in relation to renewable energy generation and consumption?

MR. JOHNSTON:
Are you talking in reference to fuel mix as opposed to credits or the RPS?

SENATOR SETTELMEYER:
Yes.

MR. JOHNSTON:
I do not have that information at hand, but WRA could provide the Subcommittee with that information at a later date. The Energy Information Administration has a lot of information available, but sometimes the Administration's state-by-state comparisons only look at generation, not the mix

of energy consumed in the state. Nevada has a tremendous amount of renewable energy development that is going, under contract, to California.

Would you like to know the percentage of Nevada's internal renewable energy use or the percentage of renewable energy generation by state?

SENATOR SETTELMEYER:
Under Nevada's RPS, we have the ability to bank some of our renewable energy credits. How do we compare to other states as far as how much we are producing and using renewable energy? The fact that we generate more energy than other states can skew the numbers, but looking at the State of Nevada, what is the percentage of production and usage of renewable energy based on what other states are doing? California is probably ahead of us, but I assume we are ahead of 40 of the other states.

MR. JOHNSTON:
I do not have the answer at hand, but I can find that information for you. We are behind California. We are also behind Colorado. As to how we rank nationally, Nevada is in the top half for sure, probably the top third.

SENATOR SETTELMEYER:
We have done an excellent job with renewable energy in Nevada, and we are moving in the right direction. Sometimes the statistics are hard to get to.

ADAM BROWNING (Executive Director, Vote Solar):
Vote Solar is a nonprofit public advocacy organization working around the U.S. on behalf of the supermajority of Americans who want to see the transition to renewable energy.

There are different types of solar programs. Utility scale is what we see through an RPS. Rooftop solar is enabled by net metering, which is a policy that allows customers with excess power to feed such power back into the grid and receive credits. When a rooftop solar customer generates power, he or she feeds energy back into the grid the utility then sells for a retail price. Community solar is the next program. Some customers cannot put solar arrays on their roofs; some people are renters or there are a lot of trees. Only about 20 percent of people can actually have solar on their own roofs. These customers can invest in an off-site community solar project. The project generates electricity and other grid

values, which the project delivers to the utility. The utility is then responsible for providing credit to the investor of the off-site solar project. This process can be seen on page 5 of my presentation titled "Solar Policy 101" (Exhibit I). The community solar process is analogous to corporations that have 100 percent renewable energy requirements and participate in solar programs themselves. Everybody should have access to these solar programs. If these admired companies see the long-term benefits of investing in renewable energy resources, then it is good policy to allow the same renewable energy avenues for ordinary consumers.

From page 6 of Exhibit I, we can see community solar is available in 14 states and Washington, D.C. Two other states have active solar energy campaigns.

Community solar programs can vary in different ways, including how the credit of energy generation is valued back to the investor as well as the number of participants, system size and the ownership model.

Page 7 of Exhibit I provides the example of Shiloh Temple in north Minneapolis, Minnesota. The Temple has a 202-kilowatt shared solar array that generates energy to serve the Temple itself and to share with about 40 households in the broader community. Credits from solar generation are made based upon a value-of-solar calculation done by the state's utility commission. Customers have a couple of different options for participating in this program: a single upfront payment that delivers 25 years of bill credits or a pay-as-you-go option in which community subscribers receive monthly bill credits that end up being of higher value than their monthly payments. In this low-income Minneapolis community where upfront capital is scarce and monthly budgets matter, most of the project's subscribers choose the pay-as-you-go option. This is a project where equity and the community were prioritized at every stage of development, connecting the dots between social justice and economic opportunity.

Colorado was the first state in the Nation to pass statewide shared renewable energy legislation—the Community Solar Gardens Act of 2010. The Act included a number of design elements that made shared renewable energy work for the utilities, developers and consumers alike. In Colorado, solar gardens are defined as projects between ten kilowatts and two megawatts in size and located in or near the same community as the customers being served. Each

project must serve at least ten subscribers, and there must be opportunities for low-income participants. Through this program, community solar garden subscribers receive a full retail credit for their portion of the power produced minus a reasonable charge to cover the utility's cost of delivering the electricity from the solar garden to the customer. Similar to net metering, this bill credit can be carried forward if it exceeds the customer's electricity use in any given period. In Colorado, there are both utility-sponsored programs and developer-sponsored subscription programs. The diversity of programs seems to be well received in the state.

Community institutions such as churches, businesses, schools and municipalities can also participate in solar programs. The Pueblo County School District in Colorado receives 100 percent of its power from a local community solar program.

In Washington, D.C., the Community Renewables Energy Act was introduced in 2012 and passed in October 2013. Final rules were issued for the credit rate last month. There is no overall program capacity limit. The system size limit is about five megawatts, and general-service, low-voltage, non-demand customers are compensated at the utility's standard offer service rate.

Page 11 of Exhibit I shows four guiding principles we look for in evaluating shared solar programs. First, we want to ensure these programs expand renewable energy access to a broader group of customers. The idea is to help people who currently cannot access renewable energy to participate in and benefit from the transition to renewable energy. Second, there must be tangible economic benefits on customers' utility bills. Third, we like to see flexibility to account for energy consumers' preferences. As a result of this flexibility, there is room for experimentation that will benefit different customers. Finally, the program should be additive to and supportive of existing renewable energy programs.

Page 12 of Exhibit I contains additional resources related to the development of community solar programs and the principles behind them.

MS. MCKINNEY-JAMES:
With the conclusion of our presentation, we would like to leave behind a document containing frequently used terminology in energy discussions (Exhibit J). This document was prepared by Bombard Renewable Energy.

CHAIR SPEARMAN:
When we talk about renewable energy, although most of it is focused on solar, we need to focus on all resources and how we develop those resources within Nevada. For example, looking at geothermal energy, there is a stark disconnect between the amount our State has and the amount we use. Geothermal energy could be a viable alternative.

The framing of our energy strategy has been incorrectly reduced to the binary theme of renewable energy resources versus the incumbent energy provider. We are all partners in developing an energy strategy that allows Nevada to become not only a leader in the U.S. but also a leader worldwide.

RAY BACON (Nevada Manufacturers Association):
My house is one of the most energy efficient houses in the State. Some of my building inspection costs should have been lower. We have some energy policy issues that can accomplish a lot.

Energy and water are interconnected. We spend a lot of money processing, moving or re-treating water. We do not connect the energy issue with the water issue, but they are connected. If we generate too much power in Las Vegas, we have Lake Mead. We have enough water from the Colorado River so that any time we have extra energy, we can use pumps to pour it back over the wall. This would enhance the water system, and Lake Mead will never be filled up in our lifetimes.

We do not price our energy the way we should. We should be looking at factors like closeness of renewable projects to the load, transmission systems and the locations they are being used. We should also look at when the renewable energy will be used and what specific kind of renewable energy it is.

In most fast food restaurants, the second or third largest consumer of energy is the ice machine. We could put signs on ice machines that say how much energy they use.

We have building code issues to work with. We have a company coming to Nevada that is going to convert trash into fuel. We have barely scratched the surface with what we can do regarding renewable energy.

STEVEN T. POLIKALAS:
I am providing the Subcommittee a report about national security and energy from the Center for Naval Analyses (Exhibit K).

JOHN FRIEDRICH (Climate Parents):
Climate Parents is a group of 90,000 parents, grandparents and families in Nevada and across the U.S. who support a healthy renewable energy future for our children and grandchildren. Clean energy equals healthy kids. The more clean, home-grown energy Nevada produces, the healthier our air and kids will be, and our kids will have more economic opportunities when they enter the workforce. The only real question is the degree to which Nevada will lead the way in regard to clean energy. Climate Parents is doing its best in getting the word out to families across the State. Parents and grandparents throughout this Session will encourage you to be as bold as possible in making Nevada a national and global clean energy leader, including supporting the initiatives discussed today. Climate Parents is especially supportive of increasing the RPS, expanding energy efficiency programs and establishing a community solar program to help make clean energy available for all Nevadans. Our kids need and deserve a clean energy future.

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CHAIR SPEARMAN:
I adjourn the meeting at 12:39 p.m.

RESPECTFULLY SUBMITTED:

Daniel Putney,
Committee Secretary

APPROVED BY:

Senator Pat Spearman, Chair

DATE:

EXHIBIT SUMMARY				
Bill	**Exhibit / # of pages**		**Witness / Entity**	**Description**
	A	1		Agenda
	B	3		Attendance Roster
	C	7	Rose McKinney-James / Energy Works, LLC	Presentation, Introduction to Energy 101
	D	16	Jennifer Taylor / Clean Energy Project	Presentation
	E	18	Tom Polikalas / Southwest Energy Efficiency Project	Presentation, Energy Efficiency in Nevada Overview
	F	2	Tom Polikalas / Southwest Energy Efficiency Project	Presentation, Energy Efficiency Jobs in Nevada
	G	2	Tom Polikalas / Southwest Energy Efficiency Project	Presentation, Nevada Fact Sheet: 20 BB Bonanza
	H	11	Robert Johnston / Western Resource Advocates	Presentation
	I	12	Adam Browning / Vote Solar	Presentation
	J	13	Rose McKinney-James / Energy Works, LLC	Presentation, Navigating Nevada's Renewable Energy Landscape
	K	25	Steven T. Polikalas	Presentation, National Security and Assured U.S. Electrical Power