FINAL REPORT TO THE DEPARMENT OF ENERGY
RENEWABLE ENERGY AND ENERGY EFFICIENCY

Awarded to:	Pala Band of Mission Indians
Award No.	DE-EE0006951
Period of Performance:	07/01/2015 – 12/31/2017
Project Location:	Pala Indian Reservation
Project Name:	Pala Fire Station Solar Project
Report Number:	DOE-PALA-06951
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Sponsoring Office:	Energy Efficiency & Renewable Energy
Award Type:	Deployment of Clean Energy and Energy Efficiency on Tribal Lands: Tribal Building Clean Energy and Energy Efficiency Retrofits: Clean Energy Systems
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EXECUTIVE SUMMARY

The Pala Band of Mission Indians was awarded a DOE-EERE Solar Energy Grant for FY 2016 and 2017. The project involved installing a 94.8 kW DC photovoltaic (PC) solar system on the Pala Fire Station to offset up to 95% of grid-derived energy and reduce overall CO_2 generation from the facility. Pala successfully installed rooftop and carport-mounted solar panels at the fire station, and to date has generated of 219,227 kWh of energy and offset 274,034 pounds of CO_2. The project was successfully executed, and we recommend other tribes to undertake similar projects if they are located in areas with sufficient solar exposure. DOE should continue to make these funds available to tribes.

PROJECT OVERVIEW

This project installed a 94.8 kW DC photovoltaic (PV) solar system to power the Pala Fire Station, a facility that provides an essential community service. Prior to project installation, the Fire Station used 152,831 kWh of electricity from the grid plus 3,444 gallons of propane (LPG) for heating purposes. The installed PV system produces an estimated 145,896 kWh annually displacing 95.5% of the current electricity use from the grid. Since monitoring began on December 30, 2016, the PV system has produced 219,227 kWh of energy and offset 274,034 pounds of CO_2 (figure 1).

Figure 1. Solar energy generation at the Pala Fire Department.

Background

The Pala Band of Mission Indians' Reservation is in northern San Diego County in California, approximately 30 miles east of the Pacific Ocean and 53 miles north of downtown San Diego. It is located approximately 6 miles east of Interstate 15 on California State Highway 76. The Pala Reservation is approximately 13,000 acres and is home to about 1,350 residents.

The Pala Band operates the Pala Casino Resort and Spa on tribal trust land. The Casino offers 2,000 slot machines and 87 gaming tables, as well as 10 restaurants, a full service spa, over 500 hotel rooms, and a gas station/mini mart. Other tribal facilities include the tribal administration complex; two parks including ball fields and a skateboarding park; a fitness center; the Pala Learning Center; Pala Youth Center, and Cupa Cultural Center. Vivian Banks Charter School provides classes for grades K-5 through the Bonsall Unified School District. The Pala Mission and San Juan Diego Center are operated by the San Diego Catholic Diocese.

The Pala Band is governed by an elected Executive Committee comprised of six members: Chairperson, Vice-Chairperson, Secretary, Treasurer, and two at-large seats. The Executive Committee is responsible for the daily governmental operations of the Band and answers to the General Council, which is comprised of all voting-age (over 18) tribal members. The Executive Committee meets weekly, while the General Council meets monthly. The Executive Committee also oversees the operation of all tribal departments, including the Pala Environmental Department, Pala Fire Department, Financial Department, Business Office, Tribal Law Enforcement, Tribal Utilities, and Tribal Services.

The Pala Band has long-term energy goals that include significantly decreasing the Band's reliance on grid-supplied energy. Concerns about the impact of global climate change have spurred the tribe to transition to renewable energy sources including solar and wind. Pala already builds every new home for tribal members with rooftop solar photovoltaic, and uses solar-powered street lighting in new neighborhoods. The ultimate energy goal for the tribe is to have all major facilities – including the Pala Casino Resort and Spa and the Pala Administration Center – powered by renewables and to achieve full energy independence from the grid.

Project Location

The project is located at the Pala Fire Station, at 34884 Lilac Extension Rd, Pala, CA 92059. The station is situated directly adjacent to State Highway 76, which passes through the Pala Reservation.The station provides essential community services and enhances tribal capacity and community resilience. The 25,059 square foot facility includes office space, a kitchen, living space, and dormitory rooms for firefighters. It also includes an equipment bay for an engine, ladder truck, and ambulance, as well as ancillary storage rooms. A separate 3,210 square foot building is designated as an emergency operations facility and training center. This center is used for fire department trainings as well as community events. It is equipped to serve as a command center for emergencies, including wildfire, floods, earthquakes, and homeland security incidents. The Pala Fire Department employs 31 people, including administrative staff, fire fighters, paramedics, and emergency medical technicians. The fire department has entered into cooperative service agreements with surrounding agencies; therefore, the Pala Fire Department responds to incidents both on and off the Pala Reservation.

Objectives

The objective of this project was to install a solar photovoltaic system to displace 95.5 % of grid-based electricity for the Pala Fire Station. Additional projects objectives were to reduce dependence on power provided by San Diego Gas & Electric (SDG&E) and reduce fossil fuel consumption and carbon emissions. These objectives were achieved through the installation of a 92.4 KW photovoltaic system on the roof of the fire station and on adjacent solar car ports. The project will displace and estimated 145,896 kWh of electricity annually from the grid, most of which is produced by fossil fuels. As a result, over the 25 year life of the project the Tribe's GHG emissions will be reduced by 2,991 tons of CO2e. The Pala Fire Department's annual electricity has been reduced by an average of $2,000 per month in the first year and should generate a savings of $1,300,648 over the life of the system. The Fire Station has met our objective of close to 100% independence from grid-generated electricity.

ACTIVITIES PERFORMED

The project commenced with site visits by the selected solar contractor, Good Energy Renewables. Good Energy developed site plans and engineering for the solar rooftop installations and the solar car ports, and began procurement of equipment. Preparation and installation proceeded as illustrated by the photographs below.

Preparation for panel installation

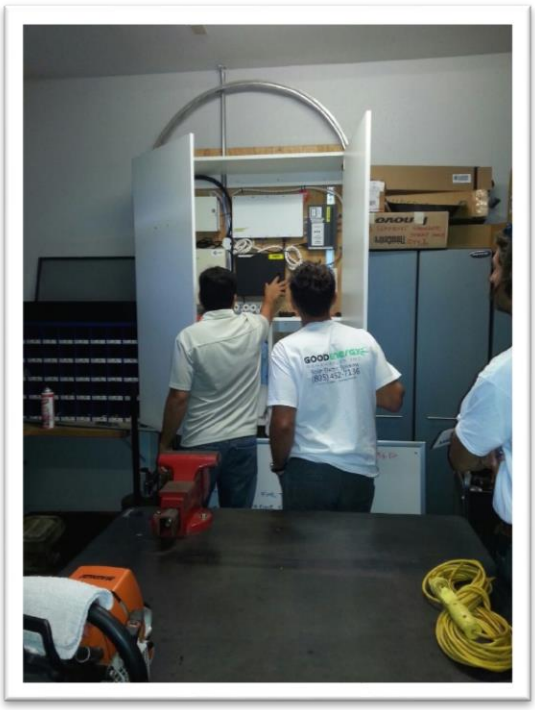
Rooftop Panel Installation

Carport Panel Installation

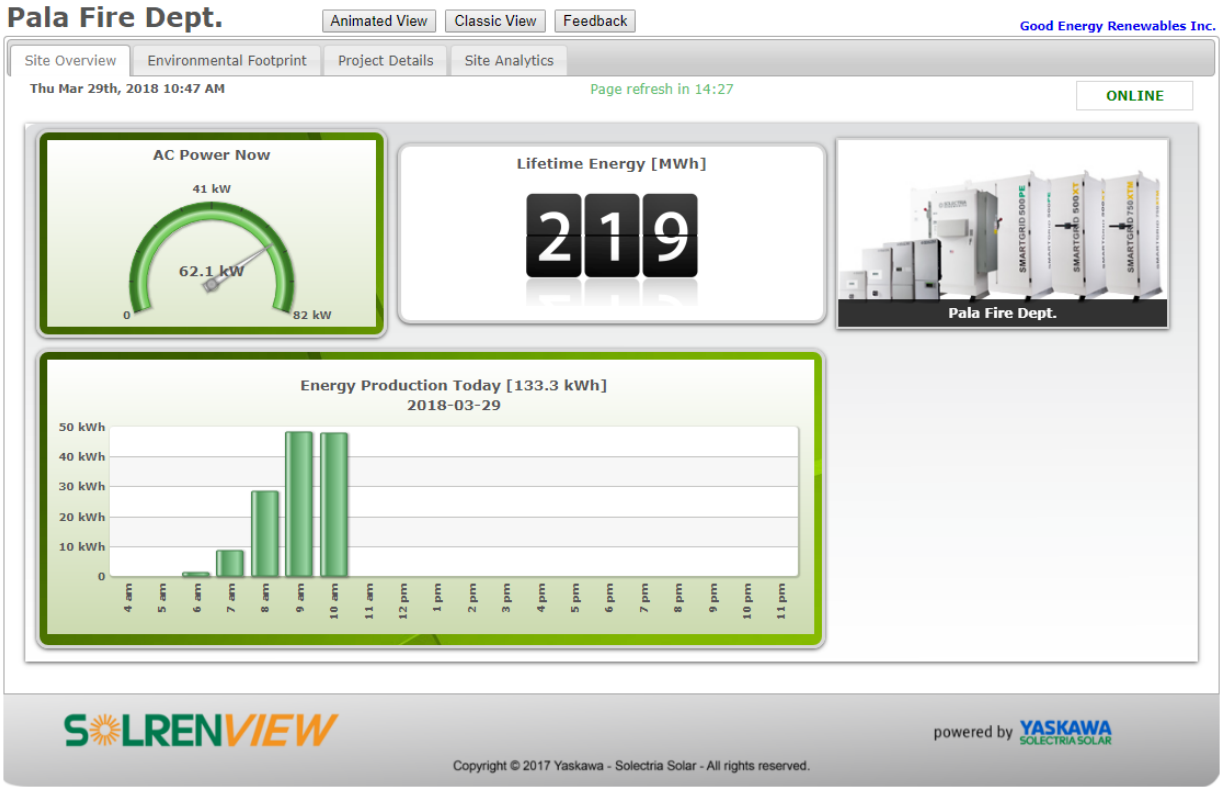

EXIT
BCB


SKYJACK
SJIII 3219
1-800-UR-RENTS

Electrical Inspection



Activation of Monitoring System



CONCLUSIONS AND RECOMMENDATIONS

The Pala Fire Station Solar Project was an unqualified success. The amount of energy we estimated the project would generate was matched what the installation has produced, to date. Energy savings and cost savings have also met expectations, as have the offsets to CO_2 generation. The project proceeded in a timely fashion, with most milestones met as scheduled. Those that weren't met as scheduled were still met within a reasonable time frame, and the delays that occurred were dealt with quickly. Most delays were due to uncontrollable factors such as weather. All project consultants and contractors completed their work as contracted, and were responsive to Pala's needs and concerns. Pala's relationship with the project managers at DOE-EERE also contributed to how smoothly things progressed. Regular reminders for reporting deadlines, easy access by email and telephone, and willingness to help with any issues or problems made working with DOE a pleasure. Pala's recommendation is that the DOE continue and expand on this program to bring more renewable energy deployment opportunities to tribes.

LESSONS LEARNED

This project proceeded smoothly at every step, and so there were no major problems or issues that provided specific learning opportunities for how to do things differently or better on future projects. From a broader perspective, we learned to be prepared for the unexpected, such as weather-caused delays, or for small setbacks such as delays in procurement for equipment. None of the setbacks we encountered were unexpected, and none significantly delayed or impeded the project.