

Applied Sunshine: Lessons learned in Adapting Solar Stoves

Organization Profile

- Year Established: 2011
- Countries of operation: USA, Guatemala
- Headquarters: USA
- Organization type: Solar stove manufacturer
- Product: GoSun <http://catalog.cleancookstoves.org/stoves/273>
- Grant: Pilot Innovation Fund Round II, 2014

Organization Overview

After years of research and development, Applied Sunshine kick-started the sales of their evacuated tube solar cooker through a successful crowd-funding campaign in 2013. GoSun has become the leading name in fuel-free cooking, having delivered thousands of stoves in more than 45 countries. Its quickly growing team shares a strong commitment to the solar-fueled lifestyle and the serving of others with their work.

Grant Objective

Applied Sunshine had already successfully developed and piloted their GoSun Sport solar stove in the developed market. However, the team believed that the product could have an impact on the billions of people around the world who primarily cooked on solid fuels. They decided to test their stove in Guatemala, after testing the product with traditional foods like tortillas and making a contact there that would help them develop in roads in the market. Their project plan was primarily to conduct user centered research and development and complete a new version of their solar stove product for the Guatemalan market. The pilot in Guatemala would also allow them to conducting business development activities, laying the foundations for commercialization of their product in Guatemala and other emerging markets.

Their user centered design process included an in depth customer survey and iterations on the design of the product.

- Designing the product to fit User Needs
- Validating Design Directions via field activities
- Developing a Deeper Understanding of the customer and their relationship to the product

Note: This documents focuses on the grant overall and lessons learned in design as well as product commercialization. An in depth presentation on the findings from the user surveys and Applied Sunshine's design process can be found on the Alliance's website alongside this case study.

Achievements of Grant

Applied Sunshine successfully developed their emerging market prototype product and market tested it with consumers. Dubbed the 'Girasol', Applied Sunshine transformed their small evacuated solar tube cooker to a large cooker able to cook and bake foods for large families.



They were able to test relevant brand names and marketing messages with consumers, settling on the brand name of the Girasol, meaning sunflower in Spanish. Finally, they were able to conduct a product buyback test with the prototypes developed. This was a small sample due to the nature and expense of prototyping, but they determined a willingness to pay of up to \$92 for their product through a buyback test. The results of the test were a surprise given that Guatemalan cookstove users are accustomed to giveaways.

Applied Sunshine believes that the value of the PIF grant was not simply garnering market

intelligence, but that it allowed them to better able to engage with consumers in emerging markets to understand the realities of their value proposition. In developed markets, their value proposition is providing environmentally conscious consumers with a clean alternative technology. In Guatemala, the environmental concern was secondary and they found that users were much more excited by the concept of an aspirational product and the prospect of baking foods.

Despite the successes and learnings associated with the product design, Applied Sunshine was not able to fully commercialize their solar oven in Guatemala. They found it difficult to find an entrepreneurial partner willing to import and market the technology in the country. Applied Sunshine was not ready to take on the role of importing and distribution in Guatemala when the prototype was complete. At that time, Applied Sunshine had invested a significant amount of their revenues from the developed markets to test the emerging market product and had to divert resources back to developed market sales in order to generate cash to sustain the organization. The grant had allowed them to understand the market better, but without staff on the ground and an additional injection of capital into the country, they knew they would not be successful in establishing the market.

Lessons Learned

Even if you are testing a very limited innovation, there are a lot of elements that need to be addressed in a holistic way. In order for these to be realized, relationships need to be in place first. ***Design requires the entire market system of manufacturers, designers, local materials, and local customers.*** Applied Sunshine's core evacuated tube technology was not going to change during the pilot project, but they

did have to find the right design that would make the technology useable and affordable in the country. This required the design team to spend a large portion of their time searching for locally available materials and testing a wide variety of materials. They experienced some challenges with material availability. For example, the reflectors available on their developed market model, the GoSun Sport were not available in Guatemala. They had to find a low cost metal reflector alternative. The exoskeleton, or frame of the solar cooker was also challenging to design at a low cost with locally available materials. Locally available materials were important in this case to keep costs down. The evacuated tube was only available in China and Applied Sunshine quickly found that import tariffs and transportation costs from China to Guatemala would rule out sending large finished products to the country.

In user-centered design, it's okay to do what it takes to get it done as long as it could work within the business model in the future. Be realistic about the barriers. Manufacturing the stainless steel cooking trays was even problematic in the country. The team spent many weeks commissioning trays. They found that stainless steel in Guatemala could be more expensive than the United States. With a few iterations of the technology, they actually created the prototypes in the US and flew to Guatemala with stoves in the team's checked baggage just to move things quickly and cost efficiently

The team tested 10 different materials for the frame of the prototype e.g. plywood, waterproofed cardboard, high density poly ethylene, rebar, piping, and conduits. The team kept their mind open to all types of materials and all styles of cooking. In one cases, the users came up with the best materials solution- a tube cap (to close the oven) made of corn husks. They found that this retained heat well and was low cost. The corn husks are not part of the final prototype, but they did encourage designers to continue to think about alternative materials.

Language and cultural barriers can inhibit design and are not always overcome by a local partner or local hire. Applied Sunshine started recruiting project partners before the designer arrived in Guatemala. As a result, the local staff and partners were not as well versed in the goals of design thinking when they began to recruit other partners and pilot participants. The lead designer was also not well versed in the local language and dynamics of indigenous culture ahead of the project. This inhibited the design process especially when Applied Sunshine's designers were soliciting feedback and working with users on the prototypes. Stove testers would only provide positive feedback instead of constructive criticism. The designers were unsure if this was caused by a desire from the translators/ local partners to demonstrate that the product was a success or if it was not culturally appropriate to provide criticisms of a product to the designer. Ideally, this problem would be mitigated by hiring a local engineer well versed in design theory, but this type of talent is difficult to find in many markets. In the future, the Applied Sunshine would spend time educating local staff design theory before they begin design activities.

It is important to be strategic when recruiting the first employees in a country. Like other stove manufacturers, Applied Sunshine wants to scale their operations as efficiently as possible. This means playing the role of manufacturer and avoiding taking on additional roles in the value chain. They planned to do this by hiring a key individual in Guatemala who would be responsible for the recruitment of local partners. The local hire was able to bring on partners for the pilot, but the management's perspective on strategic partners and go to market strategies was limited to the information provided by the local hire. The local hire was connected with NGOs in the region, knew the culture and the language, but was not a

self-starter in business. They also found that the local hire established high expectations with pilot partners around compensations and expenses. For example, the local hire and partners would attend meals that were expensive at the outset of the project, setting the standard that GoSun was financially more stable and able to sustain an expensive program. In the future, Applied Sunshine plans to conduct a talent search for a market. They believe the benefits of having the right individual to kick off operations outweigh the time and money it takes to recruit that person.

Market dynamics matter. Guatemala has a strong history of stove giveaway programs from municipalities and NGOs, which has made it difficult for enterprises to sell stoves to end users. Applied Sunshine would not be able to scale up distribution of their solar technology in the country with giveaways and focuses on testing the product in a way that would assess the consumer's desire to purchase the technology. They found that their product was unique and aspirational enough to differentiate itself from the giveaway stove programs with consumers. However, manufacturers and distributors were not prepared to take on the risk of making and marketing a product that was historically given away, ultimately not making commercialization possible at the end of the pilot. Applied Sunshine is still working to find the appropriate partner in the country.

In depth look- A Designer's Story

"We had arrived in the town of La Providencia and were cooking with the host mother of one of our solar stoves. As we got things started, her sister-in-law signaled us from the edge of the yard and asked us to come and look at what she was cooking on for her family. We stepped into a smoky room made of scrap metal nailed to wood with a dirt floor and no door. On the side of the room another piece of metal was propped up with four posts, and on it is the cooking fire. Two cinder



blocks are balanced on top with a grill between to cook on. The woman leaned over and blew into the fire. Ashes start flying up; the child she is holding buried her face into her mom's shoulder to avoid breathing the smoke or getting burned. She then told us that she needed a solar oven too. We could only nod in agreement." –Applied Sunshine intern