SolCom Feasibility Study: New Solar Products

Social Entrepreneur Corps G8 2014
Team Oportunidad

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I. Introduction

Let there be light! Juntar Familias con Lamparas (Join Families with Lamps), the new name given to the Unite to Light Lamps, demonstrates our vision for the future of SolCom solar lamps. This guide assists in assessing the feasibility of introducing new solar lamps into SolCom's product line. We explore SolCom's solar lamp market history, empirical survey data from four field sites around Guatemala, and product comparisons between the LumiCuarto and the two new Unite to Light lamps to determine our conclusions and recommendations.

Social Benefit of Solar Products

Many Guatemalans live in rural and agricultural communities with no access to electricity or experience regular blackouts. According to the Social Progress Index 2014, 18% of Guatemalans live without access to electricity.

In households lacking consistent access to electricity, solar lamps provide a cheap, effective, and easy-to-use alternative to more commonly used light sources in Guatemala, such as candles and gas lamps.

Methodology

To evaluate the feasibility of introducing the JFL-1 and JFL-2 to the SolCom product line, we analyzed the solar lamp market by conducting surveys and observing consumer impressions at campaigns. Additionally, SolCom employees and our team field-tested the LumiCuarto, the JFL-1 and the JFL-2 to determine the strengths and weaknesses of each lamp.

Additionally we contacted the President of Unite to Light for further information about the JFL-1 and JFL-2, in order to establish a better understanding of Unite to Light as a company.

Introduction of new lamps

We specifically looked into the possibility of introducing two different Unite to Light Solar Lamp models: the JFL-1 and the JFL-2. The JFL-1 is smaller, more portable, more durable, and significantly cheaper, while the JFL-2 has USB charger capabilities, a brighter light, and more advanced battery technology. Based on our experience using both of these new lamps, as well as the already introduced LumiCuarto solar lamp, we believe that introducing the JFL-1 into the SolCom product line would provide access to a previously untouched section of the market. However, the JFL-2 functions similarly to the LumiCuarto at a higher price, making introduction into the SolCom product line unpragmatic.

II. Feasibility Study of New Solar Lamps

Overview of Solar Lamp Market and SolCom's Participation

SolCom first introduced solar lamps into its product line in 2008. Since then, sales data has shown that solar lamps are extremely profitable, especially in the Huehuetenango and Quiche regions. We received SolCom solar product sales data for the years 2012 and 2013. Within this one-year period, SolCom experienced a 46.49% decrease in sales (see table below). Although this change is discouraging, we do not believe that the data implies a saturated market.

Due to convenience and ease of access, SolCom has a history of accessing the same communities repeatedly. Due to this tendency, small individual community markets may have been saturated within this timespan.

Region	2012 Sales	2013 Sales	Difference	Percentage
Xela	89	37	(52)	58.43%
Antigua	334	48	(286)	85.63%
Huehuetenango	1201	654	(547)	45.54%
Quiché	1303	809	(494)	37.91%
Sololá	10	14	4	40%
Cobán	401	224	(177)	44.14%
Total	**3338**	**1786**	**(1552)**	**46.49%**

Figure 1: Year on Year Analysis of SolCom Solar Lamp Sales

Potential for Introducing New Lamps

We believe there is still potential for growth and expansion in the solar lamps market within Guatemala. Although recent sales trends are discouraging, we believe introduction of new technology, a wider variety of solar lamp models, and outreach to new communities, can reverse these trends and lead to future growth in social impact and profits made through SolCom Solar Lamp sales.

Survey Results and Analysis

Over the course of our eight weeks in Guatemala we conducted 114 surveys in the regions of Quiche, Huehuetenango, Sololá, and Xela in the different communities where campaigns were held. Through our survey we sought to analyze the solar lamp market, the effectiveness of SolCom's outreach methods regarding solar lamps, and what characteristics of solar lamps consumers find most attractive.

To conduct the surveys in areas where SolCom has an active presence, we asked other community consultants working in different regions to conduct surveys at the different campaigns they attended. Using this methodology, our surveys gave us a comprehensive understanding of the areas in which SolCom works.

After receiving feedback from Miguel and Ricardo during our presentation in Nebaj, we tried to find trends amongst rural and urban populations. To distinguish between these two groups, we looked at access to electricity and the prevalence of power outages in individual homes.

We tried to establish some trends based upon these two variables, but we were restricted by a limited sample size due to our limited time at campaigns and field sites.

Of those people with no access to electricity, or that experienced at least one power outage a week, only 22% had received information regarding solar products prior to campaign day. Of the people with access to regular electricity, and with less than one power outage per week, 30% had access to information regarding solar products. This could suggest that those with the greatest need for solar products are not being reached by SolCom campaigns and publicity.

Our survey data shows that only 12% of people, or 14 respondents attending SolCom campaigns, have no access to electricity. Out of these 14 people without access to electricity, 7 of them had a solar product in their home and 7 knew no one with solar products. This data suggests that SolCom is not reaching out to communities with the greatest need for solar products. The majority of these respondents came from Quiche and Sololá. Respondent answers show that people in these rural areas without access to electricity have a demand for solar products. Therefore we suggest continuing to reach out to populations with limited access to

electricity. After collecting information from Regional Coordinators of Huehuetenango and Nebaj, we suggest trying to access more rural communities in Huehuetenango where there is a significant portion of the population living with inconsistent access to electricity.

Our surveys also gave us data regarding consumer preference between different kinds of lamps and lamp characteristics. We also looked at preferences towards table or portable lamps. According to the survey data consumers demonstrate equal desire for portable and table lamps. The data also shows that consumers value battery duration and durability of solar lamps the most, followed by brightness. The majority of consumers do not highly value the design or color of solar lamps.

Our data has shown us that there are opportunities for SolCom to expand its reach and access communities with a greater need for solar lamps. We will use this data in conjunction with our lamp analyses to provide our recommendations for future implementation of the JFL-1 and JFL-2.

Organizational Capacity

When looking at the feasibility of introducing the JFL-1 and JFL-2 to the SolCom product line, it is necessary to look at SolCom's business model and its capacity to introduce new products. The presence of a market and marketable products are insufficient without an infrastructure to support their introduction.

In order to successfully introduce new solar products, SolCom needs to have an effective domestic and international transport system in order to avoid unnecessarily inflating retail prices. SolCom must begin to expand their reach of operation to incorporate more rural areas with less consistent access to electricity, or individual community markets will become saturated.

Accessing new communities could remedy this issue. SolCom's ACs also have a tendency to specialize in certain products, frequently in eye exams or water filters. This specialization may also negatively affect solar lamp sales.

More intensive AC training in Solar Lamps could remedy the issue of an AC not having adequate knowledge of the product to effectively sell solar products. Additionally, this training would help complement the introduction of new solar lamps by providing the ACs with sufficient understanding of the strengths and weaknesses of each lamp to tailor their pitch to certain consumers.

In order to initiate the introduction of a new product, capital is required to purchase the product in sufficient bulk to test the compatibility of the product with the Guatemalan market. If SolCom does not have access to this amount of capital, transportation and retail price of the

lamps will be driven up. With a appropriate number of lamps, SolCom will allow the product to reach maximum potential in various regions.

Overview of Unite to Light

History and Founding

Unite to Light was founded in 2009 by John Bowers and Claude Dorais. The original mission of Unite to Light was to address the health problems faced by individuals in Ghana who were using kerosene lamps and/or candles to read and to light their homes. While working primarily in off-the-grid areas in Africa, Unite to Light is currently sending lamps to 60 countries via connections with their 100 partner organizations.

Business Model

Unite to Light designs their solar lamp technology at the Institute for Energy Efficiency at the University of California-Santa Barbara (UCSB), and then sends those designs to China to be manufactured. As of June 2013, Unite to Light manufactures two different solar lamps, the smaller UTL-1 and the larger USB-enabled UTL-C. For our purposes, we have renamed these lights as the JFL-1 and JFL-2, respectively.

As an NGO, Unite to Light is funded via lamps sales and donations. Through its "Buy 1 Give 1" program, Unite to Light partners with individuals and non-governmental organizations to distribute their lamps. If coming from individuals, the JFL-1 and JFL-2 are distributed free of charge by Unite to Light. When other NGOs purchase lamps from Unite to Light, they will either distribute them free of charge or subsidize the cost of the lamp for consumers. When buying in bulk of at least 100 lamps, Unite to Light supplies the JFL-1 at a cost of $7 per lamp. For the larger JFL-2 lamp, the cost when buying in bulk is $30 per lamp.

Market Participation

A major part of the market for the JFL-1 and JFL-2 lamps, as identified by Unite to Light, is students who use the light to complete their homework. In response to this market, Unite to Light developed the larger, USB-compatible JFL-2, so that students could use the light to recharge e-readers for further study.

Because of the relationship between Unite to Light and UCSB, the design of the lamps changes in response to feedback from lamp recipients, donors, and partner organizations. Currently, Unite to Light is developing a larger lamp with a separate solar panel similar to the LumiCuarto.

Interview with President of Unite to Light Dawn O'Bar

After speaking with Dawn O'Bar, the President of Unite to Light, our team learned that, in an effort to increase the economic sustainability of Unite to Light, she is searching for a market approach like SolCom's micro-consignment model. Under the current model of donating the JFL-1 and JFL-2, no strong grassroots distribution system or market has developed for the lamps. When transportation and importation costs are considered, the current "Buy-1 Give -1" model is even less sustainable. Their desire to partner with SolCom and other similar organizations stems from Unite to Light wanting to move away from operating via donations and into a model where the market really drives Unite to Light.

LumiCuarto Overview

The LumiCuarto is the existing solar lamp in the SolCom product line. It has been sold by SolCom for 6 years and has proved relatively successful given the market history we discussed earlier.

It is a durable lamp with three battery levels: high, medium, low. These three levels have 5, 7 and 14 hours of battery duration, respectively. In our experience, the highest level is sufficient to light a room, the second useful for reading and the third similar to that of a candle.

Other significant features of the LumiCuarto are the water resistance of the panel and the strength of the light. Additionally, it takes 4-6 hours to charge.

After having sold the LumiCuarto at our 11 campaigns over the summer, we have gathered some general feedback from consumers about the LumiCuarto. The features people find most attractive are the fact that the panel can be kept outside due to its water resistance and that it still charges, albeit more slowly, in foggy or cloudy weather. Furthermore, its ability to charge phones is appealing; however, it was not able to charge every phone tested at campaigns.

The current sale price of the LumiCuarto is 225Q, and this price has deterred many customers from purchasing the lamp. Particularly in Huehuetenango (Aguacatán), while carrying out surveys, many people stated that they were unwilling to buy our solar lamps simply because they were too expensive.

Now that the solar lamp market is established, SolCom wants to look for other solar lamps that could potentially complement or replace the LumiCuarto.

JFL-1

The JFL-1 is a small, portable, one-piece lamp that serves as a reading light or a flashlight. Its brightness is 15 lumens and it is water

resistant. To clarify, this means that the JFL-1 is not functional when wet, but will not break upon contact with water. The JFL-1 is only functional when completely dry. It is a stable lamp with an additional wall fixture hook on the back for added convenience.

The seemingly flimsy neck of the JFL-1 poses a potential issue for this lamp. Unite to Light estimates that the lamp has a life expectancy of 10 years. We suspect that this lifespan is an overestimation given the thin lamp neck; however, we do not have the resources to provide a better estimation. Additionally, the JFL-1 does not have the capacity to charge phones.

JFL-1 vs LumiCuarto

Unlike the two-piece LumiCuarto, the JFL-1 is a single unit lamp and solar panel making it more portable than the LumiCuarto. With only one setting, the JFL-1 cannot light as large of an area as the LumiCuarto on its high or medium settings. Moreover, the JFL-1, because of its smaller lamp neck, may not be as durable as the LumiCuarto. However, the JFL-1 is much more stable than the LumiCuarto, and will not topple over when the lamp neck is adjusted. The light from both lamps is sufficient to read and write. And unlike the LumiCuarto, which has an unmarked black button to change the levels of the light, the JFL-1 has a clearly marked on-off switch, so that the user knows exactly when the lamp is off and ready to charge. To conclude, we feel that the JFL-1 and the LumiCuarto appeal to different markets entirely.

Recommendation

We believe that the JFL-1 may allow individuals living in more rural and impoverished areas, with less access to the electricity grid, to enter the solar market and purchase a lamp. The JFL-1 also provides an alternative for potential customers who are in the market for a smaller reading light. Think of this as the "gateway solar lamp" that will increase consumer comfort with the idea of solar products. Since the JFL-1 serves a different purpose than the existing lamps in the SolCom product line, the JFL-1 will enable SolCom to access a previously untouched portion of the solar lamp market.

In bulk (considered to be 100 units or more) the JFL-1 costs $7, converting to roughly Q54. After looking at the LumiCuarto price determination, we calculated that the AC commission was approximately 20% of the initial price, and SolCom's commission was roughly 40% of the initial price. After factoring this in to the initial Q54 price of the JFL-1, the total came to Q90. Recognizing that SolCom is aiming to become self-sustainable and Q90 is a relatively low price, we recommend adding a

further Q10 for a final sale price of Q100. Our final recommendation is to sell the JFL-1 at Q100.

JFL-2

The JFL-2 was Unite to Light's response to consumer demand for a larger lamp after the release of the JFL-1. With dimensions of 8 inches x4 inches, this table lamp possesses a sturdy base. Additionally, the lamp and solar panel are combined in this single-unit lamp. The JFL-2 also has a wall fixture hook on the underside of the lamp, and hanging will not damage the lamp.

This model features two light settings and a USB port, allowing the user to charge both phones and tablets. The USB port allows for charging a variety of electronics with easily accessible adapters via a standard USB wire. However, this advancement came at the expense of the water resistance of the JFL-1, due to the intricacy of the circuits in the JFL-2.

JFL-2 vs. LumiCuarto

The JFL-2 and the LumiCuarto are similar in size and functionality. Both lamps have phone-charging capability, and both are capable of lighting a room. The JFL-2 does have a USB port, giving the lamp the ability to charge a wider variety of phones than the LumiCuarto. The USB also allows for charging devices such as tablets. With a reinforced lamp neck, the JFL-2 is more durable than the JFL-1, and also more stable than the topple-prone LumiCuarto. Both the LumiCuarto and the JFL-2 have unmarked buttons to change the levels of the light. This means that if the light loses its charge while in use, the user will not know for certain how many times to press the button in order to turn off the light for charging. Additionally, while the solar panel of the LumiCuarto is waterproof, the all-in-one panel and lamp of the JFL-2 is not.

Recommendation

The JFL-2, with its phone-charging capability and multi-setting lamp, is likely to appeal to the same market already serviced by the LumiCuarto. Although it does have better stability and a USB port, our recommendation is to stick with the LumiCuarto, since it can be sold a lower price and serves a similar function to the JFL-2 with the added key feature of water resistance.

The base price of the JFL-2 is $30, although the Unite to Light President mentioned that she would be willing to cut this by a few dollars if they were purchased in bulk. After this potential $3 reduction, the price is $27 per lamp or about Q216. Following the same methodology as the JFL-

1 section above, by adding a 20% AC commission and a 40% SolCom commission, the final sale price comes to Q345. Clearly, for a similar lamp, it out-prices the LumiCuarto. The only feasible way to sell the JFL-2 would be to cut commissions, which would be counterproductive in SolCom's mission to become self-sustainable. Therefore, we recommend not selling the JFL-2.

Comparison Overview Table

	LumiCuarto	JFL-2	JFL-1
Brightness	55 lumens (on highest setting)	45 lumens (on highest setting)	15 lumens
Number of Settings	3	2	1
Battery Life (in hours)	5, 7, 14	6, 8	6
Water Resistance	Yes	No	Yes
Able to charge cell phones	Yes	Yes (with USB port)	No
Time to charge battery	4-6	Inconclusive, recommended 8 hours	8 hours
Lifespan	2 years	5 years	10 years
Recommended Sales Price	Q225	Q345	Q100

III. Evaluations

In summation, after taking into consideration our survey data, market analysis, and observations, we recommend introducing the JFL-1 at a price of Q100 into the SolCom product line. As mentioned before, this price will contribute to SolCom's goal of self-sustainability while expanding SolCom's reach into the solar lamp market. Due to higher cost and comparable target market, we recommend against selling the JFL-2. However, we recommend establishing a relationship with Unite to Light, as they are an innovative company that is continually redesigning their solar lamps to respond to the needs of their consumers. These suggestions are applicable in the short term. In the future, we advise reevaluating the market and possible new solar lamps regularly in order to maintain relevance in the market and to bring the best possible products to SolCom consumers.