

# IPRO 335: Developing Technology to Improve Education in Haiti

## Advisor:

Prof. Laura Hosman

## Students:

Regine Antenor  
Mario Berrones  
Simon Brauer  
Stephanie Brummer  
Jacob Ernst  
Brandon Hammond  
Erik Harpstead  
Annie Hutches  
Dhara Shah  
Hana Tai  
Ryan Tillman



# Introduction



**95%** of primary schools in Haiti lack electricity.



# Objectives



1. Powering the laptops
2. Community Outreach
3. Educational Content Development
4. Continuity



# Building a Cohesive Team



3 Returning members

4 Travelers

4 Committees



iit  
empowering  
haiti

# Organization



Solar Committee

Education Committee

Fundraising Committee

Public Relations Committee





# Challenges



Communication with Haiti

Continuity

Raising Funds

Bridging the Cultural Divide



# Ethical Considerations



Economic Sustainability

Prioritizing Needs of the Society

Equity with Teachers

Acceptance of New Technologies

Acceptance of who we are

Equitable to all of the Community

iit  
empowering  
haiti



# Our Progress: Last Semester



Built a mini-model

Won an award from Society of New Communications: Certificate of Merit

Created a video

Created a website

Started solar calculations





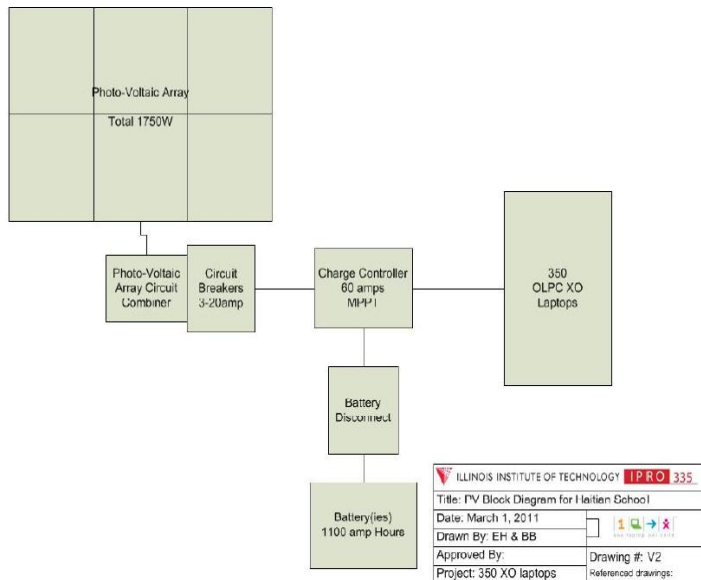
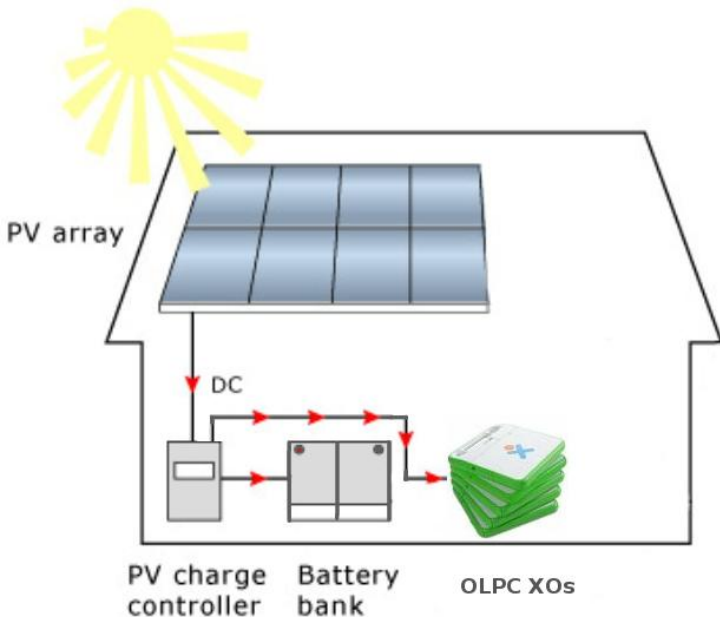
# Our Progress: Selection of Pilot Schools

St. Gabriel



Ecole Baptiste

# Our Progress: Solar Solution



## The Sizing Calculations

The XO laptop needs 17 watts (at 12 volts) of electricity for 1.5 hours to fully charge a full discharged XO;

$$\text{THEREFORE } 17 \text{ watts} \times 1.5 \text{ hours} = \mathbf{25.5 \text{ watt hours per OLPC XO}}$$

For 350 XO laptops;

$$350 \text{ XO's} \times 25.5 \text{ watt hrs} = \mathbf{8,925 \text{ watt hrs}}$$

Assuming the average month at 5.25 hours (in Haiti) of direct sunlight, the size of the solar panel would be;

$$8,925 \text{ watt hr} / 5.25 \text{ hours} = \mathbf{1700 \text{ watts from solar panels each day}}$$

The battery(ies) required to charge the 12 volt XO laptops would be,

$$8,925 \text{ watt hr} / 12 \text{ volts} = \mathbf{744 \text{ amp-hr}}$$

70% usage factor on the battery and the systems requires,

$$744 \text{ amp hr} / 0.70 = \mathbf{1062 \text{ amp-hrs battery(ies) required}}$$

# Our Progress: Bill of Materials

## Bill of Materials

St. Gabriel

<i>Item/amount</i>	<i>Cost</i>
Solar panels (18)	\$8,400
Charge Controller	\$680.00
Batteries (4)	\$4,500
Wires	\$500
Mounting	\$1,000

## Ecole Baptiste

<i>Item/amount</i>	<i>Cost</i>
Solar panels (13)	\$6,000
Charge Controller	\$680.00
Batteries (3)	\$4,000
Wires	\$500
Mounting	\$1,000

## Travel

<i>Item/amount</i>	<i>Cost</i>
Plane Tickets (10)	\$2,500
Hotel Room (\$80/night) staying for 14 nights	\$4,480
Travel Insurance (package)	\$500

**Total: \$34,740**



**iit**  
**empowering**  
**haiti**



# Our Progress: Fundraising

The screenshot shows the GlobalGiving project page for 'Solar Transformation for Haitian Education (#7860)'. The page includes a navigation bar with 'DONORS', 'NON-PROFITS', 'CORPORATE PARTNERS', and 'ABOUT US'. Below the navigation, there are tabs for 'Overview', 'Wall (10)', 'Reports (1)', 'Photos (18)', 'People (55)', and 'Map (2)'. A large photo shows a group of children in school uniforms gathered around a laptop. To the right, a progress bar indicates that \$2,805 has been raised out of a \$4,000 goal, with 55 donors. A countdown timer shows 7 days, 8 hours, 12 minutes, and 39 seconds remaining. A 'donate' button is prominently displayed. Below the button, three donation options are listed: \$10 (powers all 850 children's laptops for one day), \$25 (powers one class' laptops for one month), and \$50 (supplies mounting gear for one solar panel). The page also shows a 'Like' button and a list of users who liked the project.

globalgiving

Welcome, Laura! [project entry \(pe\)](#) [giving cart](#) [my profile](#) [logout](#)

[DONORS](#) [NON-PROFITS](#) [CORPORATE PARTNERS](#) [ABOUT US](#)

[FIND A PROJECT](#) [GIVE GIFT CARDS](#) [GET INVOLVED](#)

[Home](#) > [Find a Project](#) > [Haiti](#) > [Education](#) > Solar Transformation for Haitian Education (#7860)

[Manage Your Project](#) [Edit Project](#) [Manage Progress Reports \(1\)](#) [View Donations \(55\)](#) [Advanced Options](#)

## Solar Transformation For Haitian Education

[Overview](#) [Wall \(10\)](#) [Reports \(1\)](#) [Photos \(18\)](#) [People \(55\)](#) [Map \(2\)](#)

**globalopen CHALLENGE**

This project has to raise **\$4,000** from **50** donors by April 30, 11:59 PM EDT to earn a permanent spot on GlobalGiving.

<b>\$2,805</b> Raised	<b>\$1,195</b> Remaining	<b>55</b> Donors	<b>Secured</b> Remaining
--------------------------	-----------------------------	---------------------	-----------------------------

Time left to give:

<b>7</b> Days	<b>8</b> Hours	<b>12</b> Minutes	<b>39</b> Seconds
------------------	-------------------	----------------------	----------------------

ONE TIME  MONTHLY RECURRING  GIFT OR IN-HONOR OF

- \$10 powers all 850 children's laptops for one day
- \$25 powers one class' laptops for one month
- \$50 supplies mounting gear for one solar panel

Dhara Shah, Stevie Brummer and 63 others like this.

Total: \$10,000

## The Millennium Campus Network

Maximize student impact. Empower a generation. End Extreme Poverty.

[About MCN](#) [What We Do](#) [Events](#) [Blog](#) [News & Media](#) [Get Involved](#) [Donate!](#)



iit  
empowering  
haiti

# Our Progress: Public Relations

Home > News > The city

### IIT class designing solar chargers for Haiti's schools

AA

Recommend 183

Tweet 44

Share 42

Comments (2)

1 2 next | single page



Illinois Institute of Technology professor Laura Hosman, foreground right, with her students who designed solar-powered chargers for laptops donated to elementary schools in Haiti. (Terrence Antonio James, Chicago Tribune / April 13, 2011)

#### Topics

Haiti

Computing and Information Technology

Engineering

See more topics >

ADS BY GOOGLE

By Halley Branson-Potts, Tribune reporter

April 13, 2011



Jacob Ernst, an architecture student at the Illinois Institute of Technology, won't soon forget the severed power lines he saw in Haiti in January.

"Occasionally, you'll see someone actively cutting down a power line to take the electricity," Ernst said. "There are a lot of problems with people needing electricity, but it's in use."

## engineering FOR CHANGE

### A plan in need of a donor: Solar laptop charging stations for Haitian schools

Owner: Rob Goodier Created: April 1, 2011 Comments (1)  
Filed under: Energy



Photo courtesy of IIT

Two months before the earthquake in Haiti in January 2010, the One Laptop Per Child program distributed hundreds of its XO computers to children at two schools in a town called Lascahoos. The town is in Haiti's central plateau, northeast of Port-au-Prince and about an hour's drive west of the border with the Dominican Republic. When the quake struck, it knocked out the town's power, and it hasn't had reliable electricity since. The irony is that OLPC had chosen the spot for its dependable power flow so the laptops would have a place to charge.

Now, more than a year later, the computers are dead and OLPC is holding 11,000 new ones in reserve, waiting for the area to regain power.

With luck, and some financial generosity, the wait may not be much longer. Students at two universities, the University of Haiti and Illinois Institute of Technology, have a plan to put solar panels on the schools' rooftops. If they can raise the money to demonstrate their solution at two schools, they think they can scale it up to take laptop charging stations to the region, and even the whole country.

"Everything about our project is designed to scale across Haiti and other countries," says Laura Hoeman a political science professor at IIT who heads the course working in Haiti.



Photo courtesy of IIT

#### Laptops and only laptops

The plan is simple. The stations will provide enough solar power to charge all of a school's laptops, and nothing else.

To do that, the students first calculate how much power the schools will need. For a full charge, each laptop requires 25.5 watt hours. Assuming 5-6 hours of useable sunlight, a school with 350 children would need about seven 250W solar panels, the student teams figured.

Then, the team will rig the system to provide only direct current (DC). DC charges laptops, but not much else. That setup cuts costs by not providing alternating current (AC), and helps ensure that the power is used just for

laptops. The installation could cost about \$7000 per school. And if the laptop charging stations catch on, the costs could drop as the project scales up.

iit  
empowering  
haiti



# Our Progress: Educational Component



Electricity Safety

How does Solar Energy work

Benefits of renewable resources

Natural Disaster Response and Preparedness





# Our Progress: Plans for Continuity





# Moving Forward



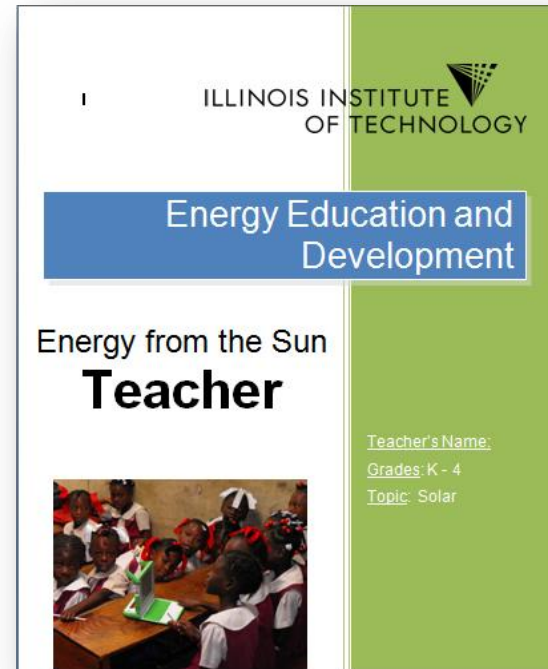
# Next Semester

Learn from the implementation

Improve on the maintenance training and how to- guides

Improve lesson plans to be more effective

Continue to strengthen continuity plans with in-country partners





# Impact



“A quality education is one of the most effective, long-term pathways out of poverty and dependence, toward self-sufficiency”

-- Dr. Laura Hosman

# Questions?

