MIT PSC Grant Application
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Total Requested: $1900

Abstract:

There are many unelectrified islands in the Philippines whose inhabitants want better access to electricity. TinyPipes brings power connections to homes that don't have access to grid electricity. The company uses solar panels to power up homes wherever there is sunlight, and controls the network of solar panels through a cellular connection. It works just like a traditional power grid, just without any power lines.

Dates and Times Available:

Free entirely during the next two weeks. The sooner the better.

Application:

The people living on Alibijaban Island in the Philippines are reliant on electricity, and go to long lengths to obtain power. Many of them use boats to ship car batteries back and forth between the electrified mainland (where they charge the batteries) and their homes. The process is inefficient and expensive. Although the Philippine government is looking for excuses to expand their nation's grid, the people of these small islands do not use enough power to make the infrastructure investments economically feasible.

You see, it's kind of a chicken and the egg problem. These people want electricity, but they are limited to consume only what they can store on their battery, before they have to travel back to the mainland for a recharge. No one has data on how much energy they consume now, nor can the utility companies predict how much these people would consume if they had access to the grid. Instead of making an infrastructural investment and hoping that it will at least break even, the utilities have decided not to extend the grid. But there is a solution.

TinyPipes installs solar panels on homes that don't have access to grid power. The panels are controlled over the cellular network, which is mature in the Philippines. Each panel can be turned on and off, and can report the amount of energy consumed. These panels can initially supply the entire amount of energy typically consumed by an average household. TinyPipes can collect data on how energy consumption increases over time with access to an excess supply of energy.

To date, TinyPipes has completed about 40 solar installations on Alibijaban Island. An installation takes about 30 minutes, but each installation is kind of a work of art. TinyPipes engineers determine the best way to mount the panel, then quickly get the work done. This process isn't sustainable, so one thing I'll be working on is to help design and revise the process that TinyPipes installers follow when they check off homes, site the installation, and install the panels. Additionally, I'll be spending two weeks in Shenzhen improving the robustness and capability of the current panels, and prototyping hardware for the next panels. This includes the design of a battery life monitor to alert homeowners when their batteries need to be replaced.

Alex Hornstein (founder of TinyPipes) and I have already talked about what I'll be doing and have brainstormed possible solutions. I'm excited to work with Alex - he's an amazing guy who I have a lot to learn from. Working on TinyPipes will give me more perspective when it comes to figuring out what I want to do after school, since I've determined working at a typical company is not for me. I'm excited about renewable energy and sustainable technology, in the sense of not letting our technological advancements get ahead of themselves. I've also been captivated by the idea of rural living, and am excited to experience it firsthand in such a beautiful and distant part of the world.

Budget:

The travel expenses are as follows:		Source:
$1650-1200	round trip flight to Hong Kong	PSC
$250	round trip flight to the Philippines	PSC
$200	Chinese visa	PSC
Engineering expenses:		
$600	Prototyping PCB Expenses	Out of Pocket
$200	Prototyping Component Costs	Out of Pocket
$300	Prototyping Panel Costs	Out of Pocket
Food and Board:		
$100	Food	Out of Pocket
$0	Couches are free	

The engineering expenses are based off of typical costs for prototyping and small-run production.