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IPRO 335
One Laptop Per Child- Haiti

December 4, 2010

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Introduction

- The One Laptop Per Child (OLPC) project provides laptops to developing countries to enrich children's education through technology.
- In 2009 Haiti received 11,000 donated XO laptops
- However 95% of Haiti's primary schools have no electricity

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Objectives

- Design an affordable, replicable, solar charging solution that can be built in country
- Develop a method of regular communication between partners in the US and Haiti to foster collaboration.
- Raise money to pay for a prototype and deployment trip to Haiti

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Building the Team

- 1st Semester IPRO
  - No predefined scope, had to define priorities
  - Built a foundation for future teams
- Collective lack of expertise with solar power installations, particularly in the developing world
- Shared a common desire: Wanting to help those less fortunate

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Our Organization

- Split the work into three initiatives based on different strengths and interests
    - Solar
    - Fundraising
    - Communications
- Each initiative had a dedicated set of three members but new tasks were addressed by the team as a whole

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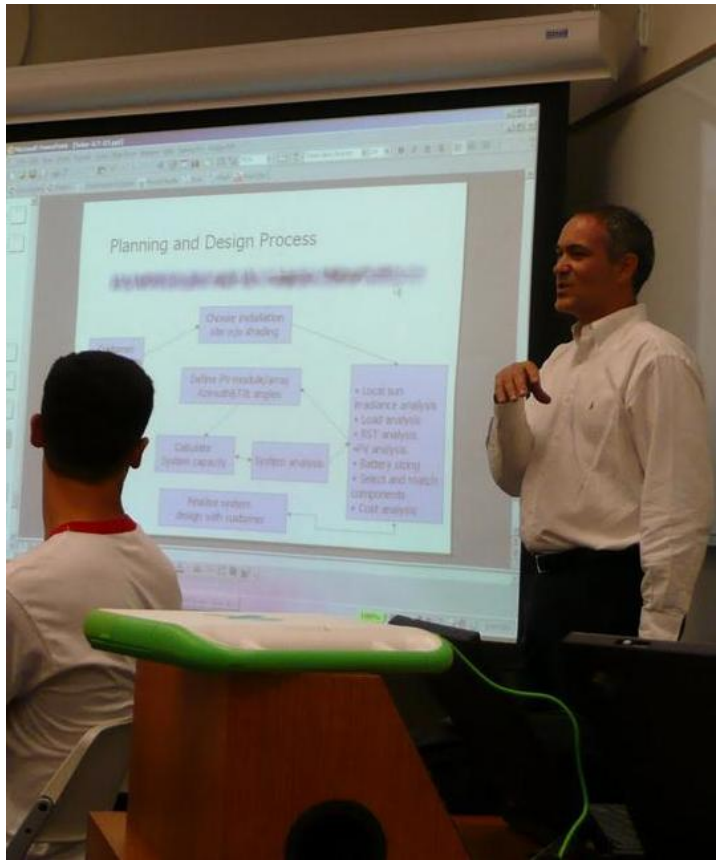
Challenges and Ethical Concerns

- Communication with Haiti
- Financial Support
- Supported by Non-Profit Organization in developing world
- Responsible use of money
  - Prioritization of scarce resources
- Public health and political situation in Haiti
- Hand-up not handout
- Bias of school chosen for pilot

Our Progress

- Held two workshops with Bruce Baikie on solar in the developing world
- Gathered data on XO laptops' power requirements and solar irradiance in Haiti
- Decided on a DC only design
  - Avoids expensive inverters
  - Maximizes efficiency
  - Controls usage to intended purpose



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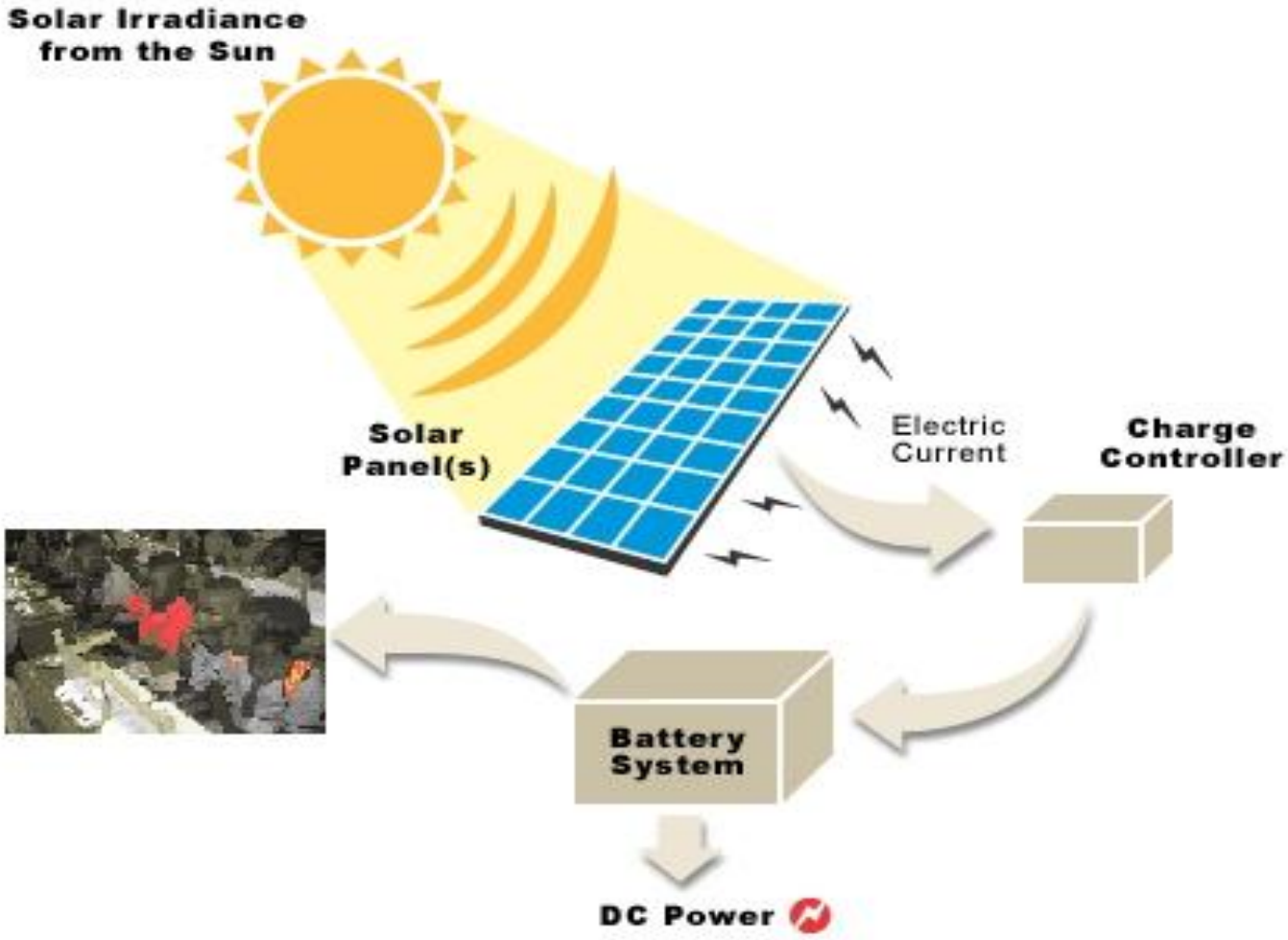
Our Progress



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Our Progress

Mini Model

An XO laptop needs **17 watts (at 12 volts)** of electricity for **1.5 hours** to fully charge a dead XO
THEREFORE
17 watts x 1.5 hours = **25.5 watt hours per OLPC XO**
For **4 XO laptops**...
4 XO's x 25.5 watt hrs = **102 watt hrs**

Assuming a minimum of **4 hours** of direct sunlight, the size of the solar panel would be....
102 watt hr / 4 hours = 25.5 watt solar panel = **round up to 30 watts**

The battery required to charge the 12 volt XO laptops would be...
102 watt hr / 12 volts = 8.5 amp hr = 30% overhead factor = **12 amp h**

Pilot School

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**

Our Progress

Bill of Materials (mini model)

Item	Price	Supplier
30 watt solar panel	$99.95 ($123.99)	Amazon.com
12 volt 12 amp/hr Sealed Battery	$27.95 ($32.70)	Amazon.com
10 amp Charge Controller	$39.99 ($49.99)	GoldenGadgets.com

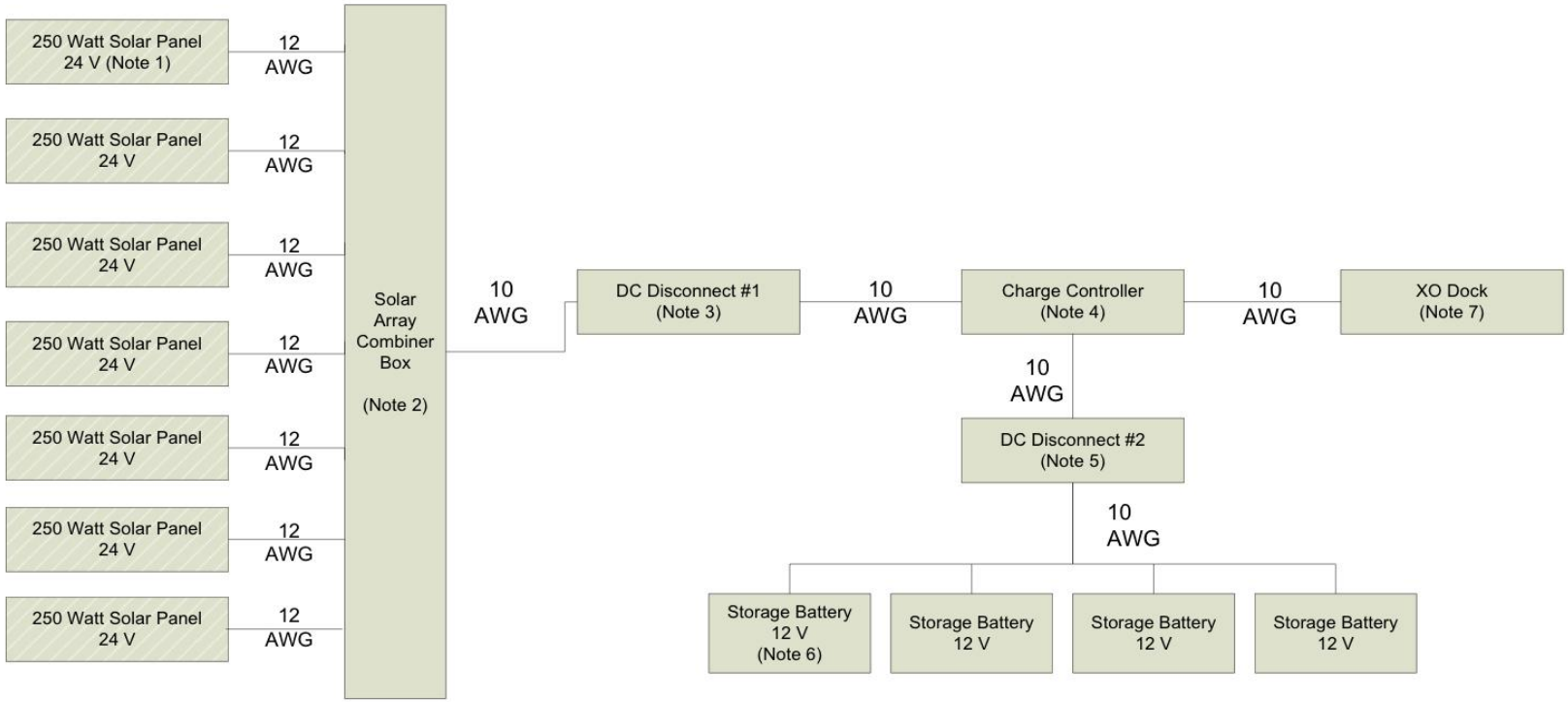
Total: $167.89 ($206.29) (with tax and shipping)

Bill of Materials (pilot school)

Description	Unit	Qty	Est. Cost	Extended
Sealed Gel Battery 12 volt, 225 amp/hr	Each	4	$651	$2,604
Solar Panel Module	Each	7	$570	$3,990
Charge Controller	Each	1	$700	$700
Electrical Wiring	Feet	100	$2.50	$250
Battery Interconnect Cable	Each	8	$18	$144
XO Charge Cables	Each	324	$1	$324
Solar Panel Mounting Materials	Misc.	6	$75	$450
Fuse and Safety Equipment	Misc.	1	$25	$25

Estimated Total Expense: $7,917

Our Progress



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Our Progress

- Built a prototype model of our solution

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Our Progress

- Guy Serge Pompilus, Haiti OLPC coordinator and project sponsor, introduced three potential pilot schools for first installation, each with different conditions

- Decided to tailor the solution to 350 laptops, the average number per school

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Our Progress

- Met with XO dock group at San Jose State University with similar initiatives as ours
    - Docking station for XO laptops to complement solar solution
- Created an external website to promote the project: www.iitempoweringhaiti.org

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Our Progress

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

Home | Our Solution | Project Updates | About | Photos | Donate

We are a group of nine undergraduate students at the Illinois Institute of Technology who, with the support of faculty and industry advisers, are working to improve the conditions of education in Haiti, by helping to support the implementation of the One Laptop Per Child Program. Our goal is to foster collaboration between partners in the US and in Haiti and to create a sustainable energy solution that will enable the children to use their XO laptops freely.

Interested in Donating?

CLICK HERE

Our Partners

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1 one laptop per child

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Our Progress

- Applied to the following grants:
  - Internet Society Community Grants
  - Society for New Communications Research
  - NCIAA Sustainable Vision Grants
- Set up a donation link for the website
- Fundraised in multiple ways around campus

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Society of New Communications: Certificate of Merit

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Impact

- Transform educational experience for 350 students and their families.
- Raising awareness of renewable clean energy
- Raised awareness about situation in Haiti
- Assisted OLPC Rwanda in designing a solar solution

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Going Forward

- In the future our IPRO, we would like to perform the following tasks:
  - Develop a more reliable method of communication between XO communities
  - Develop a curriculum for the XO Laptops
  - Teach local engineering students how to maintain and create other solutions
  - Develop a method of sizing solutions for other XO communities

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Questions

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