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19-06010

**Public Utilities Commission of Nevada
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FILED WITH THE PUBLIC UTILITIES COMMISSION OF NEVADA - 11/13/2020

November 13, 2020

Ms. Trisha Osborne
Assistant Commission Secretary
Public Utilities Commission of Nevada
1150 East William Street
Carson City, Nevada 89701-3109

RE: Docket No. 19-06010 – Rulemaking to amend, adopt, and/or repeal regulations in accordance with Senate Bill 358 (2019).

Dear Ms. Osborne:

Enclosed please find the *Net-Zero Carbon Dioxide Emissions Goal Report* prepared by Nevada Power Company d/b/a NV Energy and Sierra Pacific Power Company d/b/a NV Energy (“NV Energy” or the “Companies”). NV Energy is providing the Report in accordance with Procedural Order No. 5 and Procedural Order No. 8 issued in the Docket. The Report outlines NV Energy’s vision for transitioning the Companies and the State of Nevada to a net-zero carbon dioxide emissions future.

Should you have any questions regarding this filing, please contact me at (775) 834-3470 or roman.borisov@nvenergy.com.

Respectfully submitted,

/s/ Roman Borisov
Roman Borisov
Senior Attorney



Net-Zero Carbon Dioxide Emissions Goal Report

November 2020

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SECTION I – EXECUTIVE SUMMARY

The state of Nevada has made considerable strides towards a clean energy future and is well positioned to continue the further integration of renewable energy resources to reduce carbon dioxide emissions in Nevada. Carbon dioxide emissions from electricity generation in Nevada have already declined by approximately 50 percent since 2005.¹ In 2019, the Governor’s Office of Energy stated a mission “to position Nevada to lead the nation in renewable energy production, energy conservation, the exportation of energy and transportation electrification.”² In that same year, Senate Bill 358 (“SB358”), codified at NRS 704.7820, stated that it is the policy of the State to:

1. Encourage and accelerate the development of new renewable energy projects for the economic, health and environmental benefits provided to the people of this State;
2. Become a leading producer and consumer of clean and renewable energy, with a goal of achieving by 2050 an amount of energy production from zero carbon dioxide emission resources that is equal to the total amount of electricity sold by providers of electric service in this State; and
3. Ensure that the benefits of the increased use of portfolio energy systems and energy efficiency measures are received by the residents of this State. Such benefits include, without limitation, improved air quality, reduced water use, a more diverse portfolio of resources for generating electricity, reduced fossil fuel consumption and more stable rates for retail customers of electric service.

Subsection 2 of SB358 sets a state-wide net-zero carbon dioxide emissions goal. Referencing the goal, the Public Utilities Commission of Nevada (“Commission”), in Docket No. 19-06010, tasked Nevada Power Company (“Nevada Power”) and Sierra Pacific Power Company (“Sierra,” and together with Nevada Power, the “Companies” or “NV Energy”) as follows:

For the Commission to fully evaluate the best path(s) forward regarding the goals laid out in Section 8 of SB358, the Commission needs more information from NV Energy and other interested persons. Therefore, on or before WEDNESDAY, NOVEMBER 4, 2020, NV Energy shall submit to the Commission a report containing planning information consistent with a net-zero carbon emissions goal by 2050. The report should include information regarding resource options, cost projections, reliability considerations, potential infrastructure constraints, and any other information that is useful for the Commission to meaningfully evaluate paths toward a net-zero carbon emissions goal by 2050. NV Energy may include in its report a discussion of any changes to the integrated resource planning process that

¹ Clean Air Markets Database, U.S. Environmental Protection Agency.

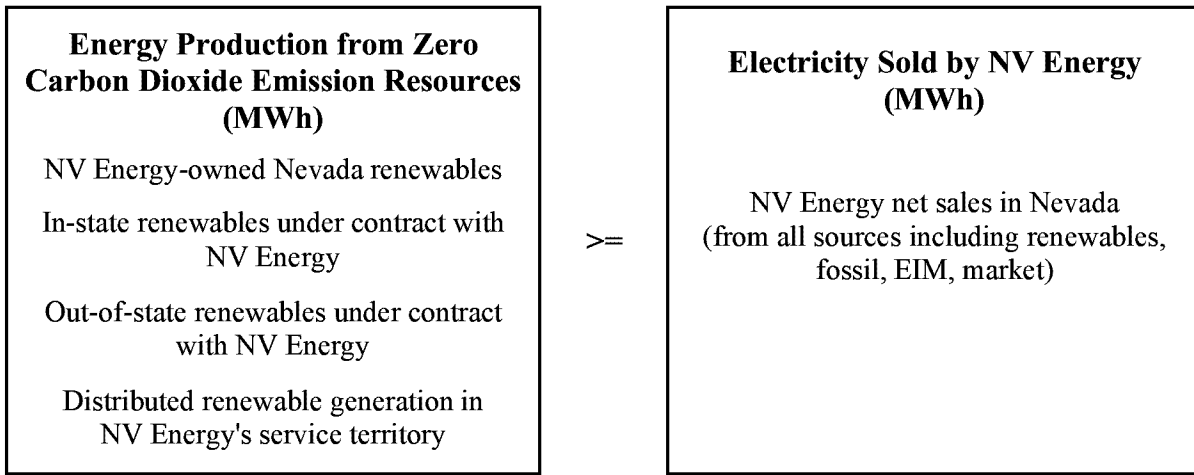
² State of Nevada Governor’s Office of Energy, 2019 Status of Energy Report, page 3.

it believes are necessary to achieve the objectives delineated in Section 8 of SB 358.

In this Report, NV Energy examines its role in the state's path to a net-zero carbon dioxide future. As stated above, the net-zero carbon dioxide goal of SB358 is a state goal that NV Energy looks forward to advancing. Its purpose is to increase production from zero-carbon dioxide emission generating resources to match total in-state sales of electricity. Nevada already has a sizeable portfolio of zero-carbon dioxide emitting resources. NV Energy's current portfolio alone has 39 projects consisting of 429 megawatts ("MW") of geothermal, 894 MW of solar, 151 MW of wind and 20 MW of smaller renewable projects (waste heat, hydro). Most recently in 2018, NV Energy received approval to acquire 1,001 MW of solar photovoltaic ("PV") generation coupled with 100 MW of storage. Just a year later, in 2019, NV Energy requested and received Commission approval to acquire an additional 1,190 MW of solar PV resources with 590 MW of co-located storage. Following this pattern, in 2020, NV Energy filed for approval to acquire 478 MW additional MW of solar PV with 338 MW of co-located storage. Besides NV Energy's ever-growing fleet of renewable projects, either owned or contracted for, Nevada is home to a growing number of renewable energy plants owned by independent producers ("IP") supplying electricity in and out of state. Renewable distributed generation is another segment of renewable energy production in Nevada. NV Energy has over 61,000 customers with roof-top solar generation contributing to the energy portfolio used to meet the energy needs of Nevada. Besides these renewable resources, Hoover Dam is a major zero-carbon dioxide emitting resource located on the Nevada-Arizona border and as such also contributes towards the state goal.

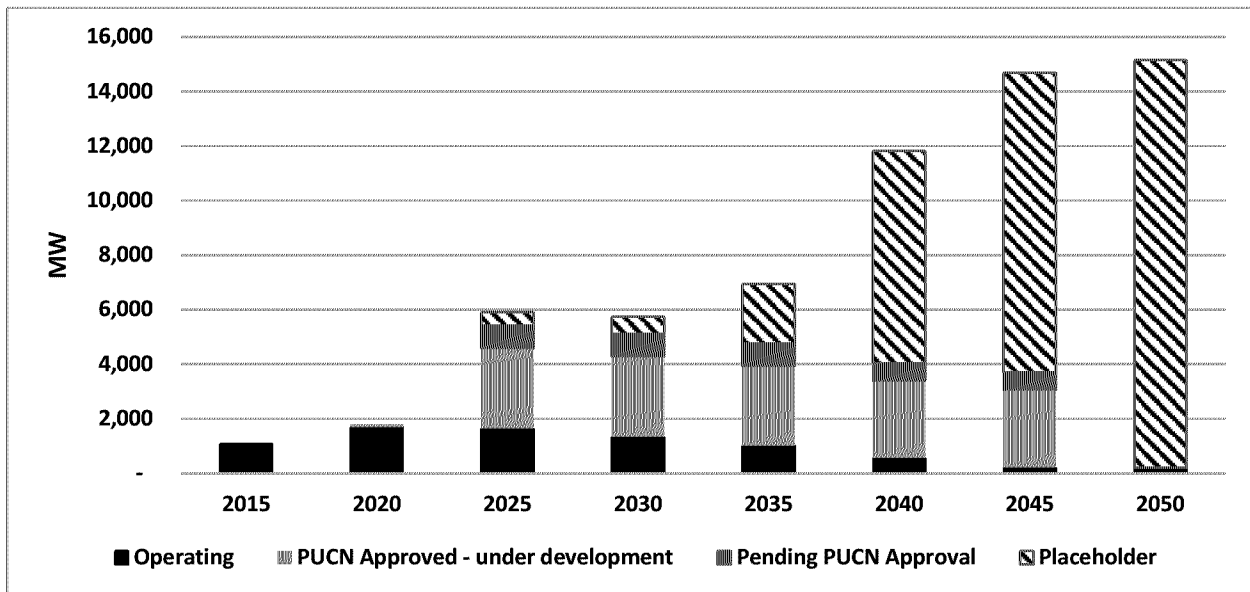
NV Energy is the state's largest electricity provider serving approximately 89 percent of the state's electric consumption. Consequently, NV Energy's progress towards net-zero carbon emissions is inextricably tied to the state's net-zero carbon goal. NV Energy is not the only load-serving entity in the state, however. Providers of new electric resources, electric cooperatives, and municipal entities also supply power to businesses and residents of Nevada and, thus, are indispensable to the state's goal of achieving net-zero carbon emissions. Notably, NV Energy does not have access to these other providers' load data and generation mix. Similarly, NV Energy possesses no ability to model zero-carbon resources not controlled by it such as IP-owned renewable generation and Hoover Dam. Accordingly, in responding to the Commission's request, NV Energy evaluated NV Energy-owned or controlled resource mixes, as well as interconnected renewable distributed generation, that would progress the Companies towards a 2050 net-zero carbon dioxide emissions goal. Figure I-1 illustrates the sources of zero-carbon generation NV Energy would rely on to serve native load in achieving a net-zero goal. Achieving the state's goal of net zero carbon emissions will require a concerted effort from the state's policymakers, every load-serving entity operating in the state, and the renewable energy development sector.

**FIGURE I-1
ZERO-CARBON RESOURCES TO MATCH NV ENERGY’S NEVADA SALES**



The recently filed Fourth Amendment to the 2018 Integrated Resource Plan (IRP 4th Amendment), Docket No. 20-07023, shows a system in transition. The Companies have made great strides to move away from a fossil-based system to a significantly “greener” energy supply and recognize there is more work to be done, especially to maintain a reliable system for all customers throughout and beyond the transition. The plan transitions the Companies from just over 2,000 MW of renewable generation in 2021 to nearly 9,000 MW, coupled with the addition of 6,100 MW of battery energy storage systems (“BESS”), by 2050, with solar PV resources constituting the majority of the renewable generation. Figure I-2 presents the growth in zero-carbon resources — including BESS — over time, showing operating resources, resources approved by the Commission, resources that are not yet approved, and placeholder resources in the IRP 4th Amendment Preferred Plan.

**FIGURE I-2
NV ENERGY'S GROWTH IN ZERO-CARBON RESOURCES**



Achieving Net-Zero Carbon Dioxide Emissions

Achieving a net-zero carbon emissions goal while maintaining low costs and reliability for customers will require a balance of diverse resources, both in-state and out-of-state, both zero-carbon and low-carbon, a solid transmission infrastructure, managed electrification of various sectors of the economy, and a demand side management plan attentive to load-shaping. To that end, the foundational components of NV Energy’s net-zero carbon plan are:

- Diversity of Resources
- Transmission Infrastructure
- Electrification
- Demand Side Planning

1. Diversity of Resources

As explained in the Effective Load Carrying Capability (“ELCC”) report and Zero Carbon Findings and Analysis by Energy + Environmental Economics (“E3”)³ in the IRP 4th Amendment and described in Section IX of this report, the ELCC of a variable resource represents its contribution to a system’s peak load. A variable resource’s contribution to the system peak is not equal to its capacity rating. ELCC is essentially a way of expressing the output of a variable

³ Docket No. 20-07023, Technical Appendices ECON-5 and ECON-6, respectively.

resource in terms of a comparable amount from a firm resource, such as a combustion turbine. As explained in the E3 reports and in Section IX of this report, increased penetration of any one type of variable resource diminishes its ELCC, thus, diminishing its value to the system. In short, in order to achieve a reliable energy supply utilizing renewable resources, which are variable in nature, it is critical to have a diverse resource mix to ensure there is always a resource available to meet the needs of customers. To rely predominantly on one type of variable resource introduces a reliability risk for customers if that variable resource were not available at a given point in time. While Nevada has an abundance of solar resource potential, for example, reliance solely on solar resources, even when combined with energy storage, will not create a cost-effective or reliable system. A mix of renewable resource types will be needed to serve Nevada in this net-zero carbon emissions future.

Nevada's and other states' push towards zero carbon would greatly benefit from a regional approach. A diverse mix of resources (e.g., solar, wind, geothermal, hydro) can best be achieved when each state is contributing the renewable resources that are most cost-effective in their locale and then distributing those resources across the region. Importing energy from renewable resource types that are more cost-effective when built elsewhere will help to keep customer energy rates low in Nevada while advancing the net-zero goal. In addition, the ability to export surplus renewable energy, such as solar or geothermal, from Nevada will be key in achieving a net-zero carbon outcome, as renewable resource output does not always match the load demand. In addition, this creates the opportunity for economic development and job creation, especially in some of the rural areas of Nevada. Nevada has an abundance of solar resource potential and significant geothermal potential – energy from these resources could be exported to states with less of these particular types of resource if adequate transmission connections existed.

Similarly, energy storage will weigh heavily in a highly decarbonized resource mix, allowing surplus renewable energy in one hour to be stored for use in a later hour when the load requires it. These clean energy technologies work well together, as energy storage mitigates some of the variability and uncertainties of renewable energy. More flexible products such as pumped storage and other longer duration storage technologies will be highly valued and will be needed to ultimately achieve a carbon-neutral position.

In addition, maintaining reliability in a decarbonized system will require a small but core footing of firm resources. These firm resources will be essential as the penetration of renewable resources increases to a point when few resources remain that can be dispatched to manage the variability of solar and wind energy. The state will ultimately need cost-effective zero-carbon firm resources, but technology must evolve before these will be readily available. For the near term, natural gas-fired and geothermal units will continue to serve this need. Geothermal plants are already providing NV Energy with firm energy, and under the right commercial arrangements, geothermal is already technically capable of dispatchable, load-following operations. Gas-fired combustion

turbines may operate at low capacity in the future but will be required until alternatives are available. Evolving technology is allowing for a much wider range of operation for combustion turbines, with faster startups and ramping than ever before. Developments such as use of hydrogen fuel, which has no carbon emissions and can be created through electrolysis, can serve as storage for renewable energy while lowering or even eliminating the carbon footprint of combustion turbines.

2. Transmission Infrastructure

The addition of large amounts of renewable resources to NV Energy's system will require a corresponding level of transmission infrastructure to access and transport this energy and bring it to the loads. Similarly, increasing electrification in the state will require new transmission infrastructure to ensure sufficient capacity exists to meet the needs of customers. Failure to put appropriate transmission infrastructure in place will not only prevent the achievement of carbon reduction objectives but will also interfere with future economic development in the state due to limitations on available energy supply. A regional transmission approach to access diverse markets outside of Nevada will allow the sale of Nevada's excess renewables — largely solar and geothermal — and purchase of other state's complimentary renewable energy, such as wind and hydropower. This facilitates the balanced renewable portfolio described above.

Senate Bill 254 ("SB254") was passed into law on June 5, 2019, requiring the Nevada State Department of Conservation and Natural Resources ("NDCNR") to submit an annual report that includes a statewide inventory of greenhouse gas ("GHG") emissions and a projection of annual emissions for the next 20 years. While the requirement of this report is clearly to drive the reduction of GHG emissions in the state, it also provides policies to support that direction. From the Companies' perspective, some of the most important policy areas discussed in the 2019 report are integrated resource planning and grid modernization. These two areas are interdependent, and, in fact, grid modernization is a pre-requisite to accommodate the net-zero carbon emissions goal. NDCNR's 2019 report discusses resiliency, flexibility, reliability and foremost renewable integration. These factors can only be achieved through an interconnected grid that has the ability to share diverse resources over a vast geographic area. In the electric industry, this is achieved through the development of transmission infrastructure both within Nevada and interconnecting Nevada to other regional energy hubs. It is impossible and cost prohibitive to meet the goals of the state without strategic transmission infrastructure on both a state and regional level.

Resource diversity and transmission infrastructure each play a key role in allowing the Companies to achieve these state policy goals. While Nevada has abundant solar and geothermal resource potential, high-quality wind and hydro resources are nearly absent within the state. Further, while battery technology continues to evolve, the zero carbon findings and analysis by E3⁴ demonstrates

³ Docket No. 20-07023, Technical Appendix ECON-6.

that solar PV and energy storage alone will not accomplish the aggressive decarbonizing goal established for the state. A balance must be created between resource types and the availability of those resources as the sun rises and sets through each day.

The best way to gain access to diverse renewable resources is through an interconnected western grid. Nevada's geographic location provides the opportunity to be a key player in the development of that grid and a key renewable energy provider in the west. At this point, the missing piece is the lack of transmission infrastructure in Nevada. The transmission infrastructure proposed in the Greenlink Nevada plan in Docket No. 20-07023 builds a foundation for the state to have the internal transmission infrastructure that could then lead to the development of interconnections to a broader regional transmission system that would increase the transfer of energy between Nevada and the developing western grid and truly position Nevada to achieve a net-zero energy supply. Several regional projects in the western grid are already under development and propose connections to or through the state of Nevada which could greatly aid in Nevada's decarbonizing efforts.

3. Electrification

Electrification is expected to progress in several sectors in Nevada, including transit, rail, mining, and buildings, with much change in the two former categories occurring in the next decade. NV Energy has a significant role to play to ensure a reliable cost-effective transition to renewable energy. Electrification policies that the State is contemplating in the Nevada Statewide Greenhouse Gas Emissions Inventory and Projections, 1990-2039, are outlined in Section VII, Electrification, of this report.

While the specific impact electrification will have on the Nevada economy is unknown, national studies have modeled the load projections through 2050. In *Electrification Futures Study: Scenarios of Electric Technology Adoption and Power Consumption for the United States*,⁵ completed by the National Renewable Energy Laboratory ("NREL"), the following industry highlights were identified:

- The transportation sector will experience the greatest technology transition toward electric vehicles;
- The buildings and industrial sectors generally see less potential for transformational change nationwide, but electrification in these sectors could acutely affect certain regions and end uses;
- Electrification has the potential to significantly increase overall demand for electricity.

⁵ Available at https://afdc.energy.gov/files/u/publication/electrification_futures_study.pdf.

The estimation for Nevada load growth by NREL in the high electricity consumption scenario of the Electrification Futures Study is 11 terawatt-hours (“TWh”) for the transportation sector and 2 TWh for buildings by 2050.

NV Energy has long understood the value of matching electrification load to excess capacity through tariffs and control technology. As the generation profile changes, this will be no different. Flexible loads that can operate and charge during periods of high renewable resource output could greatly aid in decarbonizing the state. This must be comprehensively managed through carefully planned load control technologies, rate design and infrastructure deployment. NV Energy’s goal is to maximize the ability for load shaping, ensuring, where possible, that electrification load is designed to be both flexible, to follow excess renewable energy through tariff or control technology, and demand response capable to respond immediately to reliability and/or market issues.

4. Demand Side Planning

Increasing the penetration of renewable resources will change the dynamic of balancing supply and demand, making balancing efforts on the demand side more important for the Companies to reach the 2050 net-zero carbon emissions goal. As mentioned in the electrification discussion, load shaping will be critical to the State’s decarbonization. While renewable resources are typically not dispatchable and cannot easily be shaped to match load, NV Energy can increase focus on shaping the load to more closely match the resources, encouraging more flexible demand in the relative absence of flexible resources. Demand side planning and load shaping will be a component for NV Energy to assist the State in mitigating climate affects, reducing GHG emissions, and achieving a net-zero carbon energy vision. This vision can be supported by programs such as adoption of renewables, DSM – energy efficiency and demand response, integrating resources, energy management tools, increasing the penetration of Distributed Energy Resources (“DERs”) – battery storage utilization from electric vehicles (“EV”) and PV, and grid modernization. A key component of this vision is successfully managing the appropriate energy assets and DERs. Additionally, it requires that the Companies investigate innovative grid operations in an environment of increasing demand- and supply-side renewable energy production and storage.

NV Energy is actively pursuing options to expand, advance, and encourage demand response, energy efficiency, and clean energy programs, such as load shaping energy-efficient measures and tools, demand limiting devices, non-wires alternatives, battery storage, electric transportation, solar, and charging stations. Traditionally DSM has focused on energy efficiency measures, which have been in place for decades. As DSM evolves through market saturation and/or stricter codes and standards, along with public adoption of more energy efficient products and practices, it limits the amount of energy savings that can be achieved. The market potential for 2021 is 1.2 percent of

NV Energy retails sales.⁶ Thus, NV Energy will be actively pursuing options to encourage load shaping activities. Energy efficiency, demand response, DERs and clean energy programs are important resources that are integral to a balanced portfolio; they give customers tools to reduce and/or adjust their energy consumption during times of peak demand or throughout the day or year. As customers become more aware of their energy usage and change consumption patterns as a result of time-of-use rates, NV Energy, its customers, and the State will continue to realize energy savings and carbon reductions.

Closing the Gap on Achieving Net-Zero Carbon Emissions

This report shows NV Energy’s contribution towards the State’s net-zero carbon dioxide emissions goal and illustrates changes that are anticipated and progress that will be necessary to ensure a cost-effective and reliable solution to achieving net zero for Nevada. In Section X – Clean Energy Future, two Illustrative Cases are developed that incrementally add more renewables and storage to the IRP 4th Amendment Preferred Plan to progress NV Energy dramatically towards the goal. Table I-1 shows the progression towards the goal through the addition of developable in-state renewable resources modeled in the two Illustrative Cases.

**TABLE I-1
NV ENERGY’S CONTRIBUTION TO
NEVADA’S NET-ZERO CARBON EMISSIONS GOAL**

Net-Zero Carbon Dioxide Emissions Goal Components		2021 (2020 4th IRPA)	2048 (2019 3rd IRPA)	2050 (2020 4th IRPA)	2050 Illustrative Case A	2050 Illustrative Case B
NV Energy Retail Sales (GWH)		28,877	33,927	34,237	34,237	34,237
NV Energy Owned and Contracted Zero- Carbon Generation	Native Load Service (GWH)	6,213	12,892	19,874	25,127	25,214
	Sales of Excess (GWH)	0	820	2,259	3,354	3,404
Excess Output from Rooftop Solar (GWH)		26	92	92	92	92
Goal Progress		22%	41%	65%	83%	84%
Incremental Amount Required to Achieve Net-Zero (GWH)				12,000	5,700	5,500

Both of these Illustrative Cases demonstrate that additional resources are required to close the gap on a full net-zero achievement. Each case includes nearly 9,000 MW of solar PV and over 6,000 MW of BESS from the 4th Amendment Preferred Case, which is pushing the bounds of the diminishing returns expected from incremental resources due to a declining ELCC, as discussed in Section IX. Illustrative Case A adds an incremental 1,300 MW of geothermal resources, which may be at the limit of known developable resources in the state, and 500 MW of BESS. Illustrative Case B builds on Case A, replacing a small portion (150 MW) of geothermal resources with an

⁶ DSM Market Potential Study, Technical Appendix DSM-21, Docket No. 18-06003.

incremental 300 MW of developable wind resources in Nevada and maintaining 500 MW of BESS. Notably, the increasing levels of renewables in the Illustrative Cases are not flexible resources, therefore, the dependence on fossil-fueled generating resources does not differ significantly from the Preferred Case. It is highly likely that a regional perspective is required to achieve further decarbonization. Complimentary solutions to fill this gap will evolve over time, and may include:

- Ability to export NV Energy's excess solar and geothermal energy through new transmission connections to states that have fewer of these resources;
- Access to more diverse out-of-state renewables through new transmission connections;
- Developments in storage technology, such as pumped storage hydro, that would provide longer duration storage solutions;
- Developments that reduce the carbon dioxide emissions of traditional fossil resources, such as use of hydrogen fuel.

SECTION II - INTRODUCTION TO THE COMPANIES

Nevada Power and Sierra Described

Nevada Power and Sierra are fully regulated “public utilities,” subject to the jurisdiction and oversight of the Commission and the Federal Energy Regulatory Commission (“FERC”). Jointly, Nevada Power and Sierra provide approximately 89 percent of Nevada’s electrical power.⁷ Nevada Power and Sierra provide all-in electric service to residential, commercial and industrial customers in northern and southern Nevada at rates and under terms and conditions reviewed and approved by the Commission. Nevada Power and Sierra also provide distribution-only service to very large commercial customers that have received permission to procure their own energy through an alternative energy provider. Distribution-only service is provided to these large commercial customers at rates and under terms and conditions reviewed and approved by the Commission. Finally, Nevada Power and Sierra provide transmission service to customers who interconnect directly to the transmission system, or who use the transmission system to import or export energy into and out of Nevada. Transmission service is provided to transmission customers at rates and under terms and conditions reviewed and approved by the FERC.

The nearly 2,500 employees of Nevada Power and Sierra support the generation, transmission and distribution of electric energy to over 1.3 million bundled customers statewide, covering approximately 45,000 square miles. Together, Nevada Power and Sierra serve peak loads of 7,871 MW with capacity primarily sourced from a combination of more than 50 Nevada renewable resources, a small fleet of Nevada-based modern, clean-burning natural gas facilities, and market purchases. Between 2005 and 2019, the Companies began transitioning away from coal and into renewable energy, reducing Nevada’s carbon emissions from electric production by approximately 50 percent. The companies have one remaining coal facility set to retire in 2025.

Residential, commercial and industrial customers have been clear that they want Nevada Power and Sierra to serve them with more renewable energy without impacting the costs they pay. Nevada Power and Sierra have listened, as demonstrated by their recent filings.

A map of Nevada Power’s and Sierra’s electric service territories, as well as the bulk transmission system that delivers energy into and out of Nevada is set forth in Figure II-1 on the following page.

⁷ State of Nevada Governor’s Office of Energy, 2019 Status of Energy Report, page 4.

