

Yabucoa Biblioteca Municipal Don Reinaldo Alvarez Costa (Library and Police Station)

SFPR Contact:

Rafael Quinones
rafaelq535@msn.com

Community Contact:

Mayor Rafael Surillo
(787) 312-7143

Goals:

1. Provide electricity to the Library and Police Station by installing a solar photo-voltaic system.
2. Provide emergency backup electricity to this center for future emergencies after the grid is rebuilt.

Proposed Project:

- 10.8 Kw Solar Array System,
- Replacement of florescent light tubes, fixtures and bulbs with LEDs

System Cost:

Solar Array System	\$60,000
Efficient LED Lighting	\$5,000
Total Cost	\$65,000

The Need

Hurricane Maria devastated the electrical grid in the town of Yabucoa, downing trees and wires, and destroying many homes. This Library and temporary Police Station have no grid electricity but does have a generator which runs about 12 hours per day, and as needed for police functions.

Resiliency for the community during future destructive events is also a major concern. This building was used as a refuge during and after the hurricane and was a distribution center for emergency supplies.



The Setting

The Library and Police Station is in the middle of the city of Yabucoa, a city of almost 40,000 inhabitants.

The hurricane destroyed the local Police Station, requiring the library to accommodate that function until the old Police Station can be returned to service. The Library portion of the building is closed at this time, but the temporary Police Station occupies the auditorium space and is operational. The electricity for lights and computers is supplied by a generator.

Recommendations and Actions

- Install a solar array on the upper flat concrete roof of the center building
- Install inverter and batteries in the electrical room and interconnect to the building electrical system
- Replace approximately 50% of the existing light tubes and bulbs with LEDs to reduce the electrical load
- Establish Internet connection for the library

Technical Description:

- Building Structure - The upper roof is a rectangular cement structure approximately 42 feet wide and 80 feet long.
- There are nine roof membrane vents which must not be blocked
- Solar Array – 10.8 kW, thirty six 300 watt solar modules
- Inverters – two 4.4 kW inverters by Magnum
- Battery – four 24 volt 1,500Ah batteries wired in serial
- Mounting Structure – AET Rayport rack, mounting bolts epoxied into cement roof
- Interconnection – transfer switch between grid in and solar inverter in breaker panel
- Roof modifications – new membrane under solar array

Overview

The primary purpose of this project is to bring back lights and computers for the residents of the city on a 24/7 basis and to provide emergency backup in the future should the grid power go down in a future storm.

Local Project Support

This project was identified as high on the list of priorities supported by Mayor Rafael Surillo of Yabucoa, during our meeting with him and his staff.

It was also important to the Mayor to provide a library with computers and internet access to the people of the city.

Existing Electrical Conditions and Design Assumptions

GSI can connect electrically to the existing electrical service for the building at a breaker panel. A transfer switch and solar disconnect are installed for when the grid comes back up.

The center portion of the building has two flat concrete roofs of approximately 22 by 50 feet. The upper roof is an appropriate location for a solar array.

GSI measured the output of the generator at 1,800 watts during the afternoon when only the lobby and Police Station lights and computers were on. We determined that a 5-kW solar inverter would be sufficient to power the additional loads of the library, however, replacement of existing florescent tubes, fixtures, and incandescent light bulbs is strongly recommended as is reducing the number of lights by 50%.