Tribal Renewable Energy - Final Report

Project Title: Bishop Paiute Tribe Residential Solar Program

Date of Report: March 30, 2017

Recipient Organization: Bishop Paiute Tribe

Award Number: DE-EE0006949

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Executive Summary: Bishop Paiute Tribe Residential Solar Program

Phase 1: Award Number: DE-EE0006949

The objective of the project was to provide affordable renewable energy to 22 low income reservation homeowners; provide job training to tribal members and reduce air pollution by equivalent carbon offsets. The project exceeded grant objectives installing 66kW of rooftop solar on 22 low income single family homes and providing hands-on PV rooftop solar installation training to 24 tribal individuals (four more than planned). The project was a phased installment of an on-going partnership between the Tribe and GRID that was initiated in 2013 whereby 62 rooftop solar units were installed prior to this funded effort. The reported work in this report describes the funded effort where US Department of Energy provided partial funding through grant award *IE0006949* and marks the first phase of an effort matching California Solar SASH Initiative funding with DOE Office of Indian Energy Funding and brings the total for the program to 84 installed systems (running total of 271 Kw installed) and the end of the project. Tribal workforce development was a key aspect of the project and trained 24tribal members for a total 1168 cumulative on-job training hours. The solar installations and training efforts were fully completed by September of 2016 with 66.6 kW installed - 8 kW more than the original estimate stated in the grant application.

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Project Overview - The overall Project goal was to grid-tiled rooftop PV solar to tribal homeowners as a clean energy system to achieve the Bishop Paiute Tribe's long-term goals of energy self-sufficiency, environmental protection, job training and better lives for our Tribal members and community. Through a strategic energy planning process, the Tribe has set an overarching goal of serving 50% of eligible single-family homeowners (200 systems) by the year 2020. Towards meeting this goal, the Tribe developed a phased approach whereby eligible homes and homeowners would be identified, and funded in batches of 20-50 homes. funded per availability of funding. This DOE funding opportunity represents the first of 4-5 phases towards meeting this goal and consisted of 22 individual single home systems.

Objectives - In support of the Tribe's commitment to energy efficiency, renewable energy, and environmental protection and its vision to install solar energy systems on all buildings on the Reservation where it is technically feasible, the Project goals were to:

1) Install 22 grid-tied, net-metered rooftop solar electric systems on owner-occupied, single-family homes of low-income families living on the Reservation with job trainees
2) The new clean energy systems deployed will have at least 58 kW rated capacity
3) The energy displaced will be at least 60 percent of total electricity used (or 80,000 kWh/year or 856,000 kBtus).

The Tribe's self-sufficiency and environmental stewardship was advanced through deployment of 58 kW of clean renewable energy, which will provide an estimated $491,785 in system lifetime electricity cost savings to the 22 low-income homeowners on the Reservation. In addition, the 58 kW of clean renewable energy installed would reduce greenhouse gases by about 1,500 tons, equivalent to planting approximately 35,650 trees. The installed 58 kW was estimated to produce 80,000 kWh/year, displacing at least 60 percent of the 22 homes' total electricity use of 128,785 kWh/year (reduced to 48,785), for a combined savings of about $10,400 annually. The 80,000-kW displacement translates to 856,000 kBtus. The Reservation and surrounding communities would also benefit from improved air quality via reduced wood stove use for heating. At least 20 volunteer job trainees would gain a minimum of 40 hours of valuable real-world solar installation experience needed to enter the fast-growing solar workforce.

Description of Activities Performed - The Project work started in May 2015 with 16 homeowners qualified as eligible for the program. Detailed system design site visits were conducted for these homes. Contracts were signed, systems designed, rebates reserved, and interconnection paperwork was submitted for 4 of these homes.

During the week of 9/29/2015, the Tribe held a kick-off event where these 4 systems were installed for a combined total of 11.55 kW-AC. These installations provided hands-on, solar installation training to 6 tribal job trainees and 2 community volunteers for a combined 192 training hours.

Kick off celebration of first of 22 solar instations (Phase 1 – IE0006949) on Bishop Paiute Reservation (Tuesday, Sept 29, 2015)
(More info at https://gridalternatives.org/news/solar-partnership-brings-tribes-vision-sustainability-life)

Throughout the next three months, an additional 5 homes received their solar electric systems. These systems were installed with the help of 9 tribal job trainees and 3 community volunteers for a combined 384 training hours. Additionally, the remaining 13 homes were identified and eligibility confirmed. Systems were designed and all necessary paperwork was completed and submitted.

24 Tribal Residents Trained (1168 hours)(Phase 1 – IE0006949)

Proud homeowner and job trainees - Phase 1 – IE0006949

Additional photos:
https://www.flickr.com/photos/gridalternatives/sets/72157659597192245/
https://www.flickr.com/photos/gridalternatives/sets/72157666260026555/

From April 2016 through June 2016, 9 Tribal homeowners received their solar electric systems. These 9 installations provided 8 tribal job trainees and community volunteers/job trainees 272 hands-on solar installation training hours. The 18 systems installed to date leaves 4 homes remaining to reach the project goal of 22 homes. The remaining four homes were scheduled for installation in July.

Proud homeowner and job trainees - Phase 1 – IE0006949

Additional photos:
https://www.flickr.com/photos/gridalternatives/sets/72157666049857754/
https://www.flickr.com/photos/gridalternatives/sets/72157666503906760/

The remaining 4 homes were installed before the end of September 2016. Tribal youth who had completed the Solar Futures Program were among 8 tribal job trainees and community volunteers/job trainees who participated in the 4 solar installations for a combined 232 training hours. With these installations, the goal of 22 homes were achieved. These new clean energy systems deployed on the 22 homes have a total rated capacity of 66.6 kW, over 8 kW more than originally estimated.

Final Installations Phase 1 – IE0006949

Additional photos:
https://www.flickr.com/photos/gridalternatives/sets/72157670213070470/

After the completion of the installations, GRID completed the warranty training with homeowners for all 22 installed systems. System monitoring was then started for all 22 installed solar electric systems. This monitoring continued throughout the remainder of the grant cycle. The graph below is a breakdown of the homeowners 12 months of historical usage before solar.

Since the Tribe-GRID partnership was established in 2003 a total of 118 rooftop solar electric systems on the reservation, totaling over 394kW of clean renewable energy that has been installed on single-family residences on the Reservation. The Tribe has made a goal of 200 rooftop systems to be installed by the

year 2020 which would be approximately half of total homes that are estimated to be currently eligible for this program and is summarized in the following table:

The project was successfully with efforts from the GRID Alternatives, the Tribe's Tribal Environmental Department (EMO), Employment Rights Office (TERO) and Housing Department (CDD) to help select those in the community looking for job training, leading with finding homeowners to get the solar program and finally organizing the celebrations. The tribal TERO, Environmental, and Housing promoted the program through inhouse direct mailers, passed out flyers, posted flyers and allowed computer use for sign ups and outreach orientations possible.

The job training aspects of the program were positive with tribal trainees learning a great deal, by their work on multiple projects, over a period of months. Many of the trainees wanted more training and opportunities to learn solar installation with the hopes of getting a job in the solar industry. The fact that the trainings were done on tribal homes especially resonated within the community. With a small community like ours this model worked very well because those living on the Reservation who were in the trainings were related to many of those having the rooftop installations on their homes. It was a cousin-helping brother, son-helping mother and everyone focused on learning solar which was very positive and empowering. The participants were not getting a hand out; they were getting a hand up and helping someone else at the same time, especially family. Many trainees asked about opportunities to keep learning through paid apprenticeships once the training was over which facilitated the Tribe to seek funding for the next phase of the project (*DE-IE0000041*) that involved paid apprenticeships to take learning, cost savings and environmental protection to the next step towards meeting the Tribe's strategic energy goals.

Table: Comparison of Grant Accomplishments vs Funded Project Goals:

	Goal	Actual
Installed capacity	**58 kW**	**66.6 kW**
Solar production	***80,000 kWh***	**114,184 kWh**
Total Annual Offset based on annual ***Historic usage 128,785 kWh***	***60%***	***114,184 kWh*** **88.7%**
# Tribal Workforce Training	***20 trainees*** ***874 hrs.*** ***(43 hrs./trainee)***	**24 trainees** **1168 training hours** **(48 hrs./trainee)**

PROJECT PROGRESS SUMMARY SCHEDULE										
Phase	Funding	Status	GRID Build	SPP Build	Total Build	Running Total Builds	Kw installed	kw installed (cumulative)	Completed ?	2020 goal Progress
0	SASH 1	62 Systems	14	48	62	62	204	204	Yes	16%
1	SASH 2/DOE Clean Energy DE-IE0006949	22 Systems Installed	22		22	84	67	271	Yes	21%
2	SASH 2/DOE Clean Energy DE-IE0000041	34 Systems Installed		34	34	118	123	394	Yes	30%
FS	*Tribe/DOE First Steps DE-IE000064*	*Funded - installation 2018*	*2*		*2*	*120*	*7*	*401*		*30%*
3	*SASH 2/DOE Clean Energy*	*Application phase*	*20*	*20*	*40*	*160*	*66*	*467*		*40%*
4	*SASH 2/DOE Clean Energy*	*Funding dependent*	*20*	*20*	*40*	*200*	*66*	*533*		*50%*

Lessons Learned - There were lessons learned in four areas: participant selection, site selection, energy conservation, and volunteer training:

- *Project participant selection* - This project is for low-income tribal homeowners. Early in the overall project the Tribe deliberated on applicant selection process and after careful review, the tribe decided to rollout the program on a first come first serve basis within the confines of the low-income eligibility criteria of the GRID-SASH funding opportunities.
- *Project site selection* – The project is for single family low income housing that meet community definition of permanence. For purposes of this project the Tribe established a policy defining permanent structures (i.e. no travel trailers, mobile homes with wheels etc.) A preference was given to rooftop mount systems over ground mount chiefly due to shortage of developable land on the reservation and to reduce expenses. Special inspections were completed and those modular units needing minor ground disturbance and had to be approved by Tribal historic preservation office to do so.
- *Energy Conservation* - Once having the families apply for the program and discussing about renewable solar energy and savings, and looking at individual utility bills, it was apparent that many tribal participants did not know were not able to afford or understand about energy efficiency or other energy programs that were available to help them. GRID outreach staff coordinated with the tribal resource ROSS department and tribal Environmental department to do more outreach in the community about energy efficient measures to save money and reduce carbon footprints. The families were educated on how the solar works, and other ways to save electricity. The Bishop Paiute tribe printed flyers and handouts to help educate the homeowners on ways to save more.

- Volunteer Training- The interest and cooperation from Tribal community to volunteer very positive. Towards the end of the project it was slightly more challenging retaining some volunteers. The Tribe's TERO department made an agreement the trainees signed stating that if they agree to work, they would complete full days, show up on time, and set some clear expectations for the volunteers. After this we implemented this worked out very good.

The collaboration with the GRID was very valuable in everything from helping with education, outreach, and to arranging meeting rooms for trainings and orientations, to going to tribal council for approvals on what homes to select. At outset of program in 2013 it was found that once trust was established within the community, GRID-Bishop Paiute Tribal program was highly regarded and more families wanted to get solar and get involved with the job training. GRID staff went back and visited homes where the solar systems were installed and compared electric bills before and after solar to educate families on the savings and how much of an impact they were making on the environment by choosing to get solar on their homes.

Recommendations - For future phases of the project are a product of lessons learned coupled with the funding realities that play a major limiting factor on project rollout. Generally, it can be said that seeking funding opportunities are a critical element and essential element in process success. Maintaining partnership with GRID Alternatives while keeping community apprised of future opportunities are additional areas that are recommended to continue development and support depending on time and funding.

Conclusions– The objective of the project was to provide affordable renewable energy to 22 low income reservation homeowners; provide job training to tribal members and reduce air pollution by equivalent carbon offsets. The project exceeded grant objectives installing 66kW of rooftop solar on 22 low income single family homes and providing hands-on PV rooftop solar installation training to 24 tribal individuals (4 more than planned). Response from the community has been positive overall with realized monthly savings and pride to be a part of a program to helping the environment. The demand for the Program is growing throughout the community and is spurning tribal leaders to seek additional funding to make solar possible for the community.