Dominican Republic site visit 8/5 to 8/9
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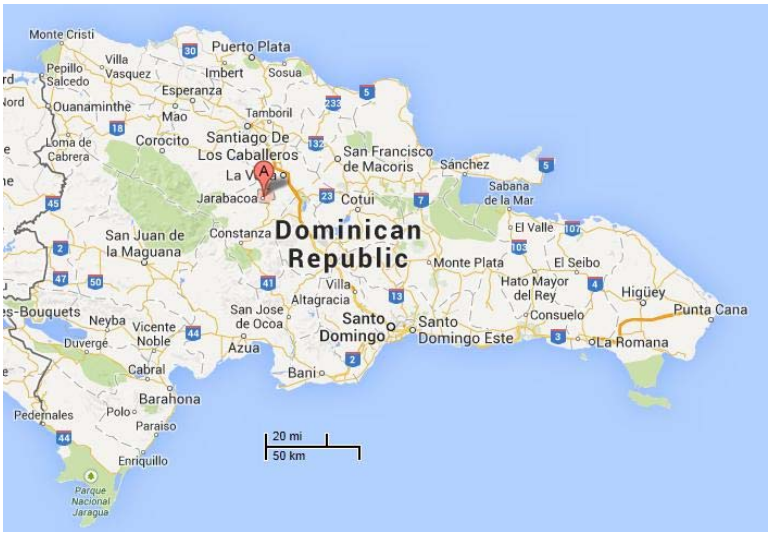
Hello, on August 5 to 9 I visited the Dominican Republic to look at potential sites for the study abroad program. I stayed at the Crosswinds Youth facility in Jarabacoa. We visited and evaluated 7 potential sites.



The initial sites proposed by Crosswinds were:

1. A small community of 200 people called Mata Deplatano does not have reliable electricity. A potential solution is a needed generator(s) powered by solar panels.

2. There are schools in Corosito that have electricity but it is random. A potential solution would be solar panels to consistently provide power for electricity.

3. Students international has a medical clinic that can only be used during the daylight because they have no electricity. A potential solution would be solar panels to power a needed generator.

My objectives for each site were to evaluate:

a.) the general need for supplemental energy
b.) the potential for cultural exchange
c.) the costs of installations
d.) the technical merits or potential for learning

The Camp

The Crosswinds camp (http://crosswindsyouth.org/) is a Christian camp for troubled teens and is located in the Dominican Republic. Crosswinds host various schools and churches for service and mission trips. The campus includes numerous modern and well maintained buildings for lodging to include hot water, electricity and nice beds with Wi-Fi. It also has an open air dining hall and adjacent kitchen that serves pretty good food three times a day. Water is bottled and provided throughout the camp. The camp uses grid power for much of the time but when it is down they have a backup generator. It is a very nice camp which could easily accommodate 12-24 students with separate apartments for the faculty.

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Comments on visited sites

Site 1 (Majaguita): site visit to a village with both a bio digester and hydroelectric generator. They have a 10KW system that was generating 220 volts at about 100 amps. The system was put in by Cornell about 16 years ago and is about 15 minutes from the camp. To get to the village requires you to go down over 200 steps. There is a river that is near the village. The elder is forward thinking and he wants to improve their electrical system. The bio digester doesn't look very good and there a smell that I didn't notice from the system in Costa Rica. The electrical system is off- grid. They also had a small PV system that was recently stolen.

Site 2 (Angusto): Small village with very bad roads about a half hour away from the camp. May not be easy to access during the spring or winter breaks because the roads pretty bad during the rainy season. Building construction was poor, some homes did not use standard lumber (this may be true for most of the homes I saw). The spacing between rafters looked pretty wide, maybe 3 feet. Would probably need structural reinforcement before installing solar panel. We looked at one person's home with a usage of, $30 per month: Refrigerator, lights most important, TV and Washer? Typically, electricity is out 3 to 4 hrs per day. The typically bill was 82KWh to 65KWh per month at 4.44 pesos per KWh.

Site 3 (Hipolito): in town site. The camp has done a lot of work to include a building a bridge, basketball court and house. No official electricity. Nice people, kids playing baseball. Maybe it would be a nice site for a simple PV install. Quick visit, many homes are poorly built or are cinder block or concrete homes.

The row of houses they we walked beside are in the most need. There are approximately 7 homes in this very low income area. Perhaps, bringing power into the middle of these houses and dispersing it out would work best. This entire row of houses sits on only approximately 3/4 of an acre of land in that particular area. The entire community (along with the section across the baseball field) sits on approximately 6 acres and has approximately 20 houses.

Site 4 (El Callejon): this is the 3rd site recommended but not really. The main community build has a great roof for a PV panel. Jayson York said that they would need to power 6 to 8 lights and then they have mixers, maybe a refrigerator, they show movies and do a little medical stuff in the facility. I took a picture of the back of the facility. We also saw the school, looked like it has a good roof for solar, newer structure. We also saw the insides of one home and it was very bad, no panel, just small wires strung around the house. People steal electricity and it looks crazy at the utility pole. Jayson said that the Dominican Republic is in an energy crisis because people are not paying for their electricity. Steve Frew found out that the cost of one home was $50 per month.

Site 5 (Haitian Community Center): install a PV system on the roof of the main building. Unknown power needs but electricity is new. The site needs lights and other stuff. The service panel will probably be replaced. Wesley said that they get about a 40 volt drop from the transformer to the property. He wants to install a transformer off the "hi" voltage and step it down to 120. Wesley has experience with PV installs and knows what he wants. He does have some trees that need to be removed or topped for solar and protection of the roof. His son will remove or top the trees. No real hydro opportunity but the structure is well built. He has big plans.

Site 6 (Mata Deplatano): this is the 1st site recommended. The site was a small town on the side of a hill which had just been hooked up to the grid. Before they were paying about 500 pesos per month but the cost will go up a lot after the power use is measured. New power meters were on the sides of homes. We looked inside of the "mayor's" home and saw an inverter that did not work. He had two batteries hooked up as well but they were disconnected. He did have a small ground rod connected as well. The roof was flat and was facing south with great exposure. There is also a new church which has a tree that would block the sun but is right next to the flat roof house and could possibly share power with the church. This village only has 110V

Site 7 (Pinar Quemado): this site is close to the camp and the camp has already done a fair amount of work to improve the quality of life of the people. Some of the Dominican camp staff lives at the site. The possibility of a solar project is not that great because of the number of trees and poor structures, but maybe a pole mounted solar array would work. There is some electricity available but it is "iffy". I believe it is metered.

Assessment of sites

All sites visited have been evaluated using a Pugh Chart but it should be noted that all sites need some help in the form of alternative energy. The generation and distribution of electricity is the Dominican Republic is poor with few natural resources to generate electricity and the reliability is poor with nearly daily power outages. Many people are faced with large electricity bills with no way of paying for it. Alternative energy could be very helpful for energy augmentation for all sites.

Sites		**Selection Factors**				**Score**
		need for supplemental energy	potential for cultural exchange	costs of installations	technical merits or potential for learning	
1	Majaguita	1	4	4	4	13
4	El Callejon	3	3	2	3	11
6	Mata Deplatano	2	3	3	3	11
3	Hipolito	3	3	2	2	10
2	Angusto	2	3	2	2	9
5	Haitian Community Center	2	2	3	2	9
7	Pinar Quemado	2	3	1	3	9

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Appendix

Pugh Chart Generation

Selection Factors

a.) need for supplemental energy - how much does the site actually "need" supplemental energy?
b.) potential for cultural exchange - how much opportunity does there exist for cultural exchange?
c.) costs of installations - what is the expected cost of installation?
d.) technical merits - how much could the students learn from the install?

a). need			b). exchange			c). costs score			d). merit	
doesn't have	4		great	4		0 to 1K	4		great	4
stealing now	3		average	3		1K to 2K	3		average	3
has it	2		minimal	2		2K to 3K	2		minimal	2
self sufficient	1		none	1		More than 3K	1		none	1

Site 8 – The Crosswind Camp

The camp is a multi-building site. It has a large 100KW Generator driven by a Cummins diesel motor. The generator produces two 120 volts lines that are distributed about the site. When the grid goes down, they must disconnect from the grid and start the generator. The loads are added incrementally using knife switches that are manually controlled. Some of the buildings require 220 for water heaters. Some buildings have inverters and batteries as supplemental power for when the power goes off. The inverter types vary from 0.5KW to 3.5KW (uses as many as 8 deep discharge batteries) but the majority of the inverters are 2.5KW (using 4 batteries). There are 15 to 16 inverters (2.5 KW) that cost about $1,000 each and typically use 4 to 8 six volt batteries hooked so that 24VDC is produced. Batteries cost $150 each. Richard showed me the generator and the process is to run the generator when the grid goes down (this happens daily for as much as 4 hours or more). The knife switch has a neutral, grid or generator selections.