Reno, Nevada



CASE STUDY



Reno, Nevada

eno, the "biggest little city in the world," is located in the northwestern part of Nevada and is the county seat of Washoe County. Nearly 106 square miles in size, Reno has a population of 227,511. It has a council-manager form of government, with five council members representing wards and one council member elected at-large for staggered four-year terms. The mayor is the chief elected official and formal representative of the city; elected at-large, the mayor serves a four-year term. The city manager is selected by the council; as the city's chief administrative official, the city manager is responsible for all city business.

The electric utility in Reno is NV Energy, which covers a service territory of 45,592 square miles and supplies electricity to 2.4 million citizens and 40 million tourists each year. While Reno, as well as the entire state of Nevada and the rest of the western states, enjoys adequate power supplies, its current solar energy strategy can be linked to the energy crisis of 2000 and 2001. The crisis, which happened primarily in California, significantly affected Nevada. According to the Federal Energy Regulatory Commission (FERC),

A number of factors contributed to the Western Energy Crisis of 2000 and 2001. These included: a low rate of generation having been built in California in the preceding years making California dependent on imports of electricity; northwestern drought conditions resulting in lower than expected water runoff for hydropower generation; a rupture and subsequent capacity constraints on a major pipeline supplier of natural gas to California markets (California was heavily dependent on gas-fired generation due to state air standards); strong economic growth and thus increased electricity demand throughout the west; and unusually high temperatures coupled with an increase in unplanned plant outages of older plants that were being run to meet increased demand in California. Further, transmission line constraints within California, both for imports and exports of electricity, exacerbated an already marginal situation

during this time period. Finally, some energy companies attempted to manipulate whole-sale electric and gas markets.²

An article in the Las Vegas Sun in January 2001 described it as follows: "When California instituted rolling blackouts, power was cut to the turbines that push jet fuel and gas over the border into Nevada. Nevada had to give California reserve power to supply the turbines to ensure the fuel would keep pumping."³ Nevada governor Kenny Guinn referred to these events as the greatest crisis Nevada had faced in four decades. Responding to the fact that McCarran International Airport in Las Vegas was "down to its last 36 hour supply of jet fuel reserves and [its] gas lines [were] two days from running empty," Guinn said that "the state's own supply must increase" and "pledged to work with Western governors and the Bush administration to prevent a California-like energy crisis" in Nevada.⁴ Months later, the FERC issued an "Order Removing Obstacles to Increased Electric Generation and Natural Gas Supply in the Western United States and Requesting Comments on Further Actions to Increase Energy Supply and Decrease Energy Consumption."

New Energy Policy

The energy crisis, in association with rapid population growth in the state, the cancellation of several proposed coal-fired power plants in the region, and several transmission issues, put pressure on the city and state to find new sources of electric power. Nevada, and especially Reno, responded by significantly increasing solar capacity. Legislative policy at the state level allowed Reno to make significant strides with energy efficiency measures and to install more solar to help lessen the need for more electricity.

"Solar is very big to us," said Jason Geddes, environmental services administrator for the city. "After the energy crisis in the early part of the decade, the state legislature began actively pursuing clean and renewable energy options." The threat of another energy crisis wasn't the only motivating factor, however. "We are sunshine lovers," he said. "We don't get a lot of clouds. We have a population that has a great interest in the outdoors and who are connected to the environment." Indeed, the city is fortunately situated near Lake Tahoe, many ski resorts, and a well-established hiking and trail system. Low-impact renewable energy made sense to Reno.

In 2001, Nevada incorporated a renewable energy standard, which was modified in June 2009; the standard requires 25 percent of the state's electricity to come from renewable sources by 2025, with at least 6 percent coming from solar energy sources by 2016. Over the last decade, more solar has been installed in Reno than in Las Vegas, which has six times the population. Solar currently provides about 22 percent of Reno's municipal energy. Through May 2013, there have been 19,398 kW installed in northern Nevada, with 6,508 kW within the city of Reno alone. In the last year, solar photovoltaic (PV) in Reno generated 46,132,543 kWh.

Most notable about the growth of solar in Reno is a focus in 2003 on distributed generation and the legislative policy that enabled it. The state legislature introduced a bill that would strip out the barriers to installing solar by establishing a solar rebate program intended to stimulate the market as well as change codes for cities, counties, and homeowners associations (see Appendix: Renewable Energy and Energy Conservation Legislation). The code now allows installation of solar PV with a simple building permit. Rooftop installations are treated like any other building request. To ensure the expeditious review, the city provides solar PV training for members of Community Development and Planning Department so that they better understand the systems. The Public Utilities Commission of Nevada crafted the rebate program, Renewable-Generations, which is administered by NV Energy. The demand and success of the program was so significant that it was expanded in 2005, 2007, and 2011.

Nevada's Solar Energy Incentives Programs

Nevada's solar energy incentives program allows schools, public agencies, qualified nonprofits, residential customers, and small businesses a one-time cash incentive for installing solar energy systems on their properties. Based on the size (kilowatt capacity) of the system installed, the rebates are funded by NV Energy ratepayers through the Renewable Energy Program Rate on their bills. Customers who install the solar systems take part in the net metering program, which measures both the electricity that is generated on the property and put into the electrical grid, and the electricity that comes from the grid and goes into the customer's property. The amount generated on-site is subtracted from the amount that comes into the property, and the customer is billed for the difference, or the *net*. A welllocated system can mean that a customer winds up paying almost nothing in electrical bills.

In addition to the solar rebate program for installations, Reno encourages customers to take advantage of energy audits at the same time. A program called HomeFree Nevada (EnergyFit), which originally started with American Recovery and Reinvestment Act funds, pays customers up to 50 percent of a home energy retrofit. The program has been established as a revolving loan fund, an account that provide loans or funds for a specified purpose; loan or project revenues are used to replenish the fund, thus allowing for continued support for similar activities. As the loans are used to encourage beneficial investments, interest rates are usually low or, in many cases, nonexistent. In some cases, activities generate profits, which are also reinvested in the program.

The solar PV on municipal buildings was installed as part of a Reno City Council priority on greening city facilities. The council had the green priority in 2008, 2009, and 2010. The projects encompass solar PV systems, a wind turbine demonstration program, solar thermal heating systems, lighting retrofits, control systems, and various HVAC upgrades. Projects represent an investment of \$19,067,678 funded through a combination of Energy Efficiency and Conservation Block Grants, Clean and Renewable Energy Bonds, Qualified Energy



Solar shade parking structure at fire station #11, Reno, NV⁵

Conservation Bonds, Recovery Zone Economic Development Bonds, and RenewableGenerations rebates, offered by NV Energy. Energy savings, projected at \$996,903, will be used to pay off the bonds, making no impact on the city's general fund. It is estimated that the city will save 6,800,000 kWh and 225,000 therms annually, and will lower its carbon footprint by 17,200,000 pounds of carbon dioxide (CO_{21}) each year.

Reno's first 50 kW system was installed in 2009 on its corporation yard using a combination of utility rebate and Capital Improvement Plan funds. The city also installed a 210 kW system on its downtown parking garage and the Reno Events center; installed under a contract with an Energy Services Company (ESCo), these systems were financed using local utility rebates and Clean and Renewable Energy Bonds (CREBs), with the bond payments being made through the energy savings.

Through a power purchase agreement (PPA), Reno installed an additional 1,027 kW, which it located on its wastewater treatment plant (522 kW), corporation yard (100 kW), community recreation centers (200 kW), fire stations (83 kW), pumping station (47 kW), park (31 kW), and golf course (44 kW). The city made a point of working with all local firms, including Reliant Electric, Aspen Electric, and Bombard Electric, to finance the PPA with Enfinity, Inc. Real-time information on all of the city's solar installations is available on the Green Energy Dashboard.

In addition to these projects, the city's economic development team is working with private industry to install solar PV and attract renewable energy companies as part of its Sustainable Economy initiative. It produced a *Low Impact Development* manual to encourage builders to install solar PV systems as part of a



Downtown Events Center, 180 kW system, Reno, NV⁷

more sustainable community and to protect the local river system.

The Washoe County School District has also embraced solar, installing almost 2.7 MW on roofs and in the parking lots in fifty-five schools. Recently, and in collaboration with Reno-based Hamilton Solar, the school district installed two more systems—at Reed High School and at North Valleys High School—for a collective 1.5 MW of solar power, with no out-of-pocket expenditures for the school district. Funded entirely by rebates through NV Energy's Solar Generations Program, the installations are estimated to save \$270,000 annually, which will be realized within the operating general fund and purposed for classroom essentials, educator salaries, and student textbooks and materials. The Reed School structure is a towering megawatt solar panel system that doubles as a student and faculty parking lot shade structure.



Stead Waste Water Treatment Facility, Reno, NV⁶



Solar parking shade structure at Reed High School, Reno NV⁸

Another Unique Approach: Black Rock Solar

Reno is also home to another organization that provides a unique approach to solar. Black Rock Solar is a 501 (c)3 nonprofit focused on speeding the adoption of solar and other types of clean energy through installation, energy efficiency, education, and job training. The organization got its start in the summer of 2007 when a group of volunteers installed a 30 kW array on the playa surface in Black Rock City during the annual Burning Man Festival, themed that year as "The Green Man." When the festival was over, the array was donated to a school system in the desert town of Gerlach, Nevada. It was expanded to 90 kW, providing the school with 30 percent of its current power needs and saving educators more than \$15,000 per year.

Black Rock Solar now provides low-cost, highquality clean energy services to clients in the nonprofit, public, low-income, and educational sectors, with a focus on those in rural and tribal areas. Funding for solar installations largely comes NVEnergy's incentive program, Solar Generations. The organization also gets funding from grants, donations and other various fundraising efforts. As of July 2013, the organization has built 3 MW of solar power capacity across the state, including sixty-one arrays for schools, nonprofits, and Native American tribes, which now realize nearly \$547,000 of combined savings annually on their energy bills. The 15,000 solar panels abate 2,735 tons of atmospheric CO, annually—equal to 456 cars removed from roads or 912 houses taken off the grid. Projects installed at little to no cost are at Lovelock Elementary, Rainshadow Community Charter High School, University of Nevada at Reno, College of Southern Nevada, Natchez Elementary School, Bishop Manogue Catholic High School, Truckee Meadows Community College, Nevada State College, Pyramid Lake High School for the Pyramid Lake Paiute Tribe, Northern Nevada Food Bank, The Children's Cabinet, Nevada Discovery

Museum, Boys & Girls Club of Truckee Meadows, and Pioneer Center.

The cost savings on energy realized by the schools, nonprofits, and tribes translate into more direct resources for the community. Jason Geddes discussed the impact the arrays have had on the food bank, for example:

When the food bank facility was first built, they saw their electricity bills skyrocket because of all of the refrigerators and freezers. A group lobbied the public utilities commission to allow them to build a bigger (solar) system than the rules would allow in order to offset costs. Since it was seen to be in the public benefit, the utility commission agreed, and Black Rock Solar installed it for them. That meant they could take the energy savings and put it towards helping children/ families; it meant about 99,000 more meals for families per year.

Regarding the Children's Cabinet project, Finance Manager Jeff Andrews said, "This array not only saves funds that can be placed directly back into our programs, but the renewable energy savings have a direct benefit to our environment."

Black Rock works closely with many tribes in Nevada. For example, it installed eleven arrays, totaling 540 kW of power, for the Pyramid Lake Paiute Tribe, saving the tribe around \$97,000 a year on utility bills. Because of the impact that Black Rock has had on many Native American and other communities, NV State Highway 447 was named America's Solar Highway. More distributed solar per mile exists on that highway than on any other highway in the United States.

NV Energy SolarGenerations incentives have helped fund many of Black Rock Solar's projects. More than 36 MW of PV has been installed under the NV Energy program since 2004. "We continue to be pleased with the



Black Rock Solar⁹ Left to Right, College of Southern Nevada, Pershing General Hospital, Pyramid Lake HighSchool

rapid growth of customer-installed renewables in our state," said John Hargrove, renewables manager for NV Energy. "Black Rock's three megawatts will help build on the state's ranking of fifth best in the nation."

On how to make solar work, Jason Geddes replies,

"It is about looking at all of the options. We came into this with the goal of putting as much energy efficiency in as possible to lower our use, and we did that and solar at the same time. We did everything we could to find possible options to see how we could facilitate them."

Appendix: Renewable Energy and Energy Conservation Legislation

Renewable Energy and Energy Conservation Legislation

Summary prepared by Jason Geddes

2003 Session

Assembly Bill 237 revised the definitions of "alternative fuel" and "dedicated alternative fuel motor vehicle" by removing petroleum diesel from the alternative fuel list and adding biodiesel. It also took steps to move the program from fuel based to emission based by requiring the State Environmental Commission to adopt regulations relating to dedicated alternative fuel motor vehicles.

Assembly Bill 296 provided that, for the purposes of complying with the Portfolio Standard,1 kWh of energy generated by solar PV energy systems is equivalent to 2.4 kWh of energy. In addition, the measure established that energy generated from tires is considered renewable energy only if generated using a reverse polymerization process, in which case, 1 kWh of energy generated is equivalent to 0.7 kWh of energy.

Assembly Bill 398 established an alternative procedure pursuant to which certain performance contracts for the installation or purchase of cost-savings energy measures in buildings occupied by state and local governmental entities are bid. The bill authorized local governments to enter into performance contracts with "qualified service companies" for the purpose of saving energy and other resources, and it repealed existing provisions regarding energy efficiency retrofits. The measure noted that performance contract terms shall not exceed fifteen years.

Assembly Bill 429 defined a "qualified Energy recovery process" to mean a system with a nameplate capacity of not more than 15 MW that converts heat lost from exhaust stacks or pipes, or from a reduction in high-pressure water and gas lines, and uses the energy to generate electricity. The measure also established a program to promote net metering systems through the Nevada State Office of Energy. The program may distribute money in the form of grants, incentives, or rebates to aid in the cost of installing or improving net metering systems. In addition, the measure defined a "net metering system" as one that has a generating capacity of not more than 30 kW, and it included the term waterpower in the definition of "renewable energy."

Further, the measure added a qualified energy recovery process to the renewable energy portfolio standard. The definition of "renewable energy system" was amended to include both solar and solar thermal energy systems that reduce the consumption of electricity, natural gas, and propane.

Assembly Bill 431 provided that the Public Utilities Commission of Nevada adopt regulations to establish a system of renewable energy credits. In addition, the bill created the solar energy systems demonstration program to provide incentives for the installation of certain solar energy systems. The Renewable Energy Task Force is responsible for reviewing and nominating applicants for participation in the demonstration program.

2005 Session and 22nd Special Session

Assembly Bill 220 expanded the types of "finished diesel fuel" that can qualify as an "alternative fuel," provided technical corrections regarding the proper names of certain specifications, and clarified that alternative fuels must comply only with any applicable regulations adopted by the federal Environmental Protection Agency pursuant to the standards established in the federal Clean Air Act Amendments of 1990.

Assembly Bill 236 was designed to encourage the development of small-scale renewable energy systems. It required a utility to offer net metering systems to its customers until the cumulative capacity of all such systems is

equal to 1 percent of the utility's peak capacity. A customer may install a net metering system that has generative capacity of up to 150 kW. The measure also established formulas for calculating the net cost of electricity based on net metering system capacity. Additionally, to make it easier for small generators to install their own systems, the measure stipulated that the permitting requirements for electric generating plants and associated facilities will not apply to certain types of renewable energy used as a primary source to generate electricity. Finally, it required a local government to permit a person to use solar or wind energy systems to the extent that the local climate allows for the use of such systems.

Assembly Bill 3 (as AB 385) provided incentives for energy efficiency and energy-efficient or "green" buildings. Qualifying buildings can be granted a partial abatement from property taxes up to 50 percent for up to ten years, and the materials used to construct or remodel such a building are exempt from certain sales and use taxes.

Additionally, it required the director of the Office of Energy to

- · adopt guidelines for green building standards for all new building projects of occupied public buildings
- establish a process for adopting the Leadership in Energy and Environmental Design (LEED) green building rating system or its equivalent
- prepare a state energy reduction plan to reduce grid-based energy purchases for state-owned buildings
- adopt regulations that include the International Energy Conservation Code
- prepare a report reviewing model commercial standards for appliances by July 2006.

To ensure that personnel are qualified to install renewable systems, the Division of Industrial Relations must adopt licensing procedures in occupations involving PV or solar energy system projects.

2007 Session

SB 437 enacted the Solar Energy Systems Incentive Program, the Renewable Energy School Pilot Program, and the Wind and Waterpower Energy Systems Demonstration Programs; established a program for evaluating the energy consumption of residential property; revised legislative findings concerning energy conservation and energy requirements; revised provisions governing the universal energy charge and the Fund for Energy Assistance and Conservation; required certain electric utilities to make quarterly rate adjustments; required the creation of various methods and programs to remove financial disincentives that may discourage energy conservation by various public utilities that purchase natural gas for resale; revised various provisions governing utility resource planning and the portfolio standard for providers of electric service; required certain residential properties for sale to be evaluated based on energy consumption and required that certain evaluations be provided to purchasers of those properties; and revised various provisions governing partial abatements of certain taxes by the Commission on Economic Development.

2009 Session

Assembly Bill 186 changed the definition of a public utility to exclude renewable energy systems dedicated to one customer. This allows for third-party ownership of renewable energy systems, enabling the city to partner with third parties, who are eligible for the federal tax credits, to install renewable energy systems.

Assembly Bill 192 changed the provisions of NRS 332 dealing with local purchasing as it applies to performance contracting, and it clarified the requirements for selecting a performance contractor and reporting on energy and financial savings. The city contracts with APS Energy Services meets all the requirements of the new law, and staff is working with APS to adhere to reporting requirements.

Assembly Bill 387 provided for planning of transmission to renewable energy zones that are to be identified. It also increased the Portfolio Standard to 25 percent by 2025 and increased the solar set-aside from 5 percent to 6

percent starting in 2016. This will serve to increase the amount of renewable energy in the energy mix and identify areas for renewable energy development.

Assembly Bill 522 changed the criteria for providing abatements to renewable energy companies by requiring the companies to (1) locate in Nevada for at least ten years; (2) acquire a local business license; (3) hire at least 75 full-time employees, at least 30 percent of whom must be Nevada citizens; (4) make a capital investment of at least \$10,000,000; (5) pay an average hourly wage at least 110 percent of the average statewide wage; (6) ensure that the average hourly wage of construction workers is at least 150 percent of the average statewide wage; and (7) offer construction employees health insurance. If the above criteria are met, the state will abate property taxes for a term of twenty years equal to 55 percent on real and personal property, and a term of three years on sales taxes above 2.6 percent. In the case of geothermal energy, the Board of County Commissioners must approve. Assembly Bill 522 is a companion bill to SB 358 (see below), providing funding of the Renewable Energy & Energy Efficiency Authority and the Nevada Energy Commissioner.

Senate Bill 73 required local governing bodies to adopt and enforce the energy conservation standards approved by the State Energy Office or a higher or more stringent standard. There is also a requirement to review systems for electric resistance heating and approve exceptions or approve those systems' hydronic radiant heating, ground-source heat pumps, or water-source heat pumps.

Senate Bill 114 changed covenants, restrictions, and condition requirements of homeowner associations and local governments to clarify that they cannot prohibit or unreasonably restrict installation of solar and wind energy systems.

Senate Bill 152 created the Green Jobs Initiative through the Department of Employment, Training and Rehabilitation; the Housing Division; and the Nevada System of Higher Education (NSHE). It further required the State Public Works Board, NSHE, and local school districts to determine specific projects to weatherize and required public facilities to retrofit, including renewable energy systems. Additionally, SB 152 called for the prioritization and selection of such projects. It specified various criteria for prioritizing and selecting these projects, including (1) the length of time necessary to commence the project, (2) the number of workers, (3) the effectiveness of the project in reducing energy consumption, (4) the overall cost of the project, and (5) whether the project will be powered by renewable energy sources.

Senate Bill 188 required the Public Utilities Commission of Nevada to establish the Solar Thermal Systems Demonstration Program to carry out the installation of at least 3,000 solar thermal systems in homes, businesses, schools, and other governmental buildings by 2019. Similar to the SolarGenerations and WindGenerations programs in which the city has participated, this program will provide rebates for the installation of solar hot water and hot air systems.

Senate Bill 358 created the Renewable Energy & Energy Efficiency Authority and the Nevada Energy Commissioner. Most of the duties of the State Energy Office and Renewable Energy & Energy Conservation Task Force are transferred to the authority. The Nevada Energy Commissioner will create a State & Local Government Panel on Renewable Energy & Energy Efficiency and a New Energy Industry Task Force to advise the commissioner. The State & Local Government Panel will have representatives appointed by the League of Cities and the National Association of Counties, and will advise the authority on issues relating to the viability and progress of energy efficiency and renewable energy retrofit projects in public buildings. The bill also changed the size, scope, and procedures involved in the solar, wind, and water incentive programs. This includes freeing up unused capacity from previous years that has made more rebates available to the city. It also increased the Portfolio Standard to 25 percent by 2025 and increased the solar set aside from 5 percent to 6 percent starting in 2016. The bill further expanded the list of projects that the city may finance to include energy efficiency improvement and renewable energy projects. Lastly, it required the governing body of each local government to develop a plan to retrofit public facilities by July 27, 2009. The plan had to include a list of specific projects prioritized using the following criteria: (1) the length of time necessary to commence the project; (2) the number of workers estimated to be employed on the project; (3) the effectiveness of the project in reducing energy consumption; (4) the estimated cost of the project; (5) whether the project is able to be powered by or otherwise use sources of renewable energy; and (6) whether the project has qualified for participation in one or more of the following programs: (I) the Solar Energy Systems Incentive Program; (II) the Renewable Energy School Pilot Program; (III) the Wind Energy Systems Demonstration Program; and (IV) the Waterpower Energy Systems Demonstration. The plan would also have to include a list of potential funding sources for use in implementing the projects, including—without limitation—money available through the Energy Efficiency and Conservation Block Grant Program (EECBG). The governing body of each local government was required to submit the developed plan to the Nevada Energy Commissioner and to any other entity designated for that purpose by the legislature. The city of Reno was able to meet the last requirements through the approved APS Energy Services contract and action taken by the Council on Clean & Renewable Energy Bonds and the EECBG programs.

Senate Bill 395 required State Purchasing to establish standards for energy efficient appliances and equipment. It also required the State Public Works Board to establish standards for green building and life cycle cost analysis. Further, it required that auto dealers disclose CO_2 emissions data for all new vehicles beginning with the 2012 model year. The city will use the appliance lists for new construction and renovation.

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