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SELCO: HARNESSING SUNLIGHT TO CREATE LIVELIHOOD

In 2010, Solar Electric Light Company (SELCO), the Bangalore-based social enterprise completed 15 years of providing sustainable energy services to the poor. SELCO's founder Harish Hande wanted to use this occasion for introspection and deliberations both within SELCO and with external stakeholders and experts through a series of workshops. The purpose of these workshops was to identify steps that SELCO had to undertake in the next few years to achieve its social objective on a larger scale.

The first workshop was held on August 20, 2010 in Bangalore, close to SELCO's Head Office. Harish started with a brief overview of SELCO and underlined the key challenges that it faced then. He could feel a sense of pride both within and among the SELCO employees seated in the room when he told the participants that until then, SELCO had sold solar lights to more than 120,000 rural homes and 4000 institutions such as orphanages, clinics, seminaries, and schools in the Indian state of Karnataka. Additionally, through its partnership with SEWA[1] it had provided energy efficient cook-stoves and solar lamps to another 80,000 poor consumers in the state of Gujarat.

"We set up SELCO to bust three myths – the poor people cannot afford technology, the poor people cannot maintain technology and it is not possible to run a commercial venture that fulfills a social objective," said Harish. "And SELCO's 15-year journey shows that if you can provide doorstep financing and servicing, you can create a sustainable business model that addresses the needs of the poor." Harish however was not the kind of person who liked to dwell in past successes. Therefore, very quickly he moved on to explaining the dilemmas and challenges that SELCO and its team of senior management were facing.

The first challenge was to figure out a business model for scaling the positive impact that SELCO had been able to create until then. Should SELCO venture into new geographies or should it diversify its products to address other energy-related needs of the poor within the same geographies? Given the economic profile of its target customers, whatever products SELCO intended to sell, it would have to make sure that its customers had access to loans to purchase those products. Thus, SELCO needed to work with banks and various financing agencies that could provide credit to the poor. How did SELCO ensure financial inclusiveness and prevent exploitation that many of the lending agencies were accused of? SELCO had always believed in providing customized energy solutions to meet specific needs of the poor and had never compromised on quality. However, in 2010, there were several cheap standardized products of dubious quality available in the marketplace. How did SELCO deal with such competitive pressures and still remain focused on its social objective, especially when its customers were often compelled to make a cost-quality tradeoff, given their economic status.

For SELCO, any form of growth and scaling would involve attracting and retaining talented individuals who were dedicated to SELCO's social objective. Being a social enterprise, SELCO was not in a position to pay the kind of compensation that engineering and management graduates from reputed Indian institutions commanded from other for-profit organizations. Thus, SELCO needed to figure out a way of leveraging high-quality talent even while its paying capacity was below the market. Finally, for creating greater impact, SELCO was feeling the need to influence policymakers who seemed to be giving a short shrift to small and medium decentralized energy solution providers like SELCO[2].

[1] Self Employed Women's' Association – its partnership with SELCO is explained in a later section on Innovations

[2] In 2009, the Indian government launched Jawaharlal Nehru National Solar Mission (JNNSM) to create an installed capacity of 20 Giga Watt by 2022 through grid-solar and off-grid solar applications using both solar thermal and photovoltaic technology. However, the detailed policy

THE EARLY DAYS

Harish got the idea of bringing solar lighting systems to rural India when he was doing his PhD on sustainable energy at the University of Massachusetts. During a field visit to the Dominican Republic, he was surprised to find poor villagers using solar lighting and reasoned that if it was possible for the poor in the Dominican Republic to use solar lights, he should be able to bring solar lights to the rural poor in India too. In early 1993, having made up his mind to focus on solar lights as a means for rural electrification for his PhD, Harish traveled to the remote sugarcane growing village of Galgamu near Anuradhapura in North Sri Lanka with his scholarship money, carrying with him a few solar panels and his solar-powered laptop. He wanted to have firsthand experience of issues and realities of villages that had no access to electricity in order to figure out how he could solve some of their problems by installing solar lights. He lived there for the next six months, understanding the connection between poverty and energy until his stay came to an abrupt end because the village was stormed by an armed rebel group who took away all his solar panels.

Subsequently, Harish went back to Massachusetts and met Neville Williams, a former Green Peace activist, who founded Solar Electric Light Fund (SELF), a non-profit organization that intended to promote the use of solar energy in developing countries. In 1993, SELF received a grant of US$ 40,000 from the US-based Rockefeller Foundation to install solar lights in 100 rural homes and Neville asked Harish to lead and implement the project in the Western Ghats region of India. Harish saw this as a great opportunity to validate his thesis about the viability of solar-powered lights in rural India. Harish however was apprehensive about being dependent on grants for his endeavor and was keen to establish a financially self-sustainable organization so that there was continuity in operations. He believed that the poor would be willing to pay for technology if they found it useful. Moreover, Harish and SELF faced several regulatory hurdles in bringing the money in the form of a grant into India. Therefore in 1994, he founded SELCO Photovoltaic Electric Private Limited as a for-profit enterprise that would sell solar lights in rural India.

Solar lights were not new to rural India. Almost every year, in the month of March[3], the Indian government installed solar-powered street lights to utilize funds devoted to non-conventional energy. However, in the absence of an organization to assume responsibility, very little effort was subsequently put in for proper maintenance of these lights. March was followed by the Indian summer, when abundant sunshine often resulted in overcharging of the solar panels and drying up of distilled water in the batteries. By the time the monsoons set in July, many of the lights stopped functioning, thereby creating a perception among villagers that solar lights were fragile and unlikely to function for more than three to four months.

Harish realized that he would have to change this negative perception about solar technology and decided to take the responsibility of maintaining some of the solar street lights in Dakshin Kannada[4] that were installed earlier. He intended to demonstrate that the technology could be made to work on a sustained basis. He also trained some of the local villagers, typically those involved in television or cycle repair, on how to maintain these lights. In the process, he started creating a pool of technicians who could take on the responsibility of maintaining and repairing solar lights as and when SELCO would install them in future.

SELCO however had no access to funds, even for its working capital. Harish struggled to convince suppliers to provide him with solar lights on credit. It was around this time that Tata BP Solar[5] was setting up its rural infrastructure division with the aim of developing markets for its products targeted at rural Indian customers. Harish was able to impress them with his ideas and they decided to provide him with solar lights on credit, one or two systems at a time. Thomas Pullenkav, a young manager at Tata BP, who was responsible for developing their rural infrastructure business, recalls “I was less convinced than my organization about the viability of Harish’s plans. However, I was impressed by his dedication and conviction and realized that giving him a system or two on credit

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framework that emerged from JNNSM seemed to favor large centralized production, largely because of small and medium enterprises’ inability to influence policy makers.

[3] March is the last month in the financial calendar of Indian government when there is heavy pressure on government departments to exhaust their budgets, so that their budgets are not cut in the next financial year.

[4] A rural district in southern Karnataka

[5] A joint venture between Tata Power Company and BP Solar, having revenue of INR 11 billion in 2009, of which INR 9 billion is earned from exports

was not much of a risk for a large company like Tata BP, even if all his plans failed. Moreover, I was convinced that Harish will pay back all his dues, even from his own pocket if he failed to recover any money from his customers."

Harish sold his first solar light to a wealthy betel nut farmer on the sly! Since the farmer had never heard about solar-powered lights, Harish was unable to convince him about its utility. However Harish found the farmer's 72-year-old mother listening to him attentively and realized that he might be able to persuade her. Therefore, a few days later, Harish approached the elderly lady when the farmer was away and installed the solar lights in his fields. At night, when the farmer saw his fields light up, he was ecstatic. When Harish returned a week later, the farmer happily handed over his US$ 300 payment[6]. During the next several months, Harish traveled across rural Karnataka, taking solar lights on credit from Tata BP and installing them in homes of farmers who could afford them. To save costs, he would travel by bus and sometimes even sleep inside them overnight. Thomas meanwhile would try various means at his disposal at Tata BP to help Harish's cause, including convincing his other dealers to extend credit to Harish. In the process, he grew closer to Harish, decided to leave Tata BP after about a year and joined SELCO, with the aim of creating an organization that could fulfill Harish's vision. Pai, one of the dealers at Tata BP, who had seen Harish's work from close quarters also decided to join SELCO.

Thus, SELCO started operating as an organization from 1996 even though it had no finance, could not afford any office space and could only employ the services of an accountant on part-time basis. The next one year, SELCO faced a hand-to-mouth existence – Harish continued to live and operate from his aunt's place while Thomas moved in with Pai to save costs on rent. Meanwhile, Harish convinced Neville that it would be better to put money in SELCO as an investment, rather than depending on grants. Neville therefore registered SELCO in the United States as a commercial entity in 1997 so that he could raise money from investors there. Apart from India, Neville set up various SELCO subsidiaries in other developing countries such as Vietnam, China, and Sri Lanka.

Toward the end of 1996, SELCO received a conditional loan[7] of INR 5 million from USAID through its partner Winrock International. This loan enabled SELCO to hire employees, invest in printing brochures, and most importantly, secure greater number of solar lighting systems on credit. This immediately increased SELCO's stature in the eyes of its suppliers. It was also the first time that Harish and Thomas received their salaries. Around the same time, the television repair market in India nosedived with the launch of several maintenance-free durable televisions and many of the technicians who had earlier worked for Harish on part-time basis, joined SELCO as employees. SELCO set up its first three rural service centers, which were essential for creating a sustainable rural delivery model. Between 1999 and 2001, SELCO India received US$ 750,000 from equity investors in the US and in 2003, a loan of US$ 1 million from International Finance Corporation[8]. **Exhibit 1** through **Exhibit 4** show SELCO's assets and liabilities position and financial performance for five years.

FINANCING SOLAR LIGHTS

For a majority of SELCO's customers, solar lights were the most expensive equipment that they would ever purchase. Even though they might be spending an equivalent amount of money in buying kerosene to meet their energy needs, making an upfront investment of an amount that was a few multiples of their monthly income was beyond their means. "One of the best financial lessons that I learnt was from a street vendor who told me that she can afford to pay INR 10 (20 cents) a day, but would find it difficult to pay INR 300 (US$ 6) every month! This was when I realized that to sell solar lights; the poor need to be provided with financing such that payback patterns were synchronized with their income patterns." However, SELCO realized that getting finance for purchase of solar lights, even from the rural banks, was difficult. Rural banks provided loans for income-generating activities and it was difficult for them to conceptualize that home lights could be used for generating income.

After two and a half years of untiring effort, Harish was finally able to convince Malaprabha Grameen Bank to sanction INR 1.5 million for financing 100 solar lights. SELCO showed the bank's internal notice, informing its

[6] Adapted from the article, "A bright idea that helped India's poor,", written by Amy Kazmin in *Financial Times*, February 25, 2009.
[7] This loan was obtained after Thomas and Harish had sent a proposal to USAID/Winrock who were evaluating projects on commercialization of renewable energy for funding. The loan was provided specifically to set up three service centers.
[8] IFC had created a Photovoltaic Market Transformation Initiative fund for India and Harish had applied seeking funds from them. This money was provided in three tranches which SELCO was supposed to pay back by 2009. The repayment date was extended after SELCO's financial restructuring in 2007.

branches about the decision to finance solar lights to other rural banks. Since Malaprabha Grameen Bank was viewed as a progressive bank in rural Karnataka, some of the other rural banks did not hesitate to emulate it, convinced that Malaprabha Bank would have done its due diligence. The fact that the internal notice did not mention the bank's upper limit of INR 1.5 million or 100 systems helped SELCO's cause. However, it was still not easy to convince the loan officers at the bank branches to sanction the loans because the banks were treading into new territory and were unfamiliar with the technology of solar lighting. Thus, for the next several months, SELCO staff organized field trips for the bank officials to demonstrate to them the viability of solar lights and how they could make a difference to the livelihood of the rural poor. While some of the bank officials were sympathetic to the idea and were flexible enough to sanction loans to a variety of customers – from the paddy farmer to the beedi roller to peanut farmer, others were apprehensive and reluctant. Therefore, SELCO even started tracking the transfer of sympathetic officials within the rural banking system and planned its own expansions accordingly.

SELCO however decided to stay away from financing the customers themselves, even though, as the business grew, there were such suggestions from their investors. Both Harish and Thomas strongly believed that there would be conflict of interests if they ventured into financing. SELCO technicians developed close relations with their customers in the process of selling and maintaining their systems. They often shared their meals with their customers and sometimes even slept at night in their customers' homes because they would have missed getting on to the only bus that reached the remote village. Such emotional connections were essential for understanding the exact needs of the customer, yet were dangerous when it came to collecting money. Therefore, it was decided that SELCO would work with rural banks, credit cooperatives, and microfinance agencies to make necessary arrangement of credit for their customers, but would not get into financing themselves. However, there are cases where SELCO stepped in to provide a bridging loan if it felt that a particular community or an individual was so poor that they cannot even arrange the margin money[9]. Even in such cases, the collection of the amount that was due to SELCO was done through the agency that provided rest of the finance to avoid any situation of conflicting interest.

CUSTOMIZING PRODUCTS

Although solar lights per se appear to be a standardized product, lighting solutions had to be carefully configured keeping in mind the needs of the customers and their capacity to pay the loan installments. "We could have gone in for some one-size-fits-all system, but we didn't," says Harish. "When it comes to the poor, everyone wants to standardize solutions to save cost, but not us. Thus, we have a significant amount of pre-sales activity, all of which is done by the technicians because they are in the best position to understand the context as well as the solution that can meet the requirement. We do not have any marketing budget. We put all our efforts into pre-sales and post-sales services, which is marketing for us. All our customer service agents don the mantle of marketeers when they are dealing with the customers. We encourage them to interact with the neighbors and the local community so that they have a deep understanding of the problems that the people face." SELCO in 2010 serviced its customers from 25 service centrs spread all across rural Karnataka. **Exhibit 6** and its associated note explain SELCO's organization structure.

A typical sales cycle for SELCO started with an understanding of how much a customer could pay toward loan installments every month. SELCO technicians discussed with the customers the various costs incurred while providing light in their homes, both in terms of out of pocket expenses as well as foregone opportunities. For example, the customer might be procuring INR 50 worth of kerosene every month and with the additional hours of work that SELCO lights could provide the family, he and his wife might be able to earn an additional income of INR 50 per month. Moreover, there would be non-quantifiable benefits in terms of better health, increased hours of study for the children as well as saving time that was otherwise spent in procuring kerosene or sourcing forest-wood. Altogether, the customer might probably be in a position to pay INR 150 per month as loan installment. This would allow the customer to procure a two-light system. But a minimum of four lights was required, one each for the kitchen, bedroom, living room and cowshed. However, a deeper understanding of the customer's lifestyle might reveal that these four rooms need not be lighted simultaneously. His wife, who looked after the cows and cooked food, needed lights either in the kitchen or in the cowshed at one point of time. It is also unlikely that the family would need lights in the bedroom and in the living room at the same time. Therefore, SELCO technicians would complete the wiring in all the rooms, provide four points where the lights could be fitted, but supply only a two-light

[9] Apart from exceptional cases, Reserve Bank of India did not allow banks to do 100% financing and stipulated that the consumer would have to provide 10% to 25% margin money as down payment for availing any loan.

system that would meet both the budget and the needs of the customer. They would ensure that the lights could be easily fixed and removed from each of the four points so that the family could carry the two lights with them from one room to the other depending on where they needed them most. Sometimes, the internal structure of the house would allow fixing a light at the intersection of two rooms, ensuring that two rooms were illuminated with one light.

"It is very important that our technicians have a genuine concern for the customer," reflects Thomas. "Fortunately we have managed to create a team of dedicated personnel over the years, many of whom have been with us right from the inception. These were people who were earning their living by repairing televisions and bicycles – whom Harish had trained himself to be technicians for solar lights. Today they run the service centers on their own. Even though our competitors offer them higher salaries, we have very little employee attrition, especially from our service centers. Once people understand our philosophy, they love working at SELCO, even though the task never gets easy, be it getting finance for the customers or enduring a long sales cycle."

SELCO charged INR 250 as annual maintenance contract for a four-light system, which entitled the customer to two maintenance services and one emergency service on call[10]. SELCO technicians checked every solar installation twice a year to ensure that they were in proper working condition. Since the livelihoods of many customers are critically dependent on the solar lights supplied by SELCO, the technicians tried to respond to every breakdown as fast as possible. This was a challenging task, given that most of the installations were in remote areas. In 2010, SELCO was able to respond to 65% of these calls within 24 hours and they were constantly working on measures to improve this rate.

SELCO has been instrumental in creating several entrepreneurs in rural Karnataka. Besides the home lights, SELCO manufactured solar lamps that could be used by street vendors to sell their products in the evenings. Since street vendors did not need the lights for the entire day, SELCO identified entrepreneurs who would buy solar lamps from SELCO and rent them to the vendors daily. Although, no bank would have been willing to cater to the needs of the street vendors, the entrepreneur was able to provide both finance and service to them.

Recounts Harish, "This guy (the entrepreneur) in Hasan[11] started with 30 lamps and put the solar charging station on the roof of his house that would charge the batteries used in these lamps. He would charge the batteries daily and rent the lamps to the vendors at 5.30 p.m. Then around 9.30 p.m. to 10.00 p.m., he would collect the lamps back and a rent of INR 12 per lamp. The vendors would thus save INR 2–3 per day since they were earlier spending INR 15 on kerosene. Soon he purchased another 30 and then another lot of 30. Now, he felt the need to purchase a tempo[12] to carry the batteries around and convey them to the vendors and eventually employed two people to transport the batteries. Then one day he came back to us saying that his technicians were getting exhausted lifting so many batteries daily – it would be of help if we could make the batteries lighter. We went back to the drawing board and designed lighter batteries – it's amazing how he made us realize a fundamental problem and led us to solve it."

LONG-TERM RELATIONSHIPS WITH SUPPLIERS

As an organization, SELCO believed in developing long-term relationships with its suppliers. A solar light comprised four key components, namely the solar photovoltaic module (solar cell/panel), battery, charge controller, and lighting system (lamps and fans). The relative costs of these components for a four-light system are provided in **Exhibit** 5. SELCO sourced 90% to 95% of its panels from Tata BP, continuing their relationship that developed even before Harish founded SELCO as an organization. Although cheaper alternatives were available, SELCO preferred Tata BP primarily for two reasons. Their products were of very good quality and despite Tata BP's stringent internal processes; they were quite flexible with SELCO in terms of schedule and batch size of orders. Moreover, having a local source of supply helped SELCO reduce inventory levels up to 25%, which was substantial given that they had to maintain inventories worth INR 15 million across their 25 service centers. SELCO purchased panels from other suppliers only when Tata BP was unable to meet their demands. Similarly, batteries were purchased largely from Shakti Electronics who worked closely with SELCO to customize batteries to suit the needs of SELCO lights.

[10] Apart from annual maintenance charges, SELCO customers incurred INR 50–80 as operating cost per year to buy distilled water needed for topping up the batteries.
[11] A place in northern part of Karnataka
[12] A small commercial vehicle for carrying goods

SELCO sourced all its other electronic items from Anand Electronics located in Mangalore, Karnataka. It was a small-scale manufacturing unit run by two entrepreneurs who had been exclusive suppliers to SELCO since 1997. SELCO felt the need for Anand Electronics to improve when it realized that the technology available with Tata BP was designed for European conditions. For rural India, SELCO needed electronic components that were rugged, even if that meant making tradeoffs in technical sophistication. Anand Electronics was earlier involved in television repairing and was finding survival difficult in the late nineties with the advent of more reliable televisions at lower prices. SELCO convinced them to become its supplier. Being a small scale unit, Anand Electronics did not have to pay excise duties and was able to keep its overhead costs low. Moreover, its long-term and exclusive relationship ensured that it could design and produce items to SELCO's exact specification, including experimenting with new product designs. SELCO kept track of the market prices of comparable products to ensure that it did not overpay for the relationship or flexibility that it enjoyed from its suppliers. SELCO had a high degree of transparency with all its suppliers and was ready to help them in case of constraints and challenges. "As an organization we strongly believe that we should stick to our suppliers, especially those who have been with us during our difficult times," says Thomas. And SELCO had seen difficult times not so long ago, almost to the point that most of its employees thought it to be the end of road for the organization.

THE HARD TIMES

SELCO broke even for the first time in March 2001, and during the next three years steadily increased its revenues. It made a profit of US$ 88,380 by the end of the financial year in March 2005. Sustained good performance enthused SELCO to plan for expanding its operations into neighboring states of Andhra Pradesh and Maharashtra. SELCO also decided to appoint business associates in Karnataka, since many entrepreneurs had expressed interests to become SELCO associates after witnessing SELCO's success during the past few years. SELCO planned to move its own employees to the new markets of Andhra Pradesh and Maharashtra and decided to address the needs of Karnataka through an associate network since it had already developed the market in rural Karnataka and established the rules of running a viable business. It was around the same time that SELCO also took a decision to diversify its supplier base so that it could get cheaper alternatives, especially for solar panels.

Unfortunately for SELCO, this was the time when Germany started providing high subsidies to solar power. This resulted in an increasing demand for solar panels of higher wattage in Germany and all major manufacturers started to cater to the German market, since there were higher margins in selling solar panels of higher wattage. Consequently, there was a shortage of solar panels in the rest of the world markets leading to a steep price rise of nearly 47%. SELCO was caught completely unawares! It did not have enough material to service its customer demands. It no longer enjoyed the comfortable relationship that it once had with Tata BP given its decision to diversify to other low-cost suppliers. Its new suppliers did not have any obligation or relationship to provide SELCO with material when the German market looked far more lucrative. Even if they had, SELCO was not in a position to pass on the price increase to its customers. Thus, SELCO's new offices in Andhra Pradesh and Maharashtra were starved of supplies and the business associate model in Karnataka started to fumble. SELCO started making losses and in the next two years, ended up wiping almost the entire net worth of the company.

It was troubled times for SELCO in the US too! Apart from India, all its other subsidiaries had failed and shareholders wanted to cash out. Harish's request for fresh funds was rebuffed and met with demands for retrenchment in India. Recalling those hard days, Thomas says, "We were sitting in November (2006) with money that would last only till next March (2007). We had no option but to go into a mode of shutting down operations. I asked Harish which investor in their right frame of mind would lend money to a company like SELCO that has burnt the money received from the first set of investors? However, Harish was optimistic even in such trying circumstances. He promised us that if we can somehow make SELCO survive one more year, he will get fresh investments. I do not know why, but we all believed in what he promised – that is something only Harish can do! Our whole mindset changed, it was like rebuilding the organization. We focused on reducing costs and improving collections. We were able to stabilize operations and tide over the crisis, even before the fresh set of investments came."

Fortunately for Harish, IFC, which had provided US$ 1 million loan to SELCO, strongly supported SELCO India and enabled Harish to raise fresh funds from a new set of socially-oriented investors such as E+Co, Lemelson, and Good Energies Foundation. Meanwhile, prices of solar cells started to reduce, increasing availability. SELCO decided to postpone its expansion plans into neighboring states and recalled its own employees to offices in

Karnataka. It also realized that the associate network model, which was purely commercial in its intension, was unsuitable for an inclusive business such as selling solar lights to the poor. Most significantly, SELCO repaired its relationship with Tata BP and reverted back to its earlier philosophy of having long-term relationships with one trusted supplier. The turnaround was complete when SELCO posted increased revenues and operating profits in March 2008. In retrospect, Harish feels that those difficult days helped SELCO not only to refine its business model but also to have a better set of investors whose philosophy was aligned to that of SELCO. "Howsoever in need you might be, one needs to be careful about the kind of person from whom you take money. You should always have control of the company for the sake of the mission. Never take money from someone whose mission is not aligned with yours," was his advice to other social entrepreneurs.

INNOVATIONS

In 2006, SELCO was approached by SEWA Bank to be its technology partners. Ela Bhatt founded SEWA in 1972 in Gujarat, with the objective of empowering poor women. In 2010, it was the largest single trade union in India with a membership of 900,000 women. SEWA Bank was established as its affiliate in 1974 to provide financial services to SEWA members. Its services include taking deposits, providing credit and insurance as well as financial counseling. SEWA Bank initiated Project Urja[13] for its 300,000 members to have access to reliable and affordable sources of energy. It estimated that chronic shortage of cooking fuel; reliable lighting and electric power were the key reasons why the underprivileged were unable to break the vicious cycle of illiteracy, unemployment and poverty. SEWA chose SELCO to provide it with technological solutions that addresses the energy needs of its members. "Project Urja was a dream come true for us," says Thomas. "It immediately provided us with access to a largely diverse clientele away from our home base in Karnataka. Since it was SEWA, we did not have to worry about creating the infrastructure for providing finance to the customer. But most importantly, SEWA showed us the path to become an energy solutions company from a solar lighting company that SELCO was."

In the next two years, SELCO designed several solar products in consultation with SEWA. This included solar lanterns for the vegetable and fruit vendors who could use it for extending their working hours, head lamps for midwives and flower pickers, solar caps for laborers and masons and a smokeless stove for cooking. Most women in rural India did not have access to hospitals and used the services of midwives for their delivery within the privacy of their homes. In the absence of grid electricity, such deliveries were often done with the help of a mirror that reflect sun's rays to the place of delivery inside the house instead. This improvised arrangement was of course not possible during night or on a cloudy day when the midwife would use a kerosene lamp or a candle.

Recollects Harish, "We sat with midwives for two to three days to understand the complete delivery process. They taught us to cut the umbilical cord. People were laughing at us, but we told them that we needed to know the process well to design the energy intervention. There are usually only two women at the time of delivery – one who is pregnant and the midwife. The midwife has a candle or a lantern, which she balances with one hand during the delivery. We therefore decided to design a solar head lamp so that both her hands are free and enough light is generated for the process." In the same locality, SELCO worked with flowers pickers, who collected flowers from midnight till 3 a.m. in the morning. It was difficult for them to balance both the flower basket and a petromax lantern in one hand and pluck flowers with the other hand. It slowed down their efficiency. With solar head lamps, they were able to pluck double the quantity of flowers in the same time. Very often, SELCO would also appoint an entrepreneur who would rent out the solar lamps to the midwives and flower pickers on a daily or an hourly basis, ensuring higher usage of the lamps and greater income generation. "Unless we work closely with them, we will not be able to identify their needs. Today, when we design a solution for a midwife, a vegetable vendor or a mason, we begin with the precept that the solution must pay for itself. It should be financed from the additional income that it generates. There is a big difference between creating a want to sell a product and identifying a need and designing a solution to fulfill it. We always want to focus on the need." While SELCO started primarily as a company providing home lighting solutions, Harish estimated that in 2010, for more than 20% of their customers, SELCO lights were a direct source of increased income generation through greater productivity. And their partnership with SEWA bank provided them with a major fillip in that direction.

Women in both rural and urban India depend on the use of kerosene, liquefied petroleum gas (LPG) or firewood for cooking. Although LPG is expensive, both kerosene and firewood are highly polluting and inefficient sources of

[13] "Urja" means energy in the classical Indian language of Sanskrit.

energy. The smoke causes cough, skin diseases, and irritation to eyes. Moreover, women typically spend an enormous amount of time sourcing kerosene or firewood, time that can be spend in income generating activities. Therefore, with inputs from SEWA, SELCO designed a smokeless gas stove – Annapurna Stove. It was a brick and cement stove that used minimum amount of firewood and retained the essential nutrients in food. Some of the women were also trained by SEWA and SELCO so that they could construct these stoves and earn a living by selling their services.

Such experience in working with the diverse energy needs of the poor inspired Harish to set up an innovation department and an incubation laboratory as an experimental arm of SELCO. The mandate for these departments was to explore and generate new ideas that could be developed into products and services to address the needs of the poor. Some of their new products include specially-designed gloves for rag pickers and an energy efficient push cart for vegetable vendors. Although these products were not yet commercially viable, the innovation departments acted as locus for developing a culture of innovation and experimentation that Harish wanted to foster in SELCO. SELCO's incubation center had drawn considerable interest and attention from other organizations and institutions worldwide. Many socially-oriented enterprises, which could not afford to have research and development centers of their own, approached SELCO to do product research on their behalf. There was also a beeline of students from various Indian and international technological and management institutions who wanted to do their internship with the center.

SCALING THE BUSINESS

Nearly 15 years after its founding, SELCO seemed to be on course toward achieving its key objective – of establishing a viable business focusing on energy needs of the poor that was inclusive in every sense of the term. An impact assessment study by World Resources Institute in 2007[14] indicated that 86% of SELCO's poor customers indicated significant savings in energy costs as their primary benefit of using SELCO products, while the rest pointed to their children's education as the primary benefit. For their efforts, SELCO and Harish have been awarded the Ashden Award (2005, 2007), Social Entrepreneur of the Year Award (2007), and the Financial Times Arcelor Mittal Boldness in Business Award in 2009. Armed with investments worth US$ 1.7 million[15] from three social investors, namely the Good Energies Foundation, Lemelson Foundation, and E+Co; SELCO planned to light up 200,000 rural homes, covering a wider geographic area, in the next four years.

However, success raises expectations and Harish and the leadership at SELCO were asked very often about their plans of scaling their business. After deep introspection and taking into consideration their failed experiment with the associate network model, Harish and Thomas had come to the conclusion that a small business model is ideally suitable for the kind of work that SELCO does. "It is better if we focus on developing other SELCOs suited to the context where they would operate, rather than trying to grow this SELCO," says Harish. Agrees Thomas, "Ideally we should create an organization that can become investment partner for entrepreneurial entities – the SELCOs of the future. We can provide the seed capital and pass on to them our knowledge, things that we learnt the hard way. However the new entities will have complete independence in the way they would develop their business, because their specific model needs to be suited to their context. We would like to do this in other parts of India first and thereafter, maybe, across the globe."

SELCO had been conservative even while scaling its business in Karnataka. "One of the obvious ways to scale," argues Harish "is to put aggressive targets on the sales team. Such targets would instinctively make them chase the low hanging fruits – they will go after customers who will buy faster and who will buy larger systems. But are these the customers to whom we really want to sell to? SELCO exists to provide solar lights to the poor – the one who can probably afford a small system and that too on credit. If one mixes the social objective with the commercial objective, it is most likely that the commercial objective will dominate." Thus, SELCO sales team and regional managers were evaluated on the quality of customers to whom they were selling over and above quantitative targets. It was of great satisfaction to the senior management team that over the years their average invoice value had reduced, implying that they were selling smaller systems to the poorer sections of the society. Moreover, more than 90% of their customers purchased their systems on credit.

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[14] N. M. Koppa and S. Willoughby, Base of Pyramid Impact Assessment, World Resource Institute, 2007. (unpublished, obtained from SELCO archives).

[15] This comprises a debt of US$ 300,000 and equity worth US$ 1.4 million.

In 2010, SELCO seemed to be on the threshold of an inflection point. Pai, one of the founding members, had moved on to become SELCO's exclusive dealer for manufacturing solar water heaters, targeted largely at the institutions and urban markets. And Thomas was planning to go on a sabbatical not quite sure about when he was going to come back. All these years, Thomas had managed the operations of SELCO and built the organization that was necessary to realize Harish's vision. He wanted to ensure that when he went on his sabbatical, SELCO was able to run smoothly. Therefore his successors had been identified and during the past six months, Thomas withdrew himself from most operational matters. Harish felt that Thomas' sabbatical was probably the ideal opportunity for him to step back from the management of the company and let the younger leaders take on their roles.

"All these years, Thomas and I have been perfect critics of one another," recounts Harish. "We could speak whatever came to our mind, because we knew that if it was a wild idea, the other will be forthright in telling so. With Thomas gone, there will be nobody to tell me that my ideas are wrong – therefore this will prevent me from thinking freely. After 15 years at the helm of the company, it is time we step back. We have built this company to a size of about (INR) 150 million. There is enough opportunity in rural Karnataka itself to take SELCO to INR 400 million to INR 500 million. But we are not the right ones to do it – we need fresh ideas, fresh legs to travel up and down the country in order to motivate people – this job needs a lot of that. I feel the difference now as I travel upcountry – while the older folks were far more comfortable in talking to me as peers, the younger ones treat me as their Managing Director. They are new; I am not very familiar with all of them as I used to be in the past.".

APPENDIX

Exhibit 1

SELCO's Profit & Loss Account (all figures in INR million)

	FY 2004–05	**FY 2005–06**	**FY 2006–07**	**FY 2007–08**	**FY 2008–09**
Revenue	130	66	63	78	120
Material Cost#	86	43	42	53	77
SG&A	8	4	4	5	8
General Admin Costs	32	29	36	28	32
Financing Costs	2	3	4	2	0.5
Profit/Loss	3.15	–12.3	–23.13	–8.39	1.36

Includes market awareness creation programs, demos, interest subsidy costs, sales commission, etc.,

Exhibit 2

SELCO's List of Shareholders as on March 31, 2009

Shareholders	**No. of Equity Shares (Face Value Re. 1)**	**Paid-up Share Capital in INR Million**	**% of Shareholding**
Solar Electric Light Company, USA	4,140,448	4.14	7
E+Co., USA	9,774,243	9.77	16
Lemelson Foundation, USA	14,000,000	14.00	23
Goodenergies Foundation, Switzerland	34,000,000	34.00	55
Harish Hande, Managing Director	253,859	0.25	0.41
K.M. Udupa, Director	20,000	0.02	0.03
	62,188,550	62.19	100

Exhibit 3

SELCO's Balance Sheet (INR million)

Parameters	**FY 2004–05**	**FY 2005–06**	**FY 2006–07**	**FY 2007–08**	**FY 2008–09**
Fixed assets	3.5	3.35	1.95	1.53	1.43
Current assets & investments	103.7	91.84	63.39	55.03	122.29
Current liabilities	37.57	23.11	19.19	20.27	31.25
Secured & unsecured loans	30.8	45.88	45.86	44.62	18.22
Share capital	45.94	45.94	45.94	4.59	62.19
Reserves (net of accumulated losses)	–7.11	–19.74	–45.65	–12.92	12.06

Exhibit 4

SELCO's Secured Loans (External Commercial Borrowings) as on March 31, 2009; Figures in US$

Lender	**Total Loan Amt**	**Loan Availed**	**Outstanding as on 31-Mar-09**
IFC	1000000	1000000	435000
Lemelson Foundation	250000	125000	125000

Exhibit 5

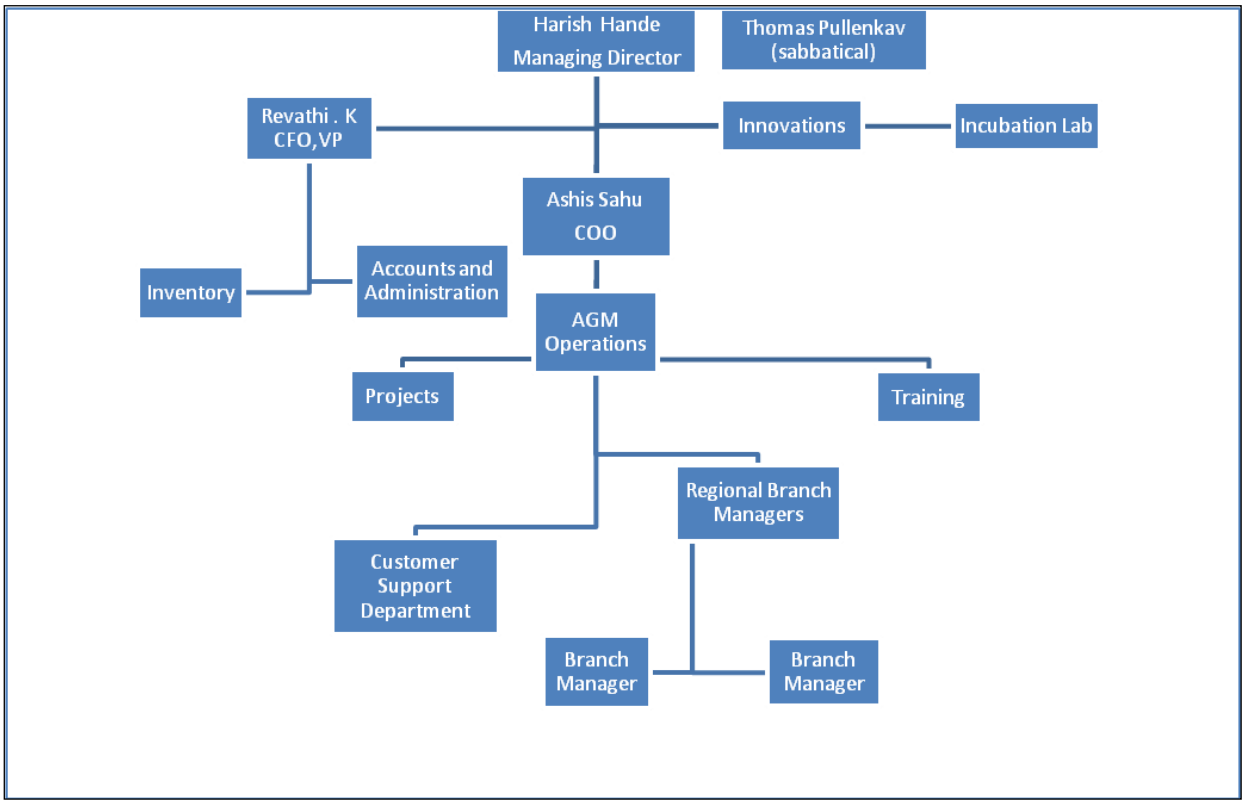
Cost Breakdown of a 4-Light System (figures in INR)

Photovoltaic module	8000
Battery	4500
4 lights @ 800	3200
Installation & wiring	1300
Total	17000

The sale price of the above system will be ~ INR 20,000.

Exhibit 6

SELCO's Organization Structure at its Corporate Office



Note on SELCO's organization

SELCO has been operating through a network of 25 Energy Service Centers (ESC), 23 of which are located in Karnataka and one each in Gujarat and Kerala. Three to four such ESCs reported to Regional Branch Offices (RBO). All RBOs reported to SELCO's corporate office in Bangalore. An ESC was typically headed by a manager and had one sales executive, two customer support executives, and one office accountant or administrator, who reported to the ESC manager as well as to their functional heads. The ESC was the basic building block of SELCO's rural operations. Each ESC had a service territory in which it marketed, sold, installed, and serviced SELCO's energy services. The RBOs provided operational and management support to the ESCs within their region and acted as a contact point between SELCO's corporate office and the ESCs. The corporate office provided all accounting and managerial oversight and was responsible for overall management of SELCO operations. The corporate office also had the innovation department (described in the case) and projects department that were typically involved in selling solar lights to institutions. SELCO in 2010 had about 150 employees in various roles and responsibilities comprising 55 customer support executives, 45 sales executives and managers at ESC's, 15 managers at corporate head office and RBOs, and 35 office administrators and accountants.