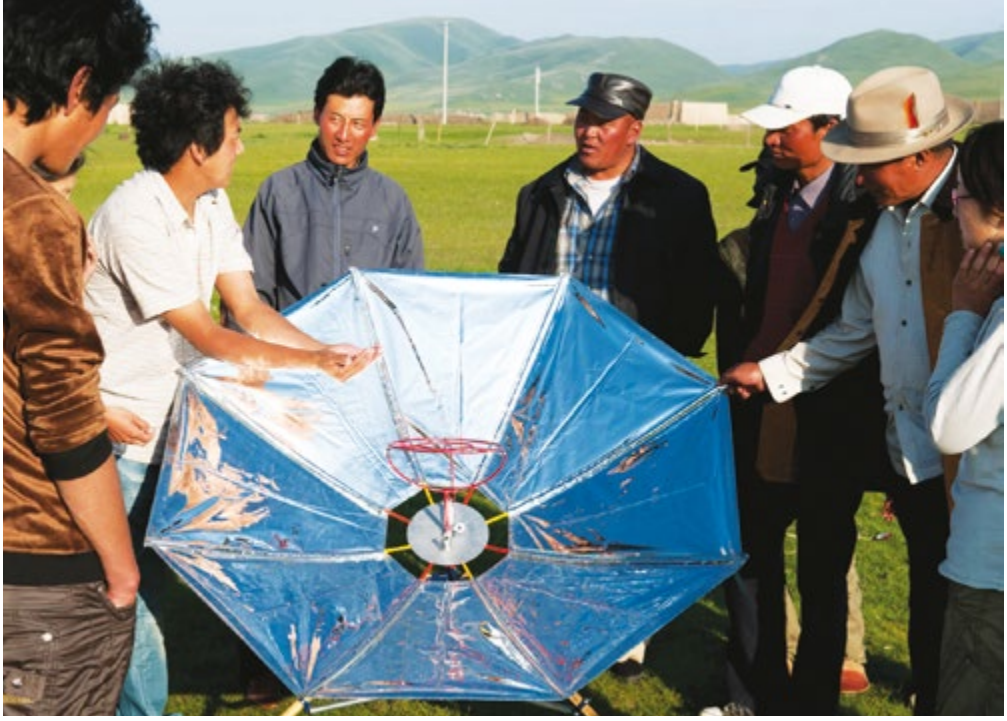

2010 SEED Winner SolSource

China - SolSource (2010)

Overview

SolSource is a line of solar concentrators that address three of the four major barriers to solar cooking and are 20% more energy efficient than competitors. The approach used to develop the SolSource involved end-users in designing, field-testing, monitoring, building, selling, and providing after-sale services. SolSource concentrators integrate with other technologies (also developed by One Earth Designs) to harness solar energy for electricity generation, household heating, and water purification.

Every year, indoor air pollution from household stoves kills more than 500,000 Chinese, and another 1 million people in other regions of the world. Globally, more than 2.5 billion people risk this fate through their reliance on polluting solid fuels like dung, wood, and coal to meet their basic needs. For these people, SolSource could be a life saving technology.

One Earth Designs was a recipient of the SEED Award in 2010. It has also been widely recognised for its innovation by several other grants and awards.

Origins

By the time they were 20 years old, Scot Frank and Catlin Powers, the eventual founders of One Earth Designs, were already designing environmental technologies in collaboration with rural villagers in China, supported by small research grants and environmental prizes. They incorporated a for-profit company in Hong Kong in 2010 to begin manufacturing and selling these technologies so that the products could provide their health, economic, and environmental benefits to more people.

One Earth Designs captured the attention of prestigious environmental awards, including the U.S. EPA's People, Prosperity & the Planet award ($100,000); the $100,000 St. Andrews Prize for the Environment (2009); 500,000 Euros Dutch Post Code Green Challenge (2010).

In late 2010, One Earth Designs won the SEED Award. The SEED Award aimed to help bring SolSource products to market by supporting the enterprise in building its business plan, clarifying its triple bottom line objectives and stimulating an in-depth examination of its programme and structure.

The problem

In the Himalayas, women spend many hours a day collecting dung and wood fuels for cooking and heating. This process leads to deforestation, and many tribes are rapidly running out of their traditional fuel sources. Families also breathe toxic indoor air pollution from the fire. Indoor air pollution is one of the world's biggest killers of children under five, claiming 1.6 million lives per year.

The solution

The SolSource 3-in-1 is a solar cooker, heater, and electricity generator. It is lightweight and affordable and has been designed together with Himalayan communities.

Text source: One Earth Designs website

How it has grown/current status/future prospects

Less than 1.5 years after winning the SEED Award, One Earth Designs has made much progress toward consolidating and establishing its hybrid social enterprise business model. In the process, it has achieved key milestones, such as:

- Setting up the manufacturing line to produce the SolSource
- Building experienced teams in Hong Kong and mainland China to carry out R&D and marketing
- Accelerating sales efforts with buyers within China and internationally

It has also been able to raise a part of the targeted capital for its Hong Kong entity, and has begun capacity building.

The growth of One Earth Designs can be evidenced in numbers: when the enterprise was first registered it consisted of 6 unsalaried workers consisting of a mix of students and volunteers, together with community organisations. Over the past year (March 2011-March 2012) One Earth Designs has been able to bring on more qualified people to take on aspects of marketing, design, and engineering. Today, the enterprise counts on 8 full time staff, 4 part-time staff, and 11 volunteers.

In terms of product development, One Earth Designs finalized the SolSource after developing and field-testing 11 prototypes, and began accepting orders for the SolSource in September 2012. Within one month, it had sold 500 SolSources which will be delivered to nomadic communities in Qinghai Province this winter. There are currently another 1,300 SolSource sales in progress. The primary buyers are governments in Asia and distributors in Asia and Latin America.

ONE EARTH DESIGNS's beginnings

"Initially this started on a shoestring. I was in China on a summer abroad trip that didn't all pan out. With the remaining two months I set off by foot, bus, and bike along the Silk Road where I befriended many people from the region. Through their eyes I was able to see & understand the most-needed basics for life: health, clean water, clean air, and community - all aspects ONE EARTH DESIGNS works with today.

Working together we brainstormed ideas and pursued seed funding to test out some of the concepts. We applied to the MIT Global Challenge and received a $3,000 award to support us for the summer. Afterwards, we realized we were on to something but that it would take a sincere commitment to implement the solution. Since then, it's been a multi-year journey building the team, pursuing our vision, and testing our designs."

Scot Frank, ONE EARTH DESIGNS co-founder and CEO

Source, Fahys, 2011

Social and environmental goals and benefits

The SolSource has the potential to save lives, reduce carbon emissions, save time for women, and save money for families. One Earth Designs is working with 10 members of our user communities to monitor these metrics among customers under guidance from Harvard and Tsinghua Universities.

a. **Social benefits:** Use of the SolSource could save lives by reducing indoor pollution from stoves which currently kills more than half a million people in China annually. In addition, it could reduce fire and fuel collection-related injuries, thus improving quality of life in general.

b. **Environmental outcome:** Widespread adoption of the SolSource would help to reduce harmful greenhouse gas emissions and deforestation rates.

c. **Economic outcome:** Women and children who do not need to collect fuel due to owning a SolSource and may therefore devote newfound time to schooling and income-generating opportunities. The SolSource also presents a significant cost savings to family's who currently purchase fuel, especially coal which can cost families as much as $600 per year.

One Earth Designs' metrics include measurements of income, the time that women and children spend collecting fuel, exposure to toxic smoke, the amount of CO2 and particulates emitted by stoves, etc. (CGIU, 2012).

Mapping One Earth Design's business model and stakeholders

a. **Business model**

One Earth Designs has a two-track business model for sales of the SolSource:

1. **Base of the Pyramid (BOP):** One Earth Designs aims to reach the 2.5 billion customers in the BOP who currently have little to no access to safe and clean energy technologies. They are currently reaching these customers in partnership with governments and NGOs. One Earth Designs plans to expand sales channels in the future to include direct and retail channels in select locations.

2. **Commercial:** One Earth Designs also plans to tap into the multi-million dollar outdoor cooking industry among green consumers globally via international retail channels and online sales.

b. Stakeholders

One Earth Designs works closely with its technical, financial and beneficiary stakeholders to align interests and achieve goals; products are intended to provide net positive social, environmental, and financial impacts and manufacturing processes are designed with the environment in mind. One Earth Designs' technical partners are:

- MIT, Harvard University, Tsinghua University, Wellesley College,Qinghai Normal University, Sustainable Minds, SolidWorks

Success factors

a. Leadership with a vision for sustainability: What stands out in this case is the innovation and attention that has been achieved by a youthful team, many of whom were or are university students. This is due to a comprehensive leadership vision that illustrates the type of attitude and strategic planning required for solving some of the world's most pressing problems (See box at right for an illustration of this vision).

b. Product innovation: Solar cookers as a technological alternative to fuel for cooking have been used throughout the developing world for more than 30 years (Knudson, 2004). However, they have faced low adoption rates around the world because they: (1) cause unwanted fires, (2) expose people's eyes and skin to harmful radiation causing discomfort, (3) lack the temperature adjustability found in every other stove technology, and (4) are not able to cook when the sun is not shining. The SolSource solves issues 1-3 and One Earth Designs has already prototyped solutions to issue 4. In addition, SolSource reflector technology achieves efficiency and durability in low-weight optimal geometries where other reflector materials are unable to do so.

Further, according to local users, solar cookers previously available in western China were too heavy and difficult to repair. More portable, international solar cookers were unable to provide sufficient power. The SolSource achieves an ideal power/portability ratio for western Chinese users.

Other technologies under development at One Earth Designs interface with the SolSource to provide a wide range of additional energy functionalities desired by rural households in China and around the world.

c. Community-based research and development approach and a concern for consumer satisfaction: The product's innovation is due in large part to its having been developed with local communities. According to Frank (2012), "We strive to have a product that addresses the needs of the people. We develop it by working directly with communities and end users to ensure that we follow the expressed needs of the beneficiaries. We do not develop the technology and then find a place it would be useful. Rather, communities come to us - our approach is based on the co-development of products".

Further, customer satisfaction and trust is a key for the product and the enterprise. Local market research indicated that consumers would not trust any other products, so One Earth Designs strives to be "the technology company that cares – the green apple of the consumer market" (Frank, 2012).

Support provided and skills developed through Innovation awards, environmental prizes and incubator programmes: Prizes and awards have provided important sources of funding and drawn attention to the product. They have also helped One Earth Designs to expand its contacts

Scot Frank's advice to aspiring innovators

"Spend the time necessary to really understand the people you are trying to help and include them in all parts of your project. (…) Dedication and follow-through are essential to make the significant impact your commitment has the potential to achieve. (…) Treat the real world and real lives seriously and consider the effects of your actions. Make one-month and three-month plans, as well as one-year and five-year strategic plans, and revise them frequently.

And last, let your passion show and let your passion live. Let it show because that is what will attract team members, partners, and investors to your organization. Let it live because mountains that seem insurmountable look like hills when you love what you do". (Source: CGIU, 2012)

Scot Frank, ONE EARTH DESIGNS Founder and CEO (in commentary posted in Fahys, 2011)

and networks with people doing related types of work and that have similar experiences; business consultants who have relevant market expertise; investment-type financing and funding.

For example, according to Frank (2012) SEED's Award Ceremony in Beijing increased One Earth Designs' credibility and helped the enterprise to expand its network through providing a number of useful contacts. SEED introduced One Earth Designs to Hogan Lovells, which was instrumental in providing pro-bono support and legal consulting on corporate structuring, Intellectual Property (IP) and on registering patents in China. SEED itself also provided good advice during a time a critical junction when One Earth Designs was transitioning from volunteer to full time staff.

Challenges and how they have been met

According to SEED's analysis of the enterprise's main challenges upon winning the SEED Award, "One Earth Designs is still very much in the start-up phase and faces a number of challenges that are unusual for an organisation at this stage: it is trying to establish a group of organisations consisting of a US not-for-profit organisation, a Hong Kong for-profit, and potentially a Chinese for-profit company. The team is still very young and there are distributed centres – Hong Kong, US and Xining communities in Western China. Specific challenges that are being met include:

"We were able to get quite far with the design for this and other products for low-income communities on very little capital. However, setting up manufacturing capacity in order to get the SolSource to the people who need it most on a large-scale has required considerable funds. Thus far, One Earth Designs has supported all R&D and manufacturing set-up costs through research grants and innovation awards".

Catlin Powers, Co-founder, Executive Vice President and Chief Operation Officer of ONE EARTH DESIGNS.

Text source commentary in Fahys, 2011

a. **Consolidating the team and its key partners:** This includes establishing partnerships with local government, legal agreements between HK and One Earth Designs inc. To help solve this hurdle it worked together with Hogan Lovells which provided it with important legal support in this process.

b. **Acquiring financial resources:** One Earth Designs has had to spend considerable time looking for resources to overcome the hurdles of moving into manufacturing, expanding sales teams, and developing capacity in technical areas. The SolSource has just come out of the product development phase; manufacturing has only just started and in small numbers. One Earth Designs is working toward overcoming this barrier through increasing its marketing and outreach activities.

   At the time of the interview, the Winner observed that short term government subsidies to low-income rural families to help them purchase electric appliances and renewable technologies could help in the launch of the SolSource. This might not be such an issue next year when One Earth Designs will expand manufacturing and produce additional units and the profits from the sales should make the enterprise self-sufficient.

c. **Finding the right manufacturers:** A significant challenge for One Earth Designs has been in finding manufacturers that are low cost yet also environmentally and socially responsible. "We don't want to compromise on hurting the environment on the one hand while we are trying to save it on the other" (Frank, 2012). In China, common pitfalls among manufacturers include poor working conditions (e.g. unsafe and/or unclean working environment, excessive noise, lack of safety equipment) and poor organisational practices, such as no IP protection for clients and no quality certifications (e.g. ISO 9000 or ISO 14000). One Earth Designs has identified manufacturing partners with sound environmental and social practices and has proceeded to establish manufacturing with these partners.

Current needs/types of support the enterprise requires now

According to Frank (2012), these are currently One Earth Design's most pressing needs:

- financial resources to underwrite expansion – the "missing middle – before we reach economies of scale."
- more connections; more mentors and support from people who have industry experience in China.
- distribution partners in China and other nations, especially in Asia
- excellent sales people with experience in China interested in joining the team

Conclusion and summary of lessons learned

This case shows how community involvement is central to ensuring appropriate technology design and use in the local context. The SolSource, developed through close collaboration with Himalayan communities, has resulted in a superior alternative to traditional solar cookers available in the region in that it is more portable, more energy efficient, safer, more comfortable and has a maintenance warrantee with local after sales-service provision. The SolSource S2 model is the first solar cooker in the world to offer temperature adjustability. Finally, the products still in the R&D phase at One Earth Designs constitute multi-functional add-ons to expand the functionality of the SolSource home energy solution.

The case also provides a strong testimony of the role university grants and awards have in channeling and harnessing youths' energy, innovative capacities as well as influencing thinking toward sustainability. These catalysts, in conjunction with organisations providing start-up and entrepreneurial support, provide the important skills and funding required for launching enterprises that help toward building the green economy.

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- Mirko Zürker, consultant, Adelphi (conducted remote support for ONE EARTH DESIGNS)