

WESOL Y-PRIZE COMPETITION

February 27, 2015

OVERVIEW

1. Project Background and Description

Modern energy services are critical to a nation's economic development and overall human well-being. Yet an estimated 1.2 billion individuals globally live without availability to electricity, 95 percent of these living in sub-Saharan Africa. About 600 million people from these desolate regions light their homes using candles or kerosene lamps. The issue is that they dim, cost a minimum of \$35 per year to keep fueled, create poor indoor air quality, and cause fires that can devastate an already desperate family. Today, advances in technology and a greater understanding of renewable energy resources have made it possible to bring electrification to such regions.

2. Project Scope

Due to certain conditions, such as environment, demographics and political stability, specific regions of Uganda have been identified as favorable areas for a solar business venture. Uganda is located near the equator, resulting in nearly 2408 hours of sunlight per year, good for solar power. In a country that is currently one of the fastest growing in the world, with about 80 percent of the workforce employed, solar power has been found to be a vital assets to businesses and individuals. As a result much of the population is already familiar with solar power and it's potential.

3. The Solution

We propose combining the use of solar technology and 3D printing to create a product that will meet the needs of the people as well as reduce the cost of an already expensive resource – light. Currently the cost of kerosene lighting is \$2.76 per month or \$13.79 for five months. Compare this with the cost of a simple solar kit consisting of a one watt panel, lantern and battery which goes for \$13.45 and last for as long as ten years. By using 3D technology to make our own solar lamps, we could reduce the cost even more from the already existing solar lamps on the market. This technology is environmentally friendly and can easily be made and assembled in country at established vendors (refer to Partners), creating more job opportunities. Not only does this have monetary value but this will also improve lighting quality, cut down on emissions from toxic fumes and reduce the potential for unintended fires. Business will be able to run at night and children will have more time to focus on their studies. Such a proposal obviously comes with concerns. Some of those include the high up front cost for most Ugandans' that live on less than a dollar a day, limited credit facilities to finance such a purchase, limited education on how to use the solar lamps, and overcoming societal norms. The main assumption that we need to validate is that people will purchase the lights even with the high upfront cost. We are investigating different purchase methods to see what would be the most feasible.

4. The Team

Tyler Young is a MBA student in marketing who has worked for 2 years as a technical sales consultant in the 3D printing industry. Jonathan Wilson is a Civil Engineering student and has experience with 3D modeling software (NX and AutoCAD). Jintoku Tai is a finance student and has lived in France, Japan, Taiwan, China, and the USA and has strong knowledge of international relations. Tyson James is a Civil Engineering student with internships in Moscow and Shanghai, and works in 3D printing having done projects such as 3D printing whistles for a concert in Kenya. Jiaqun Wang (Alex) is an Information systems major with a computer science minor. He was born and raised in China, and has a fast adaptation to new environments. Tim Snow is a Civil Engineering student and has been

involved in several business competitions as well as humanitarian organizations. Tim also has experience in design and computer program applications.

5. Project Details

Our idea incorporates the technology of 3D printing to produce the casing of the solar lamps. This technology gives us complete customization for each product to suit each client personally. It also lets us manufacture in-country avoiding potential supply-chain and political problems. We are assuming that we will be able to reduce cost and avoid political bureaucracy by manufacturing in country. We will need to validate this by talking to our partners to determine the real cost of manufacturing in country. Eventually we would like to print the solar panels as well. In addition we want to recycle plastic into the filament (material) that will be used to print the solar lamps. This would reduce our cost to create the solar lamps, clean the environment, and make our products more sustainable as they are recyclable. We have decided to manufacture our own lamps to reduce the cost and difficulties in supply chain. We see this as a valid option because we had a strong contact in country who provides immediate access to labor and resources. Our contact will also assist in understanding the political and cultural hurdles that we will encounter.

6. Partners

Tunapanda: Non-profit organization that trains people to become self-sufficient via digital technology. They have computer networks in Kenya, Tanzania, and Uganda with classes that could be oriented towards the creation of solar lamps. They won a Gigabot 3D printer last year and are eager to jump on opportunities to use with their printer. The co-founder, Jay Larson, used to work for NOMADD, a solar energy startup company, and is an entrepreneur in global technology. Tyson personally knows Jay and has introduced the idea to him. Jay has shown continued interest.

Tech 4 Trade: Non-profit organization that supports sustainable and scalable technology to alleviate poverty. They could help us scale our business with more printers and help recycled filament with their program, The Ethical Filament Foundation. Also we could reach out to The Plastic Bank as well.

Locals: They would be a huge asset to the overall success of the project. Locals would collect recycled material to be used for making the solar frames. Students from Tunapanda would learn the technology behind 3D printing and create the products.

7. Distribution Strategy

We will build out a sales campaign that will first focus on awareness and teaching, then capturing the customers. We have several ideas that will build awareness. The first thing we will do is to take a 3D printer to several villages each day then we will demonstrate the power of the 3D printer and print out the name of the village. We then go back to the villages after dark and provide a product demonstration. This will help us to market to and influence our target customer. Our target customer is an influential member of the village who will help spread the word about our products. The second part of our sales strategy is capturing our customers. One way that we will make sales is in the village on the night of the product demonstration. The second method and the bigger opportunity for us is to sell in the big markets held in Kampala. Each year there are several major markets held in Kampala and we will focus most of our sales at those large markets. This is a huge assumption that we are making. From our initial research and talking to people in the country we believe that the summer markets are a large enough event to sell many lights. We will have to continue to validate this assumption with more research. We will talk to more people look for the amount of sales volume that normally occurs in the markets.

8. Conclusion

We propose to manufacture 3D printed solar lights in Uganda in association with several key partners. 3D printing the light casings and manufacturing in Uganda will reduce costs, allowing us to reduce the price of the light. Our contacts in Uganda will provide immediate access to personnel and information to startup. The summer markets will assist in the sales process. In conclusion, we have identified a market and strategy to reach that market quickly and effectively.