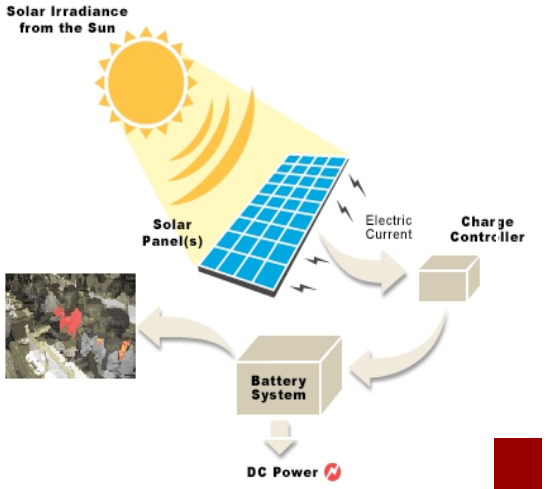

How Solar Energy Works

Solar energy is gathered by the solar panel and the electric current is transferred into the charge controller where it is then transferred to the battery. The charge controller also distributes the battery power to the laptops. Our DC-only solution permits us to obtain maximum output from the panels, keeps costs down by avoiding the use of an inverter, and ensures that only the laptops will be charged through our solution. Solar is our preferred electrical energy solution as it is renewable, low maintenance, and the least expensive. It is also the source requested by the Haitian Ministry of Education.

Upcoming IPRO Objectives

In our later IPROs, we would like to accomplish the following tasks:

- Develop a curriculum for the XO laptops
- Develop a method of communication between XO communities
- Teach local students how to maintain and create other solutions
- Develop a method of sizing various solutions for other XO communities

We are currently working with external partners to size a solar solution to charge OLPC XOs in Rwanda, by special request of the Rwandan Ministry of Education. With our help and knowledge, XO communities around the world may be able to fully utilize this technology, and help children realize their potential through the creative and joyful use of technology in their education.

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IPRO 335 One Laptop Per Child—Haiti

To design and deploy a replicable, open source solar solution at primary schools in Haiti

empowering haiiti

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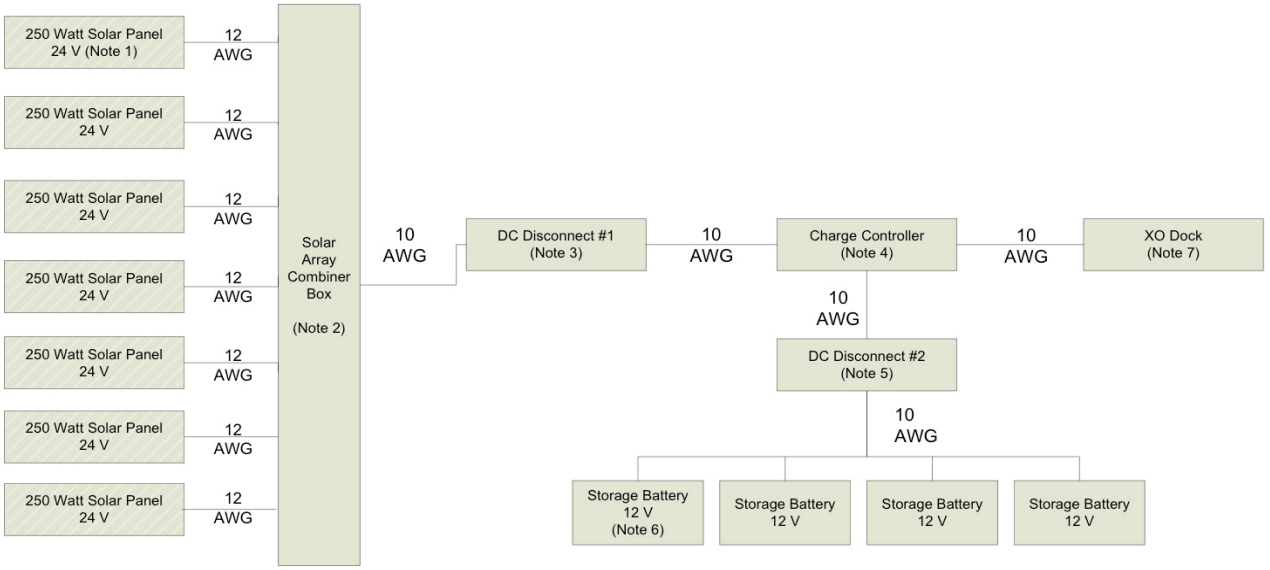
The Problem:

Haiti is one of the poorest countries in the western hemisphere with the lowest per capita income in Latin America. Haiti received a donation of approximately 11,000 laptops from the non-profit organization One Laptop Per Child (OLPC).

Although they received this donation of laptops, there currently is no way of charging the laptops, as there is no reliable electrical source. Only 12.5% of the population has regular access to electricity.

As a result, the XO laptops are sitting around collecting dust. It is not being utilized for the purposes it was designed for.

Our IPRO is trying to find a solar solution that is replicable around the country.



A diagram of the solar solution designed for a school in Lascahobas Haiti

Objectives:

1. Design an affordable replicable solar charging solution for Haitian schools
2. Develop a method of regular communication with partners with projects in Haiti to facilitate collaboration
3. Raise money to pay for a prototype and deployment trip to Haiti

Our Full-Scale Model Specifications (First Draft)

The **system's specifications** are as follows:

Reminder: 1 XO laptop needs **17 watts *(1)* (at 12 volts)** of electricity to charge for **1.5 hours** in order to fully charge a dead XO
THEREFORE
17 watts x 1.5 hours = **25.5 watt hours per OLPC XO**
For **350 XO laptops**...
350 XO's x 25.5 watt hrs = **8,925 watt hrs**
Assuming an average of **5.295 hours** of direct sunlight *(2)*, the size of the solar panel would be...
8,925 watt hr / 5.295 hrs = 1,685 watts from solar panel = **round up to 1,750 watts**
The battery required to charge the 12 volt XO laptops would be...
8,925 watt hr / 12 volts = 743 amp hr = 30% overhead factor = **966.875 amp hr**

***References:* 1.** *Test results of an in class experiment performed on September 16, 2010 at the Illinois Institute of Technology.* **2.** *Data obtained from the NASA Langley Research Center Atmospheric Science Data Center, New et al. 2002. (http://www.gaisma.com/en/location/mirebalais.html)*