

Orphans International Helpline (OIH) Hospital and Resource Center Power System Design and Monitoring



MICHIGAN STATE UNIVERSITY

Resource Center for
Persons with Disabilities

MICHIGAN STATE UNIVERSITY

College of Engineering

Wednesday, January 10, 2018

Current Sponsors: MSU College of Engineering, MSU Resource Center for Persons with Disabilities (RCPD), Orphans International Helpline, Marathon Oil, Chef Mark Anthony, MSU Tower Guard Honor Society, many private donors

Current participants: ECE480 Design Team, Stephen Blosser Engineer blossers@msu.edu 517 648-9191, Carlot Dorve MSU RCPD student, Jean Florvilus President OIH, Marc Thomas electrical engineer in Haiti mchenrythomas@gmail.com, Tim Yorty IT Manager at State of Michigan Department of Technology, Kernsy Sever hospital contractor kernsysevere@gmail.com, Hilda Ornevil Registered medical Nurse and language instructor, Haitian volunteers who are doing the construction work to bring this facility to their community.

Photos of the project in Haiti can be seen at <http://oihonline.org/ourprojects/health-clinic-project/>



Project background

Carlot Dorve, a Haitian RCPD student, testified in his recent book “From Trauma to Triumph” of the extreme need for medical and disability services in rural Haiti. Carlot is promoting and participating in this international project.

Through this project and others to follow, the MSU RCPD expertise in serving students with disabilities will become available to many thousands of individuals in Haiti. This developing hospital, which includes an education center, is located on the campus of a school and orphanage in Bombardopolis. Resident children at the orphanage and school are sponsored by individuals in the US and other locations. As these students develop in their education it is hoped that they will come to MSU and prepare to improve Haiti’s challenging condition.

MSU Electrical and Computer Engineering (ECE480) project description

ECE 480 students during the spring 2018 semester will specify a power system and design a power control monitoring system for the OIH hospital in Bombardopolis Haiti. This will be used by the hospital to monitor the solar panels, wind generators, batteries, voltage inverters, engine generators and room power availability. Rooms may have both AC and DC power. Lighting, computers, and other appliances may use DC which would typically have a higher reliability.

There are several commercially available software and hardware power control systems. (see resources below) The team will specify a system and program it with the floor plan of the hospital and all the electrical devices.

Commercially available power monitoring systems typically use computer software and phone apps for monitoring. While these can display on a computer monitor, the availability of a permanent wall mounted display panel in the hospital with a picture of the hospital floor plan and the power generation sources (wind mills, solar panels, batteries, generator) with a red-yellow-green LED by each source would be helpful. The display could also indicate where power is available on the hospital floor plan. This will provide a fast way to diagnose trouble areas.

This microcontroller based panel should be independently powered with its own battery so it will continue to function even if the whole hospital loses power.

Project details and resources

This is an off-grid hybrid system. The Haitian jungle has no electrical service. Sun and wind are in abundance. A diesel generator is also available for backup.

This project is just starting so any purchase suggestions for wind generators, solar panels, solar array controllers, batteries, etc. will be very much appreciated. The electrical load will need to be estimated at this point. A list of appliances will be made soon.

Display text and documentation for this system must be in English and French or Haitian Creole. Hilda Ornevil will review these.

The following examples are only some of the choices for commercially available systems. The team can specify a system and OIH will review and purchase the hardware. The monitoring software and some firmware may be available through the manufacturer.

Tesla power wall www.tesla.com/powerwall and Power pack www.tesla.com/powerpack

Third Sun Solar <http://thirdsunsolar.com/nonprofit-request-quote/> wholesale solar components www.wholesalesolar.com

Many low cost wind turbines are available online www.mwands.com/store/wind-turbine-generators. The challenge is finding a design that is capable of withstanding a hurricane. We may need to build custom units. Units with furling blades or other methods are needed. The units sold through the link above have low cost, easy to replace blades which would likely be the only thing damaged in a storm.

The floor plans for the hospital can be viewed at https://drive.google.com/open?id=1AdPG8FJCC2_vRlVLjUiwEZfJ30e0mCRd

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