



# SELCO Foundation

*Annual Report*

2017-2018







**2017-18**

## *Executive Summary*

Image: A blacksmiths home in Udupi, Karnataka

In 2017-2018 financial year, SELCO Foundation concentrated on not only deepening its exploration of solutions in the fields of livelihoods, health and education but also on institutionalizing the concept of sustainability in various other sectors via different types of partners.

The foundation did realize that while innovations in various parts of the ecosystem was critical, it needed to concentrate on making sustainable energy interventions a norm across fields and various stakeholders working for a better world. There were various challenges. Right from educating the various parties about not making sustainable energy as the center theme but use it as a catalyst to achieve the desired goals to taking the conversations away from off-grid to development.

The other aim is to make sure the needed pillars of development like health and education are democratized because of energy access.

The Foundation also pushed for numerous successful processes to be replicated across various new geographies and partnerships. Each of the new intervention involving replication proved that simple scale up mantra cannot work while trying to solve the developmental challenges in the world. New geographies like parts of North East and Jharkhand proved that interventions had to be tweaked and financial interventions were much harder than in the South.

In 2017-2018, the foundation explored and expanded its base among partnerships in the livelihoods and disaster space. Much of the results will be expected in the coming 5 years.

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# SELCO Foundation

## *Introduction*

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*Globally 1.2 billion people do not have adequate access to basic energy services. India has 300 million out of its 1.2 billion people without access to energy.*

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Denying the poor, access to basic energy services disallows them the human right to a decent standard of living perpetuating the cycle of inequality and poverty. There exist strong correlations of access to energy having an impact on areas of wellbeing, health, education and livelihoods across household, work, individual, institute and community levels.

SELCO aims to bridge social and economic disparities via access to reliable, affordable and clean asset based energy solutions. SELCO's philosophy is rooted in a conviction that the poor should be part of the solution and not the problem. Lack of energy perpetuates poverty as it prevents the poor from accessing basic needs and in many cases earning opportunities.

*SELCO Foundation was thus established in 2010 with the goal to use sustainable energy solutions as a catalyst to improve quality of life and economic opportunities for the under-served.*

**Its mandate is three fold:**

- Pioneer and build the ecosystem to enable innovations that link sustainable energy and poverty reduction.
- Develop poor-centric solutions by addressing aspects of technology, financial and social linkages leading to a holistic solution that is socially, financially and environmentally sustainable.
- Through the innovations, help develop concepts and processes for other parts of the world to cater to the heterogeneous nature of poor segments.

*By applying the above three mantras SELCO Foundation aims to bridge last mile gaps to deliver sustainable solutions, which innovate on replicable processes, while customizing it to site and segment for underserved communities.*

# ENERGY ACCESS

*What does it mean to us and what needs to be done?*

- Lack of Access
- An opportunity to build ecosystems
- Only Energy Access ≠ Development
- Key Catalyst for other Verticals
- Much Beyond Basic Household Needs



Input/  
Output

Universities      Student Organizations      End Users  
Non-Governmental Organizations      Social Enterprises  
Financial institutes      Small and Medium Entrepreneurs

*To enhance quality of life and livelihoods by providing customized sustainable solutions that become assets for under-served communities.*

**Build the ecosystem** to enabling innovations that link sustainable energy/ sustainability and poverty reduction

Develop **poor-centric decentralised and customised solutions** by incubating and encouraging local ownership and operations.

Enhance aspects of technology, financial and social linkages leading to a **holistic solutions that are socially, financially & environmentally inclusive and sustainable.**

**INNOVATIONS IN  
ENERGY ACCESS**



# ENERGY ACCESS MODELS

Many of the needs of the poor have been misunderstood and the solutions provided are more from a thought process of 'one size fits all'. There is an underlying assumption that the poor is a monolithic structure and needs standardised solutions. But needs and acceptability of a particular solution depend on the geography, terrain, cash flow or other social/political factors. Thus, innovating for the poor does not end with technology innovation alone, but need to be coupled with innovations in delivery, financing and ownership models as well. Thus, changing the focus from the technology or the product to impact and looking at it from the lens of development brings to the centre the need to innovate on processes around delivery mechanisms, financial models, in addition to customisation of the technology itself.

- **Appropriate Technologies**  
Understanding the varying technology needs of the user and customising them.
- **Appropriate Financing:**  
Gauging the current expenses on energy incurred by a household and modelling the financing product accordingly
- **Ownership Models:**  
Experimenting with different ownership models (Individual, Energy Entrepreneurs, Community Owned) to make the solution accessible for the end user.
- **Delivery Models:**  
Identifying different models in which the product as well as subsequent maintenance of the technology can be delivered to the end user and building an ecosystem for the same.



Image: Home lighting systems in Kalahandi, Odisha



# Home Lighting

## FINANCIAL PRODUCTS & CHANNELS

Identifying, selecting and bridging the right financial product for the end user via a financial channel which ensures longer term credit linkage and banking correspondence

## IMPLEMENTATION CHANNELS

Delivering the solution to the end user in partnership with varying types of organisations which have a connect with the community.

## CUSTOMISED LOADS & BACK-UPS

Designing the solar unit in accordance to the usage and need of the end user

## Background

For true social sustainability, the poor need to be the owner of assets: and for that to happen they need to be financed in a manner they could afford the assets. Affordable financing has been one of the biggest barriers to energy access.

Mechanisms like risk guarantee, interest subsidies, margin money support, revolving funds and group lending, -one of the ways to address this need was leveraging JLGs or Joint Liability Groups as a model. This model had been successfully applied in Karnataka where bank financing was unlocked for home lighting systems, for households spanning entire villages.

Moving into other regions in India this learning was taken forward and adapted to local contexts and the existing infrastructure there if any.

## CASE ONE

### *Financing via the Farmer Producer Organisation in Sittilingi, Tamil Nadu*



The Tribal Initiative started SOFA (Sittilingi Organic Farmers Association), an association of farmers currently practicing organic methods of cultivation. There are about 500 farmers who are registered members of the cooperative. The cooperative has formed Women's Self-Help Groups (SHGs), which perform value-addition processing, increasing the profit margin for specific products associated with it.

As the need for basic energy access to the households was apparent. After working with the processing center, SELCO Foundation used the structure of the producer company and cooperative to leverage on financing for the households. After a few demonstrations, the cooperative now successfully provides financing for 2 and 3 light home lighting systems for their members. As the valley is remote and has extremely little to no power, the intervention has a fast uptake when combined with easy financing from their own farmer producer group.





## CASE TWO

### *Peer-to-peer financing in the Kotra Block for Tribal Communities in Rajasthan*

Kotra block, in Udaipur district is a tribal block bordering Gujarat, and the block headquarters is about 140 km from Udaipur. The region is considered as extremely challenging for main stream economic and development activities. Prevalence of unorthodox tribal culture and social norms also tend to keep development and government interventions at bay. Hence, while there is a evident need and potential for impact in interventions across all verticals, building the ecosystem is both a challenge and an opportunity for such a vulnerable area. SELCO Foundation in partnership with Kotra Adivasi Sansthan took up the task of providing asset based finance for individual households. KAS is an NGO that works primarily on tribal rights issues through its political arm Rajasthan Adivasi Vikas Manch. They have deep penetration in most of the villages in Kotra block, and routinely organize people for panchayat meetings..



KAS was connected to one of the local SELCO incubatees for the supply of systems. As no bank was willing to lend in the area, interim finance for energy systems was done via peer to peer finance partner Rang De. To date over 250 Households have accessed the systems via peer to peer finance. The repayment has been healthy with a significantly large growing demand in the district. KAS has now planned to start their own dedicated with on sustainable energy access for Kotra.



## CASE THREE

### *Building confidence in Orissa Grameen Bank to finance rural and tribal communities in Odisha*

Using the case of Syndicate Bank in Kalahandi financing 500 households with a 100% guarantee in a previously unbanked remote tribal community. As the pay back and progress has been very good, more regional rural banks were approached to unlock end user finance for the incubatees.

OGB (Odisha Grameen Bank) is a rural regional bank with a very good network in tribal remote areas in Odisha. It is one of the banks that has branches present in most of the SELCO incubation service areas.

A 30% guarantee was put in Odisha Grameen Bank using the case of success with syndicate bank to unlock financing for the first 60 households in Mayurbanj district. With this guarantee mechanism decreasing and the confidence building with OGB - financing in the next 1 year for over 1000 households is poised with OGB.





# ENERGY ACCESS FOR LIVELIHOODS

A range of different occupations and skill sets make up the the informal demographic, a lot of these have been practiced over generations and knowledge transferred to every subsequent generation. However, efficient technological interventions haven't made great inroads into these myriad communities either due to lack of contextualisation of the technology itself or the financial means to acquire it. In the past year we have developed solutions that enable existing practitioners to improve their productivity or reduce the drudgery involved in the trade thereby leading to savings or income increase within each of the livelihoods

- **Energy for Farming and Allied Industries** - Agriculture, Agri-processing, Forestry, Fishing, Animal Husbandry
- **Energy for Rural Crafts & Manufacturing** - Metal works like Blacksmiths & Silversmiths, Carpentry, Pottery and the Textile Value Chain
- **Energy for Rural Micro Enterprises in the spaces of** - Food Processing, Retail, Information and Communication, Mechanical Auto Repairs, etc.





# Agriculture & Agri Processing

## APPROPRIATE TECHNOLOGY

Need based technologies for farmers working in different capacities with different land sizes and yield quantities.

## CLEAN ENERGY

Availability of a reliable, decentralised, clean electricity source to run the equipment when needed

## OWNERSHIP MODELS

Varying ownership and operational models to make the process suitable for the community.

## Background

The largest share of India's population engages in subsistence agriculture. As yield produces are low, individual farmers often lack the ability to employ sophisticated technologies and processes to make their work more efficient and profitable.

In such cases, agriculture processing is either carried out by hand or by travelling long distances to larger towns to carry out the processing of the food grain. Here, the mill owner would have a monopoly over a large number of farmers coming from smaller villages. The mill owner would also keep all the by products arising out of the production process which would otherwise be an additional source of income for the farmer.



## CASE ONE

### Solar Powered Rice Huller for Small and Marginal Farmers



For small and marginal paddy farmers, hulling the paddy is a laborious and drudgery prone process, and an expensive one if taken to rice mills. Manual hulling is done either by pounding the paddy with a long wooden rod or by laying the paddy on roads so that vehicles can drive over it.

For farmers to get their paddy hulled requires them to go to large centralised units which charge a high price to get the paddy processed into rice. More than often these units are far away from the rice fields and involve farmers travelling many miles which ultimately increases costs and reduced productivity. Additionally brown rice (polished white rice but with the bran layer) can be sold for a higher price due to its health benefits, however farmers are unable to capitalise on this. The owners of the centralised units will often claim the bran for themselves which is much higher in value.

The new mini rice huller would be small enough to be used by a single farmer or used as a rental/community owned model to serve a small community of farmers. This gives scope for production of unpolished rice at domestic level as low cost, cottage scaled value addition business for farmers. The targeted farmers are those who live far from rice mills, or who hull the rice manually by pounding it. They should also be aware and interested by the nutritional benefits of brown rice.

Currently, three iterations of the rice huller have been created and 15 prototypes are being piloted in different rice growing regions of India. The current version of the rice huller, hulls at 90% efficiency and is suitable for varying types of rice. It has many features which make it both efficient to use and user friendly.

## CASE TWO

### *Entrepreneur run flour mills in Malle Mahadeshwara Hills*

Tulasikere village falls into the Kollegala taluk which is situated in the middle of vast extensive forests. The famous historical temple Mala Mahadeshwara Betta is housed 7 kms from this region. Despite of the proximity to the temple, there is very poor road connectivity since the region is a reserve forest area and only jeeps can navigate through. The village has 150 households which are scattered all over the hills. The main crops grown here are millets like ragi and jowar as they are not water intensive. There are no borewells or irrigation facilities so the populace uses these crops for personal consumption only.



The need for agri processing in the region is quite high as it is mostly done manually which is highly time consuming. There are two diesel run flour mills only one of which is currently functional. To procure diesel, one has to travel over 7 kms through kuccha roads which is not feasible.

Shivamma, the entrepreneur was a daily wage labourer with no steady income stream and is a part of an SHG under our partner NGO Myrada. She was identified by the organization as she was very keen and in need of a steady livelihood. A solar powered flour mill and de-stoner was installed in her shed in June to cover the need of agri-processing in the region. A de-stoner was also identified as a need as it takes 3 hours to destone 5 kilos of millets. With the machine, it only takes 10 minutes which saves a lot of time and cuts down drudgery significantly. Shivamma charges Rs 7 for a kg of processing and gets about 4 customers a day. She expects to see a rise in the customer base as villagers from the four neighbouring villages are also starting to come to access these services locally.

## CASE THREE

### *Solar Powering Sittilingi Organic Farmer Association's Agri Processing Centre*



Sittilingi is a remote village in Tamil Nadu, surrounded by Avalur valleys from all the four sides with a population of 50,000. The primary occupation of this tribal population is farming. Sittilingi Organic Farmers Association was started to promote organic farming and has a value added processing centre that produced and markets millet based biscuits, health mixes, etc. While their farmer base and the production was slated to expand rapidly, reliable electricity was turning out to be a barrier for progress. The agri processing machines such as de-stoner, de-husker, flour mill etc work on three phase electricity supply, which was available for only 2-3 hours every day. Combined with low and erratic voltages which cannot sustain the equipment functioning, their production capacity was severely impacted and they started to lose valuable orders.

A 4.5kWp solar system has been installed to power the processing machines that have motors ranging from 0.5-2 HP. The system is designed to provide 4.5-5 hours of back-up and can run a combination of machines of 4 HP at a time. Post this, the electricity bill is less than 5% of the previous amount, a double increase in processing capacity, double in increase of members and an increase in employment opportunities.

To know more, read the extensive report [here](#).





# Rural Crafts & Manufacturing

## APPROPRIATE TECHNOLOGIES FOR THE VALUE CHAIN

Bridging technology gaps, as per the need of the craftsmen, across the value chain of the craft in question

## FINANCING CHANNELS

Identifying and linking financing channels which are willing to finance the end user at financial terms designed as per the cash flow of the user.

## CLEAN ENERGY

Designing the solar unit in accordance to the usage and need of the end user

## Background

Informal Crafts and Manufacturing accounts second largest share of occupation after agriculture and its allied activities amongst the rural poor. There are evidences of such activities and professions existing since early civilisations and still have a lot of pertinence.

However, practices in the trade, specifically for the type and level of sophistication employed in the occupation have not progressed. Many craftsmen even today employ extremely drudgery prone and inefficient techniques to carry out activities which could otherwise be easily mechanised. Many craftsmen today have left their ancient crafts and have given up their skills in search of more stable income providing livelihoods

The problem at the heart of this is the availability of the right kind of technology suited to the craftsmen in question, coupled with the right financial model which makes the technology affordable for the end user along with a clean energy source which is reliable and gives a great amount of flexibility to the craftsmen's operations.

## CASE ONE

### Rope and Coir Yarn Making Communities



Coir is the fibre contained in the husk of the coconut, and it used in coconut growing regions to produce coir yarn. Fibres are spun to form threads which are themselves spun together to form yarn. Coir yarn is sold at local markets for farming and construction purposes. It is also converted in to higher-grade products such as matting, carpets and geotextiles.

The labour required to make these is 3 people - one person to operate the wheel, and two people to spin the thread (hand operated). They spin for an average of 6-8 hours and some of them use a motorized machine which hinders their productivity in power starved regions. The workers also tend to face shoulder injuries due to repetitive strain caused by turning the handle of the ratt and hand injuries due to the coir fibre being abrasive which causes cuts and sores on the palms of the spinners hands.

The Motorised Ratt solution is provided to communities producing coir yarn using traditional ratts – to increase productivity and reduce drudgery. The mechanical hand crank is now replaced with a mechanised motor which reduced the labour requirement. The post intervention ratt requirement for labour is reduced from 3 to 1 person (2 people for automated). The motorised ratt also significantly reduces the noise generated by the previous machine which means children can study at home without disturbance, and also that work can be performed in the early morning without fear of disturbing neighbours. The shoulder and back problems cause due to the manual repetitive motion is also no longer an issue.



## CASE TWO

### *Blowers and Power Hammers for Rural Blacksmiths*

Blacksmithy is one of the last remaining generational artisanal occupations in the country. India has well over 200,000 blacksmiths in rural areas, each of which constitute the segment of unorganised sector livelihoods in rural areas that build and modify input tools for agriculture and non agricultural purposes.

**Blowers:**The current methods include large wheels, hand cranked blowers, manually operated large compressors etc that are utilised to maintain and regulate temperatures. There was a need for elimination of extreme drudgery and long work hours which were largely due to the methods of igniting and keeping the furnace running. The work requires labour which traditionally the women or children of the household would assist with or hire additional labour to operate the manual blower.

SELCO Foundation innovated a modified high efficient, high quality, powerful blower with a controller for easy and ergonomic flame/ temperature control. As many of the workplaces are in places with no access or unreliable electricity, the above product is powered by a solar system and an optional light. The technical solution is combined with affordable financing mechanism via local financial institutions.

**Power Hammers:** Power hammers are used to flatten metal which used to be done manually with hammers. It was a very time consuming and tedious task. The current power hammers are run by diesel motors which are not just cost heavy but produce large quantities of smoke, unhealthy for the families and the environment. Selco Foundation is has developed a solar powered DC hammer. The financial innovation is being designed to cut costs and make this more affordable for the blacksmiths. A possibility could be a community based system where a few blacksmiths could invest in one machine and allocate timings for the use.



## CASE THREE

### *Pottery Value Chain Technologies in Udupi, Karnataka*

Mr Raghu Kullal is one of the few potters left in Aloor village of Kundapur. He has been doing pottery as a family profession and has created some market linkages on his own for pots.

Following are the Interventions that were carried out for Mr Kullal:

- Solar powered Pottery Wheel: A modified high efficient, high quality and safe potter's wheel with a speed controller and PMDC motor for easy operation has been designed.
- Fuel Efficient Kiln: SELCO Foundation collaborated with Mahatma Gandhi Institute of Rural Industrialization to build an Efficient Updraught Kiln which consumes 40% less fuel and energy as compared to traditional kilns.
- Solar powered Blunger: Mixing of clay is done manually by hand which is highly time consuming. A solar powered efficient blunger has been provided which is a motorized solution for mixing clay.
- AC pugmill: For his kneading process, the motorised alternative is a pug mill. An AC machine has been installed for now until a financial model can be designed for the solar powered DC one.
- Exhibition Space for display of products: An exhibition space was designed to display all his newer range of products





# Value Added Products and Services

## APPROPRIATE TECHNOLOGIES FOR DIFFERENT SECTORS OF VALUE ADDITION

Technologies which provide an alternative source of livelihood or an addition to an existing livelihood like Food Processing, Retail etc.

## MARKET LINKAGES AND CAPACITY BUILDING

Market linkages attuned with the scale of the enterprise and training as per the need of the entrepreneur.

## FINANCING CHANNELS

Identifying and linking financing channels which are willing to finance the end user at financial terms designed as per the cash flow of the user.

## CLEAN ENERGY

Designing the solar unit in accordance to the usage and need of the end user

## Background

Employment amongst the rural populations of India ranks very high. With small patches of land and unstable irrigation sources, many individuals seek out additional sources of income to support their families. In such cases, the trend has been to migrate to big cities in search of labour work which not only provides a very meagre source of additional income but also is extremely unstable, and is associated with all the perils of migration including inhumane living and working conditions and lack of growth in incomes.

For such individuals, providing an alternate source of income which doesn't require migration is extremely pertinent. Existing livelihoods like the retail sector can have added on services with the help of technology and new services like food processing can be easily carried out at the village level and made profitable with the help of market linkages.

## CASE ONE

### Roti Rolling Entrepreneurs in Karnataka

Lack of opportunities prevents the rural as well as urban poor from shaping their own livelihoods. Two primary barriers being- access to value-based technology and reliable energy. Many rural livelihoods are energy intensive and quite often are not viable if the required energy is unavailable for the required period of time each day. Thus, grid power scarcity forces entrepreneurs to use dirty sources of energy like diesel generators and kerosene powered motors. Such measures resorted to as last available options result in excessive expenditures on energy bills, thus reducing profitability as well as having a detrimental effect on health and environment. Alternatively, other entrepreneurs are unable to afford these energy supplies and end up working when power is available, often at odd hours in the middle of the night or early morning. By bringing in energy efficiency and backing the systems with renewable energy sources we have been able to reduce capital investment and lifetime energy expenditures.



Jowar, wheat and other millets are commonly grown crops in North Karnataka, Maharashtra (and other geographies) and rotis are a dietary staple across the region. It is eaten almost daily at homes and local hotels, commonly known as dhabas or khanawaalis. Traditionally roti rolling was done by hand, but roti rolling machines are increasingly replacing this. However, due to frequent power cuts, entrepreneurs are not able to meet all the orders to full potential and are losing business despite of market opportunities.

Solar powered roti rolling machine in combination with an efficient motor provides a reliable and economical backup power for entrepreneurs preparing homemade rotis for livelihood. The solar powered roti rolling machines enables the entrepreneurs to increase their production capacity as it speeds up the rolling process and also provide backup during power cuts.

The hybrid solar system runs mostly on solar power and uses grid power only as backup in case the battery is deeply discharged. The hybrid solar system thus provides reliable backup power during power cuts and also helps in reducing electricity bills.

## CASE TWO

### *Laptops, Printing, Photocopying & Photography Centres*

In the tribal areas of Kalahandi in Odisha, basic services like photocopying, or having places to take and print passport size pictures are arduous and expensive. Today for any government registration or subsidy reimbursement etc. the documentation requirements would consist of either a copy of their ration card or their photo: thus the need to have a facility for photocopying and printing photos. Average distance the locals would have to travel to get a photocopy is around 20 to 50 kms, resulting in loss of anywhere between half a day to a full day's wages and these costs are a huge burden to the tribal communities in the region. Recognizing the need to cater to such basic services, numerous small entrepreneur and traders started small enterprises to provide one or many of the mentioned services to the people in and around their geographical areas. Extremely erratic power with varied voltage fluctuations led to considerable disruption in business (substantial loss in income) and breaking down of expensive equipment – leading to further financial distress.



## CASE THREE

### *Solar Powered DC Refrigerators for rural petty shops and cafes*



Refrigeration and Cooling continues to be one of the key needs in rural and tribal areas- affecting several services, livelihoods as well as well-being. The need for refrigeration and cooling was studied in the area from different scales and perspectives and two key issues were identified. Lack of energy, and hence refrigeration and cooling facilities, restricts the communities access to certain goods and amenities. An entrepreneur in Kalahandi district, wasn't able to expand his grocery shop, and sell milk, yogurt, juice etc due to lack of a refrigerator. This technology has been piloted in numbers in Karnataka and Orissa with many such entrepreneurs undergoing similar issues. Efficient DC fridges of different sizes and capacities from different manufacturers are being tested on field to understand the feasibility and viability. The need for this intervention especially in hotter climates is high as food items and raw materials are lost due to lack of cooling affecting businesses and livelihoods.

Lok Seva Kendra (LSK) provides basic administrative related services for the poor at the doorstep of remote tribal communities and provides services such as (but not limited to): Photocopying, Printing and scanning, Downloading of music and movies and Passport size photos. An entrepreneur from the community is selected by the field staff who undergoes training to get familiarized with the equipment, fix basic issues and also financial know how. In many such livelihood scenarios, the scope of the intervention gets reduced due to lack of space for equipment or for providing the necessary services. In projects such as the Lok Seva Kendra in Kalahandi, Livelihood Centres or Energy Centres for rental services, SELCO Foundation has been looking at various ways to buffer the costs of physical infrastructure.

Moving forward SELCO will also be collaborating with local vocational training institutes (like RSETI) and collaborating with partners to initiate and enhance sustainable computer training centers in the region in order to support, initiate and identify entrepreneurship for LSK and LSK type models in the region.





# ENERGY ACCESS FOR HEALTHCARE

Access to basic health services is a fundamental right for any citizen in any part of the planet. But that is not the case for populations living the poorer parts of the world. Inefficiencies of delivery models, higher transaction costs to serve the underserved areas, lack of skilled human resources in resource constraint geographies etc. are some of the challenges that have prevented reliable delivery of health services.

Simple services like diagnostics, emergencies, hygienic maternal deliveries, basic vaccination or dental care are an unaffordable luxury for most of rural and tribal populations. Sustainable Energy combined with efficiencies of medical technologies can be one of the most critical components to democratise the delivery of health around the world.

- **Energy Gaps**  
To Critically understand the energy gap hampering the delivery of quality health care
- **Optimised DRE systems:**  
To bridge the energy gap and develop a framework and criteria for optimization
- **Mobility:**  
Identify technologies, devices and processes that can increase the efficiency and mobility of healthcare delivery
- **Interventions:**  
Decentralised Renewable Energy for PHCs, Efficient labour room at PHC and SC, Sure-Chill (Solar Direct) Vaccine Storage and Blood storage units, ePartograph, Maternal kits and Breath Counters

Themes	Intervention	Region	Impact Generated
Energy Access for Primary Care	DRE Solution for Primary Health Centres and Sub Centres	Karnataka, Assam, Meghalaya, Arunachal Pradesh	>200,000 individuals get access to improved quality and quantity of health services through implementation partners
	Efficient Labour Rooms	Karnataka, Tamil Nadu	600+ pregnant mothers receive improved care
	Delivery Point at Sub Centre	Karnataka	Being piloted, if successful 1000+ women will be benefited per SC/Year
	Malaria Clinic	Odisha	300+ patients benefited per month through malaria diagnosis and treatment
Cold Chain	Combo Sure Chill (Solar Direct) Vaccine Storage Sure chill Blood storage Unit	Assam, Nagaland, Chattisgarh	a. Combo: Immunization coverage at clinic run by JSS at Bamhani village situated 70 km to the north of Bilaspur town caters to population of 8408 persons dispersed across 17 villages. Tinsukia Boat Clinic run by C-NES, Assam. The boat clinic covers 20 villages with total of 216 visits/year. On an average 500+ children are immunized per year.
	Cold Chain Point at Sub Centre	Karnataka	b. Blood storage- Blood storage unit to cater JSS's hospital in Ganiyari village with 70 bedded in patient department and 500 deliveries per year.
Maternal & Child Care - Community Health Care	ePartograph	Karnataka, North East	Partograph- 6 PHC in KA and 4 in NE are provided with digital partograph that helps Staff nurses and ANMs at the PHCs to plot the partograph and monitor the labour efficiently. On an average 20+ deliveries take place at each PHCs per month.
	Community Health Nurse Kit	Odisha	55 Community Health Nurse kits help ANMs and Nurses at Swasthya Swaraj to deliver primary health care at the community level.
Mobility in Healthcare	MMU	Karnataka	Mobile health Van Udbhav foundation covers population of 9200 from 18 villages.
	Boat Clinic	Assam	4 boat clinics with partnership with CNES reaches around 33 islands of each island having a population 350- 400 people on average. The boat clinic conducts at least 18 health camps in a month.

# Maternal & Child Care

## BUILT ENVIRONMENTS

A well-lit, ventilated and well-designed physical space where mothers feel comfortable.

## APPROPRIATE TECHNOLOGY

Necessary medical equipment which are robust, reliable, appropriately designed and energy efficient

## CLEAN ENERGY

Availability of a reliable, decentralised, clean electricity source to run the equipment when needed

## Background

India has made significant progress in addressing the issue of high maternal mortality ratio. However, progress on reduction of neonatal and infant mortality rate is suboptimal. The current trend in high institutional deliveries has not resulted in proportionate reduction in mortality rates in the country. For this, the availability of proper care during and immediately after delivery are critical in saving the lives of mothers and new-borns. Therefore, labour rooms play an important role in reducing maternal and neonatal mortality at the primary care setting.

The three main factors that affect the outcome of emergency presentation during pregnancy (chronologically) are the lengths of the delays in: (i) the decision to access care (ii) the identification of " and transport to " a medical facility, and (iii) the receipt of adequate and appropriate treatment. Once the pregnant mother has managed to reach a health facility, facility infrastructure (availability of electricity, water, appropriate efficient medical equipment, built environment, blood bank, diagnostic facility etc) play a critical role in providing (or enabling) health workers to provide the necessary basic, emergency or critical care.

## CASE ONE

### Maternal Care & Labour Rooms for Primary and Secondary Healthcare

Availability of reliable power at the labour rooms at the health centres has led people to prefer primary health centres for delivery over higher health centres. Staff nurse at the Kannur PHC expressed, "Earlier days for the delivery people use to think twice before coming here. They would directly go to District or Taluq hospital as electricity at PHC could never be relied upon, but now because of solar people prefer PHC. PHC being closer to their houses, it also reduces their travel time and any risk due to delay in reaching health facility". For PHC staff conducting deliveries at night time was particularly more difficult due to absence of basic lighting. Additionally, availability of the appropriate equipment like Spotlight for conducting delivery has made staff's work much easier. "Before the Spotlight was introduced and solar powered, despite power availability we had to use torch as we needed a more focused light for conducting deliveries. Now we can have more people focusing on conducting delivery and suturing rather than one person just holding a torch" said the staff nurse. Earlier in Kannur PHC, after delivery women will leave as early as possible as there was no electricity, now they stay for recommended 48 hours. Moreover, presence of critical labour room efficient equipments like Baby warmer, suction apparatus and oxygen helps PHC manage less severe delivery cases and reduces need to refer them to higher centres.

Another major impact of power availability is on the safety of PHC night staff. Staff Nurses feel safer at night due to availability of electricity as now its PHC is always lit. They feel confident that they can do their job better and not worry about their safety.





## CASE TWO

### *Delivery Point at Sub-Centres: Keba Sub-Centre, Arunachal Pradesh*

For every 5000 people in rural areas one sub-centre is constructed for the purpose of provision of primary health care services. ANMs and ASHA workers who work out of these sub centres are allocated for every 1000 people. Currently, only 47% of sub centres are run in prescribed government buildings.

Every PHC has a set of sub-centres operating under its jurisdiction for the provision of emergency services which largely consists of maternal health care and deliveries. The sub-centre has very basic infrastructure requirements that include a delivery room, consultation room, storage spaces for medicine and a living room for the ANM (Auxiliary Nurse Midwife) to stay. However due to the lack of physical infrastructure, sub centre clinics are not operational on a regular basis. The project aims to establish the requirement of sub-centres under PHCs for the purpose of last mile delivery of health care services and also provide appropriate design technologies to improve the efficiency of the built structure, DRE for energy access and use of efficient equipment.



The Keba Sub-Centre in Arunachal Pradesh has been built from scratch keeping into account both the needs of a health centre and a place of stay for the Community Health Worker. Built for function, the building materials and space utilisation significantly determines the optimisation and efficiency of the energy usage. The solution analyses the building design in relation to the function inside, the technology design suggested and energy consumption.

Natural Lighting and Ventilation is built into the building in accordance to the level of privacy required in the day and night. Solar powered efficient technologies help the health worker to provide better care.



## CASE THREE

### *Portable Maternity Kits*

The maternal kit brings the essential labour room to the mother. The provider goes to the customer rather than the customer going to the provider. The kit will include the basic kits for maternal and child care including ANC, PNC and Delivery.

#### **The portable kit has:**

- Basic diagnostic kits for testing Anemia, Blood sugar levels, Urine albumin and Malaria. (12volt 18-watt solar panel, Li-Ion Battery, Charge Controller, DC to AC converter, AA/AAA battery charger, 12-volt DC points) Fetal Doppler
- BP Monitor and Pulse Oximeter
- Mobile charging point
- 3 Watt LED Lamp
- Headlamp
- e-Parotgraph (so that the delivery can be monitored from the PHC or CHC through IOT)
- Maternal Medical Kit (Eclampsia and PPH)
- Clean delivery kit (JSS kit)
- Baby warm Jacket (JSS)
- Ambu Bag, a Nebulizer (if needed)
- Portable electric suction pump



# Mobility in Health

## APPROPRIATE TECHNOLOGY

Necessary medical equipment which are robust, reliable, energy efficient and designed for portability.

## CLEAN ENERGY FOR CRITICAL LOADS

Availability of a reliable, decentralised, clean electricity source to run the equipment when needed

## DESIGNING FOR FUNCTION

Designing the mobility component takes into precedence the core function the vehicle serves. Whether it is immunisation and primary care, awareness and outreach, or specialised care.

## Background

Provision of mobile health services can be the critical bridge between remote communities and quality healthcare services. Mobile Healthcare can be made available for different purposes and in different forms.

SELCO Foundation has been working in the space of mobile healthcare with four partners currently: CNES in Assam to solar power its boat clinics and test equipment in the sea farer context; Karuna Trust and Udbhav Foundation for its road travelling vans which provide care to remote regions in Karnataka and Jan Swasthya Sahyog for innovating upon new technologies for the use of community health workers.



## CASE ONE

### Boat Clinic with Combo Sure Chill in Assam with C-NES

More than 2.5 million people live on 2,500+ islands in Assam locally called chars or saporis. It is densely populated (690 persons per sq.km). The Maternal Mortality Rate is approx. 300 per 1,00,000 live births and Infant Mortality Rate is 54 per 1000. CNES provides a boat clinic service to people living in these areas for immunisation and basic primary care.

Refrigerators for storing vaccines are crucial to providing such a service. However, diesel powered generators are required to power such a service. Once the diesel runs out so does the provision of this service and boat needs to return to dock.

SELCO Foundation partnered with CNES to power three of its boats and partnered with Godrej Sure Chill to provide reliable vaccine storage equipment to each boat. This has not only cut down on the inconvenience associated with diesel storage and usage but has also increased the number of patients that can be reached out to on each trip, considerably bringing down the per-patient cost incurred. Currently CSR co-leveraging is being explored to support the additional boats that serve the area.



## CASE TWO

### Udbav Foundation's Mobile Medical Unit

The Male-Mahadeshwara Hill area is located in southeast Karnataka, where it borders Tamil Nadu. It forms a connecting corridor between the BRT Wildlife Sanctuary to its west, and the Cauvery Wildlife Sanctuary to the northeast. MM Hills was notified as a reserve forest serves as an important elephant corridor between the Western and Eastern Ghats.

Mobile Vehicle by Udbhav Foundation is used for providing Out-patient related services, including clinical and laboratory services. Van is equipped with medicine chambers, examination table, chairs for patient and staff and emergency medical equipments. In a day on an average, van covers distance of 80 to 120 km. Most of these vehicles carry basic laboratory equipments like microscopes, centrifuge, small fridge, lights, fans etc.

Mobile unit is supported with flexible solar panels to support basic laboratory equipment, a vaccine box and a television to aid basic examinations, community health awareness, support and consultation.



# Appropriate Technology

## BLOOD STORAGE UNIT

While anyone can be at risk for health complications during pregnancy, the danger is particularly high in rural areas where poverty and malnutrition are rampant, women start having children at incredibly young ages, and the number of pregnancies for an individual woman is often in the double digits. On top of the already high risk of health issues that these women face, they live in remote villages that can be hours away from a functioning health centre. With around half of deliveries being conducted at home, if complications arise during delivery, there is little hope of getting the woman to a hospital in time.

Post-partum haemorrhage is perhaps the most common form of emergency during and immediately after delivery and is a leading killer among women living in remote areas of the world.

The Gaps in refrigeration and cooling in health care service for blood storage units: Problem faced by JSS (and tribal areas) is not just limited to the lack of connection to the electricity grid, the poor quality and irregular supply makes the challenge of energy access even greater. Due very poor quality and unreliable power supply which directly affects the quality of the services these facilities intended deliver, especially the OT and the blood storage facilities which is very crucial.

JSS conducts approximately 2000 major surgeries per year. Most often these surgeries require blood transfusion especially for PPH cases and trauma cases. Currently they transport the blood form Bilaspur town to the JSS hospital which will require approximately 1.5 hrs. At any given point they store 20 to 30 units of blood and use 80 to 100 units of blood per month. They have to make 2 to 3 trips to Bilaspur to collect blood. Currently they are using conventional blood storage units which relies on continuous good quality power supply and monitoring which is very unreliable and they have to use DG sets. Now with newer technology (sure chill) is installed the blood storage units can use this as the main source of cold chain and use the existing storage units as back up thus improving the efficiency of use of energy, time and supports the surgical services provided.



## BREATH COUNTER

According to State Health Resource Centre, Chhattisgarh, 1247 deaths were reported due to Pneumonia among under four age group in the same year. In the Indian Public Health System, these data points are gathered by ASHAs (Accredited Social Health Activist) or similar health workers who are often neo-literate. For the diagnosis of pneumonia, and acute respiratory infections the Community Health Worker (CHW) should assess whether an infant has fast breathing, by measuring their respiratory rate. CHWs have to count the number of breaths taken by an infant for a minute, along with remembering age specific respiratory cut off points to determine whether the infant has pneumonia.

SELCO Foundation leverages the knowledge of ecosystem partners to effectively design and replicate the solutions. Remidio Innovative Solutions, a Bangalore based startup which focuses on designing and developing medical devices, was selected as the required partner to develop such a product which was tested with SHRC's staff in Chattisgarh. The new Breath Counter is intuitive and easy to use.

Mithanins and ANMs of Chattisgarh shares that it lets workers focus on breath counting solely without worrying about remembering count or keeping track of time. They appreciate that Breath Counter gives immediate feedback hence timely referral can be achieved. Additionally, they found the design of breath counter be ergonomic, easy to hold and count.



# ENERGY ACCESS FOR EDUCATION

In the context of low income communities (specifically remote rural/tribal communities), multiple issues plague the education system. Some of the most pressing interconnected issues include-lack of strong and consistent school management committee and systems; basic infrastructure (water, energy, sanitation etc); teachers regularly taking classes and lack of context-based teaching and learning modules. Due to these and other issues the student interest, attendance rates and learning levels remain compromised. More specifically, unreliable access to the grid in remote areas, cause loss of valuable study time during school hours and at home during the night.

- **Early Childhood Education and Anganwadis:**  
Re-looking ICDS centres and bridging the gaps to deliver better services
- **Built Environments & Education:**  
Role of infrastructure and internal space utilisation in delivering quality education and creating conducive learning environment for learners from varied backgrounds
- **Digital Education:**  
Customised end user based technology and content

Themes	Region	Impact
Digital Education Program	Karnataka	1600 schools impacted with over 200,000 students wit digital education programmes in primary and secondary schools
	Tamil Nadu	
	Odisha	
	Maharashtra	
	North East (Meghalaya, Assam, Manipur)	
Hostel Lighting	Karnataka	More than 500 schools and 50,000 students impacted via energy access interventions in hostels
	Odisha	
	Tamil Nadu	
Light For Education (Batteries charged in school, used at home)	Karnataka	156 schools with more than 9000 high school students impacted with lighting at home.
Smart Anganwadis	Karnataka	Over 2000 students between the ages of 3 to 6 years of age impacted via digital interventions for creches.



# Anganwadis

## MONITORING IMPROVED LEARNING OUTCOMES

Greater development of analytical and cognitive skills in children, on par with their counterparts from private Anganwadis and Montessori schools. (Robust data collection platform built in along with the content to track usage patterns).

## INTERACTIVE CONTENT

Specially designed and developed content which uses motion sensors to ensure that an Interactive learning environment is created in the Anganwadi.

## BUILT ENVIRONMENTS

Anganwadi designs and retrofit guidelines that give an idea of space utilization to the best of what is available. Introduction of toilets, cook areas, rain water harvesting (where necessary) and guidelines to use infrastructure as a learning aid for children by using tools like abacus, etc. instead of plain railings.

## AIDING THE TEACHER

Teachers effort get reduced to as more of a facilitators, than being content developers with the introduction of tablets and this kind of content.

## CLEAN ENERGY

Sustainable energy access is provided with the introduction of fans and lights along with the tablets which are fully solar powered.

## Background

Anganwadis in our rural areas face usually less acceptance or have more scope of improvements compared to a private run pre-school or Anganwadi. The reason is gap in facilities (power, technology, etc.) or infrastructure/building/space or the teacher herself. This shows a clear cut access gap which leads to gap in access to quality education which can further impact the learning outcomes and create a social difference between the rural and the urban children or the rich and the poor.

## CASE

### Tablets in Government Run Anganwadis in Drought Struck North Karnataka

Bijapur or Vijayapura is the district headquarters of Bijapur district which is in the northern part of the Karnataka state. There are various non-government organizations working in the region for delivering better services or strengthening existing public services. Karuna Trust is one such organization working in the region to deliver and strengthen better health services. The organization also does various awareness campaigns and involves local people as stakeholders of change.

Technology, if designed appropriate to people's/local environment's need, can act as a catalyst and as a good platform to conduct multiple tasks. The Anganwadi project done with this organisation is one such example of the same. Karuna Trust uses the Anganwadi space in the evening in their regions to mobilise community and do health awareness. The system designed for these specific Anganwadis had a one TV + one Tablet model instead of the regular two tablet models that we have done earlier. Here, in the morning the Anganwadi worker uses the tablet to deliver educational content to children which is being also casted in TV with the help of a Chrome cast, and the same tablet and TV in the evening is used by Karuna Trust to show various videos on health awareness which engages the people more in their discussion. The solar system in this case is designed to run the system in the evenings too. This ensures uninterrupted utilization of the resources available for public good.

Hence, this type of organisational involvement with an administrative process strengthens the relationship in the community for the intervened infrastructure and also shows the role a robust, customised technology and renewable energy plays to strengthen that link.



# Portable Schools

## AFFORDABLE AND PORTABLE STRUCTURES

As evacuation is always a risk in the areas where migrant communities dwell in the cities. These structures can be dismantled in a few hours and can be transported to any other place very easily, no skilled mason is required to assemble and disassemble the same.

## LOCALLY AVAILABLE MATERIAL

Materials that can be fabricated by any fabricator with the help of designs and guidelines created.

## NATURAL LIGHTING & VENTILATION

The structure is designed to capture ample natural lighting which makes it much more conducive for creating a healthy learning environment. The internal space is designed to be used as a learning tool, introduction of abacus, play area, rain water harvesting system are a few additions in the infrastructure.

## APPROPRIATE TECH + ENERGY

Projectors to be used by the teachers to show relevant audio/video content to enhance learning. Sustainable energy access is provided with the introduction of a fan and a light to make the environment comfortable for the children.

## Background

The growth of Indian cities often comes along with an equal share of a growth in disparity between populations. Civic chores like labour for construction, waste management etc. have been carried out by people who occupy the very bottom of urban society and build their lives in conditions which are inhospitable, unhygienic and very often inhumane.

Education for children from such communities has the same fate. Tent or bridge schools, a provision of the Indian Government, are housed in hot and sultry GI Sheet structures, lack access to basic services like clean water and electricity and often fail to inspire a generation of individuals who can instead be nurtured to uplift the status of their communities and ensure a better future for themselves.

## CASE

### Bridge Schools for Migrant Communities in Bangalore



There are many migrating communities which occupy land under either private or public ownership scattered across the fringes of Bangalore city. Such students have not attended mainstream schools, hence bridge schools which are temporary 'bridging' solutions which prepare the students for mainstream education.

Bridge schools are government programs which are run by local Non Profits. SELCO Foundation partnered with a few such organisations in Bangalore to test and demonstrate the use of good quality portable structures which provide a comfortable and enriching learning environment to the students, further incentivising them to attend the schools.

Two such schools were built in Bangalore under the pre-conception that these students along with their families would have vacate the premises at any given time, and in such a situation the school would be dismantled and built again in the land of new occupation.





# ENERGY ACCESS AND BUILT ENVIRONMENT

Inappropriate building design results in households relying on technologies to improve their wellbeing. The solutions innovated upon by the Built Environment team are a combination of improved building design, technology design- resulting in resilient structures and reduced energy usage; combined with appropriate financial models and ownership models that respond to other challenges around land tenure-ship. The team also believes that the function of a building and the way the building is designed for that function can also significantly determine the optimisation and efficiency of the energy usage. The solutions analyse the building design in relation to the function inside, the technology design suggested and energy consumption thereof.

- **Materials:**  
Incremental Solutions for existing housing typologies to incorporate energy efficiency; Sustainable materials with lowered embodied energy
- **Planning, Design and Layout:**  
Layout planning to ensure cross ventilation and efficient space utilisation
- **Energy Consumption- Efficient Technology and Appliances::**  
Design of complete habitat to look at energy infrastructure- sustaining the activities housed within (eg: lights and TV for homes, audio visual aids for schools, health equipments for PHCs)

Project	Geography	Features
Portable Shelters	Belgaum, Kundapura, Udupi (Karnataka)	<ul style="list-style-type: none"> <li>- Portable, quick assembly structures made of energy efficient materials with natural lighting and ventilation.</li> <li>- Built in energy needs, from basic lighting to learnings aids- interactive and audio visual aids using solar powered projector.</li> <li>- Improved insulation and natural lighting- increasing wellbeing and reducing the consumption of lights during day time</li> </ul>
Pucca Housing	Bangalore (Karnataka)	<ul style="list-style-type: none"> <li>- Energy Efficient homes, complete with appropriate energy solutions- for living activities as well as the home based livelihoods.</li> </ul>
Incremental Energy Efficient Solutions	Bangalore (Karnataka) Kalahandi (Orissa)	<ul style="list-style-type: none"> <li>- SKIN (a tent envelope with increased insulation and built in windows)</li> <li>- Roofing Sheets for Country tiled roofs and corrugated roofs for bringing in natural lighting</li> <li>- Developing incremental natural lighting and ventilation solutions which respond to different roofing typologies and the social and cultural context of the geography (privacy, density, labour etc)</li> </ul>

# Transitory Housing

## PORTABLE STRUCTURES

Structures that can be packed and moved within a day to ensure it complements the transitory nature of the household- and other community infrastructure such as schools, health clinics etc.

## NATURAL LIGHTING & VENTILATION

Structures that incorporate natural lighting, provide improved insulation and ventilation- reducing reliance on artificial lighting and reducing expenditure on energy fuel.

## Background

A high percentage of low income migrant households cannot afford formal housing in the cities. This results in them building small, informal, temporary settlements that provide basic shelter. While in the short term it results in low capital investment and a quick build, in the long term the households end up with higher recurring costs in the form of expenditure on home repairs, health treatments and fuel usage.

Thus a solution was formed keeping in mind the following parameters-

1. The portability of infrastructure- quick assembly and flat pack mobility
2. Incremental nature of building and settlement growth- modular structures and units
3. Day to day, cashflow based decisions for accessing amenities due to insecure livelihoods

## CASE

### Housing for Urban Migrants in Kanbargi, Belgaum, Karnataka



SELCO Foundation has been partnering with Mahesh Foundation since the past 4 years to improve the well-being of migrant slum households in Belgaum. Working with a community of 250 Households, Mahesh Foundation runs an Anganwadi for the children in the slum, and a regular weekly clinic. Energy access, however, was still a gap which restricted their interventions in the community. Together with Mahesh Foundation, the SELCO Foundation team developed a holistic energy access solutions- one that aims to not only decentralise the generation of energy in accordance of the need, but also lays out systems that improve efficiency of energy usage in the community.

- The Anganwadi, catering to over 50 children from the community not only uses an efficient solar powered interactive audio visual aids to generate more interest in children for learning, but is also housed in a building that can be used without artificial light in the day time (primary time of use), reducing the reliance on a light bulb for the children to study and conduct various learning based activities.
- Transitional and portable structures, have not only improved the wellbeing of the households, but also provide protection during heavy rains- where previously many of them were incurring high loses during flooding. The households do not require fans 9 months of the year (previously the houses were not habitable in afternoons specially throughout the year), and in most cases require artificial lighting post sunset only.
- Portable energy rental unit has also resulted in the households moving away from dirty fuels such as kerosene, while incurring lower costs.





# Natural Lighting & Ventilation

## CARBON FOOTPRINTS

Reduce the energy footprint of low income households by introducing incremental solutions for natural lighting and ventilation

## LOWER ENERGY EXPENSES

To increase the disposable income of the poor households by reducing their expenditure on energy

## WELL-BEING

To allow for a healthier living and working environment within the building by incorporating natural lighting and ventilation

## Background

Inadequate natural lighting and ventilation across domestic, institutional or commercial structures due to improper planning has an adverse impact on the wellbeing of the dwellers ranging from reduced productivity to long term health issues. Even though many households might employ artificial lighting in their households during daytime, they do so with bulbs or CFLs with much less illumination than is necessary for reading or doing pay-per-piece kinds of work. This puts in considerable strain on their eyes and cause problems like deterioration of eyesight, headaches, etc. Also poor air circulation in the household is also not optimal to work as the air becomes stale after sometime.

Electrification of these structures and utilising it during the day adds to considerable amount of costs and precious waste of energy.



## CASE ONE

### Solution for Corrugated Roofs



As mentioned above, corrugated, galvanized iron/asbestos sheets (GIS) are very commonly used as roofing tiles in slum areas. Although these sheets are cheap and keep the rain out, they also prevent light and fresh air from entering the household. In the slums, where homes often share three out of their four walls, artificial lighting is needed inside during the daytime to perform daily activities such as studying, cleaning, etc. Additionally, fans are commonly used to induce airflow. Airlite is a semi-transparent, corrugated unit made from Fibre Reinforced Plastic (FRP) that can be easily installed to bring natural light and fresh air into the house. These design features reduce the household's need for electricity, therefore lowering bills and saving income. SELCO initially worked on this project in collaboration with another organisation called Innovation Centre for Poor(ICP) in the slums of Ahmedabad. Key challenge however, has been the financing for both these products, and in the coming year a combo solution (ie lighting + roofing solution) would be piloted.

## CASE TWO

### Solution for Terracotta Country Tiles

In rural and tribal geographies of Orissa, households typically have mud walls, bamboo strip purlins, with khapar tiles on top. In the paddy growing geography of Kalahandi, Orissa, windows are kept shut over 8 months due to the cold. In all houses, mornings and nights are always dark with no access to natural lighting. The households do not prefer having windows beyond the veranda space as they don't want the moisture to affect the paddy they store inside. Households use candles or gas lamps for cooking, lighting up the storage space etc. In houses that have solar lights, they are kept "ON" even during the day. The product designed aims to improve the visibility inside the houses during day time, without using any energy by providing them with ample natural light inside the house, thereby increasing productivity, security, protection from snakes and a means to do their daily work without using lights during the day (hence saving on cost).

**ECOSYSTEM DEVELOPMENT  
FOR SUSTAINABLE ENERGY**



# SKILL DEVELOPMENT AND TRAINING

SELCO Foundation began its work in the field of skill development with a sincere belief that 'training' of individuals solely for vocational needs will not be the answer to the Indian or the Global South's context. The solar industry needed more than just technicians, innovators of appropriate technologies and processes which would respond to conditions and contexts of their own surroundings and entrepreneurs who would best be able to cater to these needs and bridge the gap between the solution and the customer.

- **Solar Technology Training**  
Training vernacular students from rural areas to take up solar technology roles in rural enterprises or become entrepreneurs.
- **Entrepreneurship:**  
Entrepreneurship training for rural solar based entrepreneurs or of other rural livelihoods
- **Innovation:**  
Inculcating a spirit of innovation amongst grassroots individuals to create new technologies or solutions for the betterment of their communities.
- **Livelihood**  
Training centres and courses which specialise in one or more specific rural livelihoods

Themes	Regions	Total Numbers of Centres
Solar Technology Training + Entrepreneurship Training	Karnataka, Meghalaya, Assam, Orissa, Bihar	8
Livelihood and Healthcare Training Centres	Karnataka (Agriculture, Livelihoods) Odisha (Healthcare)	4
Banker Training Workshops	Odisha, UP, Bihar, Assam, Karnataka, Maharashtra, Tamil Nadu, Rajasthan, Meghalaya	14 Workshops with a total of 500 participants



# Training Centres

## CASE ONE

### *Solar Technology and Entrepreneurship Trainings with Don Bosco*

With increasing number of decentralised energy enterprises and greater Government attention to renewable energy solutions have hastened the need for skilled personnel in the sector at various different levels across a range of technology solutions. There is a requirement for technicians, service providers, sales personnel, managers, entrepreneurs and innovators – the whole ecosystem that makes up a service industry. SELCO Foundation partners with skill development institutions for Technician and Micro Entrepreneur Development to meet the twin objectives of increasing skilled manpower while creating the much needed human resource base for deployment of decentralised solar energy systems.

SELCO Foundation has partnered with DB Tech at the National level to facilitate identification of skill centres to undertake Solar PV technician and micro entrepreneurship training as an add-on to the existing 3 month electrician trade. DB Tech has set up a network of 300+ skill training centres across India which addresses the socio-economic needs of marginalised youth by conducting various types of training. By capitalising on the existing infrastructure and resources available, a Solar lab has been installed successfully in 5 selected DB Tech centres in Muzaffarpur, Shillong, Bangalore, Chitradurga and Rangajan. The lab encompasses Solar technology demonstrations and testing areas for hands-on learning and innovation. A course curriculum and content on Solar technician training and micro-entrepreneurship was developed for the training centres. The content comprises of presentations, animations, technical videos practicals/hands-on activities, assessments etc. 'Training of Trainers (ToT)' is provided to equip the faculty with the knowledge required to deliver effective training and to familiarise with curriculum, content and assessment standards.



## CASE TWO

### *District Agricultural Training Centre*



District Agricultural Training Centre (DATC), under the Karnataka State Department of Agriculture (KSDA) - has been created mainly to provide Agricultural Extension services to farmers and to transfer the latest technical knowledge to the farming community, laying demonstrations, imparting training to farmers to improve skills & knowledge to boost up the agricultural production and productivity.

SELCO Foundation has set up a 'Solar interventions in Agriculture' Lab in one such DATC situated at Hiriyr in Chitradurga district, with an aim to create awareness to the farmers and students on sustainable practices available in agriculture. This lab includes Solar powered machineries such as Paddy Thresher, Rice Huller, De-stoner, Chilli Grinder, Flour mill, Cotton Picker, a functional roti rolling machine in the kitchen and solar water pump for kitchen garden. Going forward, this lab can develop into an innovation centre.

This model encompasses aspects of energy training, demonstrations of various agricultural machineries powered by Solar energy, hands-on learning and innovation, with an objective to improve the wellbeing and livelihoods of small and marginal farmers. Solar micro entrepreneurship and business development training is also planned in order to provide an additional livelihood opportunity for the farmers during off season.



# ENTREPRENEUR DEVELOPMENT

SELCO Incubation program was started with an aim to address the challenge of energy access through sustainable social enterprises which can provide clean energy solutions to communities in rural, tribal and poor urban areas. The program amalgamates the learnings of the past 23 years of SELCO India to enhance the capacity of local energy enterprises.

The program aims at empowering small entrepreneurs to grow into medium and eventually larger enterprises with the ability to reach more end users. A special focus will be maintained on non-english speaking local entrepreneurs. The figure below captures the various support areas on which SELCO works with its entrepreneurs during the various stages of the enterprise's development.

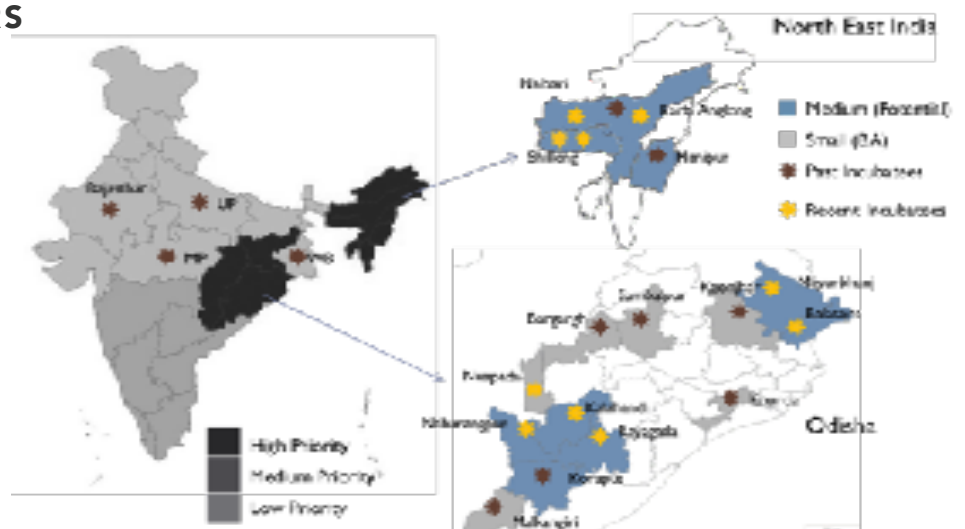
- **Medium Scale Entrepreneurs:**  
Entrepreneurs catering to one or more districts in a state
- **Small Scale Entrepreneurs:**  
Entrepreneurs catering to one or more blocks in a district
- **Micro Scale Entrepreneurs:**  
Entrepreneurs catering to a few villages

## POTENTIAL ENTREPRENEURS

Type of Entrepreneur	No. of Potential Entrepreneurs Identified	Regions
Medium	4	Meghalaya, Assam, Manipur, Odisha, Jharkhand
Small	7	
Micro	14	

## ACTIVE ENTREPRENEURS

Regions	No. of Active Entrepreneurs
Meghalaya	1
Manipur	4
Assam	10
Odisha	7
Jharkhand	2



2017-18

## Conclusion



Image: A transitional home for migrant communities in Karnataka

In 2017-2018, as seen from the report the foundation achieved quite a bit of the result in the verticals of health, education and livelihoods: but these are just the tip of the ice-berg. The challenges across geographies are vast and lots of cross sectoral work needs to be done. The Foundation needs to expand its base among partners from other fields and geographies. The processes need to be replicated in many more directions if the SDGs of 2030 have to be solved.

The Foundation will keep focusing itself as the champion of eco-system developer in India and other parts of the developing world. In the field of health, the foundation will broaden its interventions in the sectors of maternal health and child welfare. In the livelihoods, the foundation will deepen its involvement in the fields of agriculture and small businesses.

The education vertical will continue its quest to create numerous sustainability leaders by 2025. In the next couple of years, depending on the resources, it will push for interventions in the field of art and disability.

In order to make this world an inclusive one, pure scale up of solutions are not the answer, but democratization of the interventions is important. SELCO has pushed the needle a bit, but lot more work needs to be done in the coming decade.



Image: An Entrepreneur providing photocopying and printing services to tribal communities in Odisha



**SELCO** Foundation

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# M/S RAMESH ASHWIN & KARANTH

CHARTERED ACCOUNTANTS

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## INDEPENDENT AUDITORS' REPORT

### To the Trustees of Selco Foundation

We have audited the accompanying consolidated financial statements of Selco Foundation (Trust), which comprise the Balance Sheet as at March 31, 2018, and the Statement of Income and Expenditure and the Receipts and Payments Account for the year then ended, and a summary of significant accounting policies and other explanatory information.

### *Management's Responsibility for the Consolidated Financial Statements*

Management is responsible for the preparation of these consolidated financial statements that give a true and fair view of the consolidated financial position, consolidated financial performance and consolidated Receipts and Payments of the Trust in accordance with accounting principles generally accepted in India. This responsibility includes the design, implementation and maintenance of internal control relevant to the preparation and presentation of the consolidated financial statements that give a true and fair view and are free from material misstatement, whether due to fraud or error.

### *Auditors' Responsibility*

Our responsibility is to express an opinion on these consolidated financial statements based on our audit. We conducted our audit in accordance with the Standards on Auditing issued by the Institute of Chartered Accountants of India. Those Standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the consolidated financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the consolidated financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the Company's preparation and presentation of the consolidated financial statements that give a true and fair view in order to design audit procedures that are appropriate in the circumstances. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of the accounting estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.





**Opinion**

In our opinion and to the best of our information and according to the explanations given to us, the consolidated financial statements give a true and fair view in conformity with the accounting principles generally accepted in India:

- (a) In the case of the Balance Sheet, of the state of affairs of the Trust as at March 31, 2018;
- (b) In the case of the Income & Expenditure Account, of the Surplus for the year ended on that date; and
- (c) In the case of the Receipts and Payments account, of the cash flows for the year ended on that date.

Place: Bangalore  
Date: 05<sup>th</sup> September 2018

For Ramesh Ashwin & Karanth  
Chartered Accountants  
F.R No. 010680S



Prashanth Karanth  
Partner  
M No. 214235

**SELCO Foundation**  
**# 690, 1st Floor, 15th Cross, 2nd Phase, JP Nagar, Bangalore 560078**  
**BALANCE SHEET AS AT 31ST MARCH 2018**

PARTICULARS	Schedule	31/03/2018	31/03/2017
<b>FUNDS AND LIABILITIES</b>			
Non Corpus Fund	1	324,019,933	129,207,063
<b>Total Liabilities</b>		<b>324,019,933</b>	<b>129,207,063</b>
<b>PROPERTY &amp; ASSETS</b>			
Fixed Assets	2	5,345,203	4,239,222
<b>Current Assets, Loans &amp; Advances</b>			
Cash and Bank Balance	3	330,670,201	120,461,501
Current Assets	4	20,449,357	14,643,007
<b>Less: Current Liabilities &amp; Provisions</b>	5	32,444,828	10,136,666
<b>Net Current Assets</b>		<b>318,674,730</b>	<b>124,967,841</b>
<b>Total Assets</b>		<b>324,019,933</b>	<b>129,207,063</b>

See accompanying notes to the financial statements  
As per our report of even date

For SELCO FOUNDATION

For Ramesh Ashwin & Karanth  
Chartered Accountants,



Trustee



Trustee



Prashanth Karanth  
Chartered Partner

M No. 214235

F.R No. 010680S



Chief Executive Officer




Sr Manager Finance and HR

Place : Bangalore  
Date : 05/09/2018



**SELCO Foundation**  
**# 690, 1st Floor, 15th Cross, 2nd Phase, JP Nagar, Bangalore 560078**  
**INCOME & EXPENDITURE ACCOUNT FOR THE PERIOD ENDED 31ST MARCH 2018**

PARTICULARS	Schedule	31-03-2018	31-03-2017
<b>INCOME</b>			
Grant Received - Foreign	6	464,787,594	178,065,394
Donations - Local	7	28,686,528	71,238,975
Interest received		15,033,766	9,927,116
Interest received - other source		44,062	57,507
Professional income		281,060	667,784
<b>Total Income</b>		<b>508,833,010</b>	<b>259,956,776</b>
<b>EXPENDITURE</b>			
Project Cost	8	286,512,119	163,683,486
Research & Development Costs		3,376,242	4,210,192
Administration Costs	9	22,773,443	9,989,502
Depreciation	2	1,358,336	1,179,402
<b>Total Expenditure</b>		<b>314,020,140</b>	<b>179,062,583</b>
Surplus		194,812,870	80,894,193
Provision for Taxation		-	-
Surplus (Carried to Balance Sheet)		194,812,870	80,894,193

See accompanying notes to the financial statements  
As per our report of even date

For SELCO FOUNDATION

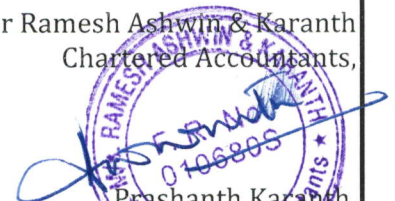


Trustee



Trustee

For Ramesh Ashwin & Karanth  
Chartered Accountants,



Prashanth Karanth

Partner

M.No. 214235

F.R.No. 010680S



Chief Executive Officer



Sr Manager Finance and HR

Place : Bangalore

Date : 05/09/2018

**SELCO Foundation**  
**# 690, 1st Floor, 15th Cross, 2nd Phase, JP Nagar, Bangalore 560078**  
**Receipts And Payments Accounts For The Year Ended 31.03.2018**

PARTICULARS	Amount(Rs)	Amount(Rs)
<b>Opening Balance</b>		
Cash		24,876
Bank		6,800,052
Fixed Deposit		113,636,573
<b>Receipts during the year</b>		
Grant Received	464,787,594	
Donation Received	28,686,528	
Interest received - From Banks	9,370,879	
Interest received - From Other Sources	50,122	
Professional Income	275,000	
<b>Net Receipts</b>		503,170,123
<b>TOTAL</b>		<b>623,631,624</b>
<b>Payments during the year</b>		
Project Costs/Research and development cost	265,115,331	
Administrative Costs	23,889,828	
Fixed Asset purchased	2,464,317	
TDS FY 2017-18	1,491,948	
<b>Net Payments</b>		292,961,424
<b>Closing Balance</b>		
Cash		40,187
Bank		4,810,982
Fixed Deposit		325,819,031
<b>Total</b>		<b>623,631,624</b>

For SELCO FOUNDATION


As per Our report of even date  
For Ramesh Ashwin & Karanth  
Chartered Accountants



Trustee



Trustee

  
Prashanth Karanth  
Partner

M No. 214235

F.R No. 010680S

  
Chief Executive Officer

  
Sr Manager Finance and HR



Place : Bangalore

Date : 05/09/2018