SOCIETAL BENEFITS OF SOLAR PV

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ABSTRACT

The purpose of this paper is to highlight the societal benefits of solar photovoltaic (PV) technology, beyond just the energy creation and environmental benefits. The paper highlights experiences of nonprofit organizations that have successfully implemented PV technology and expanded their missions through participation in NV Energy's RenewableGenerations program.

The paper will 1) introduce the RenewableGenerations program; 2) examine funding strategies and models that encourage nonprofit participation; 3) illustrate how to take advantage of positive PR initiatives that support greater participation in a solar PV program and 4) provide several examples of nonprofit organizations that have enhanced their communities through electricity cost savings from the implementation of solar PV measures.

Nonprofits often provide immediate and consistent support to their communities without the security of a steady income. Fortunately, these organizations are one of the program's many eligible customer sectors. Therefore, RenewableGenerations is able to implement solar PV measures at little to no cost to the customer by combining program rebates with creative financing.

SolarGenerations Background

Nevada's solar incentive program was created in 2003 by the Nevada Legislature as a small solar initiative with the main goal of stimulating the solar industry in Nevada. The program began with a small capacity allotment of 500 kW, to be administered by the Public Utility Commission of Nevada (PUCN) under the guidance of a new unfunded Task Force appointed to oversee it. Understanding that neither the PUCN nor the Task Force had the ability to manage such a program, NV Energy suggested they be allowed to run the program. When the program launched in 2004, the solar industry could count on one hand the number of contractors providing solar services. Eight years later, by the end of 2012, the program had helped pay for more than 35 megawatts of solar capacity through $153 million in incentives with over 60 active PV installers.

Similar to the path of most of the country's solar programs, NV Energy's SolarGenerations program has had to mature quickly in order to keep pace with the fast-growing solar industry. The Public Utilities Commission of Nevada has helped make the program more responsive to the needs of customers and contractors. And the legislature, in each biennial session since creating the program in 2004, has addressed the program by either expanding it or creating more definitive guidelines and making the program permanent in 2007. Schools also became a focus of the program with the largest capacity allocation. Subsequently the Commission enlarged the schools category to include private, preschools, colleges and Universities. Needless to say, this growth process has not been without tribulations, especially as the demand for the program began to outrun the available capacity beginning in 2010 when prices on solar began to see rapid declines.

As nimble as the solar market was with falling prices, the high incentive levels in Nevada served as stimulus to local contractors, many of whom put aside their hammers in the slumping Nevada housing market and picked up wrenches for the growing solar industry. The high incentive levels were also a loud call to third-party solar developers from nearby states who saw new opportunity in Nevada.

Growth in 2010 was an astounding 279 percent over the previous year. Nevada's solar boom continued in 2011 with another 264 percent growth over 2010. At this point, the Public Utilities Commission realized it needed to assess the program's popularity and consequently adjusted the incentive down. The Commission ordered NV Energy to moderate the release of capacity in 2011 while it reset the incentive levels. By mid-2012 the program had new incentive levels and more capacity to release for customers. The lull in capacity release in late 2011 produced a minor moderation of growth in 2012 (still greater than 2010 levels), but the program is expected to resume extremely strong growth in 2013.

Funding Strategies that Encourage Nonprofit Participation

NV Energy has made it a priority to attract a broad cross-section of customers to the solar program to avoid typical criticisms often directed towards solar incentive programs that these programs are only available for customers with greater resources. The program has categories of residential, small business, schools and public buildings. Beginning early in the program, NV Energy emphasized the program's outreach component, which sends team members into the community to discuss solar options with a wide variety of customers. Through this outreach, NV Energy has successfully helped the solar industry identify many customers who would otherwise not typically be sought after for solar development. One of the main niches of success of this outreach effort has been nonprofit organizations, including churches.

Early in the program, NV Energy helped brainstorm with a group of solar advocates from Nevada's Burning Man festival to identify needy recipients of solar energy. The formation of Black Rock Solar has brought more than 2.5 megawatts of solar energy at no or very low cost to tribes, nonprofits and schools. Two of their projects are featured in a later section.

In 2009, the Nevada legislature approved third-party ownership for Nevada's renewable incentive programs. This added a strong leveraging ally for the NV Energy outreach team, which took the message quickly to churches, schools and other nonprofits. NV Energy worked with these entities to connect them with Nevada contractors who were exploring the third-party models. By late 2010, some of the first third-party projects were being completed and the model is now an integral part of the financing options presented by a handful of Nevada contractors who have brought solar to many churches, schools and nonprofits.

Part of the strategy for attracting participation by nonprofits has been NV Energy's efforts to help organizations celebrate their successes. NV Energy helps plan and orchestrate media events that include check presentations and other events that draw news coverage and other stakeholders. Prominent speakers, including Nevada senators and other state and local government officials, have participated while NV Energy will often provide one of two special renewable energy demonstration trailers for these events. These events regularly bring together community leaders, the solar industry and NV Energy to help foster collaboration that has brought solar to a wide variety of customers.

The SolarGenerations program offers a construction incentive which is payable when a project finishes construction. This type of incentive in most cases is more attractive to the nonprofits than a production-based incentive which is paid over time, often extending several years. Most nonprofits have little or no readily available funds for construction costs, but the program rules allow the customer to designate the payment to go to any payee. As a result, contractors, distributors and manufacturers often carry the incentive payment for the entity and take payment after the project is done. This gives the entity time to raise donations or finance part of the system as necessary.

Case Study: The Blind Center of Nevada

The Blind Center of Nevada is a nonprofit center where participants come from all over the Las Vegas Valley to learn a work skill, be in a community with other blind and visually impaired people and get paid to work. Although they had considered installing solar PV on their facility for some time, the investment was cost-prohibitive for their existing budget. The SolarGenerations program's rebates, the Blind Center of Nevada and their contractors came together to make this project succeed.

Fig. 1: The Blind Center of Nevada shade structure.

One of the main jobs for participants that come to this facility is to recycle e-waste and rebuild computers. The receiving area where the e-waste is sorted and received was

in the direct sun on the south side of the building and many of the workers had to be out in the 120-degree Las Vegas summer sun. Furthermore, there was only dirt on the ground in that work area, so the environment was very dusty and hot. With the NV Energy rebate they installed two shaded solar PV canopies. The solar installer commented, "this receiving area…is very hot during most of the year. After installing the solar cover they had approximately 7,000 square feet of shaded receiving and storage area. The open-air temperature is an average of 20 degrees less than their previous situation." The members also have a clean area to work in because the dirt lot has been replaced with concrete. Similarly, when participants were dropped off or waiting to get a ride home, they would have to wait in the sun or cross the busy street at the bus stop.

Fig. 2: The Blind Center of Nevada's shaded bus bench.

What was a burden is now a blessing since receiving the solar PV arrays. Sunburst Energy and Pueblo Electric designed the solar PV array not only to provide for the electrical needs but also to shade the blind members from burning in the summer sun. An extra-tall parking structure topped with solar panels became the new bus stop. Now the members no longer have to walk across the street.

The Blind Center of Nevada funded its project through a five-year third-party ownership arrangement with its solar installation contractor and included assigning its SolarGenerations rebate of $364,800 to its contractor for the 72.96 kW PV system.

Fig. 3: Members of the Blind Center of Nevada.

When talking about the difference that solar has made, the Blind Center Director Cory Nelson said, "The monthly savings on our power bill free up cash for us to pursue the true mission of the Blind Center of Nevada – helping people who are blind and visually impaired." The solar PV has improved the look, improved the morale, allowed the center to help more members in more ways and prevented a few sunburns. Director Cory Nelson cannot help but beam every time someone asks about the solar installation. "The $1,200 to $1,800 of monthly energy cost savings allow us to offer more activities, such as a campout this summer. And we have been able to fund new life skills independence classes for people who are blind and visually impaired," says Nelson. The solar PV array allows the Blind Center to power its main building for 10 months out of the year.

The community has responded positively to the Blind Center of Nevada expanding its mission. The organization gives many campus tours that include a stop at the solar arrays. Director Nelson says, "Our community guests love that we are largely electrically independent and that we're able to use the solar array structures themselves in a meaningful way to improve the Blind Center of Nevada's facilities."

Case Study: Frontier Southern Baptist Church

Many churches in the Las Vegas Valley have been recipients of solar rebates from the SolarGenerations program. Many of these same churches are being publicly acknowledged for their community service efforts among the people of Las Vegas. Receiving a rebate and installing solar PV has been one way that many of these churches have been able to make up for a financial shortfall in challenging economic conditions. The electricity cost savings from installing solar PV have helped support their missions and expand the outreach that they were already doing in the community.

Fig. 4: Frontier Southern Baptist Church.

Frontier Southern Baptist Church is one church that has installed solar PV and offset most of its electric bill. When the NV Energy team went to the church to check for program compliance, they noticed a crowd of approximately 30 individuals waiting, even though it wasn't even 7:00 a.m. yet. They were lined up behind the church waiting to receive items from the food pantry. It was clear that the church was fulfilling an important need for the community.

The number of people helped by the church has increased dramatically since the installation of solar PV. When asked about the increase Pastor Barnes replied, "We now feed about 2,500 people, give them groceries of all types once a week." The church is in an area with one of the highest unemployment rates in the city. Along with the meals the church gives out clothes and furniture to those in need.

The Frontier Southern Baptist Church received a rebate of approximately $74,000 for a 14.976 kW solar PV system. The remainder of the cost was funded by its solar installation contractor through a five-year third-party ownership arrangement.

According to Pastor Barnes, "Our electric bill is almost zero. All we pay are the standard maintenance fees. The savings go to support the churches' missions. We are able to do more for the community and people in need. Countless people have been helped." Savings from the electric bill allow these programs to continue and help those in need.

Case Study: Rite of Passage Silver State Academy in Yerington, Nevada

Rite of Passage has been a provider of programs for at risk youth for over 25 years. Based in the rural Nevada community of Yerington, this program has a particular focus on practical measures for teaching life skills to troubled youth, many of whom come from inner cities and have seldom if ever seen a farming community. For this 250 kW solar project, the Academy worked with Black Rock Solar, a socially inspired solar provider that works mainly with schools, tribes and nonprofits. The Academy also looked inward and enlisted the Academy's welding students to build parking shade structures on which the majority of the solar panels were installed. There are many advantages to installing panels on parking structures – this eliminates concerns about loading on the roofs of existing structures, preserves open areas that would otherwise be required for ground-mount systems and, importantly, provides shade to the school's vehicles and implements, prolonging their life spans. The installation contractor estimates the electrical savings to the school to be at least $40,000 annually. The project was awarded an incentive of over $1.1 million from NV Energy's SolarGenerations program, and due in large part to the labor of the Rite of Passage students, the system was provided to the Academy at no additional cost to them.

Fig. 5: Rite of Passage welders.

"The savings from the array during the first year alone will let us divert thousands of dollars back into our student programs and services."
-Lawrence Howell, Silver State Academy Executive Director

"It was a great experience for me. I never would have thought I can do something this big, let alone be the lead welder. I thank Rite of Passage and Black Rock Solar for giving me this opportunity."
-Antonio A., who led the student welding team

Case Study: Storey County School District in Lockwood and Virginia City, Nevada

The Storey County School District saw the completion of its third 50 kW solar system in fall of 2012 at the Hillside Elementary School in the small community of Lockwood, on the Truckee River east of Reno. With its first two systems at the middle and high schools of the historic mining town of Virginia City, Nevada, the three systems are expected to offset approximately 280,000 kWh per year. These savings are significant, especially for Storey County, the smallest of Nevada's school districts, where low enrollment and decreasing revenues have struck hard in recent years. These systems received a total of $621,843 from NV Energy's SolarGenerations program.

Fig. 6: Hillside Elementary School.

“This project will provide energy and cost savings to the residents of Lockwood and Storey County. If alternative energy is to be the future of America, this type of project exemplifies the possibilities. This is the second project that Black Rock Solar has completed. Both projects have been completed efficiently and effectively. The district would like to thank them for their efforts and professionalism.”
“Every cent that we can save, we can turn around and put back into the classroom. And we can buy more things for the students so they can learn.”
- Dr. Robert Slaby, Superintendent of Schools

School District Funding Issues

Nevada’s public K-12 school districts have had funding issues since before the economic crisis. The public demanded improved graduation rates, test scores and accountability but was unwilling to pay the costs of improved education. Because schools in the state are aging with limited funding for capital improvements, they had to make cuts to their general fund budgets which pay for salaries, supplies and utilities. After the crisis, tourism revenue dried up and the state’s 17 school districts faced several rounds of legislative cuts.

Cost savings from renewable energy allow these schools to stretch their budgets. Third-party financing lets school districts capitalize on federal tax incentives and enables them to participate with little cash outlay. The required demonstration component to the PV installation presents a “hands-on” opportunity to educate students, parents and others in the use of renewable energy and demonstrates the schools’ efforts to divert energy expenditures to other areas.

Fig. 7: Glen C. Taylor Elementary School.

NV Energy’s SolarGenerations program has responded to this need by providing more than $76 million in total rebate dollars to 200 schools. With those funds, they have installed more than 16 MW of solar PV capacity.

Fig. 8: Bozarth Elementary School.

Fig. 9: Solar PV installation at West Career & Technical Academy.

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