

Ceiba Rio Abajo Community Center

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Community Contact:

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Goals

1. Provide a potable water distribution point to the local rural community;
2. Provide electricity to the Community Center to facilitate its use as a meeting place;
3. Establish the Community Center as a refuge for future emergencies.

Proposed Project

- New 1,000 Gallon Cistern
- 1.2 Kw Solar Array System,

System Cost

Cistern	\$500
Solar Array System	\$6,500
Efficient LED Lighting	\$100
Energy Efficient Refrigerator	\$400
Total Cost	\$7,500

The Need

Hurricane Maria devastated the rural community located in the mountains above the town of Ceiba, downing trees and wires, and destroying many homes. Roads have been cleared, but the electrical grid restoration in this area may be as much as a year away. Because the local water system is dependent on electrical power, there is no piped water service. Rural areas such as this one will be among the last areas to be restored. Resiliency for the community during future destructive events is also a major concern.



The Setting

The Rio Abajo Community Center is an initiative of the religious organization Iglesia Evangelica, Inc which is also a 501 c (3) corporation. This community center building acted as a refuge for the community during hurricane Maria, is presently a distribution center for food, water, and other donated items, and is a part-time health clinic. The center also provides health education to the community. GSI met with the Pastor Jaime Solero and 5 members of the Board of Directors to determine their needs.

The center is located approximately 3 miles from the center of Ceiba in the mountains surrounding the town. Hurricane Maria destroyed the local electrical grid and shut down the municipal water and sanitary system.

The community at large is not well served by the water distribution system of the municipality. A water truck arrives on an irregular schedule, honks its horn to alert residents, and

waits briefly for residents to appear with water buckets to fill. The time varies daily and residents are not previously alerted of the truck schedule. There seems to be a political problem as most of this community supported the previous mayor over the current mayor, even though they are of the same party. This system does not work well for the residents.

Task List

- Purchase and deliver cistern for water distribution
- Install a solar array on the flat concrete roof of the building
- Install inverter and batteries in front left interior corner of building under the existing breaker panel
- Replace existing florescent light fixtures and lamps with more energy-efficient LED replacements devices
- Purchase a new energy efficient refrigerator.

Technical Description

- Building Structure - The Community Center building is a rectangular cement structure approximately 40 feet wide and 60 feet long with a flat concrete roof;
- Solar Array – 1.2 kW, four 300 watt solar modules;
- Inverter – 1 kW inverter by SolarEdge (or other);
- Battery – two 12 volt 100Ah batteries wired in parallel;
- Mounting Structure – AET Rayport rack or equivalent, mounting bolts epoxied into cement roof through the ballast pans;

- Interconnection – transfer switch between grid in and solar inverter in breaker panel;
- Roof modifications – none required.

Recommendations and Actions

GSI is recommending that a large water cistern be purchased immediately for the building. It would be filled by the water truck and would allow the residents to come for water at their convenience. The cistern would also provide resilience in future emergency conditions.

A small scale photo voltaic panel array controlled with an inverter, and backed up with a battery set will allow the center to be used in the evenings and will provide resiliency for the community in the event of a future emergency.

GSI donated a small solar lighting system consisting of a solar panel, battery, three LED lights and cell phone charging. The Center can also sell these small (\$100) units to the community at large if GSI can get a significant quantity donated for a nominal cost of \$25.

Local Project Support

This project is supported by the local church through its pastor and the Board of Directors of the Community Center. Their first part of the project is to prepare the ground for the cistern which involves grading a flat area and constructing a base to get the cistern off of the ground. Note: the building has an existing small cistern which is filled by pumped water when available. It is not large enough to supply the needs of the community.

Existing Electrical Conditions and Design Assumptions

The building has 4 fans @ 50 watts each, 5 lights @ 75 watts each, and an old refrigerator @ 250 watts. These loads can be met by a 1 kW sized inverter (up to 1,000 watts). The battery and solar array size are specified in the Technical Description section.