



ENERGY FOR
SOUTH ASIA

Innovative Financing for Small-Scale Infrastructure Investments in Support of the PRESK Program

December 2004

Prepared by



Contract No. 386-C-00-03-00135-00

Prepared for

USAID SARI/Energy Program

www.sari-energy.org



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**Innovative Financing for Small-Scale Infrastructure Investments
in Support of the
Participatory Rural Energy Services for Karnataka (PRESK) Program
India**

**for
United States Agency for International Development
under
South Asia Regional Initiative for Energy**

**Prepared by
Small-Scale Sustainable Infrastructure Development Fund (S³IDF) and Nexant, Inc.
Nexant SARI / Energy
December 2004**

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List of Acronyms

ASCI	Administrative Staff College of India
BAU	business as usual
BESCOM	Bangalore Electricity Supply Company
BVT	Bhartiya Vikas Trust
CBO	Community Based Organization
CCU	Charge Control Unit
CFL	Compact Fluorescent Lamp
CGB	Chitradurga Grameen Bank
DOE	Department of Energy
DPR	Detailed Project Report
ESCO	Energy Service Company
FI	Financial Institution
ESCOM	Electricity Supply Company
FY	fiscal year
GHG	Green House Gases
GOK	Government of Karnataka
GP	grama panchayat
HRU	Heat Recovery Unit
IDFC	Infrastructure Development Finance Company, Ltd.
ICT	Information and Communication Technology
INR	Indian Rupees
IP	irrigation pump
km	kilometers
kv	kilovolt
kVA	kilovolt ampere
KGB	Kalpatharu Grameen Bank
LoA	Letter of Agreement
LoU	Letter of Understanding
LPG	Liquid Petroleum Gas
MEU	Micro-Enterprise Unit
MoU	Memorandum of Understanding
NA	Not Applicable
NABARD	National Bank for Agriculture and Rural Development
NBC	Net Bank Credit
NGO	Non-governmental Organization
OECD	Organization for Economic Co-operation and Development
PRESK	Participatory Rural Energy Services of Karnataka
PV	Photo Voltaic
RBI	Reserve Bank of India

RIDF	Rural Infrastructure Development Fund
RDPR	Department of Rural Development and Panchayat Raj
RRB	Regional Rural Bank
Rs.	Indian Rupees (INR)
Rs. Crore	Rupees 10 million
RSC	Resource Service Center
SARI	South Asia Regional Initiative
SARI/E	South Asia Regional Initiative for Energy
SELCO	SELCO Solar Light Private Limited
SHG	Self Help Group
SHS	Solar Home System
SME	Small and Medium Enterprises
S ³ IDF	The Small-Scale Sustainable Infrastructure Development Fund, Inc
TIDE	Technology Informatics Design Endeavor
TO	Task Order
UNEP	United Nations Environment Programme
UPS	Uninterruptible Power Supply
URC	Resource Center on Energy, Climate and Sustainable Development
USA	United States of America
USAID	United States Agency for International Development
USD	United States Dollar
v	volt
VSSB	Vyavasaya Sahakara Sanga Bank
WTP	Willingness to Pay
WCE	World Computer Exchange

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Executive Summary

During the four months from end-of-May to end-of-September, S³IDF's collaboration with PRESK has achieved:

- Demonstration in the PRESK taluks of S³IDF's innovative and replicable pro-poor approach that identifies and brings to implementation small-scale projects that are viable but not bankable under local bank “business as usual” (BAU) practices. The approach creates linkages between owner, operators and customers of small-scale infrastructure that enable access to the necessary know-how, technology and financing. The pilot projects utilized “gap filling” financing to overcome the BAU constraint to facilitate local bank provision of financing for these projects.
- A total of 16 rural energy Project Concepts were identified for consideration by PRESK.
- Five projects were carried through to implementation stage.¹ These projects comprise an *Phase I* installation of approximately 140 solar powered light points that will benefit the businesses of street hawkers and a women's self-help group, mobilizing the local investment of some INR 650,000 (US\$14,000) and involving five different local branch banks to provide financing support.
- Cognizant of the limited schedule of the collaboration, the initial “Long List” of necessity included numerous projects with potential short timelines (2-6 months) for the period of concept to ready for implementation stage. Substantial progress has been made in exploring viable business solutions to enabling poor farmers to gain value-added in agricultural processing of groundnut and Hongai nut, and in developing projects/programs for improving the efficiency and reducing the quantity of water-energy use in irrigation and groundwater pumping.
- Substantial progress has been made in strengthening the supply chain for introducing improved ovens and heat recovery to the SMEs that comprise Karnataka's critical silk reeling and dyeing industries.
- Preliminary work has been done for establishing a possible community-based electricity service association that could be a model for participatory rural energy services in Karnataka.
- A set of relationships between the Fund and various local market players – equipment suppliers, NGOs, BESCO and government officials and perhaps most importantly, local banks, these relationships will (already are) lead to additions to the small projects the Fund is fostering in the PRESK taluks and/or immediately adjacent areas in the same districts.² And at the same time the experiences in the PRESK- S³IDF collaboration are easing the replication of the S³IDF approach application elsewhere in Karnataka as projects fostered under the PRESK-S³IDF collaboration are used as examples in building relationships with other market players.

¹ At the time of the completion of the formal PRESK- S³IDF collaboration, one of these five projects had already gone through to financial closure (FC); that is the co-financing arrangements with a local bank had been finalized. In the case of this project the subsequent steps of physical implementation (equipment installation) had been completed and the project was in operation. Since the end of the formal collaboration, another of these projects has also passed through these steps and is in operations. And as of the time of the writing of this report (early December), another project is so close to FC that the parties have begun equipment procurement. Of the two remaining, one is close to FC and last of the five is still in the process of bank negotiations.

² In recent months (since completion of the formal collaboration) S³IDF has added 8 projects to the pipeline list of projects it is working on in the districts in which the PRESK S³IDF collaboration focused.

In a strategic sense, the principal output of this collaboration may have been the set of aforementioned relationships as well as the knowledge, and practical local experience gained by S³IDF. The Fund has become “rooted” in both the geographic region and the philosophical approach of PRESK. As it builds on work in Karnataka – newly its “home state” – in the coming years, the S³IDF Portfolio of projects to be developed and financed in or adjacent to the taluks of the PRESK program is expected to grow and expand. Many others if not all of the project concepts first identified and assessed under this PRESK Task Order may in time be brought to Implementation.

S³IDF will also continue to monitor and report on its progress. Reports on the PRESK Portfolio and related work will be posted on the S³IDF website (www.s3idf.org) and shared through professional conferences and other media. By building the portfolio, and continuing to network and publicize its work, the Fund can achieve several sustainability objectives. First, it is the best way to attract new project opportunities. Second, doing so helps to leverage or catalyze additional and new resources from donors and investors that can be used to expand the Portfolio further. And finally, the work must be publicized and shared in order to encourage and provide lessons-learned to others who are willing to undertake complementary investment and development programs on their own.

Through PRESK and similar projects, S³IDF wants to prove the validity of its business approach – providing socially and economically disadvantaged communities with services they need to and create cost-savings, employment, and other benefits of development.

1.1 The PRESK Pilot Program

Programs for rural electrification reform in India have focused mainly on conventional measures such as unbundling supply, installing meters, reducing subsidies, and privatization. In Karnataka, in 2002, senior officials from the Department of Rural Development and Panchayat Raj (RDPR) and the Department of Energy (DOE) began to consider new approaches that would be consumer-based and decentralized, working through the locally elected *grama panchayat* councils (GPs). The USAID-funded South Asia Regional Initiative for Energy Program (SARI/Energy) learned of these initiatives, and, following discussions and a joint design effort in early 2003, SARI/Energy joined with RDPR and other key agencies to undertake what became an 18-month collaborative pilot program, called Participatory Rural Energy Services for Karnataka (PRESK).

From April 2003-September 2004, the PRESK Pilot worked directly with GPs and farmers to address issues of rural electricity services together with issues of groundwater depletion, improved farm management and broader aspects of rural development. PRESK's work to date has contributed to understanding of these issues, identifying effective responses, building local management capacity, and creating channels for continuing collaboration between farmers, local governments, energy service companies (ESCOs), and central government agencies. The Government of Karnataka's (GOK) initiative in 2002 to take "a participatory path" as exemplified by PRESK has been reinforced by the "Common Minimum Program" of the new Union and Karnataka state governments' and the national recommitment to developing the rural economy.

Four subdistricts (*taluks*), covering 112 grama panchayats (GPs), were selected for the PRESK Pilot Program. PRESK's mission was to work with the GOK and the local electric services company to establish a positive dialog with the GPs in those taluks, train the GP members in electricity supply support services, and transfer best practices for water and electricity management to the GPs. Because of the regional nature of the SARI/Energy Project, these included "best practices" experience for rural energy supply from neighboring South Asian countries. For example, the highly successful experience of the Bangladesh Rural Energy Board in creating capacity for management of electricity distribution services at the local level were introduced for possible adaptation to Karnataka's situation.

The PRESK team was comprised primarily of SARI/Energy consultants³ who worked in collaboration with staff of the Karnataka Department of Rural Development and Panchayat Raj, the Department of Energy, and the Bangalore Electric Services Company (BESCOM). PRESK conducted public meetings, workshops and training sessions for GP representatives and farmers. A range of "practical research" initiatives were undertaken, to assess and improve understanding of the issues from both central and grassroots perspectives, to identify and share "best practices" for improving energy and water management, to motivate farmers, and to build capacity at the local level. Reports on the overall PRESK program and several research reports are available from the SARI/Energy website (www.sari-energy.org).

³ Nexant, Inc. was the technical support contractor for PRESK under the SARI/Energy program. A small office was established in Bangalore, staffed by local experts in energy and rural development. In addition, a "Resource Center" was established in Taluk Gubbi, to provide a continuing staff presence in the field.

PRESK's program and accomplishments were based on three core concepts:

- empower GPs and farmers with information;
- identify better practices, test them in the field, and, once proven successful, share them broadly; and
- work with agriculture, water, and energy issues as a synergistic whole.

Most of the activities of the PRESK Pilot Program were focused on rural farmers, on BESCOM, and on the GPs. But to support the overall objective of PRESK, i.e. to introduce and sustain improved rural energy services through local participation, it was also clearly desirable to involve the local business community – financial institutions, entrepreneurs, and small and medium enterprises (SMEs) -- into the PRESK process. A promising opportunity to engage these players arose toward the end of 2003, when USAID and SARI/Energy began a dialog with the Small-Scale Sustainable Infrastructure Development Fund (S³IDF).

1.2 The Small-Scale Sustainable Infrastructure Development Fund (S³IDF)

The Small-Scale Sustainable Infrastructure Development Fund (S³IDF), Inc. is established both in the United States and in India as a non-profit charitable corporation whose mission is *to provide financing and technical assistance that foster pro-poor and pro-environment small scale electricity, water, sanitation, and other infrastructure services necessary for poverty alleviation*. In doing this, the Fund adapts pro-poor investment financing models that change business-as-usual practices of local financial institutions so that such investments may become replicable and sustainable. Target clients are SMEs that are potential owners and operators of small-scale infrastructure – individual entrepreneurs, local businesses, community or self-help groups, business-like NGOs or various public-private collaborations.

The Fund focuses primarily on the South Asian countries of Sri Lanka and Nepal, and selected states in India. Although S³IDF as an organization is less than three years old, its program is the culmination of several decades of professional work of its founders and core partners in the fields of energy, infrastructure, and finance.

Very simply, S³IDF operates as a social merchant bank, applying the long-term business investment characteristics of a conventional merchant bank with an exclusive focus on small (under \$100,000) investments in pro-poor, pro-environment infrastructure and related enterprises.

S³IDF can provide know-how and some financing from its own resources, but whenever possible it seeks to increase access and linkages to others with knowledge, technology and financing. To do this it collaborates with local partners – business-like NGOs, academic groups, equipment suppliers and others.

Within India, core partners of S³IDF include a group specializing in water, sanitation and energy matters at the Administrative Staff College of India (ASCI) in Hyderabad, the Indian Solar Electric Light Company, Ltd. (SELCO), and the Infrastructure Development Finance Company, Ltd. of India (IDFC). Other regional or local partners are brought in where they have special local knowledge or other skills and experience. An example of this is the Fund's work with the Bhartiya Vikas Trust (BVT), which operates in several districts of Karnataka and has exceptional practical experience in financing projects through local women's self-help groups (SHG).

These collaborations bring a collective set of skills, experience and resources that can foster successful pro-poor investments. The partners assist S³IDF to identify and develop promising

business opportunities, and assist in technology transfer and skill-development as well as financing to local infrastructure project owner/operators. Local partners may also assist S³IDF in monitoring and evaluation.

1.3 The Challenge of Small Infrastructure Development

Utility infrastructure services – water and energy supply, waste collection and disposal, transportation and communications – are essential to economic development. Availability or access to these services is a direct measure of the state of economic welfare of communities and households worldwide. Lack of availability and access to basic utilities is a primary indicator of economic underdevelopment. These basic utilities underpin food production, shelter, education, health care, entrepreneurship, and governance. As a corollary, the relative lack of utility services in rural areas is a major driver in the massive worldwide flows of people from the countryside to urban centers – where utility investments are concentrated.

Recent advances in technology, materials, telecommunications and other developments now frequently make it feasible to provide infrastructure services cost-effectively through small-scale investments geared to poor villages and communities or even to individual households or enterprises. For example:

- New plastic pipe networks can bring potable water from a trunk main to previously unserved areas at much lower cost than conventional metal pipes. These water supply schemes can be complemented by latrines and/or related investments such as biogas plants that use the night soil (human waste) to produce energy and fertilizer.
- Improvements in technology and declining costs increasingly favor small-scale decentralized generation of power from locally available renewable resources -- solar, wind, hydro, and biomass. Such projects may even, in addition to generating for local use; produce a surplus to "export" to the main grid or to local enterprises.

Even with these technological advances, poor communities and households, and the small and medium enterprises (SMEs) that could develop and manage the utility infrastructure to serve them, are still commonly constrained by inadequate access to technology, know-how, and to financing. Financing is especially important because infrastructure systems are inherently capital intensive. Even for individual households or enterprises, basic energy infrastructure – whether access to grid-based electricity or on-site generation -- can cost hundreds or even several thousands of dollars and often much more.

Financing constraints are critical for both the infrastructure service provider and the customer. Potential customers who are poor in cash flow or assets cannot afford the initial or "first cost" capital investment (e.g. for electricity connection) in a single payment. However, they often can afford the service if there is a mechanism for paying over time. Such mechanisms require financing that the customer can access or that the SME can bundle with the service.

Despite the efforts of governments, development assistance and finance entities, foundations, and charitable organizations, there is still an enormous shortfall in what needs to be done to help these small infrastructure service providers and their customers. Governments, donors, and private investors generally see investments in infrastructure for utility services for poor communities and households as posing large additional demand for finite financial resources. But the primary barrier to allocating public and private funding to pro-poor infrastructure investment is arguably not the capital cost, which can be justified for economically viable

investment opportunities. Rather, the primary barrier is the high transaction cost -- the effort that is needed to scope out and define viable projects, and to match potential owners/managers with financial institutions and funds and the technology and know-how needed. These up-front costs of transacting the design and financing of a utility service project are often as great for a small project as for a much larger one. But large projects can absorb the design and deal-making into the overall cost; in small projects these transactions costs may exceed the value of the project itself.

It is this gap between the immense need for investment in pro-poor infrastructure and the commitment of public and private resources that is the target of S³IDF's programs. S³IDF works to help small-scale infrastructure providers and/or their customers to gain access to know-how, technology and financing. The PRESK Program has a complimentary objective: to improve energy and related services for Karnataka's rural people. Given these complementary aims, the PRESK-S³IDF collaboration offered a win-win opportunity, enabling both partners to augment their existing programs – and achieve significant tangible objectives within a very brief span of time.

1.4 S³IDF-PRESK

S³IDF had previous project experience in Mysore and other areas within the State of Karnataka, but it had not worked before in any of the PRESK Pilot taluks. Even though the PRESK Pilot Program was entering its final months, USAID and the PRESK staff saw that there was a good potential partnership. If S³IDF was willing to devote priority attention to work in the four PRESK taluks, some initial models for innovative financing might be established, receptive local banks, equipment and know-how providers and candidate project entrepreneurs (owner/operators) could be identified and their awareness increased. And importantly S³IDF itself would become “rooted” in the four PRESK taluks. All of this would reinforce the PRESK initiative, while laying a foundation for on-going work by S³IDF and creating models that local banks and other investors could learn from and replicate or adapt.

In May 2004, S³IDF agreed to:

- set out a methodology and criteria for identifying and selecting candidate project opportunities, their further review and assessment to determine viability, and final development to ready-for-implementation;
- in at least 2 of the 4 PRESK taluks, identify a “long list” of at least 10 project concepts sufficiently defined and scoped, including possible partnerships, to merit further pre-investment work;
- prepare technical and financial pre-investment work to the pre-feasibility level of a “short list” of at least 5 project concepts drawn from the “long list” of potentially viable concepts – again aiming to include activities from at least 2 of the 4 taluks;
- complete the technical, financial and organizational work to move at least two projects from the short list to ready-for-implementation stage. This would include preparation of Memoranda of Understanding (MoU) and/or Letters of Agreement (LoAs) between the project owner/operators, equipment suppliers, and banks or other financial institutions that would be the actual partners in each project; and
- identify local financial institutions (FIs) and/or regional/national FIs present and operating in the area of the four taluks, and assess opportunities for obtaining their involvement in financing such projects -- both under business as usual (BAU) practices and when complemented by loan guarantees or other forms of innovative financing.

Since the PRESK Pilot Program itself was wrapping up, the work would need to be completed by the end of September 2004, a period of only four months. This is a very brief period of time for full-cycle project investment work, which is often measured in years rather than months. Local contacts have to be developed, and the whole process of seeking, scoping, assessing, and brokering new business partnership must be worked out. But it was anticipated that a serious start could be made, and S³IDF was willing within the limits of its resources, to continue to develop all project concepts that were consistent with its pro-poor mandate, even beyond the end of the collaboration. Moreover, cognizant of the limited schedule of the collaboration, and the need to meet the quantitative project targets in the points above, the initial “Long List” of necessity included numerous projects with potential short timelines (2-6 months) for the period of concept to ready for implementation stage (more on timelines in Section 2).

By the end of July a “long list” list of sixteen promising project concepts, representing each of the four PRESK taluks, had been identified. During field work in August, and the accompanying pre-investment analysis six of these projects, again representing all four taluks, proved to meet the criteria for the short list of qualified project concepts. And by September 30th one of these five projects had already gone through to financial closure (FC); that is the co-financing arrangements with a local bank had been finalized. In the case of this project the subsequent steps of physical implementation (equipment installation) had been completed and the project was in operation. Also at that time two more projects were already in implementation, with the other two at the ready-for-implementation stage. Thus it is underscored that S³IDF had exceeded each of the contracted targets⁴

Moreover, for the first time in these taluks, local banks had become engaged in small-scale pro-poor energy investments, and S3IDF and its core partners had established a set of relationships with local banks, entrepreneurs, and business-minded NGOs. Over the coming months, S3IDF will draw upon its own resources to extend this work, pursuing more complex and increasingly unconventional projects.

This report describes the work and accomplishments as of September 30, 2004. The next Sections present S³IDF’s methodology and criteria for identifying project concepts, establishing the long list and narrowing down to the short list, and continued development through to ready-for-implementation stage are explained, with descriptions of the projects selected, and the business models and financing techniques applied to each of them. Also included are the basic texts for the LOUs/MOUs used for each of these projects.

Even though the formal collaboration between S³IDF and the PRESK Pilot Program is completed, S³IDF, in keeping with its own mission and objectives, will continue to work in the four taluks. By documenting the investment decisions and the results of the projects to date, it is hoped that this report will begin the process of expansion and replication – stimulating the allocation of additional resources and facilitating the entry of additional players to adopt and apply the models that have demonstrated success.

⁴ Since the end of the formal collaboration, another of these projects has also passed through these steps and is in operations. And as of the time of the writing of the draft of this report (mid December), another project is so close to FC that the parties have begun equipment procurement. Of the two remaining, one is close to FC and last of the five is still in the process of bank negotiations. Moreover, in light of the prior comments it is worth noting that in recent months (since completion of the formal collaboration) S³IDF has added 8 projects to the pipeline list of projects it is working on in the districts in which the PRESK S³IDF collaboration focused.

2.1 S³IDF's Methodology and Criteria

As background for introducing the specific concepts and projects selected for investment analysis for the PRESK Pilot Program, this section explains the “usual” methodology and criteria that S³IDF applies in its work, and the following Section 2.2, describes the modifications adopted for work with PRESK.

The first step is to identify project opportunities. Usually, opportunities come to the attention of S³IDF staff, advisors, or partners through their day-to-day work. S³IDF responds to the specific opportunity. If the opportunity looks promising as a project, and likely to fall within its pro-poor pro-environment mandate, S³IDF then works to support the potential service providers and/or the customers of the project opportunity by:

- supplying technological and financing information and know-how, often drawing from pertinent experience elsewhere;
- supplying financial assistance from S³IDF's own resources;
- facilitating access to information, know-how and/or financing support from local and international sources (bilateral and multilateral) that local partners and the SMEs owner/operators are not familiar with, cannot easily make contact with, and/or cannot meet the collateral or other requirements for;
- seeking contributions and participation from institutions and, in particular, individuals who wish to support such investments;⁵
- monitoring and evaluating these investments and owner/operator business models both to ensure that they are implemented in accord with S³IDF's mission and to learn lessons for application in subsequent projects; and
- documenting and disseminating the results and lessons learned.

Central to the Fund's approach to fostering pro-poor infrastructure SMEs is a menu of financing support keyed to leveraging and facilitating greater participation by local financial institutions. Depending on the specific needs of the situation – for both the owners/managers and of the bank or other potential local investors -- S³IDF can provide financing support to "fill the financing gap." This current financing menu includes⁶:

- long-term debt that is, as necessary, in second position (after the FI);
- short-term or bridge financing until construction is finished and completion risk is eliminated; and
- cash equity to complement the sweat and limited cash equity of the micro-enterprise; or
- loan guarantees or other credit conditioning.

In addition it is sometimes possible to access special subsidy or other program support for which S³IDF can and does play a facilitating role. In both the PRESK and broader market contexts of Karnataka and India, it must be emphasized that there are various sources of subsidies that may

⁵ One of S³IDF's characteristics is its ability to mobilize funds from individuals in developed countries who because of social, ethical, and/or environmental concerns are interested in supporting such efforts.

⁶ For a full menu of investment options that S³IDF might consider depending on the project and market characteristics, see Table 1

be applicable for the projects S³IDF is fostering. Irrespective of whether S³IDF is or is not supportive of the policies underlying these subsidies or the manner in which they are implemented, given its pro-poor Mission, it is incumbent on S³IDF to assist the owner/operator and or customers of the projects it supports to access these subsidies if possible. And this is done even when S³IDF “gap filling” finance the project can be bankable without the subsidy –albiet with longer term financing. To “leave an existing subsidy untapped” would be irresponsible from S³IDF’s perspective unless the transaction costs of accessing the subsidy effectively prohibit such access.⁷

S³IDF generally does not operate or own the small-scale investments it supports. There are two exceptions. One is passive partial ownership when the support is in the form of cash equity as a means to strengthen the project owner or enable them to meet criteria of FI’s. The second is partial ownership in special purpose organizations needed to implement and/or operate a pro-poor investment until the capabilities of the ultimate owner/operators can be sufficiently strengthened to take over responsibility.

Since S³IDF proactively engages at or near the beginning of the investment timeline, it can play a constructive role in all aspects of the project’s formulation and development. An indirect objective for most projects is to help break through the “business as usual” practice of a local bank or FI. Having a range of financial tools available allows flexibility in dealing with both project investors and implementers.

The Fund’s financial assistance for investments may be at “below market” terms, and for investment preparation or capacity building it may be on a partial grant basis. However, even NGO and other non-profit owner/operators are expected to practice business-like behavior, and to strive for financial viability. In some instances, small-scale infrastructure providers can achieve commercial returns even while serving poor communities. For such investments it may be appropriate for S³IDF to provide financing on near commercial terms.

For an investment to receive S³IDF’s support, the poor should benefit in at least one of four ways:

- as direct users of the electricity, water or other infrastructure services provided, or as indirect users, e.g. as users of the services provided by energy- linked income generating (i.e. productive) investments, such as grain milling.
- through employment in the SME that operates the infrastructure and/or linked investments;
- as owners of the infrastructure or linked investments; and/or
- as beneficiaries when other non-profits (e.g. orphanages, schools) are helped by new/lower cost energy or other infrastructure services.

Monitoring and evaluation (M&E) are integral to S³IDF’s approach. S³IDF aims not just to improve its performance in subsequent projects but hopes to influence other entities to adopt similar approaches to support pro-poor investments. The projects that the Fund takes on are almost always “below the radar screen” of national and international development agencies. S³IDF’s ultimate objective is to change this situation to get government regulators to facilitate

⁷ In some of the projects presented in the next section, in particular those that deal with solar based lighting and for which it was possible to move in a shorter timeframe S³IDF facilitated access to a loan under interest subsidy scheme under written by UNEP and administered by certain local banks. The scheme requires that the banks make the loan decision and bear transaction risks so S³IDF partial guarantees proved necessary. It is worth noting that these projects could be commercially viable without the UNEP scheme. The access to UNEP makes the concept more attractive and gives the owner a better deal.

rather than hinder small-scale, pro-poor investments and to get governments, donors and FIs of all sizes to allocate greater effort and resources. While its own activities are modest in scale, S³IDF expects that it can have broader impact by documenting and sharing its experience, and eventually, being able to demonstrate convincingly that such small-scale pro-poor investments are well worth the up-front transaction costs involved.

S³IDF's resources, expertise and money, come from the organization's core group. As already noted, S³IDF has also successfully tapped a small number of like-minded individuals to invest in their work. In addition, some co-financing has been secured from a few competitive programs, most importantly that of the Shell Foundation. The PRESK project is the first instance of co-financing by a national donor agency⁸.

Drawing upon the experience of S³IDF's founders and core advisors, several factors influenced the timelines, and the progression of project concepts from the start of detailed pre-investment to implementation start. These included:

- Complexities in the project concept itself. For example, when there are multiple complementary components that may or may not be included and various combinations of these components need to be assessed (e.g. in water-energy irrigation nexus projects where component options include improved pumping efficiency, electricity supply augmentation, water harvesting, improved efficacy of water use by drip irrigation etc.).
- Complexities or gestation periods in the technologies or resource being used. There may be resource risk that calls for site-specific measurements over time (e.g. in wind and hydro projects, and some biomass projects).
- Complexities in the likely implementation and/or ownership business model involved. The time needed to reach an agreement is a function of the number of parties involved.
- Know-how and technology supply chain issues, especially for small investments that do not allow for "gross sales margins" that would enable a commercial supplier to "go anywhere;" so "extra transport and other overhead costs" must be born to serve a particular project. These complexities are often a function of whether the nearest supplier has a presence and/or experience with projects in the particular taluk and is willing to participate on reasonable commercial terms in the implementation and after-service aspects of the project; and whether such participation can happen on a single project basis or whether the suppliers require some minimum bundle of projects/sales before they will enter and remain in a market

At the pre-investment stage, S³IDF's characterizes its project concepts into two broad categories of "pipeline projects". These are labeled as Category A and Category B, depending on the information available and the relative stage of pre-investment development. Category A concepts are far enough along in pre-investment activities to be confident that they will meet S³IDF's pro-poor criteria, so further pre-investment efforts are warranted. Category B project opportunities are less well developed. They may be little more than a preliminary concept, perhaps likely to make sense in a particular site or community or possible future partnership. But some of the other aspects are missing; the concept has not yet moved to a viable project stage.

⁸ Recently S³IDF finalized a grant contract won under the Renewable Energy and Energy Partnership (REEEP) global competition for 2004 underwritten by the UK's Foreign and Commonwealth Office. This REEEP support is co-financing some of the S³IDF efforts to push forward projects that resulted from the PRESK- S³IDF collaboration.

Inclusion on the Category A list is based on least three considerations:

- the project concept - the infrastructures and/or related services involved; technologies to be employed, and possible investment components and likely ownership/management;
- the site and associated community or communities - including the set of poor who will be likely beneficiaries;
- the potential partner/stakeholders with whom S³IDF would work.

When a project enters Category A, it is also given one of four “timeline labels,” to indicate its approximate gestation period to ready-for-implementation. Currently, these label categories are:

- **Short Timeline (possible within a few months)/Straight Forward:** S³IDF has previously taken similar projects into implementation; no complexities or long gestation issues; technology/equipment partners have been worked with before and are willing to supply and backstop at the particular site.
- **Medium Timeline (many months)/Relatively Straight Forward:** S³IDF has previously taken similar projects into implementation; there are not too many complexities or long gestation issues; technology know-how partners even if not previously worked with are willing to supply and backstop at the particular site.
- **Long Timeline (could be a year, even more)/But Doable:** S³IDF has little or no direct experience to implementation yet; there are some complexities and/or long gestation issues; technology know-how partners even if not previously worked with are willing to supply and backstop at the particular site.
- **Long Timeline (could be a year, even more)/And Complex & Questionable:** S³IDF has no direct experience yet; but founders have some experience; there are multiple complexities or long gestation issues; there are questions whether candidate technology and/or know-how partners are willing to supply and backstop at the particular site or without a bundle of projects.

As pre-investment work continues, the project pipeline grows or contracts, and concepts move from Category B to A as they become well enough defined. And as detailed pre-investment work on Category A projects continues the following can happen:

- they drop out as the pre-investment work indicates the projects to be unviable, or despite initial judgments, prove insufficiently pro-poor to warrant further involvement by S³IDF.
- the project goes forward but without the need for further S³IDF assistance, although perhaps there may be further S³IDF involvement in terms of monitoring and evaluation.

2.2 PRESK-Specific Methodology

Several modifications to S³IDF’s usual investment selection criteria were made in order to fit with the PRESK Pilot Program’s objectives and circumstances. These modifications involved the types of project sought, the location, and the time frame. Each of these modifications had an impact on the selection of project opportunities, and on the priority for taking them through to ready-for-implementation development.

First, on type of project sought, S³IDF’s normal portfolio spans all utility infrastructure: energy, water, sanitation, and transport. For the PRESK work, however, only energy and energy-related investments such as agricultural water pumping were directly relevant. And even within the energy sector, priority would be for electric power rather than for, say, biogas for direct combustion opportunities. Also, the PRESK program is concerned with virtually all energy

users in the rural communities, while S³IDF's mandate is for pro-poor pro-environment opportunities. So, for the PRESK work, S³IDF explored opportunities that even from the outset appeared likely to fall outside of its pro-poor criteria. These opportunities were identified and given preliminary analysis, in anticipation that others might be encouraged to pick them up and take them forward.⁹

The several projects that went through to ready-for-implementation status under PRESK sponsorship all fit within the Fund's pro-poor mandate. Most of the other concepts identified but not yet ready-for-implementation by September 30th will be pursued in the future by S³IDF itself.

The four pilot taluks of the PRESK Pilot Program are: Taluk Doddaballapur, Bangalore Rural District; Taluk Chintamani, Kolar District; Taluk Monakalmooru, Chitradurga District; and Taluk Gubbi, Tumkur District. Although S³IDF had developed projects in other parts of the state, and established its Indian office base in Bangalore just as the collaboration with the PRESK Program was beginning, these were all new localities for the Fund. This made the Fund's existing partnership with the Bhartiya Vikas Trust (BVT), of particular value. Although BVT also had not worked previously within these specific taluks, its extensive experience in rural Karnataka was of significant help in making local connections. Normally, the Fund would work within a community where it had, through its existing partners and its own contacts, familiarity with local conditions and institutions. In this case the challenge was not just to work within the four new pilot taluks, but also to work within all four of them simultaneously.

As suggested by the comments in Section 2, the final factor, the brief time frame available, became a key driver in selection and development of opportunities and concepts. It is generally true in project development that many interesting, innovative, and very beneficial projects take longer to design and bring to fruition. Work in the PRESK taluks will likely be no exception. While each of the project concepts that were fully assessed and brought to implementation were new and innovative for their respective taluk and the banks and SME clients involved, several interesting and potentially far-reaching project concepts were, for the moment, not pushed. Since, however, they clearly appear within S³IDF's mandate, they will be pursued over the coming months.

2.3 The S³IDF-PRESK Process

S³IDF's work normally begins with response to a suggestion from one of its staff or advisors of a possible opportunity in a specific community, followed by a combination of desk research and field investigation. Since, for the PRESK work, S³IDF was entering preselected locations without the benefit of a pre-existing project or institutional pull, the research and field investigations became more critical. Desk-based desk research (from published, unpublished and electronic sources) provided an understanding of the agro-economic, demographic and institutional aspects of the four taluks. Fieldwork then started with contacts from the Fund's networks. For example, each of the four Grameen Banks covering the respective four districts was contacted for suggestions on both possible project concepts and possible project partners. As candidate project opportunities were identified, they were then more fully scoped. Possible linkages to other productive activities in the taluk were considered. Subject to further pre-

⁹ For example, the Mahatma Gandhi Institute for Rural Energy Development (MGIRED) is expected to adopt PRESK's approach and activities and continues to work with them. Several of these would be promising prospects. Others may be attractive to local entrepreneurs.

investment efforts, some of these project opportunities then moved forward, while others were dropped.

Overall, the PRESK work followed S³IDF's usual procedure for taking candidate opportunities through development and assessment. It is important to note, however, that in accord with PRESK guidelines, the terminology for categorizing portfolio projects was revised. Under this work, and throughout this document, S³IDF internal "Category B" projects are referred to as "Project Concepts" or "The Long List". And S³IDF's "Category A" projects are ones that are in various stages of detailed pre-investment work, herein this category encompasses those referred to as "The Short List" at the "Feasibility Stage" or "Ready-for Implementation."

Also, there is a substantive adjustment. Normally, a project opportunity that does not immediately appear pro-poor will not even be considered for S³IDF's "Category B" portfolio. But for the PRESK work, projects were included without first having a strong initial judgment that they will be sufficiently pro-poor to meet S³IDF's mandate. If the follow-up pre-investment work found the projects to be viable but not sufficiently pro-poor, suggestions are made about other entities that might follow-up and push these projects towards implementation. But the projects were included on the "Long List" and the Project Concept descriptions are included in Appendix D.

An overview of the results of these efforts to date (September 30, 2004) is the PRESK-S³IDF Project Portfolio is presented in Section 3.

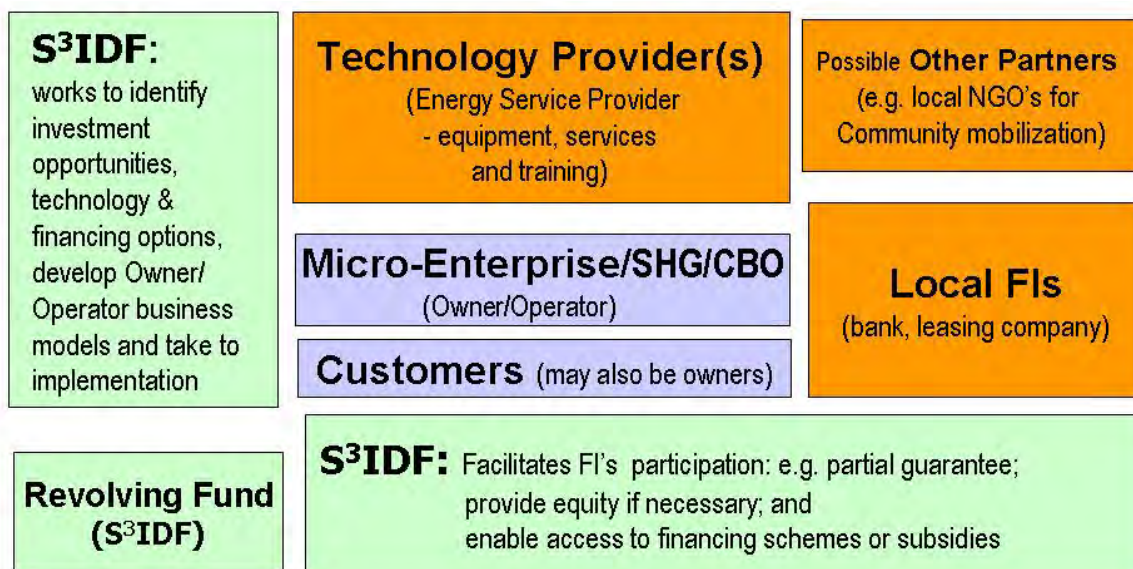


Figure 2-1 S³IDF's Social Banking Approach

Table 2-1 Indicative Menu of Financing Options (Types and Sources)

1. Equity Financing with financial resource mobilization from:

- a. sponsor/investors (active)/users' internal funds;
- b. other active sponsor/investors, such as venture capital funds, investment positions by merchant banks;
- c. supplier (e.g. of equipment) as investor (part or all of equipment costs);
- d. passive investor(s) through "private placement" of equity financial-security instruments (e.g. shares certificate);
- e. passive investor(s) through public (security-agency-regulated) placement/offering; and
- f. special categories of above where investor has additional (non-financial) objectives, such as targeting environmental/green project or entity investments.

2. Primary and Secondary (mezzanine) Debt Financing with financial resource mobilization from:

- a. commercial and/or development bank and other FI working capital* and term loans (limited recourse or balance sheet);
- b. complementary and/or alternative (often mezzanine) debt from "active/directly involved" equity sources (categories 1. a -c above);
- c. export credit agency (ECA) source when equipment is imported;
- d. investment grade term-debt instrument (e.g. bond) placed through limited offering to sources for which fiduciary and/or other constraints limit portfolio positions largely to such investment grade instruments;
- e. As in d. but from broader range of sources through a registered offering
- f. "junk" (non-investment grade) bonds (the more general case) placed to similar sources as in (d) and (e) but participation of sources for (d) constrained as noted
- g. Analogy of 1(f) for debt, sometimes as complementing equity position

3. Other Financing/Financial Support with financial resource mobilization and/or support from:

- a. Grants/contingent grants, cost shares sometimes for specific costs (e.g. pre-investment studies) or cost components (e.g. geothermal exploration) from public agencies at federal, state or local level
- b. Depreciation and/or tax credits from federal, state or local authorities, which, in effect, lower the cost of debt and/or equity financing
- c. Lease financing from equipment suppliers, or through arrangements with FIs
- d. Myriad guarantees, credit enhancements and/or other support usually from DFIs' support by federal, state or local governments; to facilitate one or another of financing options above, or the creation of subcategory of one of these options such as "tax free" development, pollution control or other special bonds

*For an entity engaged in retail-type or other investments with receivables, this could include receivable-backed short-term loans.

Generic table developed by S³IDF in various versions, e.g.

- deLucia, Russell J. "Decentralized/Small-scale Infrastructure Development: Observations, Options and Suggestions for Sustainable Development" Overheads/Talking Points prepared for presentation at the Roundtable on Decentralized Infrastructure Development, India International Center, New Delhi. 2003.
- deLucia, Russell J., "The Role of Finance in Promoting Private Rural Energy Service Provision: Focus on Small Systems and Small Players," address at USAID SARI/Energy Program's Regional Conference on Private Participation in Rural Energy Services Delivery, Colombo , Sri Lanka , from October 29-30, 2003.

This section provides a snapshot of the work as of September 30, 2004. While the date marks the end of the USAID funding through the SARI/Energy PRESK Pilot Program, it also marks the starting point for what will be S³IDF's on-going PRESK Portfolio. The Fund's "roots" have now been set in the four PRESK Pilot Taluks – Chintamani, Doddebhallapur, Gubbi, and Molokalmuru. And the Fund has taken on a "participatory rural energy services for Karnataka" inclination that is sure to influence its work in the State for months and hopefully years to come.

The complete Project Concept Descriptions based on the original "Long List" are presented in Appendix D. Similarly, the complete Feasibility Assessments for the "Short List" are presented in Appendix E. The basic business documents for the several projects that have already gone to In-Implementation or Ready-for-Implementation are provided in Appendix F. It is hoped that this section will provide a general overview of each of the projects, and the themes that arose from the project identification and development.

The sixteen projects are grouped into nine types:

- Temple Lighting & Cooking Projects
- Hongai Seed Processing
- Groundnut Processing
- Silk Industry - Efficiency of Reeling Ovens and Dyeing, and Power Weaving Projects
- Solar Home Systems for Self-Help Groups (SHS for SHG) Projects
- Last Mile Projects
- Water-Energy Nexus Projects
- Light Points for Hawkers & Traders Projects
- ICT Power Supply Projects

These address some of the principal development challenges/opportunities for which small-scale pro-poor and/or participatory energy investments may be most beneficial in the region, as well as some of general business models that are being applied – and evolving from – the work.

For each group, the one or several Project Concepts, using the original number (consistent with the report presentations in the appendices) are indicated.

A brief assessment of the "results" of this portfolio of projects-in-development is provided in Section 5.

Table 3-1 PRESK-S³IDF Portfolio: Types of Projects, Project Concepts (PCs), and In/Ready for Implementation, as of September 30, 2004

<p>Temple Lighting & Cooking Projects</p> <ul style="list-style-type: none"> ▪ PC-1 Chintamani: Hot Water Options at Kaiwara Temple ▪ PC-2 Chintamani: Lighting at Kaiwara Temple <p>Hongai Seed Processing</p> <ul style="list-style-type: none"> ▪ PC-3 Chintamani: Energy-Productive Use Investment for Hongai Seed Processing <p>Groundnut Processing</p> <ul style="list-style-type: none"> ▪ PC-9 Molakalmuru: Energy productive use investment for groundnut processing <p>Silk Industry - Efficiency of Reeling Ovens and Dyeing, and Power Weaving Projects</p> <ul style="list-style-type: none"> ▪ PC-4 Chintamani: Energy Efficiency Investments in Silk Reeling Ovens ▪ PC-7 Doddaballapur: Gasifier Based Fuel Substitute/Efficiency Improvement in Silk Dyeing ▪ PC-16 Molakalmuru: Introducing power driven weaving units for silk weavers at Kondlahalli <p>Solar Home Systems for Self-Help Groups (SHS for SHG) Projects</p> <ul style="list-style-type: none"> ▪ PC-5 Chintamani: Solar Home Systems (SHS) for SHG Members at Iragampalli – In-Implementation Project No. 1 ▪ PC-10 Molakalmuru: Lighting Options for Weavers’ SHG <p>Last Mile Projects</p> <ul style="list-style-type: none"> ▪ PC-14 Molakalmuru: Last Mile Project for a Weavers Colony at NMS Badawane <p>Water-Energy Nexus Projects</p> <ul style="list-style-type: none"> ▪ PC-6 Multiple taluks: Water-Energy Nexus Investments for Small Holders <p>Light Points for Hawkers & Traders Projects</p> <ul style="list-style-type: none"> ▪ PC-8 Doddaballapur: Light Points for Hawkers – Ready-for-Implementation Project No. 2 ▪ PC-11 Chintamani: Light points for Hawkers – Ready-for-Implementation Project No. 3 ▪ PC-12 Gubbi: Light points for Hawkers – Ready- for-Implementation Project No. 4 ▪ PC-13 Molakalmuru: Light points for Hawkers – Ready-for-Implementation No. 5 <p>ICT Power Supply Projects 999</p> <ul style="list-style-type: none"> ▪ PC-15 Molakalmuru: Electricity dependent ICT project at Kondlahalli Rural High School
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3.1 Temple Lighting & Cooking Projects

- *PC-1 Chintamani: Hot Water Options at Kaiwara Temple*
- *PC-2 Chintamani: Lighting at Kaiwara Temple*

Summary

Two Project Concepts were identified, and pre-investment assessments showed them both to be financially viable, as well as pro-environment. But while many of the temple's visitors are poor, they would not be the direct or major beneficiaries. Hence, both projects do not satisfy S³IDF's pro-poor criteria and have been transferred to the contacted technology suppliers to take forward to feasibility and implementation. Also, while potentially innovative in technology application for a significant community institution, financing could be conventional equity or bank loans at or near normal commercial terms.

Project Description

Kaiwara Temple in Chintamani Taluk, Kolar District, is an important pilgrimage center in southern India. The temple serves food to 1,000 devotees per day, typically cooking about 150 kg of rice and 800 litres of lentils. On festive occasions this might increase to around 10,000 devotees per day. Much of the temple's cooking is done using steam, generated in a boiler by burning fuel wood and kerosene. Electric lighting is primarily for the kitchen, guest dining room and community-dining hall where pilgrims are served, and for street lighting within the temple complex. The temple is grid connected, but power supply is erratic so diesel generators are used for back up.

The first project concept is an energy efficiency and/or clean fuel investment for large-scale food preparation. Three approaches for reducing fuel wood and kerosene in the boilers were assessed: (1) flat plate solar water heater to pre-heat the water entering the boiler; (2) solar concentrators to generate the steam; and (3) gasifiers to increase the efficiency of fuel wood usage by conversion to combustible gas for fueling the boiler. These investments can have significant financial and environmental benefits, which in turn can have social and health benefits as the workplace environment improves.

The second project concept is for solar lighting to provide more reliable and environmentally sustainable supply to a prominent institution. By investing in solar lighting, the temple can reduce its operating expenses for ongoing electricity charges and set an example to other institutions – and all visitors -- in clean renewable energy and energy independence. Such a project contributes to energy demand management in two ways – it ensures and promotes use of high efficiency end use devices (in this case lighting) and reduces demand, freeing up electricity in the rural areas for more vital end uses such as irrigation.

Financing/Business Model

For day-to-day functions of the physical plant and operations, large temples function essentially as privately owned companies, and have well-established relationships with local banks. They can also draw upon relationships with wealthy individual members. Given the temple's assets and cash flow, the model for such projects would be private ownership by the temple authorities, likely using either all equity financing or equity and bank debt.

Know-how and Technology Partners and Supply Chain Issues

Possible boiler technology partners were identified for all the three water-heating options: SELCO is the local flat plate solar water heater supplier. For Solar Concentrators, Unisun Technologies Ltd., has a registered office in Bangalore, with manufacturing in Gujarat. For gasifier technology, Vijay Engineering, based in Peenya Industrial area, Bangalore, is a licensee of the gasifier developed by TERI/SDC¹⁰. Ankur Scientific Energy Technologies, based in Gujarat, is also involved in manufacturing of gasifiers for thermal application as well as power generation. For the solar-powered lighting project, SELCO will be the local solar photovoltaic supplier.

Other Partners, Stakeholders, Beneficiaries and Implementation Issues

While the devotees are indirect beneficiaries, the temple authorities are the prime beneficiaries of this project. Since this project does not satisfy S³IDF's pro-poor criteria, it has been transferred to the technology suppliers mentioned above to do the feasibility and final project development. The temple administration, after further study, will have to decide which option to use; the project concept otherwise has few significant complications and could have a relatively short timeline to implementation.

Replication

This concept for improved cooking is replicable wherever a temple, institution or organization uses steam cooking. Most temples in Karnataka utilize steam-cooking technology, as do many residential schools. The solar lighting concept is also replicable wherever a temple, institution or organization has relatively large lighting loads, unreliable grid service, together with the will and the ability to mobilize the financing. These projects will serve to showcase the technologies to the thousands of visitors to the temple.

3.2 Hongai Seed Processing 222

- *PC-3 Chintamani: Energy-Productive Use Investment for Hongai Seed Processing*

Summary

The project concept concentrates on the supply chain for Hongai seed, a locally cultivated tree crop with promise as biofuel oil. Appropriate investments at each step of the supply chain could benefit poor farm workers, especially women. S³IDF will continue to develop project possibilities beyond the PRESK Pilot work.

Project Description

Hongai seed is an important agro-forestry product in Chintamani and other parts of Karnataka, such as Tumkur, especially for the poor. Chintamani Taluk has at least five Hongai oil-extracting mills. Poor villagers collect, manually dehull and deliver the seeds to the mills, or sell them to middlemen/traders who transport and sell to the mills. The objective of the project is to introduce and/or upgrade energy supply and related investments as well as related organizational changes, so that poor people share in the productivity increases and value-added capture in the supply chain. The most basic energy related investments are mechanized or better tools for manual dehulling. Other investment options range from improved oil extraction units to seed production.

¹⁰ See Project Concepts #4 and #7 about TERI/SDC work on energy efficiency in the silk industry.

Hongai (*Pongamia pinnata*) grows well in the area. It is nitrogen fixing, improving the soil where it grows. It provides a harvest in the dry months of March to May. Since Hongai is a rain-fed/dry land crop it is a good fit in the semi-arid regions of Karnataka. The inedible oil has various high-value uses: as a fuel, in making soaps, for lubrication in machines, and in medicinal blends. The oil can be used as a substitute for diesel to power generators to produce electricity or for other applications. The pressed cake is unsuitable as animal feed, but can be used for composting, as feedstock for biogas plants, and as solid fuel.

Financing/Business Model

Building on existing commercial practice, various levels of energy-linked investments and pro-poor organizational models warrant pre-feasibility analysis. Casual self-employed people in the villages -- children, women, elderly men and women -- currently dehull the seeds manually and sell them to the oil mills. Use of dehullers to replace manual dehulling could increase their productivity. These people could be organized into Self Help Groups (SHGs), or existing SHGs could be encouraged to cultivate Hongai on village wastelands, either to supply dehulled seeds to existing mills, or to start their own oil extraction unit. Village wasteland could be leased from the Panchayat and the micro-enterprise could generate employment. A non-profit organization could take up the project initially and then the SHGs could take over the operations. Investment and associated organizational interventions that warrant consideration include:

- Enabling (for example, through loans) investment in mechanized dehullers/better tools for dehulling to enhance dehulling productivity.
- Investing in oil extraction units (and power supply if off grid). The investment could be owned/operated by a SHG/NGO that also organizes the supply chain for this oil extraction unit. A more expansive intervention would be for the NGOs/SHGs to undertake cultivation of Hongai on wastelands.
- Investing in self-generation (for the oil extraction unit's power) using Hongai seed oil as a fuel replacement for diesel engines (for shaft power or local electricity generation); a more expansive intervention would be other Hongai oil based energy supply investments.
- While perhaps not directly energy-linked, once the intervention included oil extraction, logical linked business options would be marketing the oil itself (including to diesel engine owners) or producing goods (such as soaps) that utilize Hongai oil as an ingredient.

Such investments will likely require both equity and partial guarantee support from S³IDF or an analogous entity to also facilitate local bank participation.

Know-how and Technology Partners and Supply Chain Issues

Specific technology suppliers of dehullers, oil-extractions machines (and their power units), and other equipment that would encompass the investment basis for possible micro-enterprises have to be identified. But there is market presence of these technologies, so this should be relatively straightforward (and is already underway).

Other Partners, Stakeholders, Beneficiaries and Implementation Issues

S³IDF is in dialogue about various project concepts with several Chintamani-based entities who would be likely partners. These include three local financial institutions: local branches of Canara Bank, which has partnered with S³IDF on other projects; the Kolar Grameen Bank (KoGB) and Chitradurga Grameen Bank (CGB).

The primary beneficiaries would be the women (and others) operating the investments and the associated micro enterprise.

This is a complex project concept that will have a long timeline to implementation. The pre-investment study should consider the options outlined above and develop a thorough understanding of matters such as the costs and benefits in forming the micro-enterprise for cultivating Hongai, dehulling and extracting oil versus simply streamlining of seed collection and dehulling, and finding extended markets for the additional oil produced. Further pre-investment work will continue both during and beyond the PRESK Pilot period.

Replication

The project concept is potentially widely applicable in a number of districts in semi-arid zones of Karnataka, especially in at least three of the four pilot taluks of the PRESK program - Chintamani, Gubbi and Molakalmuru Taluk. In Tumkur District, the Zilla panchayat is presently promoting Hongai cultivation among farmers, SHGs and schools.

3.3 Groundnut Processing 333

- *PC-9 Molakalmuru: Energy productive use investment for groundnut processing*

Summary

The project concept is an energy-productive use investment for groundnut processing, with the technology and business model (ownership/organizational) aspects to be such that poor and small producers capture greater portions of the post-harvest value. This is a complex project concept that will have a long timeline to implementation; S³IDF will continue to develop it beyond the PRESK Pilot timeframe.

Project Description

Groundnut is a major rain-fed crop in Chintamani and Molakalmuru taluks (and commonly the main cash crop). The plant is also an excellent feed for cattle. Groundnut shell is used as a fuel in many places, especially after briquetting.

Groundnut is shelled/decorticated with various levels of technology, from “by hand” manual powered devices to various powered shelling machines. Oil extraction is done with various expellers. Groundnut commonly moves 50-75 kms from production point to processing, which may be just decortication or oil extraction as well. Oil mills in Molakamuru area operate through a network of agents and middlemen that buys most of the groundnut grown in the area. Shelling is also done as a paid service, and the grower is given back the groundnuts alone. The groundnuts without their shells sell at a relatively higher price, approximately INR 2500-2700/Quintal (1 Quintal= 100 kilograms) compared to INR 1700-1900/Qt for groundnuts with shell.

Financing/Business Model

The project concept involves creation of Micro Enterprise Investment(s) that would enable the small producers to capture more value. Alternative investment cum business models should address the following issues/options:

- itinerant versus “fixed” de-shelling facilities;
- what/how-many of the processing steps to include: de-shelling, oil extraction, briquette making;

- scale and technology choice for the steps above; if the technology choices are not manual, what technology should be used for generating power for the machinery? and
- alternative ownership/operation options – fee-for-service; cooperative ownership, and variation combining these and other options.

It is likely that at least a partial guarantee would be needed to facilitate a bank loan, but equity infusion to the SHG or entrepreneur may also be required.

Know-how and Technology Partners and Supply Chain Issues

Specific technology suppliers of both the itinerant and stationary models of decorticators and stationary models for oil extraction have to be identified. Since there is market presence of these technologies, this identification should be relatively straightforward (and is already underway). There do not appear to be any significant technology supply chain issues.

Other Partners, Stakeholders, Beneficiaries and Implementation Issues

Other partners may emerge from ongoing contacts, but there are two Molakalmuru based entities with whom S³IDF has begun dialogue about various project concepts: Chitradurga Grameen Bank and MYRADA, a non-profit organization that has been doing watershed projects in the area and has programs working with many SHGs.

Implementation and Other Issues

The pre-investment study will consider the options outlined above and develop a thorough understanding of the costs and benefits between the prices of shelled versus unshelled groundnut. But it appears that investment cum business model options can meet S³IDF's criteria, so pre-investment work will continue beyond the PRESK Pilot Program timeframe.

Replication

The concept is applicable to other areas where there are sufficient numbers of smallholder groundnut growers such as Chintamani Taluk, Kolar District. In the course of the pre-feasibility study and in conjunction with possible collaborators specific sites will be considered. Also, analogous investment cum business models can be considered for other crops for which de-shelling or similar process steps are required and for which the residue has some uses; examples include mustard, sorghum and maize.

3.4 Silk Industry - Efficiency of Reeling Ovens and Dyeing, and Power Weaving Projects

- *PC-4 Chintamani: Energy Efficiency Investments in Silk Reeling Ovens*

Summary

The objective of the project is to accelerate the nascent market penetration of investments in energy efficiency technology in the silk reeling industry -- individual investments that while small in costs can have significant financial, environmental, health and social benefits. The project would not just support few such investments, rather be a program that would lead to overcoming the constraints to widespread and numerous such investments. S³IDF will continue to develop the program concept beyond the timeframe of the PRESK Pilot Program.

Project Description

The reeling industry constitutes the initial steps of processing the raw silk after the cocoons have been graded and sold. Reeling is the step where the silk thread is put on a reel. In Karnataka, this industry is made up almost exclusively of small-scale firms whose processes are energy intensive. Various biomass fuels are used for ovens for stifling (the silkworm in the cocoon), cocoon cooking (to dissolve the gum and allow the thread end to be located) and for silk drying. Typically each reeling enterprise has multiple ovens – usually 2-5, though sometimes up to 10. There are only a few types of “cooking” ovens, with the “Italian” and “Charka” types most commonly employed. Both are relatively primitive, of simple construction (and low investment cost). Both are operated in batch mode and are characterized by low thermal efficiencies due to radiated heat loss and loss through the chimney. These result in a hot and unhealthy working environment in the reeling enterprises.

Two general technology interventions to increase energy efficiency in silk reeling ovens are being assessed: (1) improved ovens with higher thermal efficiencies, and (2) Heat Recovery Units (HRU) retrofitted to existing ovens

The India Office of the Swiss Agency for Development Cooperation (SDC) has sponsored the design, development, demonstration of an improved oven by TIDE (Technology Informatics Design Endeavour) and that of a HRU unit by TERI (Tata Energy Research Institute). Reports from use of the TIDE Charka oven show fuel savings of more than **30%**, resulting in short payback time (months) for the improved ovens. Around 2500 such improved ovens are in use. Most of these sales have been subsidized. Commercialization of improved TIDE ovens for the Cottage class of ovens is even more nascent, with only 75 improved TIDE “Italian” ovens in use.

TERI’s HRU technology has been licensed to a small supplier for commercialization; the cost of a HRU unit is between INR 3,500 to 4,500. Use of the HRU to capture the waste heat to pre-heat the “cooking” water yields reported fuel savings of more than **20%** and reduced processing time (and hence higher productivity), again with a payback time in months for the HRU investments.

Both technologies have yet to address fully the challenges of broader and deeper market development. These challenges are issues of organization (including supply chain), financing and financial risk management. The financial risk management issues are pertinent from both the supplier and customer’s perspectives. The customer’s perspectives appear to be strongly influenced by the current poor market environment for reeled silk and the history of subsidies that have been provided to the reeling industry.

Further project feasibility assessment will first examine the tradeoffs between the HRU and improved ovens to select the better technology option. The next step would be to identify/evaluate alternative business models and implementation strategies to address the challenges mentioned above. These business models could then be tested as part of a pilot program that encompass a number of investment implementations in order to try to develop (in a third step) a larger program to jumpstart an accelerated market penetration.

Know-how and Technology Partners and Supply Chain Issues

The TERI HRU unit is currently being supplied on a commercial basis by a new small enterprise based in Sidlaghatta Taluk, Kolar District. He has no supply chain into other taluks, not to

mention other districts and currently has no plans to attempt to expand his marketing beyond Sidlaghatta.

Financing/Business Model

Application of either or both technological options would be through private ownership by silk reelers. The principal bottleneck appears to be with the suppliers. Entrepreneurs should be able to bundle credit services (or other financing) with oven products. This will likely require equity investment or loan to the technology supplier so that he can offer lease financing and/or short-term credit. This should establish a private ownership “lease toward ownership” model for market penetration.

Other Partners, Stakeholders, Beneficiaries and Implementation Issues

At this concept point two obvious candidates for partnering in one aspect or another of the possible project are:

- The Grameen banks in the districts in which the two taluks mentioned above lie (Kolar Grameen Bank and Kalapatharu Grameen Bank). The local branches of Canara Bank in these districts are relevant candidates for partnering. S³IDF has been in dialogue with both Grameen Banks and one of the local branches of Canara bank on the challenge of accelerating market penetration of the selected technologies;
- The Karnataka Department of Sericulture has various programs and projects to help the industry and it would be a logical partner;
- The Central Silk Technology Research Institute (CSTRI), which is part of the Central Silk Board is engaged in technology research and dissemination (limited) and has various investment subsidy programs. Dialogue with CSTRI is continuing.

The beneficiaries would be entrepreneurs operating the reeling units through improved income from fuel savings, improved quality of the reeled silk, and increased productivity in the case of HRU units. The workers in the reeling units will also benefit from improved working conditions from less smoke and heat from the ovens.

This is a complex project concept (more of a program than a project) that will have a long timeline to implementation. Further pre-investment work is continuing.

Replication

The industry is very important in certain districts of Karnataka, which produces more than half of India’s silk. The number of such small-scale silk reeling firms is in the many thousands.

The project concept is widely applicable in a number of districts in Southeastern Karnataka where large numbers of reeling enterprises are found. Given that there are a large numbers of such enterprises in at least two of the four pilot taluks of the PRESK Program- Chintamani and Doddaballapur, the focus will be on a project in one or both of these taluks. The possibilities for a program in multiple taluks including others under the PRESK Program should be considered, as there tends to be some local concentration of types of ovens.

- *PC-7 Doddaballapur: Gasifier Based Fuel Substitute/Efficiency Improvement in Silk Dyeing*

Summary

The project concept is to promote market penetration of biomass gasifier technology in the silk dyeing units of Doddaballapur taluk in Bangalore Rural District. S³IDF will continue to develop the program concept beyond the timeframe of the PRESK Pilot Program.

Project Description

Biomass gasifiers for small-scale thermal loads are examples of renewable energy investments that have large commercial market potential in the PRESK area and elsewhere in Karnataka. However, this technology has had limited market implementation due to various constraints, including financing and technology/know-how supply chain issues. S³IDF believes such investments could lead to significant financial and environmental benefits, such as improved viability of the silk units and an improved workplace environment. These benefits in turn would lead to associated social and health benefits in the silk industry. Expanding the investment perspective to biomass feedstock/fuel supply chain could also lead to other pro-poor benefits, such as additional employment. As envisioned at this conceptual phase, the project would consist of supporting a few such investments, as a step to developing a program that would lead to overcoming the constraints to widespread and numerous such investments. The project would also begin consideration of broader feedstock/ fuel supply chain options.

A typical dyeing unit has multiple baths (between two and five), where water is boiled and maintained at a constant temperature of 98 degrees Celsius. The typical size of a bath is around 200 liters. Baths in the dyeing units have low thermal efficiency and the fuel consumption is high. Gasification technology gives increased energy from burning of biomass. For units installed at the target site, preliminary estimates suggests a short pay back period of one to two years. The gasifiers would require regular supply of biomass feedstock (of type, size and dryness suitable for the gasifiers) and this could potentially open up new employment opportunities in the form of micro-enterprises that take up supplying fuel for gasifier units.

Financing/Business Model

The proposed project intervention could encompass various initial options leading to a more extensive program intervention; these options include:

- Helping the gasifier supplier to expand into Doddaballapur using his existing business model. This help could include technical assistance and financing (to both the supplier and gasifier users/investors);
- Support (assistance and/or financing for gasifier investments employing alternative business models using the same equipment supplier, or alternates;
- As a complement to (a) or (b), organization and implementation of a micro-enterprised to supply biomass feedstock/fuel such that it operates in a pro-poor fashion especially with regard to employment and value added capture in the fuel supply chain.

Know-how and Technology Partners and Supply Chain Issues

Vijay Engineering, based in Peenya Industrial area, Bangalore, is a licensee of the gasifier developed by TERI/SDC and is the probable technology partner in this project for at least one of the options outlined above. Vijay Engineering has experience manufacturing gasifiers and supplying biomass for different applications such as silk dyeing, silk bleaching, lead melting, food processing, to name a few. This supplier indicates that for his business model (combining gasifier sales, after service and fuel/feedstock supply), a minimum of five dyeing units would be required to make it feasible for him to implement his model in the Doddaballapur area. Vijay Engineering provides six months free maintenance and technical know-how to start and operate a

unit for supplying fuel to gasifier units. Another potential supplier for gasifiers that has been identified is Ankur Scientific Energy Technologies Pvt. Ltd. based in Vadodara, Gujarat.

Other Partners, Stakeholders, Beneficiaries and Implementation Issues

A financial institution is yet to be identified, but there are two obvious candidates. First, the local branch of Canara Bank, which is collaborating with S³IDF on other projects. The Kalapatharu Grameen Bank serves Doddaballapur taluk, and this is the second candidate; S³IDF has had discussions with them on other matters. As mentioned above, this change in technology will result in savings in time, labor and water along with improved silk productivity (both in quality and quantity), and reduced pollution. Employment opportunities in the fuel wood-processing (cutting and drying) unit are an added benefit for the project. An NGO or a women's Self Help Group (SHG) can attempt to generate livelihood by cultivating biomass on available low-grade land for the micro enterprise unit supplying fuel to gasifier unit.

There are two interrelated implementation issues. One is sustainable supply of feedstock/fuel for the gasifiers at a cost that keeps the investment viable. The second, as suggested above, is presence of equipment/know-how suppliers to service the market in a particular taluk –both in sales and after service and depending on the business model, feedstock/fuel supply also. The feasibility analysis will need to examine alternative business models and the intertwined issue of local biomass supply and sufficient numbers of gasifier customers (dyeing units or otherwise) in the taluk for which it will be cost effective to establish a fuel supply system to serve them in taluk either from local (in the taluk) sources or by transport from neighboring areas, thus increasing the feedstock/fuel cost and operation cost of the gasifiers.

This is a project concept that has a number of complexities and possible long gestation issues. An additional feasibility analysis of project options will continue beyond the PRESK Pilot period provided the pre-feasibility analysis indicates that a pro-poor option is viable.

Replication

The initial investment project that could be the start of a broader program and encompassing one or more of the options above will be in Doddaballapur, Bangalore Rural District, Karnataka. This investment concept is replicable in other areas with similar silk dyeing and reeling units. And in terms of a broader market penetration, the concept of use of gasified biomass fuels is also applicable to other small-scale industries (as well as larger industries) that need to generate wet or dry heat.

- *Molakalmuru: Introducing power driven weaving units for silk weavers at Kondlahalli*

Summary

The concept is to increase the productivity of the handloom-weaving units by assisting an entrepreneur to install an electric driven thread-rolling unit that spins threads onto cylinders.

Project Description

When used on existing retrofitted hand-weaving machines, an electric-driven thread rolling unit increases the productivity of the handlooms by around **30%**. One rolling unit can serve many weavers, depending on the hours worked. The project could also extend to providing financial assistance to individual weavers to retrofit their handlooms so that that machine rolls can be used

in their handlooms. Currently, only around **1%** of weavers in Kondlahally have retrofitted handlooms and those with the retrofit get their cylinders thread rolled by traveling to the nearest rolling unit at Molakalmuru.

The weavers' colony is in Kondlahally village, 15 kilometers from Molakalmuru town. The village has five hundred handlooms and less than ten handlooms have the necessary retrofit to use the machine rolled thread. The weavers are organized into Self Help Groups (SHGs). Brahmaputra SHG is one of the SHGs interested in retrofitting the handlooms of its members. Brahmaputra SHG has fourteen members and one of its members, the entrepreneur, is keen on investing in the thread-rolling unit. The investment required for the thread rolling unit is INR 25,000 and the investment required for retrofitting each handloom unit is INR 1,000.

Financing/Business Model

Individual handloom owners can own the “retrofit” investment. SHGs would probably own the thread rolling unit investment, which can be financed via loan or lease finance if partial guarantee is provided.

Know-how and Technology Partners and Supply Chain Issues

There are a number of suppliers who can supply the thread rolling machine, but none in Molakalmuru taluk. Nearest suppliers of this machine are in Bangalore or Dharmavaram, Andhra Pradesh. A possible supplier of this machine is Mr. Byrappa and Sons in Bangalore. Local suppliers in Molakalmuru can do the retrofit required for the individual handlooms.

Other Partners, Stakeholders, Beneficiaries and Implementation Issues

The Brahmaputra SHG will be the key partner. Members can avail financing for individual retrofitting through their SHG. The entrepreneur putting up the initial investment for the thread rolling machine would require financial assistance to install the system. The weavers, entrepreneur and employees in the rolling unit will be the main beneficiaries. The weavers gain from increased productivity, which in turn leads to higher incomes. Village weavers also avoid traveling 15 kilometers or more to the nearest rolling unit, saving time and transportation costs. The entrepreneur will gain from running the enterprise on a for profit basis. By providing employment opportunities other village locals also benefit. The threading machine runs on a 2 HP motor and hence would be dependent on reliable grid electricity. As of now the village does not have severe power cuts (shut down of 4 to 5 hours in a day) and hence the availability of power should not be a problem. If the supply situation deteriorated, the working of the unit would be affected and additional backup supply would need to be considered.

The capability of the identified entrepreneur to undertake the enterprise and the ability of a minimum number of weavers to undertake the retrofit needs to be determined. Once this is done, the suppliers for the cylinder equipment and the local retrofitters also need to be finalized. Considering the above, this will be a project concept without complications and hence should have a relatively short timeline to implementation. Further pre-investment work will continue.

Replication

Handloom weaving employs 500 weavers in Molokumuru Taluk alone, and many thousands across Karnataka. Reliable and affordable power rolling units would have widespread interest and benefit.

3.5 Solar Home Systems for Self-Help Groups (SHS for SHG) Projects 555

- *PC-5 Chintamani: Solar Home Systems (SHS) for SHG Members at Iragampalli*

Summary

The project involves providing single light points to members of Jyoti Mahila Sangha, a women's self-help group (SHG), in village Iragampally, Chintamani Taluk, Kolar District. This project has completed feasibility assessment, financing and supplier arrangements completed, and the first five light points have been installed and are operating.

Project Description

The project involves providing single light points to members of Jyoti Mahila Sangha, a women's self-help group (SHG), in village Iragampally, Chintamani Taluk, Kolar District. The 20-member strong SHG has a good track record of saving and borrowing and repaying loans from the local branch of Canara Bank. The SHG members make masala powder and the light points would help them increase their income by allowing them to work extended hours. (The area is grid-connected, but service is erratic and most people use candles or kerosene based lanterns for lighting.) The lighting will be from rechargeable battery-based light points, with battery charging powered by individual PV panels. Based on the experience and feedback of the 5 members, the remaining members may join the project and S³IDF will continue to make similar financial arrangements for them as well.

Know-how and Technology Partners and Supply Chain Issues

SELCO Solar Light Pvt. Ltd., with its registered office in Bangalore, and a branch office in Kolar is the local PV equipment supplier. SELCO completed the installation for the initial five systems and is responsible for the maintenance (for a specified time) of the system. SELCO also provided the necessary training to operate the equipment. SELCO's Kolar office is responsible for post implementation problems that could arise because of its proximity to Iragampalli (approximately 50 km).

Financing/Business Model

The SHG does not have the capacity to pay the margin money (loan down payment) in one installment. S³IDF's provision of guarantee (security) for the margin money in the form of a fixed deposit will allow the SHG members to access a loan from the local branch of Canara Bank under the UNEP scheme. Launched in 2003, the UNEP Project's objective is to accelerate the market development for solar home systems in southern India by helping to overcome the relative lack of consumer financing options. The project is a partnership between United Nations Environment Programme (UNEP), and its Risoe Center on Energy, Climate and Sustainable Development (URC), and two of India's major banking groups - Canara Bank and Syndicate Bank. The aim is to help these Bank groups develop lending portfolios specifically targeted at financing solar home systems (SHS). With the support of the UN Foundation and Shell Foundation, the project provides an interest rate subsidy to lower customers financing costs; the banks make the transaction decisions and bear the transaction risks. Only SHSs of certain technical specifications and provided by approved suppliers are eligible. SELCO, the proposed technology partner in this project is one of these approved suppliers. The light points will be purchased using a loan from the local financial institution with which the SHG has a good track record of saving, borrowing and repaying. At the end of the loan repayment, the individual SHG members will own the light points.

Other Partners, Stakeholders, Beneficiaries and Implementation Issues

The SHG, Jyoti Mahila Sahaya Sangha has been groomed under the supervision of Resource Service Center (RSC), an active NGO in Chintamani. The financial institution is the Iragampalli branch of the Canara Bank As seen with earlier projects; these light points will also result in savings over traditional kerosene lamps. The light points can also be loaned to other SHG members or the village community when not in use by the owner, on a “pay for use” operating basis, thus making sure the light points are fully utilized at all times and the rental could make up for lost work. Except for the issue of whether all SHG would join at the outset, this was a project concept without complications and is already in implementation.

Replication

A follow-on assessment is being made of feasibility for a PV-hybrid grinding system for the SHG's use. Currently the grinding is outsourced. The SHG has already begun to plan equipment purchase. S³IDF has also begun discussions with nearby temples to establish marketing links for the SHG's masala powder.

The concept is easily replicable in other areas where there are women's self help groups (SHGs), including the taluks of Gubbi, Molakalmuru and Doddaballapur. Members of SHGs are normally involved in small-scale businesses that are normally run from their homes. As a result, these businesses can thrive because of extended hours. Also, since the location of the light points is at home, it provides the additional utility of providing home lighting for purposes such as cooking and other household chores, reading, children's schooling etc.

The concept and innovative financing is intended to set an example for other Financial Institutions to change their business as usual practices (BAUs). The concept is easily replicable and sustainable in other similar areas where residents are without access to the grid (or a reliable grid) and local SHGs already have an established banking relationship and they have a willingness to pay for reliable home lighting. The economic benefits are higher especially if the SHG members are involved in small-scale income generating businesses.

- *PC-10 Molakalmuru: Lighting Options for Weavers' SHG*

Summary

This project is to provide lighting for weavers in Kondlahally village in Molakalmuru taluk and help them increase their income by allowing them to work uninterrupted during grid interruptions and for extended hours.

Project Description

Kondlahally village is 15 kilometers from Molakalmuru town. Kondlahally village has around five hundred handloom units housed in individual households. Currently, all the handlooms use either a 60W light bulb or a 40 W tube light to provide light for a single handloom unit. The presence of bright light at all times is necessary good quality weaving. Currently, most weavers stop weaving when there is no grid electricity, unless there is adequate sunlight and their weaving units are positioned in the house to receive the sunlight at the weaving section. Hence, power shutdown affects the productivity of the weavers. With reliable lighting, the weaving will not be solely dependent on grid electricity for lighting, thus increasing the productivity of the weavers.

Field studies conducted by S³IDF at Molakalmuru indicate that, based on the existing supply of grid electricity, weaver's need a few hours of independent light per day (independent-backup from the grid) for their weaving needs. Studies conducted indicate that an 11 W CFL lamp with proper reflecting surface is adequate. Most of the weavers are organized into Self Help Groups (SHG's). The SHG's have expressed willingness to invest in grid independent lighting. S³IDF has initiated discussions with the Brahmaputra SHG, a SHG with fourteen members, to introduce light points for its members.

Seven options by which grid-independent lighting could be provided to the weavers were assessed; these are categorized on the basis of technology, ownership, and operations responsibilities:

- *Option 1:* Individual Lighting Systems - charging through Grid;
- *Option 2:* PV Individual Lighting Systems;
- *Option 3:* PV - Grid Hybrid Individual Lighting System;
- *Option 4:* Centralized charging station - charging through Grid & Distribution wires
- *Option 5:* Centralized charging station for batteries for light pointes - charging through Grid;
- *Option 6:* Centralized charging station for batteries for light points - charging through PV and
- *Option 7:* Centralized charging station for all light points - charging through PV/grid hybrid - by transporting of batteries

These options have all received extensive analysis as presented in Appendix D. The options and preliminary assessments were discussed with the concerned weavers of Brahmaputra SHG. The weavers then indicated that, they no longer are keen on investing in light points as the power supply condition has improved after the recent monsoon rains. Currently, less than four hours of power is cut in five days. However it warrants noting that the situation is likely to change as the government has announced that the present power supply situation may not continue and rural areas might face more power cuts.

Since the weavers are not keen on investing in any of the options mentioned above due to the improved power situation, S³IDF will not proceed to move the project forward till such time the weavers again feel the necessity of light points.

3.6 Last Mile Projects 666

- *PC-14 Molakalmuru: Last Mile Project for a Weavers Colony at NMS Badawane*

Summary

The concept is to provide last mile electricity connection to a weavers' colony in NMS Badawane in Molakalmuru Town, Chitradurga District.

Project Description

The colony has eighty houses with only six houses having grid electricity. The six households obtained grid electricity by paying for the grid connection. The rest of the households do not have the financial ability to pay the regional electricity supply company (BESCOM) the required charges for individual connections and the initial cost of internal electrical wiring of their houses. A possible extension of the last mile connectivity project would also be to:

- Ensure reliable electricity supply through supply augmentation, as the grid is currently not reliable at the colony.
- Introduce electricity linked end use productivity investments¹¹.

The weavers' colony is on the outskirts of Molakalmuru town, two kilometers away from Molakalmuru town in a locality called NMS Badawane. The colony does not have a proper approach road; the current approach road is through private land. The colony also does not have proper water supply. Discussions with the village locals indicate that, if the availability of services, such as water, electricity, and transport improves, the size of the colony could grow to four hundred households.

About **75%** of the households are weavers who work at nearby handlooms as laborers. They are unable to install handlooms in their homes and weave from home due to the lack of sufficient light. The remaining households work as tailors, and as daily laborers. If electricity is supplied, people have expressed their willingness to have their own handlooms as they would have enough light to carry out quality handloom weaving. Additionally with electricity supply, the productivity of the existing weaving units will increase as weavers will be able to work after dark and introduce productivity improvements in the handlooms. Other self-employment opportunities dependent on electricity will open to the households of the village. Providing electricity will also help children to study at night, which is one of the most important needs of electricity expressed by the households.

Know-how and Technology Partners and Supply Chain Issues

As the regional electricity utility, BESCOM is the logical choice as the electricity supplier. To extend the grid to individual households, BESCOM requires electricity meters to be installed in every household and the households to pay for the electricity meter charge and the cost of laying the transmission lines in the colony. One option for community households to avoid the cost of installing individual electricity meters and simplify the process of dealing with BESCOM is to form an electricity users' association, as allowed by the Electricity Act of 2003. In accordance with the Act, the electricity users' association installs the transmission lines for the households, draws power from BESCOM as a single entity, and manages the distribution of electricity to the households. This arrangement might require the electricity users' association to design tariff structures with the installation of a single electricity meter to avoid the cost of installing individual household electricity meters. If this arrangement is pursued, the collection of the electricity user charges will be entirely managed by the electricity users' association and the association will pay BESCOM for the electricity usage of the households drawing power through the association. To ensure reliable electricity supply, the weavers' colony can look into various grid augmentation options. Technological solutions can be through energy generation based on biomass, biogas, uninterrupted power supply (UPS) system, and solar power, etc. The ownership and operating responsibility of augmentation will largely depend on the technological option that is chosen.

The choice of biomass or biogas sources for supply augmentation will depend on the availability of feed supply and the existence of technology suppliers in and around Molakalmuru. With regard to biogas feed, the colony currently has twenty cows, which could be utilized for biogas feed. The various supply augmentation options with respect to UPS and solar power will be considered in the pre-feasibility of the Molakalmuru weavers' light point project.

¹¹ See concept piece, Molakalmuru: Energy Productive Use for Silk Weaving Units

Other Partners, Stakeholders, Beneficiaries and Implementation Issues

The beneficiaries of the project will be the people of the community. The quality of life in the colony will improve as, for example, productivity-linked employment options will open up and children will be able to study at night. The households in the colony are in the process of forming an association, which can be extended to be an electricity users' association. This project requires the following to be in place before it can move into implementation:

- The weavers' colony should form an electricity users' association.
- With S³IDF's help, the association will bring in BESCO as a technology partner and look into the requirements of electricity supply augmentation and doing the augmentation if required.
- The association will also have to choose the appropriate technology, ownership, and operational model.

This project will require a long timeline, probably over a year, but is doable. It fits very well the mandates of both PRESK and S³IDF. Project feasibility assessment will continue beyond the PRESK Pilot period.

3.7 Water-Energy Nexus Projects 777

- *PC-6 Multiple taluks: Water-Energy Nexus Investments for Small Holders*

Summary

The project's concept is to improve one or more aspects of the on-farm electricity-groundwater nexus for smallholders currently irrigating from bore wells. Targeted improvements would be one or more of the following:

- improving the efficiency and/or reliability of electricity use for pumping;
- reducing use of irrigation water;
- reducing use of grid electricity; and
- improving the efficiency, effectiveness and/or reliability of irrigation.

Project Description

The project intervention(s) would (initially) focus on one or more of the aforementioned improvements without necessarily aiming to change the farmers' existing cropping pattern. Also at this concept stage, the idea is to focus initially on small holders who cultivate mulberry, coconuts and other horticulture crops in order to capture synergies with both the ongoing pre-investment work stemming from other concepts developed under this TO and S³IDF's other experience and the importance of these crops to small holders.

The project is envisioned at a program scale, initially working at micro-level of small-scale investments implemented for a single smallholder farm (or group of farmers), and eventually expanding to foster such investments on a multitude of smallholder farms. Even at the outset, for an individual farm or group of small farms, a specific project could bundle two or more investment (and know-how transfer) elements, such as

- trickle, drip, or sprinkler irrigation depending on the crop(s);
- more efficient motors and/or pumps;
- electricity supply improvements/augmentation (individual or group, e.g. capacitors or other "grid" improvements);

- micro catchments, land formation and/or bore-well improvements for water harvesting and recharge.

Based on the pre-investment work thus far, in the case of multiple investment elements it is likely that the initial farm specific cases, the choice would be one or more smallholder farms in Chintamani taluk with particular focus on ones currently producing mulberry and/or vegetables. The reason for this is that if multiple investment elements noted above are involved, at least for initial such projects, they may have a long gestation period and the necessary follow-up that will be required will be more easily handled from our Bangalore base. For single investment element cases (e.g. trickle irrigation for mulberry small-holders) the site decisions are more likely to be based on working relationships with partners (more below) and at this stage none of the taluks are ruled out in the ongoing pre-investment activities.

Know-how and Technology Partners and Supply Chain Issues

The market presence (in the specific taluk or nearby) of suppliers of know-how and technology and their “on the ground” application experience appears to vary significantly. This variation is from essentially no presence (in these taluks) to suppliers with presence in some taluks and relatively widespread application experience (but perhaps not with small-holders).

At least in the investment and know-how element for water harvesting, suppliers include both:

- non-commercial players providing know-how and advise and/or underwriting initial demonstration investments; and
- at least on commercial business (e.g. Farmland Inc.) that offers an integrated package of investment and know-how components.

Of the four possible investment and know-how elements noted above, the one which has achieved notable market penetration – but still small in terms of potential- is that of trickle, drip or sprinkler irrigation investments for more efficient water delivery and use. A few points to be underscored:

- As might be anticipated, the penetration has been smaller amongst small holders. Government subsidies have been an important factor in this market penetration¹². But the subsidies are not granted “up front”; the systems must first be bought and then their subsidies collected – generally with a lag in time. Thus despite the subsidy, there remains a significant first-cost constraint for small-holders/low-income farmers;
- Commonly, the subsidy-qualifying technology supplier plays an intermediary and/or facilitation role for accessing the subsidy; but it appears that this role is not regularly extended to small holders because of their inability to make significant down payments;
- Low cost systems such as those supplied by the International Development Enterprises (IDE) agents that are especially fitting for small holders do not qualify for the subsidy.

Investigations of technology and know-how suppliers and supply chain issues are continuing.

Financing/Business Model

The most likely business model will be arrangements with partners - both equipment/know-how suppliers and local financial institutions – so that debt or lease financed arrangements make it

¹² For sericulture and horticulture, there are subsidy programs for drip irrigations systems covering the whole state of Karnataka. Regulators must qualify these equipment suppliers. For sericulture the subsidy is **70%** subsidy for men farmers and **90%** subsidy for women and those belonging to Schedule Castes and Schedule Tribes. For horticulture, the subsidy is **50%** for all farmers.

possible for small-holder to access (and own/operate) the investment elements that are part of a farm-specific project. In the case of investment element a) given the possible access to subsidy program monies (more below) often available only after some delay, bridge financing may be a logical option. For group/collaborative investments other business models can be examined.

Other Partners, Stakeholders, Beneficiaries and Implementation Issues

S³IDF project is continuing a series of discussions with the Grameen banks responsible for each of the taluks - Kolar Grameen Bank (for Chintamani), Chitradurga Grameen Bank (for Molakalmuru), and Kalapatharu Grameena Bank (for Doddaballapur and Gubbi). In several of these discussions, smallholder investments encompassing one or a bundle of the aforementioned elements are part of the dialogue. The banks appear to be more than willing to consider such investments. Second, there are various non-governmental organizations (NGOs) involved in some of the taluks with whom S³IDF has begun a dialogue and that may be a candidate for partnering in projects with small holders. One such example is the Resource Service Center (RSC), an activist NGO in Chintamani that is involved in watershed management and has experience working with SHGs. Third, if a more programmatic effort were developed and undertaken, the Bangalore Electricity Supply Company (BESCOM) would be a logical partner. BESCOM has a new unit focusing on demand management and at some point this unit will out of necessity have to focus on agriculture pumping electricity use and the myriad water-energy nexus issues including use by small holders.

Even at the micro-specific small farm level, initial projects addressing the water-energy nexus could be complex ones if a bundle of the investment elements are involved. And even if only one of the investment elements is involved, the initial projects while not overly complex will nonetheless require many months for formulation and implementation. In the case of a single investment element (e.g. trickle irrigation), they should be somewhat easier and quicker. Further pre-investment work is continuing on an intermittent basis, and will continue well after the PRESK Pilot period.

Replication

The project concept is potentially widely applicable in the four pilot taluks of the PRESK Program. But the aforementioned crop focus points to Chintamani and Doddaballapur in the case of mulberry and Gubbi in the case of coconuts. But at this concept stage in terms of the specific candidate investment sites for initial investments none of the taluks have been excluded and the decisions will be made with strong consideration to two factors: potential partners (more below) and whether the initial investments encompass multiple or only one of the investment elements noted above.

3.8 Light Points for Hawkers & Traders Projects 888

- *PC-8 Doddaballapur: Light Points for Hawkers*
- *PC-11 Chintamani: Light points for hawkers*
- *PC-12 Gubbi: Light points for hawkers*
- *PC-13 Molakalmuru: Light points for hawkers*

Summary

These four projects involve creation of Micro Enterprise Investments owned and operated by local small businessmen. The micro-enterprise provides lighting to hawkers (street sellers). The

lighting is from light points running on rechargeable batteries; the battery-charging station is powered by PV panels. The recharged batteries are provided on a "pay for charge" operating basis and substitute for kerosene lanterns previously used. Lighting costs are reduced and quality of service improved; the micro-enterprises also create incremental local employment. S³IDF's provision of a partial guarantee is allowing the entrepreneurs' micro-enterprise to access loans from local banks under the UNEP Indian Solar Financing Initiative¹³. The technically innovative system was conceived by S³IDF with its equipment partner, SELCO. Unlike PV based lighting "pay-for-use" projects that employ lanterns, this project employs light-points that better serve the hawkers' lighting preferences, providing better light and lower costs than the kerosene lanterns that are being replaced. The light points stay fixed, and a specially selected lighter-weight battery is charged and delivered to the hawkers.

Project Description

Hawkers are mostly petty sellers of fruits, vegetables etc. and some even use moveable carts to ply their trade. Most hawkers currently use kerosene-based Petromax lanterns, which are comparatively expensive to maintain, given the cost of kerosene and frequent replacement of the mantle. Also the kerosene lanterns generate considerable heat that has been known to damage the fruits and vegetables that the hawkers vend.

The light points, which run on batteries charged by solar photovoltaic (PV) panels, are charged during the daytime at a centralized charging station and in the evening, the batteries are delivered to the hawkers for their use. The hawkers require the light points for an average of 4 hours every evening, after which the batteries are returned to the charging station. These are supplied to the hawkers on a daily rental payment for use, which is pre-decided based on their willingness to Pay (WTP). The hawkers benefit with better lighting at a lesser cost, thus improving their economic condition. Local unemployed or underemployed persons will fill all employment opportunities in the micro-enterprise, such as maintaining and operating the charging station, distribution/collection of batteries daily and collection of rental payments. The entrepreneur will invest a small proportion of the total capital needed and S³IDF's provision of partial guarantee in the form of a fixed deposit will allow the entrepreneur to access a loan from the local branch of Canara Bank or Syndicate Bank under the UNEP scheme. The cost for the project is being worked out based on the number of hawkers willing to participate. Launched in 2003, UN India Solar Finance Initiative's objective is to accelerate the market development for solar home systems in southern India by helping to overcome the relative lack of consumer financing options. The project is a partnership between United Nations Environment Programme (UNEP), and its Risoe Center on Energy, Climate and Sustainable Development (URC), and two of India's major banking groups - Canara Bank and Syndicate Bank. The aim is to help these Bank groups develop lending portfolios specifically targeted at financing solar home systems (SHS). With the support of the UN Foundation and Shell Foundation, the project provides an interest rate subsidy to lower customers financing costs; the banks make the transaction decisions and bear the transaction risks. Only SHS of certain technical specifications and provided by approved suppliers are eligible; SELCO, the proposed technology partner in this project is one of these approved suppliers. After many months of meetings and discussions with UNEP about the benefit of these pro-poor Light Points schemes (not just for hawkers but other poorer

¹³ S³IDF facilitated access to a loan under interest subsidy scheme under written by UNEP and administered by certain local banks. The scheme requires that the banks make the loan decision and bear transaction risks so S³IDF partial guarantees proved necessary. It is worth noting that these projects could be commercially viable without the UNEP scheme. The access to the UNEP scheme makes the concept more attractive and gives the owner a better deal.

communities such as rural women's self help groups), UNEP has agreed to extend the scheme to cover such S³IDF Light Points schemes. As in other projects under the UNEP Project, the banks make the transaction decisions and take transaction risks.

Because of S³IDF's previous experience in developing this kind of project, and its relationships with a certified supplier, SELCO, and one of the designated banks, Canara (at least through its regional office), it was possible to identify, assess, partner, finance and bring to sign implementing agreements for hawker Light Points projects in each of the four taluks within the timeframe of the PRESK collaboration. In each project however, the local bank branches were introduced for the first time to the business concept and the UN funding support scheme. And the hawkers and entrepreneurs were introduced to both to the solar lighting points technology and to the business model.

In Doddaballapur, the project will begin with 35 hawker clients. In Chintamani, Gubbi, and Molakalmur taluks, the initial numbers are 35, 25, and 40, respectively. Thus the program begins with nearly 140 Lighting Points.

The concept is easily replicable in other areas where there are a number of hawkers (at least 20 to make the idea of a centralized charging station feasible, thus making the project cost effective) in a neighborhood. This also ensures that the distribution and collection (of batteries as well as the rental payment) is simplified. Earlier similar projects fostered by S³IDF have also shown that such a project is viable for the entrepreneur as well in terms of his/her investment. The supplier covers the equipment under warranty for a limited time after which maintenance coverage can be bought annually for a very small amount. The financial institution's investment is also considerably risk-free given that S³IDF would put in a partial guarantee and the technology supplier would provide a buy-back guarantee under its terms and conditions.

Know-how and Technology Partners and Supply Chain Issues

SELCO Solar Light Pvt. Ltd., with its registered office in Bangalore, Karnataka will be, the local PV equipment supplier. SELCO has extensive experience in sales and service of various lighting and other PV based systems in Karnataka and has an established working relationship with various financial institutions. SELCO has a wide network and has built a solid rural power delivery infrastructure in Karnataka and adjacent states in Southern India. SELCO from its prior experience and feedback from projects dealing with street hawkers has proposed an innovative Light Points that provides good lighting for the hawkers' wares and comes with a lighter weight battery for easier transportation.

Financing/Business Model

The micro-enterprise units (MEU) are operated and managed by the entrepreneur. The lighting is from rechargeable battery-based light points (battery charging powered by individual photovoltaic (PV) panels) that are provided to the hawkers on a "pay for charge" basis. The centralized solar power system, consisting of Solar Panels, Batteries, Lights and such other accessories as required, are purchased using a loan from the local financial institution that the entrepreneur can access based on S³IDF's partial guarantee. At the end of the loan repayment, the entrepreneur will own the MEU. Currently, these projects can avail of a UN Solar Energy initiative, through which either Canara Bank or Syndicate Bank can provide below-market rate loans. These light points result in increased savings and better lighting. These projects are good examples of the validity of a business model having a blend of adoption of renewable energy for

commercial purposes, serving poor communities with services they need and creating cost-savings, employment and other benefits among socially and economically disadvantaged communities.

SELCO is installing and maintaining (for a specified time) the system. SELCO also provides the training to operate the charging station. The entrepreneurs in each project conducted a survey under S³IDF's guidance to determine feasibility. Timely collection of the agreed-upon tariff will be a key factor to the success of the project. Timely distribution and collection of the batteries is also essential to avoid overuse of the batteries resulting in reduced life of the batteries. This is a project concept without complications and has a relatively short timeline to implementation. Opportunities will be sought to expand and replicated the initial projects.

3.9 ICT Power Supply Projects⁹⁹⁹

- *PC-15 Molakalmuru: Electricity dependent ICT project at Kondlahalli Rural High School*

Summary

This Information and Communication technology (ICT) project concept is to provide computers to a high school (Kondlahally Rural High School) in Kondlahally village. The computers will provide computer training to children during the school hours. The computers will be utilized as a revenue generation source after school hours by providing computer related services, such as accessing agricultural information through the Internet, to the village locals. Telephone lines exist in the village for Internet connectivity. Since the village experiences power cuts, especially during the summer months, providing reliable electrical supply to the computers, such as by means of an uninterrupted power supply (UPS) system and/or supplemental supply by PV system, will also be part of the project.

Project Description

The school is the only high school in Kondlahally village, Molakalmuru Taluk, Chitradurga District, Karnataka. There are approximately five hundred students and eleven teachers. As the school is a government aided Kannada medium school, the government pays the teachers' salaries. A committee comprising of Kondlahally residents manages the school. There is no computer center in the entire village and hence, a computer center at the school will help children and locals in bridging the digital divide. A room for the computer center in the school has already been identified. The school has grid electricity. Although the school experiences a few hours of power shut down everyday, the electricity supply appears adequate to run the computers on a UPS system during electricity shut downs.

Know-how and Technology Partners and Supply Chain Issues

Mr. Revenna, a local village businessman, champions the computer center in the school. Mr. Revenna is the Secretary of the school committee and has the backing of the committee for setting up the computer center. Mr. Revenna previously funded the extension of the school building. By housing the computers in an existing schoolroom, the capital cost of physical premises for the computers is avoided. To reduce the capital cost for the computers, second-hand computers will be procured. The first choice of procuring second-hand computers is Indian IT companies, such as Infosys and Wipro. The second choice for second-hand computers is World Computer Exchange (WCE) based in Boston, USA. WCE procures second-hand computers from industrialized countries and supplies these computers to schools in developing countries. S³IDF

staff has been in dialogue with WCE, which has agreed in principle to support school's project such as the one in Kondlahally.

Providing the appropriate educational content for the children is another essential requirement. One of the candidate partners for the children's educational content is the Azim Premji Foundation, which has agreed in principle to support schools, such as Kondlahally Rural High School. Azim Premji Foundation works with a large number of government schools in the state of Karnataka and their material is largely in the local language.

A critical component for the success of the computer education project will be the presence of a well trained instructor who can provide appropriate computer training to the children and an entrepreneur who can run the center on a for profit basis after school hours. Both the instructor and the entrepreneur will be selected from the villages by the school authorities. The training for the instructor will be done by the Azim Premji foundation, whereas the training for the entrepreneur will be provided if required, through a yet to be identified organization.

To run the computer center after school hours on a financially sustainable basis will largely depend on the center being able to provide value added services to the local population. This requires an understanding of the services that would attract the local population. Other than providing vocational computer training, most services require Internet connectivity. The village has telephone lines and hence Internet connectivity can be provided through telephone lines. However, the reliability of Internet connectivity through telephone lines needs to be examined. Another requirement for revenue generation services would require collaboration with other partners, such as with the state government that has plans to implement e-government services through village kiosks. Further work needs to be done on identifying ways in which the computer center can be run on a financially sustainable basis and in forming collaborations with various service partners.

Other Partners, Stakeholders, Beneficiaries and Implementation Issues

The school will be the key partner in the project. The school will participate by putting up a certain minimum initial investment through the school committee and in running the computer center on a financially sustainable basis by requiring the students utilizing the computers to pay a nominal fee that will cover the computer instructor's salary and the center's maintenance. The school will also work to ensure that the benefit of the computer center is extended to the local population by opening the computer center for the local population after school hours and also in running this set up through an entrepreneur on a financially sustainable basis. School children are benefited through computer education, the locals are benefited by access to information and other computer related services, and local employment is generated through people employed to teach the children and run the computer center after school hours.

This project requires a number of further activities to be undertaken before it can go to implementation, including:

- Identifying the suppliers for the computers;
- Identifying a computer instructor and providing training;
- Establishing partnerships for revenue generating services after school hours;
- Identifying ways of running the computer center after school hours on a financially sustainable basis;
- And identifying an entrepreneur to run the computer center after school hours.

In effect, a business plan is needed for the education cum Internet service enterprise that is to be a collaboration of various parties. S³IDF will pursue development and feasibility assessment beyond the PRESK Pilot timeframe.

4.1 Introduction to the Assessment of FI's in the PRESK Taluks

This section reports on a review and assessment of banks/financial institutions (FIs) present and operating in the area of the PRESK Program.

The review was limited in scope, aiming to produce an initial assessment of the possibilities for these FIs to participate in the financing of such projects both under “business as usual” (BAU) practice and/or when augmented by partial risk guarantees or other options from the menu of innovative financing support¹⁴ that S³IDF employs to foster viable pro-poor, pro-environment projects including viable projects that are not bankable under BAU practices.

During the course of the PRESK collaboration, five projects were brought to the ready-for-implementation stage. That meant that discussions were held with FIs not just in the context of a long list of possible projects but in terms of specific investment transactions for which S³IDF was attempting to facilitate financing participation by the FI. Thus this assessment draws upon discussions with FIs in the context of both specific transactions, as well as broader discussions about possible transaction types.

In a few instances these discussions were held with officials at Bank headquarters as well as local branches and in the special case of the national entity NABARD (National Bank for Agriculture and Rural Development) with the office responsible for Karnataka. The assessment also drew from a selected review of documentation regarding Bank lending requirements and norms pertinent to the projects of focus. As discussed further below, this included in particular matters with regard to priority sector lending and the guidelines and norms issues by the regulator, the Reserve Bank of India (RBI).

4.2 Access And Availability Of Financing: Some Aspects

In addition to the obvious matter of presence in the four taluks (discussed below), there are some other aspects of financing access that warrant a brief mention. First is the question of whether to focus only on bank and debt financing as opposed to other FIs and other forms of finance. Within this limited review, it was decided to focus only on banks. The other principal FI would be leasing companies; India has many of these, literally thousands. But in these taluks and with the types of transactions being developed by this work, there appeared to be no relevant lease transactional experience readily identified. With regard to debt versus other forms of support, especially equity, which is often required while there appeared to be some sources operating in both the formal and informal markets, these sources did not appear to be very accessible and any thorough examination was beyond the scope of this review.

Second is the issue of financial intermediation through which financing is channeled from market or government sources to particular investments such as those noted in Table 4-2 and the owners/customers of these investments. In broad terms there are two channels. One is the *direct* channel whereby bank finance flows directly to the investment and its owner /operator and the bank takes the transaction risks with or without some partial guarantee or other credit conditioning provided by another party such as S³IDF. Another is an *indirect* channel in which, for

¹⁴ See Table 2-1 under Section 2 on S³IDF menu of financing options

example, the financing flows from an equipment supplier or other entity acting as a special form of ESCO (Energy Service Company), which in turn receives support from Bank/FI finance. In many situations this indirect approach overcomes information asymmetries and the ESCO is better positioned to take the financing transaction risk.

The *indirect* channel or approach has been successfully employed to foster market penetration of small energy investments in a number of countries. Most of this experience has been in OECD (Organization for Economic Co-operation and Development) market situations but an increasing body of such experience is being found in the developing world. Employment of this indirect approach should be a consideration for the future in the four taluks for these projects. But for now this approach is ruled out for several reasons. There is a lack of local transactional experience, undeveloped supply chains and capital of many of the logical equipment and know-how suppliers.

Thus the focus on financing access of necessity looked more towards debt that might be accessed from local banks. The first requirement for such possibilities is physical presence of the bank (in the taluk) and the second is that of how such investments might fit in the bank's lending scope. With regard to the latter the most important aspect is the matter of priority sector lending requirements as mandated by the statute and guidelines issued by RBI.

4.3 The Bank Classes and Priority Sector Lending

There are more than 50 public and private Indian commercial banks but only a small number have a national footprint. There are also numerous cooperative banks operating in the commercial sector, and more than 30 foreign banks¹⁵. While this review did not identify any of the latter (foreign) to be present in the four taluks, representatives of one or another of the other commercial bank classes had some presence. Examples of commercial banks with a presence in one or more of the four taluks include: Canara Bank, the Vyavasaya districts in which the taluks lie.

But perhaps most pertinent, from the perspective of the types of small energy and related investments of focus herein and as exemplified by those noted in Table 4, are the many (almost two-hundred) Regional Rural Banks (RRBs). The RRBs were created to bring banking services to underserved areas and populations. They are sponsored and capitalized by the central and state governments and particular commercial banks with whom they are affiliated. The RRBs are relatively new entities in that the statutes mandating them only date from the mid 1970s. But they now serve both rural areas and small towns in 23 states/Union territories, covering almost 500 districts including those in which the four taluks lie.

In Karnataka (and elsewhere) the RRBs are titled Grameen Banks. For each district there is a lead grameen Bank. For the four PRESK taluks, the grameen banks and the commercial banks to which they are affiliated are shown in Table 4-1.

¹⁵ Indian public sector banks include some that were originally private (e.g. Syndicate Bank) but were nationalized in 1969, as well as some whose ownership from the start was public (State Bank of India). In Karnataka three of the banks in the former category – Syndicate, Canara and Corporation Bank – are ones whose corporate culture continues to reflect their private sector origins.

Table 4-1 Grameen Banks by Taluk

Taluk	Grameen Bank/Affiliate
Molakalmuru	Chitradurga Grameen Bank, affiliate of Canara Bank
Gubbi	Kalpatharu Grameen Bank, affiliate of State Bank of Mysore
Doddaballapur	Kalpatharu Grameen Bank, affiliate of State Bank of Mysore
Chintamani	Kolar Grameen Bank, affiliate of Canara Bank

Given the mandates for priority sector lending outlined immediately below, this limited review as well as other S³IDF experience suggests that these grameen banks are favorably included to supporting small pro-poor energy schemes, provided that the transactions can be structured to meet their norms. As discussed below, in most cases this will mean financial participation a third party, such as S³IDF.

4.4 Priority Sector Lending and Being Applicable to All the Investment

Considering all the small-scale projects in Table 4-2 that S³IDF is currently (or in the future will be) helping to bring to fruition, priority sector lending is of overwhelming importance because it is a financing umbrella under which all these investments appear to fit.

All commercial banks face priority sector lending targets that are determined (and periodically revised) by the RBI. The priority sectors include agriculture and small-scale industries both broadly defined, with many sub-sectors and inclusive of both short term lending (e.g. working capital) and long term lending for plant and machinery (e.g. tractors and electricity generators). The priority sectors also encompass numerous other special sectors/activities (e.g. lending to self-help groups and members of scheduled castes). Priority lending targets individuals, groups and formal entities (e.g. small businesses).

There are norms such as an entity's capital that determine whether it can qualify for priority lending. While these norms effectively preclude large corporations operating in agriculture, they are not unduly restrictive in terms of players in these sectors. There are also limits on the size of particular priority sector loans based on the segment under which the loan falls. The maximum loan that can be granted under each segment is different. For some of these segments the maximum loan is as high as Rs. 25 lakhs, about US \$50,000. While the RBI issues guidelines for different classes of banks (see bibliography for examples), broadly speaking the targets are that **40%** of net bank credit (NBC) should be for all priority sector lending and **18%** of NBC should go to agriculture.¹⁶ The banks can meet these targets through direct lending and via their affiliated RRBs or absent achieving these targets by investing in the certain RBI prescribed entities or instruments such as bonds of the Rural Infrastructure Development Fund (RIDF) operated by NABARD.¹⁷

¹⁶ Overtime while the targets for priority sector lending have been stable, the coverage of what is included has expanded. For example financing and distribution of inputs for agriculture and related sectors (e.g. dairy and livestock) can be included as can other activities.

¹⁷ Unlike direct priority lending, which targets private entities, the RIDF funding is largely used to provide finance to public entities for investments serving some rural/agriculture-related purpose such as irrigation.

While nationwide many banks, especially the private and international banks, do not meet the priority lending targets, this shortcoming is reportedly less the case for some public banks and it appears particularly so for the Karnataka based public commercial banks interviewed for this review. Nationwide much of the priority lending is achieved via RRBs. In Karnataka while the RRBs are also very important in meeting the lending and other banking service needs of the priority sectors, unlike elsewhere, their affiliated commercial banks (e.g. Syndicate and Canara bank) reportedly achieve their priority lending targets largely themselves and their affiliated RRBs (Grameen Banks) deepen the pool of priority lending and banking services. And given their location and particular small-scale, this review and the efforts to move some of the projects to financial closure suggest that it is the local Grameen Banks, (sometimes with guidance from the commercial bank with which they are affiliated) that present the best possibilities for possible financing of the investments noted in Table 4-2 and analogous ones that S³IDF will foster.

4.5 Financing Possibilities: Implications Of Project And Borrower Characteristics

While in principle the small-scale projects of concern herein are candidates for financing by local commercial banks and in particular the RRBs/Grameen banks noted in Table 4-1, the work under this TO and prior experience suggests that in the end, bank financing depends on the characteristics of the specific investment transaction and the entities that would be involved (as owners, operators and customers). And reflecting these characteristics, there are the questions of whether the possibility of such financing will happen under the bank's business as usual practice or whether this BAU will need some assistance/modification via partial guarantees or other participation by S³IDF or some other third party.

While it is not feasible to make universally holding comments on these financing possibilities, in light of the characteristics of the investments presented in Table 4-2 and taking note of factors it is feasible to make some observations about the financing possibilities that banks generally consider. Some of the more important of these factors and their implications in terms of the investments of concern are noted below:

- *Location* and commonly whether the potential investment is within the lending territory of the bank or a branch/affiliate office of the bank and also the ease of physical inspections and monitoring. While many commercial banks finance projects located distances from their operations, the smaller the transactions the more likely this is not the case and often other factors (see below) come to bear. The Grameen banks only operate within limited areas and all the projects in Table 4-2 are within the lending territory of one of these banks.
- *Relationships* – whether the potential borrower has an existing relationship with the bank and in particular, a borrowing history. Both the review for this PRESK TO and ongoing experience suggests that the Grameen and other local banks will make a banking relationship (checking and/or savings account) a prerequisite (even if not formally stated) to their considering possible financing support for a particular project. And for some small borrowers that S³IDF has been assisting, this may be their first such banking relationship. In the case of borrowers with banking track records, if the record is positive, this can aid the financing possibility (and the reverse if the track record is poor). But even if the track record is positive, if there is an existing loan, for “collateral poor” borrowers, the bank's norms may preclude a second loan without other support such as a partial guarantee from S³IDF.

- *Scale of the investment* and the associated borrowing and whether this size is within the remit of the banker. This factor is not a problem for the small-scale investments of concern herein; all of them are of a size well within the lending limits of the local Grameen banks.
- *Transactional experience* (to help in risk assessment) in particular with analogous investment projects and in particular with: i) similar technologies and/or ii) the same/similar class of borrower, if not the exact potential borrower. Here transactional experience with same/similar classes of borrowers will exist for all of the possible borrowers that would be involved in the investments noted in Table 4-2. But this is not the case for transaction experience with some (not all) of the technologies involved. And when there is little or no such transaction experience even when other factors such as cash flows are addressed (See below), the bank's risk assessment may require excess collateral or absent such excess collateral than a partial risk guarantee.
- *Collateral*, except for certain special programs, collateral requirements are the norm and commonly not just the collateral represented by the assets of the investment under consideration, but other collateral provided by the potential borrower such that the coverage in collateral well exceeds the loan. And absent the borrower being able to provide such additional collateral which will be the case in many of the investments of focus - partial guarantees or other credit conditioning (e.g. equipment buy back agreements from reputable suppliers) will need to be provided by S³IDF or other third parties.
- *Investment cash flows* presented in project reports showing the costs and revenues (including savings) the investment may generate. These will be necessary but likely not sufficient for a positive lending decision absent the bank being satisfied with regard to other factors. And for the project of concern, this is especially true when there is not sufficient transactional experience to allow the banks to adequately judge these cash flows.
- *Special program considerations* can be an important factor whether these are self-mandated programs such as some Grameen banks have or ones mandated by the RBI such as the priority lending emphasized above. As noted, all of the investments of concern can fit under the priority sector lending in one category or another. And some of the investments may fit other special programs such as ones to facilitate further development of SHGs that already have relationships with the bank. But generally, these special program considerations only ensure that the proposed investment will get serious consideration and not necessarily guarantee financing support, as many if not all of the other factors are part of the bank's calculus.

Recall that the pre-investment work has been completed only for a subset of the investments of concern. Noting this, some comments are in order reflecting these two sets of investments. Consider the first set, those for which pre-investment has been completed and reached the ready-for implementation status. For all but one of those in the ready-for-implementation stage, these investments are currently going forward with participation by various local banks. The documentation used to facilitate this bank participation is presented in Appendix F. In each case this participation was possible with S³IDF also being a financing participant in general via a partial risk guarantee.

While the documentation to reach ready-for-implementation stage will differ with specific financing transactions, the documentation presented in Appendix F does provide a "starting point template" that can be used to one degree or another in other transactions. Obviously, as is apparent from the documentation in Appendix F, when the transactions are very similar in terms of the characteristics presented in Table 4-2, the documentation is also much the same in content.

Considering the second set of investments, if it is assumed that the pre-investment work is completed with positive results for all, then integrating all the discussion above in this note, the review and experience thus far suggests financing support from local banks is possible for all these investments. A point to note here is that the general case will be that this financing will be contingent on partial guarantees or other credit continuing until the body of local bank's pertinent transaction experience is both large and positive in terms of loan repayment which could take considerable time.

When the projects are ones "ready for implementation" or close to it, the financing model mentioned is the one being employed. In other cases the comments are merely judgments of what is likely if further pre-investment work indicates financial viability. The general case is where S³IDF will participate with debt, equity and/or partial guarantees.

Table 4-2: Project Concepts, and Characteristics having Implications for local FI Participation

Project Concept, Technologies and Status	Scale of application and users of energy or energy linked service	Possible and likely Ownership and financing models	Indicative investment costs
1. Chintamani: Hot Water Options at Kaiwara Temple			
<p><i>Technology:</i> solar thermal collection, solar thermal concentration for steam generation or biomass gasifier technology</p> <p><i>Status:</i> Further pre-investment work to be done by others, not adequately pro-poor for S³IDF</p>	<p>Investment enables daily cooking of 150 kilograms of rice/800 litres of lentils.</p> <p><i>Direct users:</i> Temple and its employees; Thousands of temple visitors</p>	<ul style="list-style-type: none"> ▪ Private ownership by the temple authorities. ▪ Likely either all equity financing or equity and bank debt given the temple's assets and cash flow. 	<p>INR 16,00,000/- (\$ 35000) for the thermal concentrator</p>
2. Chintamani: Lighting at Kaiwara Temple			
<p><i>Technology:</i> solar photovoltaic, batteries and related electronics.</p> <p><i>Status:</i> Further pre-investment work to be done by others, not adequately pro-poor for S³IDF</p>	<p>35-40 lights for dining hall. 4-5 streetlights in the temple complex.</p> <p><i>Direct users:</i> the Temple authorities; thousands of temple visitors</p>	<ul style="list-style-type: none"> ▪ Private ownership by the temple authorities. ▪ Likely either all equity financing or equity and bank debt given the temple's assets and cash flow. 	<p>INR 3,25,000 (\$ 7100) with a variation of 5% inclusive of all components</p>
3. Chintamani: Energy-Productive Use Investment for Hongai Seed Processing			
<p><i>Technology:</i> "Hongai plantation" technology, Oil expelling technology</p>	<p>Very large number (hundreds) of direct users in plantation (for collection,</p>	<ul style="list-style-type: none"> ▪ A community based organization model or a federation of SHGs. ▪ Ownership model may 	<p>No indicative figure at this stage.</p>

<p><i>Status:</i> Further pre-investment/feasibility work to be done by S³IDF beyond PRESK timeframe and scope.</p>	<p>dehulling etc.) The Chintamani oil mills will be the buyers of the hongai seeds</p>	<p>have the involvement of local panchayats for the plantations.</p> <ul style="list-style-type: none"> ▪ Will likely require both equity and partial guarantee support from S³IDF or analogous entity to also facilitate local bank participation. 	
<p>4. Chintamani: Energy Efficiency Investments in Silk Reeling Ovens</p>			
<p><i>Technology:</i> biomass stoves and waste heat recovery units (HRU)</p> <p><i>Status:</i> Further pre-investment/feasibility work to be done by S³IDF beyond PRESK timeframe & scope</p>	<p>Silk reeling units may have 2 to 10 ovens (typically 2-5 ovens/unit)</p>	<ul style="list-style-type: none"> ▪ Private ownership by Silk reelers ▪ Entrepreneurs should be able to bundle credit services (or other financing) with oven products. ▪ Likely will require equity or loan to the technology supplier so supplier can offer lease financing and/or short-term credit. 	<p>HRU unit: INR 3500 to 4500/unit (\$76 to \$ 97/unit)</p> <p>TIDE Charka oven: INR 1800 (\$40)/unit</p> <p>TIDE Italian oven: INR 2000 (\$44)/unit</p> <p>(Installed price in Siddlaghatta. Entrepreneurs in Bangalore)</p>
<p>5. Chintamani: Solar Home Systems (SHS) for SHG Members at Iragampalli</p>			
<p><i>Technology:</i> solar photovoltaic lighting, batteries and related electronics.</p> <p><i>Status:</i> under operation</p>	<p>5 House holds in Iragampalli each investing in a single light solar home lighting system.</p>	<p>Ownership by beneficiary households. Bank financing <i>done</i> through a SHG of which the households were members, with partial guarantee from S³IDF.</p>	<p>INR 6000/house hold (\$130/house hold) (for a single light solar home lighting system)</p>
<p>6. Multiple taluks: Water-Energy Nexus Investments for Small Holders.</p>			
<p><i>Technologies:</i> Drip irrigation, high efficiency pumps, water harvesting and potentially decentralized electricity generation.</p> <p><i>Status:</i> Further pre-investment and feasibility work to be done by S³IDF</p>	<p>Each investment would be used by individual small landholder farmers or small groups of landholder farmers (5 to 10) when investment is shareable (e.g.: storage tank)</p>	<ul style="list-style-type: none"> ▪ Ownership model may be individual farmers ▪ Group ownership/CBO ownership with group operations required ▪ Financing likely to be partial guarantee to get banks to participate but additional support 	<p>Under study</p>

beyond PRESK timeframe & scope		(equity) to CBO could be required. <ul style="list-style-type: none"> ▪ Possibility of bridge loan to access subsidy (on drip irrigation). 	
7. Doddaballapur: Gasifier Based Fuel Substitute/Efficiency Improvement in Silk Dyeing			
<i>Technology:</i> Biomass gasification. <i>Status:</i> Further pre-investment and feasibility work to be done by S ³ IDF beyond PRESK timeframe & scope	Silk dyeing units have 1 – 5 baths. Investment of one Gasifier /bath necessary.	<ul style="list-style-type: none"> ▪ Private ownership with Silk dyeing unit “lease toward ownership” model for market penetration. Issues relating to financing of necessary supply chains. ▪ Likely technology supplier will require equity or debt infusion. 	INR 62,000 (\$ 1350)/ gasifier for a 200 litre bath without installation charges INR 70,000 (\$1521) installed charges (in Doddaballapur, entrepreneur in Bangalore)
8. Doddaballapur: Light Points for Hawkers			
<i>Technology:</i> solar photovoltaic lighting, batteries and related electronics. <i>Status:</i> Ready for implementation	Will serve around 35 hawkers in Doddaballapur.	<ul style="list-style-type: none"> ▪ Ownership and operations by a small entrepreneur. ▪ Bank financing with partial guarantee from S³IDF <i>being arranged</i>. 	Investment of the order of INR 200,000 (\$ 4350)
9. Molakalmuru: Energy productive use investment for groundnut processing			
<i>Technology:</i> Oil seed de-shelling/briquetting technology <i>Status:</i> Further pre-investment and feasibility work to be done by S ³ IDF beyond PRESK scope & timeframe.	Can potentially serve a large number of small holder groundnut (and other oil seed) farmers covering the entirety of specific rural areas	<ul style="list-style-type: none"> ▪ Ownership models likely: SHG ownership Small entrepreneur ▪ Likely partial guarantee to facilitate bank loan but equity infusion to SHG or entrepreneur may also be required. 	Under study
10. Molakalmuru: Lighting Options for Weavers’ SHG			
<i>Technology:</i> Grid based un-interrupted power supply (UPS) technology, batteries <i>Status:</i> Nothing yet post pre-feasibility	14 weaver families with unreliable grid access	<ul style="list-style-type: none"> ▪ Possible Ownership models: ▪ SHG ownership of a centralized system ▪ Small entrepreneur ownership of a centralized system ▪ Likely either case will need a partial guarantee. 	Centralized grid based: INR 35,000 (\$ 760)

11. Chintamani: Light points for hawkers			
<p><i>Technology:</i> solar photovoltaic lighting, batteries and related electronics.</p> <p><i>Status:</i> S³IDF has completed the pre-feasibility for this project and the project is currently ready for implementation.</p>	Will serve around 40 hawkers in Chintamani	<ul style="list-style-type: none"> ▪ Ownership by a team of small entrepreneurs. ▪ Bank financing with partial guarantee from S³IDF <i>being arranged.</i> 	Investment of the order of INR 200,000 (\$ 4350)
12. Gubbi: Light points for hawkers			
<p><i>Technology:</i> solar photovoltaic lighting, batteries and related electronics.</p> <p><i>Status:</i> S³IDF has completed the pre-feasibility for this project and the project is currently ready for implementation.</p>	Will serve around 25 hawkers in Gubbi	<ul style="list-style-type: none"> ▪ Ownership by a small entrepreneur ▪ Bank financing with partial guarantee from S³IDF <i>being arranged.</i> 	Investment of the order of INR 125,000 (\$ 2720)
13. Molakalmuru: Light points for hawkers			
<p><i>Technology:</i> solar photovoltaic lighting, batteries and related electronics.</p> <p><i>Status:</i> S³IDF has completed the pre-feasibility for this project and the project is currently ready for implementation.</p>	Will serve around 20 hawkers in Molakalmuru.	<ul style="list-style-type: none"> ▪ Ownership by SHG. ▪ Likely bank financing with a partial guarantee from S³IDF. 	Investment of the order of INR 100,000 (\$ 2713)
14. Molakalmuru: Last Mile Project for a Weavers Colony at NMS Badawane			
<p><i>Technology:</i> electricity transmission and distribution technology / decentralized generation by biomass / biogas / Solar photovoltaics</p> <p><i>Status:</i> Further pre-investment and feasibility work to be done by S³IDF beyond PRESK scope & timeframe.</p>	Currently a colony of around 80 house holds Expected to grow to around 400 households after reliable electricity and water services	<ul style="list-style-type: none"> ▪ Ownership possibilities: CBO owns and manages the investment. BESCOM owns but leases or provides management contract to CBO. ▪ CBO option will likely require equity and partial guarantee of bank loan; BESCOM option may only require working capital loan to CBO. 	To get a BESCOM connection and internal wiring: INR 5000/hh (\$ 108/house hold) plus an investment of INR 7,00,000 (\$ 15217) for grid extension

15. Molakalmuru: Electricity dependent ICT project at Kondlahalli Rural High School			
<p><i>Technology:</i> Information and communication technology with related UPS investments</p> <p><i>Status:</i> Further pre-investment and feasibility work to be done by S³IDF beyond PRESK scope & timeframe.</p>	<p>The school has around 11 teachers and five hundred children</p>	<ul style="list-style-type: none"> ▪ Ownership models possible: Rural high school authorities Public private collaboration ▪ Financing options will depend on how ICT equipment is procured. Likely bank loan will require guarantee or other credit conditioning. 	<p>Under study</p>
16. Molakalmuru: Introducing power driven weaving units for silk weavers at Kondlahalli			
<p><i>Technology:</i> Productivity improvement technology</p> <p><i>Status:</i> Further pre-investment and feasibility work to be done by S³IDF beyond PRESK scope & timeframe.</p>	<p>500 handlooms require mechanized thread rolling services. Investments can be:</p> <ul style="list-style-type: none"> ▪ Retrofit the 500 handlooms ▪ Separate thread rolling unit(s) that provides the necessary service to all the handlooms 	<ul style="list-style-type: none"> ▪ Ownership models: Individual handloom owners can own the “retrofit” investment SHGs can own the thread rolling unit investment. ▪ Likely thread unit can be financed via loan or lease finance if partial guarantee is provided. 	<p>Retrofit option for existing handlooms: INR 1000 (\$22)/ handloom A new centralized thread rolling unit: INR 25000 (\$543) /unit</p>

5.1 Background

S³IDF's collaboration with PRESK began with defining the methodology and criteria to be used. Then, a progression of pre-investment work on innovative small energy infrastructure projects began the process of identifying, developing, and assessing viable projects in the areas of the four pilot taluks of the PRESK Program.

From the outset, the intent was that some, preferably most if not all, of the innovative small energy projects identified and examined and in the progression of pre-investment proven to be viable would also qualify for S³IDF to continue to work to foster the implementation of these projects. For this continuation, the projects must meet S³IDF's pro-poor and pro-environment criteria. With only two exceptions, this has proven to be the case.

The TO target was for at least 10 project concepts in at least two of the PRESK taluks mentioned above. Not only was the target number exceeded but these project concepts included ones in all four of the PRESK taluks. And even after subsequent pre-investment work had culled some projects as not being pro-poor or otherwise unviable, there remained one or more projects in each of the four taluks. As the pre-investment progression moved, in light of the PRESK completion date and the accelerated timeline for the S³IDF collaboration,¹⁸ projects with longer timelines (for movement to implementation) of necessity could not receive priority under the schedule and resources of this Task Order (TO). For most of these projects S³IDF will continue further work, but outside the scope and schedule of the PRESK Pilot Program.

5.2 Progress to Date

During the four months from end-of-May to end-of-September, S³IDF's collaboration with PRESK has achieved:

- Demonstration in the PRESK taluks of S³IDF's innovative and replicable pro-poor approach that identifies and brings to implementation small-scale projects that are viable but not bankable under local bank "business as usual" (BAU) practices. The approach creates linkages so that owner, operators and customers of small-scale infrastructure can access the necessary know-how, technology and financing. And through provision of "gap filling" financing overcomes the BAU constraint to facilitate local bank provision of financing for these projects.
- After modest modification of its criteria and procedures to focus only PRESK compatible small projects, an initial PRESK-S³IDF Portfolio has been created, based on a "Long List" of 16 promising Project Concepts, of which only 2 were passed on to other entities to pursue because they fell outside of the Fund's pro-poor mandate and 1 was set aside (probably only temporarily) when, after extensive pre-feasibility work, the project beneficiaries decided that grid-sourced power supply had become reliable enough to meet their needs;

¹⁸ Although the original completion date for work under the PRESK Task Order was to be completed by the end of November, in mid-June, PRESK staff informed the Fund that the September 30th end-date for the PRESK Pilot Program should also be considered the end-date for PRESK's work on innovative financing.

- Cognizant of the limited schedule of the collaboration, the initial “Long List” of necessity included numerous projects with potential short timelines (2-6 months) for the period of concept to ready for implementation stage. From the initial ‘Long List’ 5 projects have been carried through to In-Implementation or Ready-for-Implementation stage¹⁹; these comprise an initial installation of nearly 140 solar powered light points that will benefit the businesses of street hawkers and a women’s self-help group, mobilizing their investment of some INR 650,000 (US\$14,000) and engaging 5 different local branch banks in innovative (non-Business As Usual) financing;
- Substantial progress has been made in exploring viable business solutions to enabling poor farmers to gain value-added in agricultural processing of groundnut and Hongai nut, and in developing projects/programs for improving the efficiency and reducing the quantity of water-energy use in irrigation and groundwater pumping;
- Substantial progress has been made in strengthening the supply chain for introducing improved ovens and heat recovery to the SMEs that comprise the silk reeling and dyeing industries; and
- Preliminary work has been done for establishing a possible community-based electricity service association that could be a model for participatory rural energy services in Karnataka.
- A set of relationships between the Fund and various local market players – equipment suppliers, NGOs, BESCO and government officials and perhaps most importantly, local banks, these relationships will (already are) lead to additions to the small projects the Fund is fostering in the PRESK taluks and/or immediately adjacent areas in the same districts.²⁰ And at the same time the experiences in the PRESK- S³IDF collaboration are easing the replication of the S³IDF approach application elsewhere in Karnataka as projects fostered under the PRESK-S³IDF collaboration are used as examples in building relationships with other market players.

5.3 Future Work

In a strategic sense, the principal output of this collaboration may have been the set of relationships, knowledge, and practical local experience gained by S³IDF. The Fund has become “rooted” in both the geographic region and the philosophical approach of PRESK. As it builds on work in Karnataka – newly its “home state” – in the coming years, the S³IDF-PRESK Portfolio of projects to be developed and financed may be expected to grow and expand. Most if not all of the project concepts first identified and assessed under this PRESK Task Order may in time be brought to Implementation. S³IDF will also continue to monitor and report on its progress. Reports on the PRESK Portfolio and related work will be posted on the S³IDF website (www.s3idf.org) and shared through professional conferences and other media.

By building the portfolio, and continuing to network and publicize its work, the Fund can achieve several sustainability objectives. First, it is the best way to attract new project

¹⁹ At the time of the completion of the formal PRESK- S³IDF collaboration, one of these five projects had already gone through to financial closure (FC); that is the co-financing arrangements with a local bank had been finalized. In the case of this project the subsequent steps of physical implementation (equipment installation) had been completed and the project was in operation. Since the end of the formal collaboration, another of these projects has also passed through these steps and is in operations. And as of the time of the writing of this report (early December), another project is so close to FC that the parties have begun equipment procurement. Of the two remaining, one is close to FC and last of the five is still in the process of bank negotiations.

²⁰ In recent months (since completion of the formal collaboration) S³IDF has added 8 projects to the pipeline list of projects it is working on in the districts in which the PRESK S³IDF collaboration focused.

opportunities. Second, doing so helps to leverage or catalyze additional and new resources from donors and investors that can be used to expand the Portfolio further. And finally, the work must be publicized and shared in order to encourage and provide lessons-learned to others who are willing to undertake complementary investment and development programs on their own.

In September, as the USAID support to the PRESK Pilot Program was finishing, the RDPR announced its intention to “take PRESK statewide”. PRESK’s strategy and program was to be transferred into a newly formed PRESK Cell within the Mahatma Gandhi Institute for Rural Energy Development (MGIRED), which has recently been reconstituted as an independent society. The MGIPC will hopefully continue PRESK’s efforts to address issues of rural energy services, groundwater management, and rural development. S³IDF looks forward to being able to collaborate further and support the MGIPC in continuing future PRESK work.

Through PRESK and similar projects, S³IDF wants to prove the validity of its business approach providing socially and economically disadvantaged communities with services they need to and create cost-savings, employment, and other benefits of development.

1.1 Overview of Task ²¹

The Consultant will identify and undertake pre-investment activities for innovative small energy infrastructure projects in the rural areas of the four pilot taluks of the Participatory Rural Energy Services for Karnataka (PRESK) Program.

The Subcontractor's first task will be to establish selection criteria, based on its own experience and operating principles. Then, applying these criteria, the Subcontractor will survey, assess, and select candidate project activities, and local partners for implementing them. This process should culminate, over the course of 3-5 months, in preparation of a shortlist of several selected pro-poor pro-environment small projects that the Subcontractor with its project-specific partners would then take forward to implementation.

The four PRESK pilot project taluks are: Taluk Doddeballapur, Bangalore Rural District; Taluk Chintamani, Kolar District; Taluk Monakalmooru, Chitradurga District; and Taluk Gubbi, Tumkur District.

Small projects here mean ones with investment costs under USD 100,000 and with emphasis on those below USD 50,000. Additional project opportunities may be identified and given sufficient pre-investment efforts so that they may warrant further steps by others such as the Bangalore Electric Services Company (BESCOM) or with gram panchayats (GPs) but which do not fit fully within the specific criteria of this assignment (e.g. not sufficiently pro-poor).

1.2 Deliverables

- Preparation and submission of a statement of methodology and criteria for identifying and selecting candidate project opportunities.
- Preparation and submission of a list and brief description of project concepts for at least 10 small scale project opportunities identified in at least 2 of the 4 taluks. (While the Subcontractor will aim to identify at least 1 such opportunity in each of the four taluks, it is understood that the final outcome will depend on local circumstances). These are projects sufficiently conceived and scoped (including possible partnerships) to be worth undertaking further pre-investment work
- Preparation and submission of documents for technical and financial pre-investment work to the pre-feasibility level of at least 5 projects from the list presented in Deliverable #2. Again, this shortlist should include activities from at least 2 of the 4 taluks.
- Further work and preparation of documents, covering technical, financial and institutional organization aspects sufficient to move at least 2 of the projects from the shortlist of Deliverable #3 to a stage of ready-for-implementation. This will include preparation of Memorandum of Understandings (MoU) or Letters of Agreement (LoAs) with the project-

²¹ From Nexant, Inc. Task Order to Small-Scale Sustainable Infrastructure Development Fund, by mutual agreement on May 25, 2004.

specific partners (e.g. equipment suppliers, project owner/operators). The Subcontractor should seek to engage local financial institutions (FIs) in the financing of the projects, either under “business as usual” (BAU) practices or through tapping of risk guarantees or other innovative financing arrangements.

- A brief written report (probably of 4-10 pages) describing local Financial Institutions (FIs) and/or regional/national FIs present and operating in the area of the 4 taluks. This report will include an initial assessment of possibilities for these FIs to participate in financing such projects as covered by the deliverables above- both under BAU and when complemented by innovative financing. To the extent feasible this report will also assess possibilities for participation by these FIs participation in larger projects that might be part of future reform scenarios in Karnataka.

Table 1-1 Project Timeline

May 25, 2004	Task Order signed between Nexant and S ³ IDF, work begins
June 2004	Deliverable No. 1 submitted
June 19, 2004	S ³ IDF urged by Nexant to complete all deliverables by September 30th in coordination with completion of PRESK Pilot Program
August 3, 2004	Deliverable No. 2 submitted
September 7, 2004	Deliverable No. 3 submitted
September 9, 2004	Deliverable No. 4 submitted
September 22, 2004	State Level Monitoring Committee Meeting, S ³ IDF participation and presentation
September 28, 2004	Deliverable No. 5 submitted
September 30, 2004	Completion of PRESK Pilot Program
post-September 30	S3IDF continues work in the PRESK taluks on its own and other resources

- “Banks achieve target in priority lending” (July 7, 2004) in THE HINDU.
- “Banks exceed target in priority sector lending” (April 9, 2004) in Deccan Herald.
- C.P.Chandrasekhar, Jayati Ghosh. (July 9, 2004) “Bank reform and the rural sector” in Business Line, financial daily from THE HINDU group of publications.
- “FAQs on banking matters” in www.indiaonline.com.
- Ashish Gupta. “Time for Change: The Collapse of Global Trust Bank is a rude reminder of how fragile India’s banking system really is and of the urgent need to do something about it”. (August 29, 2004) in Business Today.
- “Highlights of Monetary Policy 2004” in www.sify.com.
- Jagan Mohan V. (2004) “Bridging the banking divide” in www.indiatogether.org.
- Ashutosh Narkar. (2004) “Agri lending, not as bad as it seems” in www.indiaonline.com.
- “Panel for 40% priority lending by banks” (May 26, 2004) in www.rediff.com.
- Yassir A Pitalwala. “Agri lending is profitable for banks” (July 17, 2004) in www.mid-day.com.
- “Priority Loans- new private banks get 2-3 years time” in www.namasthenri.com/banks
- “Priority sector credit” from Handbook of Banking Information (18th Edition).
- “Priority sector lending up 7 pc at Rs 22,466 crore in Karnataka” (April 9, 2004) in Business Line, Financial Daily from THE HINDU group of publications
- “RBI Move set to hike Farm Credit: Rajnath” (May 22, 2004) in the Financial Express.
- Reserve Bank of India (2004). Master Circular on Priority Sector Lending (updated up to 30 June, 2004).
- Reserve Bank of India (2004). Master Circular on lending to Priority Sector. RBI/2004-05/54.
- Reserve Bank of India (2004). Master Circular “Credit facilities to Scheduled Castes and Scheduled Tribes”. RBI/2004-2005/132.
- Reserve Bank of India (2004). Master Circular “Priority Sector Lending –Special Programmes: Swarna Jayanti Shahari Rozgar Yojana (SJSRY)”. RBI 2004-05/164.
- “Rural Infrastructure Development Fund (RIDF) – Genesis” in www.nabard.org.
- “Rural Infrastructure Development Fund (RIDF) IX – Approach Paper” in www.nabard.org.
- “Targets for priority sector lending need review: RBI panel”. (May 27, 2004) in the Business Line, financial Daily from THE HINDU group of publications.

Project Concepts

1. Chintamani: Hot Water Options at Kaiwara Temple
2. Chintamani: Lighting at Kaiwara Temple
3. Chintamani: Energy-Productive Use Investment for Hongai Seed Processing
4. Chintamani: Energy Efficiency Investments in Silk Reeling Ovens
5. Chintamani: Solar Home Systems for SHG members at Iragampalli
6. Multiple taluks: Water-Energy Nexus Investments for Small Holders
7. Doddaballapur: Gasifier Based Fuel Substitute/Efficiency Improvement in Silk Dyeing
8. Doddaballapur: Light Points for Hawkers
9. Molakalmuru: Energy-Productive Use Investment for Groundnut Processing
10. Molakalmuru: Lighting Options for Weavers' SHG
11. Chintamani: Light Points for Hawkers
12. Gubbi: Light Points for Hawkers
13. Molakalmuru: Light Points for Hawkers
14. Molakalmuru: Last Mile Electricity Project for a weavers' colony at NMS Badawane
15. Molakalmuru: Energy Linked ICT Project at Kondlahally Rural High School
16. Molakalmuru: Energy Productive use for Improved Silk Weaving Units

The first thirteen project concepts were developed during the initial stage of seeking promising project opportunities. The last three (Nos. 14-16) were identified and vetted as promising opportunities during the process of pre-feasibility assessment of the original set of project concepts. They are included together here with the others as individual concept notes.

In accord with S³IDF's usual practice, each project concept that is considered promising to be on its pipeline list for active pre-investment development and analysis is given one of four "timeline labels," to indicate its approximate gestation period to ready-for-implementation. Currently, these label categories are:

- **Short Timeline (possible within a few months)/Straight Forward:** S³IDF has previously taken similar projects into implementation; no complexities or long gestation issues; technology/equipment partners have been worked with before and are willing to supply and backstop at the particular site.
- **Medium Timeline (many months)/Relatively Straight Forward:** S³IDF has previously taken similar projects into implementation; there are not too many complexities or long gestation issues; technology know-how partners even if not previously worked with are willing to supply and backstop at the particular site.
- **Long Timeline (could be a year, even more)/But Doable:** S³IDF has little or no direct experience to implementation yet; there are some complexities and/or long gestation issues; technology know-how partners even if not previously worked with are willing to supply and backstop at the particular site.
- **Long Timeline (could be a year, even more)/And Complex & Questionable:** S³IDF has no direct experience yet; but founders have some experience; there are multiple complexities

or long gestation issues; there are questions whether candidate technology and/or know-how partners are willing to supply and backstop at the particular site or without a bundle of projects.

1) **Project Concept No. 1: - Chintamani: Hot Water Options at Kaiwara Temple**

Project Description/Concept

The project concept is an energy efficiency investment to reduce the fuel required for large-scale food preparation at a temple – Kaiwara temple, Chintamani. The concept involves reducing or replacing fuel wood and kerosene in the boiler for generating steam for cooking at the temple.

The Kaiwara temple in Chintamani is an important pilgrimage center in South India. On average, the temple serves food to 1,000 devotees per day for breakfast, lunch, and dinner. On festive occasions this might increase to around 10,000 devotees per day. Much of the temple's cooking is done using steam cooking technology.

There are three approaches for the reduction in fuel wood and kerosene in the boilers.

- i. Using a flat plate solar water heater to pre-heat the water entering the boiler.
- ii. Using solar concentrators to generate the steam.
- iii. Using gasifiers to increase the efficiency of fuel wood usage, the combustible gas generated from the gasifier will be used as fuel for the boiler to generate the steam.

The solar water heater is usually a flat metal box with pipes inside, and is referred to as solar thermal collector. These pipes are attached to a metal sheet that is painted black to facilitate absorption of the sun's heat. The top of the box is covered with a sheet of glass, and the box is insulated to reduce heat losses. Like most water heaters, solar water heaters store the water to be heated in a tank. But instead of heating the water with an electric element or a gas flame, water is heated as it flows through a solar collector panel, where the sun's heat is captured and stored.

Solar concentrators are parabolic reflectors that concentrate sun's rays to a single point/line where fluid is flowing and desired temperature can be obtained up to 150°C to 170°C.

A gasifier is a compact machine that aids in converting biomass into a combustible gas called producer gas that, in turn, is a combination of hydrogen, carbon monoxide, methane and other hydrocarbons. Gasifiers require a regular supply of biomass feedstock (of type, size and dryness suitable for the gasifiers). The temple already has supply and storage mechanisms for fuel wood for the boilers. However the temple's wood would need to be cut to a specific size and dried to be suitable for the gasifiers.

These investments can have significant financial and environmental benefits, which in turn can have social and health benefits as the workplace environment improves.

Candidate Investment Site

The location of the project will be the Kaiwara temple in Chintamani Taluk, Kolar District, Karnataka. The Kaiwara temple presently uses fuel wood and kerosene to generate the steam for all its cooking needs and has infrastructure for it as well. The temple is spread over two acres of land and as noted above provides food to about a 1,000 people everyday. This requires cooking on

a massive scale of about 150 kg of rice and 800 litres of lentils. The temple has shown interest in considering alternatives.

In principle the concept is replicable in other areas where a temple, institution or organization uses steam cooking and the basic infrastructure for the same already exists. In Karnataka and other parts of India, many of the bigger temples serve lunch and dinner to its devotees and most of the temples utilize steam-cooking technology. The same practice is observed in many of the residential schools in Southern India.

Know-how and Technology Partners and Supply Chain Issues

Possible technology partners have been identified for all the three options mentioned above: SELCO Solar Light Pvt. Ltd., with its registered office in Bangalore, Karnataka is the local flat plate solar water heater supplier. SELCO has extensive experience in sales and service of various heating, lighting, and other PV based systems in Karnataka and has an established working relationship with various financial institutions. SELCO has a wide network and has built a solid rural power delivery infrastructure in Karnataka and adjacent states in Southern India. SELCO's branch in Kolar will be responsible for the installation, training, and post-implementation complications if any.

For Solar Concentrators, SELCO is partnering with Unisun Technologies Ltd., which has a registered office in Bangalore, Karnataka. Unisun manufactures steam generators using solar energy. The manufacturing unit is located in Gujarat. Unisun is also involved in water purification systems. There are reportedly other suppliers of Concentrators in India and the process of identifying them is ongoing.

For gasifier technology, Vijay Engineering, based in Peenya Industrial area, Bangalore is a licensee of the gasifier developed by TERI/SDC²². Vijay Engineering has experience with manufacturing gasifiers for different applications and the supply of biomass for the same. Vijay Engineering provides six months free maintenance and technical know-how to start and operate a unit for supplying fuel to gasifier units. Ankur Scientific Energy Technologies based in Vadodara, Gujarat are also involved in manufacturing of gasifiers for thermal application as well as power generation.

Other Partners Stakeholders and Beneficiaries and Related Issues

The temple is expected to be capable of financing the investment. While the devotees are indirect beneficiaries, the temple authorities are the prime beneficiaries of this project. Since this project does not satisfy S³IDF's pro-poor criteria, it will be transferred to the technology suppliers mentioned above to do the feasibility.

Implementation and Other Issues

Depending on the technical option chosen, at this concept phase, the working assumption is that the equipment/know-how suppliers (e.g. SELCO/ Unisun/ Vijay Engineering/ Ankur Scientific Energy Technologies) will be responsible for the installation and maintenance (for a specified time) of the system. The supplier will also provide the necessary training to operate and maintain the equipment. Based on the decision made by the temple administration to go forward with one of

²² See Project Concepts #4 and #7 about TERI/SDC work on energy efficiency in the silk industry.

the options outlined above (after further study), this is a project concept without significant complications and hence could have a relatively short timeline to implementation. This is a type II Project Timeline (many months)/Relatively Straight Forward. Further pre-investment work should continue.

2) Project Concept Number 2: - Chintamani – Lighting at Kaiwara Temple

Project Description/Concept

This project is a special case of solar lighting projects that is envisioned to provide more reliable and environmentally sustainable supply for a lighting need critical to a prominent religious institution in Chintamani. To a lesser extent it will also contribute to electricity demand management in a specific rural area. The Kaiwara temple is located in the rural areas of Chintamani taluk and is an important pilgrimage center in Southern India. The temple attracts pilgrims from all over South India with an average of around 1,000 pilgrims being served breakfast, lunch and dinner on a daily basis. On festive occasions the number of pilgrims increases to around 10,000 pilgrims a day. The temple is currently grid connected, but since the power supply is erratic, the temple uses diesel generators as a back up during power shutdown.

The project constitutes provision of lighting powered by solar photovoltaic for two purposes:

- a) Lighting for the kitchen, guest dining room and community-dining hall where pilgrims are served free meals.
- b) Street lighting within the temple complex.

The lighting requirements for the kitchen, guest dining room and community-dining hall are expected to be 35 – 40 nine-watt lights. Most of the lighting is required for the community-dining hall. The street lighting requirement is expected to be around four 11-watt lights that will run from dusk to dawn. The temple authorities have shown interest in considering alternative ways to deal with the unreliable power supply.

Such a project contributes to energy demand management in two ways – it ensures and promotes use of high efficiency end use devices (in this case lighting) and results in the reduction of an equivalent electricity demand on the rural electricity grids, thus freeing up electricity in the rural areas for more vital end uses, such as irrigation.

Candidate Investment Site

The location of the project will be the Kaiwara temple in Chintamani Taluk, Kolar District, Karnataka. The temple can reduce its operating expenses for ongoing electricity charges and set an example to other institutions in energy independence.

In principle the concept is replicable in other areas where a temple, institution or organization has relatively large lighting loads and the will to make such investments and the ability to mobilize the financing for such projects exists. Two temples in Karnataka have already utilized solar power for lighting in the community dining halls.

Know-how and Technology Partners and Supply Chain Issues

SELCO Solar Light Pvt. Ltd., with its registered office in Bangalore, Karnataka will be the local solar photovoltaic supplier. SELCO has extensive experience in sales and service of various

heating, lighting and other PV based systems in Karnataka and has an established working relationship with various financial institutions. SELCO has a wide network and has built a solid rural power delivery infrastructure in Karnataka and adjacent states in Southern India. SELCO's branch in Kolar will be responsible for the installation, training and post-implementation complications if any.

Other Partners Stakeholders and Beneficiaries and Related Issues

The temple is expected to be capable of financing the investment. While the devotees are indirect beneficiaries, the temple's operating organization is the prime beneficiary of this project. This will also serve to showcase solar lighting in particular and solar technology in general to the thousands of visitors to the temple. Although many of the temple's visitors are poor people, they are not the direct or major beneficiaries. Hence, this project does not satisfy S³IDF's pro-poor criteria and will be transferred to SELCO to take forward the project to feasibility and implementation.

Implementation and Other Issues

SELCO Solar light Pvt. Ltd. will be responsible for the installation and maintenance (for a specified time) of the system. The supplier will also provide the necessary training to operate the equipment. Assuming that the temple authorities agree to the project's implementation (discussions are ongoing), this will be a project concept without complications and hence should have a relatively short timeline to implementation. This is a type II Project Timeline (many months)/Relatively Straight Forward. Further pre-investment work should continue.

3) Project Concept Number 3: - Chintamani: Energy-Productive Use Investment for Hongai Seed Processing

Project Description/Concept

This project concept concentrates on the supply chain for Hongai seed. Hongai seed is an important product from current agro-forestry practice in Chintamani and other parts of Karnataka, such as Tumkur, especially in terms of the role of the poor. The objective of the project is to introduce and/or upgrade energy supply and related investments as well as related organizational changes, such that poor people share in the productivity increases and value-added capture in the Hongai seed supply chain. The most basic of such energy related investments are mechanized or better tools for manual dehulling. There is a host of more extensive investment options, such as oil extraction units and also potentially extending to Hongai seed production.

The Chintamani taluk currently has at least five Hongai oil-extracting units. Poor villagers currently collect, manually dehull and in some instances deliver the Hongai seeds to the oil extracting units, thus forming a critical step in the supply-chain of Hongai seeds²³. There are dehulling and/or oil extraction investments that potentially can be made with appropriate organizational structures, so that the poor capture greater portions of the post harvest value of Hongai; supply augmentation is a distinct option. This might be done by considering wastelands for Hongai cultivation, or for poor farmers to take up additional income generation by means of Hongai cultivation as an additional crop.

²³ Reportedly, the supply chain may differ slightly. For example, in some instances middlemen/traders buy the de-hulled seed and transport and sell it to the extraction units.

The Hongai (*Pongamia pinnata*) grows abundantly and well, compared with other trees in the local dry conditions; the tree itself is nitrogen fixing and so will improve the soil where it grows. It provides a seasonal harvest in the dry months of March to May. Since Hongai is rain-fed/dry land crop it is a good fit in the semi-arid regions of Karnataka, where difficulty in accessing deep underground water has resulted in poor harvests. The seeds/nuts of the Hongai tree are its most useful product. The leaves are not useable as fodder for cattle, though the rich evergreen foliage can be used as green manure. The non-edible oil extracted from them has various high-value uses. Amongst these are, its use as a fuel, in making soaps, for lubrication in machines, and in medicinal blends. Hongai has high oil yield compared with some other seeds. The oil can be used as a substitute for diesel to power generators to produce electricity or for other applications. Diesel engines run well on Hongai oil and in a sustainable system modality there are considerable environmental benefits in terms of both conventional and GHG emissions, the latter because the carbon dioxide released is also sequestered from the atmosphere itself²⁴.

A drawback of the Hongai seed pressing is that the cake is non-edible and so is unsuitable for the higher-value use (animal feed) of other oil-seed residues. This is not to suggest the cake has no value, it can be used for composting and other applications (e.g. feedstock for biogas plants and as solid fuel).

Investment and Business Model Options

Building on existing commercial practice, one can envision various levels of energy-linked investments and pro-poor organizational models that warrant pre-feasibility analysis. Casual self-employed people in the villages that include children, women, elderly men and women and other unemployed people currently bring in the Hongai seeds to the oil mills. Manual dehulling is done by them and sold to the oil extraction units; Use of dehullers to replace manual dehulling could increase their productivity. These people, especially the women could be organized into Self Help Groups (SHGs) to streamline the supply of Hongai seeds. Existing SHGs could also be encouraged to take up Hongai cultivation on village wastelands, either for supply of seeds to existing oil mills in the area, or to start their own oil extraction unit. The village wasteland could be leased from the Panchayat and this micro-enterprise could generate employment as well. A non-profit organization could take up the project initially and then the SHGs could take over the operations of the same. Investment and associated organizational intervention that warrants consideration includes but is not necessarily limited to the following:

- a. Enable (for example, through loans) investment in mechanized dehullers/better tools for dehulling to enhance dehulling productivity.
- b. Oil Extraction unit investments (and power supply if off grid): The investment could be owned/operated by a SHG/NGO that also organizes the supply chain for this oil extraction unit. A more expansive intervention option would be for the NGOs/SHGs to undertake cultivation of Hongai on wasteland lands.
- c. Investments for self-generation (for the oil extraction unit's power) using Hongai seed oil as a fuel replacement for diesel engines (for shaft power or local electricity generation); a

²⁴ The use of hongai oil as an engine fuel can be characterized as pre-commercial. There has been various works to demonstrate the technical feasibility in various scales of engines and end-use applications ranging from diesel pump-sets to large engine transport applications. For example, Bangalore Transport Corporation has started running five buses on hongai and reportedly Southern Railways has a demonstration project for use of hongai oil. There are reportedly some continuing use in small engines and even some entrepreneurs promoting its use as a substitute for diesel. But the research for this concept note has not identified any significant commercial chains – even very local ones – of hongai as an engine fuel and the complementary know-how and technology.

more expansive intervention option would be other Hongai oil based energy supply investments.

- d. While perhaps not directly energy-linked, once the intervention included oil extraction, logical linked business options would be marketing linkages for the oil itself (including to diesel engine owners) or producing goods (such as soaps) that utilize Hongai oil as an ingredient, as well as the marketing linkages for the same.

Candidate Investment Site

The project concept is potentially widely applicable in a number of districts in semi arid zones of Karnataka, especially in at least three of the four pilot taluks of the PRESK program - Chintamani, Gubbi and Molakalmuru Taluk. The focus will be on a project in one or all the three taluks. In Tumkur District, the Zilla panchayat is presently promoting Hongai cultivation among farmers, SHGs and schools. In the course of the pre-feasibility study and in conjunction with possible collaborators specific sites will be considered.

Know-how and Technology Partners and Supply Chain Issues

Specific technology suppliers of dehullers, oil-extractions machines (and their power units), and other equipment that would encompass the investment basis for possible micro-enterprises have to be identified. But as there is market presence of these technologies, this identification should be relatively straightforward (and is already underway).

Other Partners Stakeholders and Beneficiaries and Related Issues

Possible other partners may emerge from ongoing contacts that are being pursued. But at this concept point it warrants noting that there are Chintamani based entities with whom S³IDF is in dialogue about various project concepts and who we can envision being possible partners. At this concept stage, the most pertinent are three local financial institutions: local branches of Canara Bank, which has partnered with S³IDF on other projects; the Kolar Grameen Bank (KoGB) and Chitradurga Grameen Bank (CGB) with both of whom we are in pre-investment dialogue about various projects in their districts but not necessarily in taluks under the PRESK program.

The probable beneficiaries would be the women (and others) operating the investments and the associated micro enterprise from the increased income and their families. It is now well known that providing economic independence to the women provides a better opportunity for improving the entire family's standard of living in terms of health, nutrition, education and savings.

Implementation and Other Issues

This is a complex project concept that will have a long timeline to implementation. The necessary pre-investment study must consider the options outlined above and all this must be done against a thorough understanding (to be developed) of such matters as the exact cost benefit in forming the micro-enterprise for cultivating Hongai, dehulling and extracting oil versus, just the streamlining of seed collection and dehulling. And there are other issues, such as finding extended market for the extra oil produced, as well as any goods that use the Hongai oil as an ingredient. This is a type III Project –“Long Timeline (could be a year, even more)/But Doable”. Further pre-investment work will continue both during and beyond this Task Order.

4) Project Concept Number 4: - Chintamani: Energy Efficiency Investments in Silk Reeling Ovens

Project Description/Concept

The objective of the project is to accelerate the very nascent market penetration of investments in energy efficiency technology in the silk reeling industry; individual investments that while quite small in costs (more below) can have significant financial and environmental benefits. Both the financial and environmental benefits can have social and health benefits as the workplace surroundings improve and viability of these labor-intensive small firms improves. As envisioned at this conceptual phase the project would not be one of just supporting a few such investments, but rather a program that would lead to overcoming the constraints to widespread and numerous such investments.

This reeling industry constitutes the initial steps of processing the raw mulberry silk after the cocoons have been graded and sold. Reeling is the step where the silk thread is put on a reel and hence the name is given to these entities²⁵. In Karnataka, this industry is made up almost exclusively of small-scale firms whose processes are very energy intensive – fuel (various biomass) for ovens for stifling (the silkworm in the cocoon), cocoon cooking (to dissolve the gum and allow the thread end to be located) and for silk drying. Typically each reeling enterprise has multiple ovens- in the range of 2-10 but with the lower end of the range (2-5) most common. In addition, the machines for reeling of the silk thread are electric motor driven (reportedly some reeling entities use diesel engines). Based on both production value and employment, the industry is very important in certain districts of Karnataka, which produces more than half of India's mulberry based silk²⁶. The estimates of the number of such small-scale silk reeling firms are in the many thousands.

There are few types of “cooking” ovens²⁷ (the “Italian” and the “Charka” types) employed in the industry; each industrial firm contains multiple such ovens. Both oven types are relatively primitive of simple construction (and low investment costs). Both are operated in batch mode and are characterized by low thermal efficiencies due to heat loss both from radiation (from the oven) and loss through the chimney. These ovens also result in a hot working environment in the reeling enterprises.

There are two possible technology interventions with respect to energy efficiency improvements in silk reeling ovens.

- Improved ovens with higher thermal efficiencies
- Heat Recovery Units (HRU) retrofitted to existing ovens

Improved ovens would increase the thermal efficiency by ensuring better heat transfer to the cooking vessel by circulating the hot gases around the cooking vessel and by reducing heat losses from the external walls of the oven. Other benefits from the improved oven would be uniform water temperature throughout the operation and a smokeless environment.

²⁵ Reeling units generally consist of two tightly connected processes where cocoons are first boiled in hot water in an oven and then the open silk strand from the cocoon is fixed to the reeling.

²⁶ The industry has a significant presence in South-east Karnataka with the main belt in most parts of Kolar district, Ramnagaram, Kanakapura, parts of Bangalore, Doddaballapur and parts of Chitradurga (much less).

²⁷ The types are generally classified as Cottage and Charka ovens with the former further subdivided into the so-called Conventional and Italian versions.

In the case of the HRU unit, the waste heat from the chimney is captured and used to pre-heat the cooking water (and/or dry the silk), thus increasing the thermal efficiency. Pre-heating the water also decreases the processing time per batch. Improved thermal efficiency and decrease in processing time increases the overall oven (and firm) productivity. Waste heat recovery would also improve the firms' working environment.

With the above possible improvements in mind, and in the context of a broader focus on the silk industry (see also Project Concept Number 7) the India Office of the Swiss Agency for Development Cooperation (SDC) sponsored the design, development, demonstration of the above two technologies. The design, development and demonstration of the improved oven was carried out by TIDE (Technology Informatics Design Endeavor) and that of the HRU unit was carried out by TERI (Tata Energy Research Institute).

To commercialize the oven, TIDE has designed the oven using pre-fabricated concrete moulds and components. TIDE has introduced the oven in the market through a few suppliers to whom it has provided the required designs. The cost of the TIDE-improved Charka oven is INR 1800. On the other hand, TERI has developed the HRU technology and licensed it to a small supplier for commercialization. The cost of a HRU unit is between INR 3,500 to 4,500.

Reported estimates when the TIDE Charka oven is employed suggest significant financial benefits from fuel savings (30+ percent fuel saving) resulting in very short payback time (months) for the improved ovens. Around 2500 such improved ovens are in use. Most of these sales have been through subsidies. The commercialization of improved TIDE ovens for the Cottage class of ovens is in very nascent stage with 75 numbers of improved TIDE "Italian" ovens in use.

Reported estimates when the HRU is employed to capture the waste heat to pre-heat the "cooking" water suggest significant financial benefits resulting from: i) fuel savings (20+ percent fuel saving) and ii) reduced processing time (and hence higher productivity), resulting in very short payback time (months) for the HRU investments. Despite these results, this is a very nascent market for HRU market penetration; it is very limited in both the numbers of installations and the geographic market area (Only Sidlaghatta taluk and only for "Italian" ovens).

Both the technologies have yet to fully address the many challenges of a broader and deeper market development. These challenges appear to be related to various institutional (including supply chain), financing and financial risk management issues. The financial risk management issues are pertinent from both the supplier and customer's perspectives. The customer's perspectives appear to be strongly influenced by the current poor market environment for reeled silk and the history of subsidies that have been provided to the reeling industry.

Further examination of these issues/challenges will be part of the proposed project that will first examine the tradeoffs between the HRU and improved ovens to select the better technology option. The next step would be to identify/evaluate alternative business models and implementation strategies to address the challenges mentioned above. These business models could then be tested as part of a pilot program that encompass a number of investment implementations²⁸ in order to try to develop (in a third step) a larger program to jumpstart an accelerated market penetration.

²⁸ There is also an issue of whether to broaden the scope of possible energy savings and/or productivity improving investments even within a certain segment of the reeling industry as reportedly there has been work done on a commercial basis focused on electricity efficiency improvements in the reeling process.

Candidate Investment Site

The project concept is potentially widely applicable in a number of districts in South-eastern Karnataka where large numbers of reeling enterprises are found. Given that there are a large numbers of such enterprises in at least two of the four pilot taluks of the PRESK Program-Chintamani and Doddaballapur, the focus will be on a project in one or both of these taluks. The possibilities for a program in multiple taluks including others under the PRESK Program should be considered, as there tends to be some local concentration of types of ovens. This concentration of units with particular oven types has implications for how to address supply chain issues (see below) with a focus on reeling enterprises using a particular oven type. At this concept stage, focus on specific reeling enterprises is of lesser concern than other matters as outlined below.

Know-how and Technology Partners and Supply Chain Issues

At this concept point in the Task Order work, the following comments on these matters are warranted:

TIDE improved Charka oven:

- The current Charka oven developed by TIDE/SDC is designed to be constructed using prefabricated concrete moulds and prefabricated components.
- The oven is being supplied and installed by a few suppliers developed by TIDE.

TERI HRU unit:

- The current HRU that TERI/SDC developed is a relatively simple tube-in-tube heat exchanger that appears amenable to fabrication by numerous metal-mechanical enterprises that routinely works with stainless steel.
- This HRU is currently being supplied (installed) on a commercial basis by a new small enterprise based in Sidlaghatta taluk, Kolar District; the enterprise has links to a professional who currently works for the Department of Sericulture; the supplier has the basic HRU fabricated in small batches by a metal-mechanical workshop. Most likely large batch production could lower the HRU fabrication costs.
- The aforementioned supplier has no physical or representative supply chains into other taluks, not to mention other districts and currently has no plans to attempt to expand his marketing footprint beyond Sidlaghatta taluk.

Other Pertinent Partners Stakeholders and Beneficiaries and Related Issues

At this concept point two obvious candidates for partnering in one aspect or another of the possible project warrant mentioning:

- The Grameen banks in the districts in which the two taluks mentioned above lie (Kolar Grameen Bank and Kalapatharu Grameen Bank). The local branches of Canara Bank in these districts are relevant candidates for partnering in conjunction both with this TO and other ongoing S³IDF activities. We have been in dialogue with both Grameen Banks and one of the local branches of Canara bank and the challenge of accelerating market penetration of one of the selected technologies will now become part of this dialogue.
- Various Government entities: The Department of Sericulture of the Karnataka government has various programs and projects to help the industry and it would be a logical partner in a proposed project as outlined above. Another partner could be the Central Silk Board (part of the Ministry of Textiles). The Central Silk Technology Research Institute (CSTRI), which is

part of the Silk Board is engaged in technology research and dissemination (limited) and has various investment subsidy programs. Dialogue with CSTRl is continuing.

The beneficiaries would be entrepreneurs operating the reeling units through improved income from fuel savings, improved quality of the reeled silk, and increased productivity in the case of HRU units. The workers in the reeling units will also benefit from improved working conditions from less smoke and heat from the ovens.

Implementation and Other Issues

This is a complex project concept (more of a program than a project) that will have a long timeline to implementation. This is a type III Project –“Long Timeline (could be a year, even more)/But Doable”. Further pre-investment work is already continuing, but on an intermittent basis, and is likely to continue well after this Task Order assignment. It is unclear at this time whether this intermittent work will make sufficient progress to take this concept to the pre-feasibility level in the timeframe of the PRESK Pilot Program. But based on the work thus far and our very preliminary ideas about an appropriately structured project/program, such a project/program could be consistent with S³IDF’s pro-poor, pro-environment missions and hence work on the concept will continue in any case beyond the timeframe of the TO.

5) Project Concept Number 5: - Chintamani Solar Home Systems for SHG members at Iragampalli

Project Description/Concept

The project concept is to provide individual solar photovoltaic (PV) systems with single light points to members of a women’s self-help group (SHG), Chintamani Taluk, Kolar District, Karnataka. The 20-member strong SHG has a very good track record of saving and borrowing and repaying loans from the local branch of Canara Bank. The SHG members are involved in income generating activities, like making masala powder and the light points would help them increase their income by allowing them to work extended hours. The lighting will be from rechargeable battery-based light points (battery charging powered by individual PV panels) that are provided to (currently) 5 members of the SHG to start with. The SHG does not have the capacity to pay the margin money (loan down payment) in one installment. S³IDF’s provision of guarantee (security) for the margin money in the form of a fixed deposit will allow the SHG members to access a loan from the local branch of Canara Bank under the UNEP scheme²⁹. Based on the experience and feedback of the 5 members, the remaining members may join the project at a later time and S³IDF will continue to make similar financial arrangements for them as well. The estimated cost per Light Points system is approximately INR 6,000.

²⁹ Launched in 2003, the UNEP Project’s objective is to accelerate the market development for solar home systems in southern India by helping to overcome the relative lack of consumer financing options. The project is a partnership between United Nations Environment Programme (UNEP), and its Risoe Centre on Energy, Climate and Sustainable Development (URC), and two of India’s major banking groups - Canara Bank and Syndicate Bank. The aim is to help these Bank groups develop lending portfolios specifically targeted at financing solar home systems (SHS). With the support of the UN Foundation and Shell Foundation, the project provides an interest rate subsidy to lower customers financing costs; the banks make the transaction decisions and bear the transaction risks. Only SHSs of certain technical specifications and provided by approved suppliers are eligible. SELCO the proposed technology partner in this project is one of these approved suppliers.

Candidate Investment Site

The project will be in Iragampalli village, Chintamani Taluk, Kolar District. The area is connected by gridlines, but the power transmission is erratic. Most of the people use candles or kerosene based lanterns for their lighting needs. A common charging station was considered, but it would not have been feasible for 5 light points; hence individual solar PV systems are being considered as the women are willing to pay for these. The concept is easily replicable in other areas where there are women's self help groups (SHGs), including the taluks of Gubbi, Molakalmuru and Doddaballapur. Members of SHGs are normally involved in small-scale businesses that are normally run from their homes. As a result, these businesses can thrive because of extended hours. Also, since the location of the light points is at home, it provides the additional utility of providing home lighting for purposes such as cooking and other household chores, reading, children's schooling etc.

Know-how and Technology Partners and Supply Chain Issues

SELCO Solar Light Pvt. Ltd., with its registered office in Bangalore, Karnataka and a branch office in Kolar will be the local PV equipment supplier. SELCO has extensive experience in sales and service of various lighting and other PV based systems in Karnataka and has an established working relationship with various financial institutions. SELCO has a wide network and has built a solid rural power delivery infrastructure in Karnataka and adjacent states in Southern India.

Other Partners Stakeholders and Beneficiaries and Related Issues

The SHG, Jyoti Mahila Sahaya Sangha has been groomed under the supervision of Resource Service Centre (RSC), an active NGO in Chintamani. The lighting will be from rechargeable battery-based light points (battery charging powered by individual photovoltaic (PV) panels) that are provided to 5 members of the SHG to start with. Additional members of the SHG will join the project at a later time. The light points will be purchased using a loan from the local financial institution with which the SHG has a good track record of saving, borrowing and repaying. At the end of the loan repayment, the individual SHG members will own the light points. A prospective financial institution is the Iragampalli branch of the Canara Bank with which preliminary discussions have been held. As mentioned above, not only will the small-scale businesses operated by these women thrive due to extended work hours, but also since the location of the light points is at home, it provides the additional utility of providing home lighting for purposes such as cooking and other household chores, reading, children's schooling etc. As seen with earlier projects, these light points will also result in increased savings over the traditional kerosene based lamps. The light points can also be loaned to other SHG members or the village community when not in use by the owner, on a "pay for use" operating basis, thus making sure the Light Points is fully utilized at all times and the rental could make up for lost work.

Implementation and Other Issues

Except for the issue of whether additional SHG members may choose to join now (versus later), this is a project concept without complications and hence should have a relatively short timeline to implementation.

This is a type I Project I Short Timeline (possible within a few months)/Straightforward. Further pre-investment work will continue. Based on the experience of the 5 women, the other SHG members might also join the project. A related but separate effort will examine whether solar

powered or other technology to assist in grinding might help the women with their business of making masala powders. And at a further point (after this project has been implemented) marketing linkages can also be investigated with others in the network, such as a temple in Chintamani.

6) Project Concept Number 6: - Multiple taluks: Water-Energy Nexus Investments for Small Holders

Project Description/Concept

The project's concept is to improve one or more aspects of the on-farm electricity irrigation water nexus for small holders currently irrigating from bore wells. The targeted improvements would be one or more of the following:

- improving the efficiency and/or reliability of electricity use for pumping;
- lowering the use of irrigation water;
- lessening the use of grid electricity; and
- improving the efficiency, effectiveness and/or reliability of irrigation.

The project intervention(s) would (initially) focus on one or more of the aforementioned improvements without necessarily aiming to change the farmers' existing cropping pattern. Also at this concept stage, the idea is to focus initially on small holders who cultivate mulberry, coconuts and other horticulture crops in order to capture synergies with both the ongoing pre-investment work stemming from other concepts developed under this TO and S³IDF's other experience and the importance of these crops to small holders.

The project's concept can be viewed at two levels, the micro-level being one of more small-scale investments implemented for a single smallholder farms (or group of farmers). A program level can also be conceived, whereby an initiative would be designed, developed and implemented to foster such investments on a large multitude of such smallholder farms. At this concept point, the idea is to first focus on the micro-level with some replication considered from the start. In this case, for the individual farm or group of small farms³⁰ a specific project could have one or a bundle of two or more of a number of investment (and know-how transfer) elements; those elements currently candidates for consideration are:

- trickle, drip, or sprinkler irrigation depending on the crop(s)- see below.
- more efficient motors and/or pumps,
- electricity supply improvements/augmentation (individual or group, e.g. capacitors or other "grid" improvements)
- micro catchments, land formation and/or bore-well improvements for water harvesting/recharge.

For a specific farm/group of farms, the small-scale investment project may consist of only one of the investment elements above or some combination of the elements implemented together with multiple equipment/know-how suppliers and an umbrella financing arrangement. Alternatively the various investment elements could be implemented in a planned schedule of incremental investment transactions. The most likely business model will be arrangements with partners - both equipment/know-how suppliers and local financial institutions – so that debt or lease financed arrangements make it possible for small-holder to access (and own/operate) the investment

³⁰ It is common for small holders to share the use (and sometimes investment and ownership) of a single bore-well, hence the logic for some investments to encompass multiple small farms.

elements that are part of a farm-specific project. In the case of investment element a) given the possible access to subsidy program monies (more below) often available only after some delay, bridge financing may be a logical option. For group/collaborative investments other business models can be examined.

Candidate Investment Site

The project concept is potentially widely applicable in the four pilot taluks of the PRESK Program. But the aforementioned crop focus points to Chintamani and Doddaballapur in the case of mulberry and Gubbi in the case of coconuts. But at this concept stage in terms of the specific candidate investment sites for initial investments none of the taluks have been excluded and the decisions will be made with strong consideration to two factors: potential partners (more below) and whether the initial investments encompass multiple or only one of the investment elements noted above. Based on the pre-investment work thus far, in the case of multiple investment elements it is likely that the initial farm specific cases, the choice would be one or more smallholder farms in Chintamani taluk with particular focus on ones currently producing mulberry and/or vegetables. The reason for this is that if multiple investment elements noted above are involved, at least for initial such projects, they may have a long gestation period and the necessary follow-up that will be required will be more easily handled from our Bangalore base. For single investment element cases (e.g. trickle irrigation for mulberry small-holders) the site decisions are more likely to be based on working relationships with partners (more below) and at this stage none of the taluks are ruled out in the ongoing pre-investment activities.

Know-how and Technology Partners and Supply Chain Issues

At this concept point in the Task Order work, based on the pre-investment work undertaken thus far, the following comments on these matters are warranted:

- The market presence (in the specific taluk or nearby) of suppliers of know-how and technology and their “on the ground” application experience appears to vary significantly. This variation is from essentially no presence (in these taluks) to suppliers with presence in some taluks and relatively widespread application experience (but perhaps not with small-holders).
- At least in the investment and know-how element related water harvesting, suppliers include both:
 - non-commercial players providing know-how and advise and/or underwriting initial demonstration investments; and
 - at least on commercial business (e.g. Farmland Inc.) that offers an integrated package of investment and know-how components.
- Of the four possible investment and know-how elements noted above, the one which has achieved notable market penetration – but still small in terms of potential- is that of trickle, drip or sprinkler irrigation investments for more efficient water delivery and use. A few points to be underscored:
 - As might be anticipated, the penetration has been smaller amongst small holders.
 - Government subsidies have been an important factor in this market penetration³¹. But the subsidies are not granted “up front”; the systems must first be bought and then their subsidies collected – generally with a lag in time. Thus despite the subsidy, there remains a significant first-cost constraint for small-holders/low-income farmers.

³¹ For sericulture and horticulture, there are subsidy programs for drip irrigations systems covering the whole state of Karnataka. Regulators must qualify these equipment suppliers. For sericulture the subsidy is **70%** subsidy for men farmers and **90%** subsidy for women and those belonging to Schedule Castes and Schedule Tribes. For horticulture, the subsidy is **50%** for all farmers.

- Commonly, the subsidy-qualifying technology supplier plays an intermediary and/or facilitation role for accessing the subsidy; but it appears that this role is not regularly extended to small holders because of their inability to make significant down payments.
- Low cost systems such as those supplied by the International Development Enterprises (IDE) agents that are especially fitting for small holders do not qualify for the subsidy.

Investigations of technology and know-how suppliers and supply chain issues are continuing.

Other Pertinent Partners Stakeholders and Beneficiaries and Related Issues

Again, at this concept point the following comments on this matter are warranted. First, as a result of other concepts presented in this Deliverable, and also other S³IDF projects, we have had and are continuing to have a series of discussions with the Grameen banks responsible for each of the taluks - Kolar Grameen Bank (for Chintamani), Chitradurga Grameen Bank (for Molakalmuru), and Kalapatharu Grameena Bank (for Doddaballapur and Gubbi). In several of these discussions, smallholder investments encompassing one or a bundle of the aforementioned elements are now part of the dialogue. Where this dialogue has been specific, while in the end, decisions are investment-specific; the bank appears to be more than willing to consider such investments. Second, there are various non-governmental organizations (NGOs) involved in some of the taluks with whom S³IDF has begun a dialogue and that may be a candidate for partnering in projects with small holders. One such example is the Resource Service Center (RSC), an activist NGO in Chintamani that is involved in watershed management and has experience working with SHGs. Third, if a more programmatic effort were developed and undertaken, the Bangalore Electricity Supply Company (BESCOM) would be a logical partner. BESCOM has a new unit focusing on demand management and at some point this unit will out of necessity have to focus on agriculture pumping electricity use and the myriad water-energy nexus issues including use by small holders.

Implementation and Other Issues

Putting aside consideration of a programmatic initiative (at least for now) even at the micro-specific small farm level, the initial such projects addressing the water-energy nexus could be complex ones if a bundle of the investment elements are involved. And even if only one of the investment elements is involved, the initial projects while not overly complex will nonetheless not have short timelines to implementation. These initial water-energy projects will be type III Projects –“Long Timeline (could be a year, even more)/But Doable” when a bundle of investment elements are involved. And in the case of a single investment element (e.g. trickle irrigation), they could be a type II Project “Medium Timeline (many months) /Relatively Straight Forward”. Further pre-investment work is continuing on an intermittent basis, and is likely to continue well after this Task Order assignment.

7) Project Concept Number 7: - Doddaballapur - Gasifier Based Fuel Substitute/Efficiency Improvement in Silk Dyeing

Project Description/Concept

The project concept is to promote the market penetration of biomass gasifier technology in the silk dyeing units of Doddaballapur taluk in Bangalore Rural District. Biomass gasifiers for small-scale thermal loads are examples of renewable energy investments that have large commercial market potential in the PRESK area and elsewhere in Karnataka (as well as in other states of India). However, this technology has had limited market implementation due to various constraints, including financing and technology/know-how supply chain issues. S³IDF believes such

investments could lead to significant financial and environmental benefits, such as improved viability of the silk units and an improved workplace environment. These benefits in turn would lead to associated social and health benefits in the silk industry. Expanding the investment perspective to biomass feedstock/fuel supply chain could also lead to other pro-poor benefits, such as additional employment. As envisioned at this conceptual phase, the project could consist of supporting a few such investments, as an integral step to developing a program that would lead to overcoming the constraints to widespread and numerous such investments. The project would also begin consideration of broader feedstock/ fuel supply chain options.

Karnataka is one of India's largest silk-producing states and Doddaballapur has a high concentration of silk dyeing and reeling units. A typical dyeing unit has multiple baths (between two and five), where water is boiled and maintained at a constant temperature of 98 degrees Celsius. The typical size of a bath is around 200 liters. Baths in the dyeing units have low thermal efficiency and the fuel consumption is high. Tata Energy Research Institute (TERI) and Swiss Agency for Development and Cooperation (SDC) conducted energy efficiency studies for silk dyeing units³².

A gasifier is a compact machine that aids in converting biomass into a combustible gas called producer gas (a combination of hydrogen, carbon monoxide, methane and other hydrocarbons). Gasification technology reduces the fuel expense by improved burning of the biomass. Based on information from a gasifier supplier in Bangalore (Vijay Engineering), the cost of installing one gasifier at the candidate investment site in Doddaballapur would be INR 70,000. This cost is based on a single gasifier design for one silk dyeing bath. Assuming the technology and know-how supply chain constraints can be overcome (more below), inferences from preliminary cost-savings analysis can be drawn. This analysis suggests a short pay back period of one to two years.

The gasifiers would require regular supply of biomass feedstock (of type, size and dryness suitable for the gasifiers) and this could potentially open up new employment opportunities in the form of micro-enterprises that take up supplying fuel for gasifier units. Vijay Engineering, an equipment supplier active in this market niche in southern Karnataka, operates in urban Bangalore. This entrepreneur (more below) manufactures and installs gasifiers as an integral part of other metal-manufacturing work. Since his initial project he has also entered the feedstock/fuel supply business for the gasifier users³³. This supplier indicates that for his business model (combining gasifier sales, after service and fuel/feedstock supply), a minimum of five dyeing units would be required to make it feasible for him to implement his model in the Doddaballapur area.

The proposed project intervention could encompass various initial options leading to a more extensive program intervention; these options include:

- Helping the aforementioned gasifier supplier to expand into Doddaballapur using his existing business model. This help could include technical assistance and financing (to both the supplier and gasifier users/investors).
- Support (assistance and/or financing) for gasifier investments employing alternative business models and still using the aforementioned equipment supplier, or alternative equipment suppliers.

³²TERI has developed gasifier, waste heat recovery and related oven systems technologies under a project sponsored by SDC targeting the silk reeling and dyeing processes. These systems were designed to address fuel saving via retrofit to the systems in place in reeling and dyeing units and to have low incremental investment cost and short pay back periods. Another of these technologies is mentioned in Concept #4 Energy Efficiency Investments in Silk Reeling Ovens.

³³Regular supply of fuel for the gasifiers is an essential part of the project's sustainability. In urban Bangalore much of the biomass feedstock/fuel can (and does) come from waste wood from sawmills and other sources. But in many market areas these waste-wood supplies are limited and other biomass must be used.

- As a complement to i. and/or ii., organization and implementation of a micro-enterprise to supply biomass feedstock/fuel such that it operates in a pro-poor fashion especially with regard to employment and value added capture in the fuel supply chain.

Candidate Investment Site

The initial investment project that could be the start of a broader program and encompassing one or more of the options above will be in Doddaballapur, Bangalore Rural District, Karnataka. This investment concept is replicable in other areas with similar silk dyeing and reeling units. And in terms of a broader market penetration, the concept of use of gasified biomass fuels is also applicable to other small-scale industries (as well as larger industries) that need to generate wet or dry heat.

Know-how and Technology Partners and Supply Chain Issues

Vijay Engineering, based in Peenya Industrial area, Bangalore, the aforementioned equipment supplier, is a licensee of the gasifier developed by TERI/SDC and is the probable technology partner in this project for at least one of the options outlined above. Vijay Engineering has experience manufacturing gasifiers and supplying biomass for different applications such as silk dyeing, silk bleaching, lead melting, food processing, to name a few. The equipment supply chain issues from Vijay Engineering's perspectives with its business model were noted above. Vijay Engineering provides six months free maintenance and technical know-how to start and operate a unit for supplying fuel to gasifier units.

There are reportedly other technologies (and suppliers) aiming to improve the efficiency of fuel use in silk-dyeing enterprises. Another potential supplier for gasifiers that has been identified is Ankur Scientific Energy Technologies Pvt. Ltd. based in Vadodara, Gujarat.

Other Partners Stakeholders and Beneficiaries and Related Issues

A financial institution is yet to be identified, but there are two obvious candidates. First, the local branch of Canara Bank would be approached as they have had discussions with S³IDF earlier and the bank is collaborating with S³IDF on other projects. The Kalapatharu Grameen Bank serves Doddaballapur taluk, and this is the second candidate; S³IDF has had discussions with them in the context of other matters. As mentioned above, this change in technology will result in savings in time, labor and water along with improved silk productivity (both in quality and quantity), and reduced pollution. Employment opportunities in the fuel wood-processing (cutting and drying) unit are an added benefit for the project. An NGO or a women's Self Help Group (SHG) can attempt to generate livelihood by cultivating biomass on available low-grade land for the micro enterprise unit supplying fuel to gasifier unit.

Implementation and Other Issues

There are two interrelated implementation issues. One is sustainable supply of feedstock/fuel for the gasifiers at a cost that keeps the investment viable. The second, as suggested above, is presence of equipment/know-how suppliers to service the market in a particular taluk –both in sales and after service and depending on the business model, feedstock/fuel supply also. The feasibility analysis will need to examine alternative business models and the intertwined issue of local biomass supply and sufficient numbers of gasifier customers (dyeing units or otherwise) in the taluk for which it will be cost effective to establish a fuel supply system to serve them in taluk either from local (in the taluk)

sources or by transport from neighboring areas, thus increasing the feedstock/fuel cost and operation cost of the gasifiers.

This is a project concept that has a number of complexities and possible long gestation issues. It is a type III project (could be a year, even more)/but doable. Further pre-investment work will continue. At least some of the project intervention options outlined above will receive further analysis during the schedule of this TO. An additional feasibility analysis of project options will continue beyond the TO period provided the pre-feasibility analysis indicates that a pro-poor option is viable.

8) Project Concept - Number 8: - Doddaballapur: Light points for Hawkers

Project Description/Concept

This project is a variation of an innovative project concept originally conceived by S³IDF in partnership with SELCO (more below) to bring affordable lighting services to poor customers without access to the grid (or a reliable grid). The concept involves creation of a Micro Enterprise Investment, which, located in the un-electrified/under-electrified Hawker's (street sellers) community will provide lighting to the hawkers. The hawkers are mostly petty sellers of fruits, vegetables etc. and some even use moveable carts to ply their trade. Most hawkers currently use kerosene-based Petromax lanterns, which are comparatively expensive to maintain, given the cost of kerosene and frequent replacement of the mantle. Also the kerosene lanterns generate considerable heat (more than a light) that has been known to damage the fruits and vegetables that the hawkers vend.

The light points, which run on batteries charged by solar photovoltaic (PV) panels, are charged during the daytime at a centralized charging station and in the evening, the batteries are delivered to the hawkers for their use. The hawkers require the light points for an average of 4 hours every evening, after which the batteries are returned to the charging station. These are supplied to the hawkers on a daily rental payment for use, which is pre-decided based on their Willingness to Pay (WTP). The hawkers benefit with better lighting at a lesser cost, thus improving their economic condition. Local unemployed or underemployed persons will fill all employment opportunities in the micro-enterprise, such as maintaining and operating the charging station, distribution/collection of batteries daily and collection of rental payments. The entrepreneur will invest a small proportion of the total capital needed and S³IDF's provision of partial guarantee in the form of a fixed deposit will allow the entrepreneur to access a loan from the local branch of Canara Bank or Syndicate Bank under the UNEP scheme³⁴. The cost for the project is being worked out based on the number of hawkers willing to participate.

³⁴ Launched in 2003, the UNEP Project's objective is to accelerate the market development for solar home systems in southern India by helping to overcome the relative lack of consumer financing options. The project is a partnership between United Nations Environment Programme (UNEP), and its Risoe Centre on Energy, Climate and Sustainable Development (URC), and two of India's major banking groups - Canara Bank and Syndicate Bank. The aim is to help these Bank groups develop lending portfolios specifically targeted at financing solar home systems (SHS). With the support of the UN Foundation and Shell Foundation, the project provides an interest rate subsidy to lower customers financing costs; the banks make the transaction decisions and bear the transaction risks. Only SHS of certain technical specifications and provided by approved suppliers are eligible; SELCO, the proposed technology partner in this project is one of these approved suppliers. After many months of meetings and discussions with UNEP about the benefit of these pro-poor Light Points schemes (not just for hawkers but other poorer communities such as rural women's self help groups [SHGs]), UNEP has agreed to extend the scheme to cover such S³IDF Light Points schemes. As in other projects under the UNEP Project, the banks make the transaction decisions and take transaction risks.

Candidate Investment Site

The location of the project will be in Doddaballapur Taluk, Bangalore Rural District, Karnataka. The concept is easily replicable in other areas where there are a number of hawkers (at least 20 to make the idea of a centralized charging station feasible, thus making the project cost effective) in a neighborhood. This also ensures that the distribution and collection (of batteries as well as the rental payment) is simplified. Earlier, similar projects fostered by S³IDF have also shown that such a project is viable for the entrepreneur as well in terms of his/her investment. The supplier covers the equipment under warranty for a limited time after which maintenance coverage can be bought annually for a very small amount. The financial institution's investment is also considerably risk-free given that S³IDF would put in a partial guarantee and the technology supplier would provide a buy-back guarantee under its terms and conditions.

Know-how and Technology Partners and Supply Chain Issues

SELCO Solar Light Pvt. Ltd., with its registered office in Bangalore, Karnataka will be, the local PV equipment supplier. SELCO has extensive experience in sales and service of various lighting and other PV based systems in Karnataka and has an established working relationship with various financial institutions. SELCO has a wide network and has built a solid rural power delivery infrastructure in Karnataka and adjacent states in Southern India. SELCO from its prior experience and feedback from projects dealing with street hawkers has proposed an innovative Light Points that provides good lighting for the hawkers' wares and comes with a lighter weight battery for easier transportation.

Other Partners Stakeholders and Beneficiaries and Related Issues

The micro-enterprise unit (MEU) will be operated and managed by the entrepreneur. The lighting will be from rechargeable battery-based light points (battery charging powered by individual photovoltaic (PV) panels) that are provided to the hawkers on a "pay for charge" basis. The centralized solar power system, consisting of Solar Panels, Batteries, Lights and such other accessories as required, will be located in land owned/rented by MEU and will be purchased using a loan from the local financial institution that the entrepreneur can access based on S³IDF's partial guarantee. At the end of the loan repayment, the entrepreneur will own the MEU. A prospective financial institution to approach is the local branch of the Canara Bank or Syndicate Bank as only these banks are covered under the UNEP scheme. As mentioned above, these light points will result in increased savings and better lighting. Through this and analogous projects, S³IDF wants to prove the validity of a business model having a unique blend of adoption of renewable energy for commercial purposes, serving poor communities with services they need and creating cost-savings, employment and other benefits among socially and economically disadvantaged communities.

Implementation and Other Issues

SELCO will be responsible for the installation and maintenance (for a specified time) of the system. SELCO will also provide the necessary training to operate the charging station. The entrepreneur will conduct a survey under S³IDF's guidance to determine the feasibility of the project. Timely collection of the agreed-upon tariff will be a key factor to the success of the project. Timely distribution and collection of the batteries is also essential to avoid overuse of the batteries resulting in reduced life of the batteries. This is a project concept without complications and hence should have a relatively short timeline to implementation. This is a type I Project I Short

Timeline (possible within a few months)/Straightforward. Further pre-investment work will continue.

9) **Project Concept Number 9:- Molakalmuru: Energy-Productive Use Investment for Groundnut Processing**

Project Description/Concept

The project concept is an energy-productive use investment for groundnut processing, with the technology and business model (ownership/organizational) aspects to be such that poor and small producers capture greater portions of the post-harvest value. Groundnut is a major crop in Chintamani and Molakalmuru taluks (and commonly the main cash crop). Production is under rain-fed conditions³⁵. Normally Redgram, Pigeon pea, Horse gram, Bajra etc. are grown as inter crops with groundnut. Groundnut fetches the farmer cash and the inter-crop takes care of his domestic consumption needs. The groundnut plant and the inter-crop fodder are also an excellent feed for cattle. The groundnut shell is used as a fuel in many places, especially after briquetting.

Groundnut is de-shelled/decorticated with various levels of technology from “by hand”, manual powered de-shelling and various powered de-shelling machines. Oil extraction is done with various expellers. Groundnut commonly moves 50-75 kms from production point to processing, which may be just decortication or oil extraction as well. Oil mills in Molakalmuru area operate through a network of agents and middlemen. This commercial chain buys most of the groundnut grown in this area. The oil mills have decorticators for shelling the groundnut and groundnut oil is extracted from the seed using an expeller. De-shelling/decortication is also done as a paid service, and the grower is given back the groundnuts alone. In this instance, the grower gets no specific returns on the shell that is valuable as a fuel. De-shelling is important to the farmers since the groundnuts without their shells sell at a relatively higher price in the market, (approximately INR 2500-2700/Quintal (1 Quintal= 100 kilograms) compared to INR 1700-1900/Qt for groundnuts with shell³⁶).

The project concept involves creation of a Micro Enterprise Investment(s), which will allow the small producers to capture more value. Alternative investment cum business models should address the following issues/options:

- itinerant versus “fixed” de-shelling facilities;
- what/how-many of the processing steps to include: de-shelling, oil extraction, briquette making³⁷
- what scale and technology choice for the steps in b.; if the technology choices are not manual what technology should be used for generating the required power for the machinery
- alternative ownership/operation options – fee-for-service; cooperative ownership, and variation combining these and other options

³⁵ The Molakalmuru taluk area has an average annual precipitation of 400-500 mm. When this is the case, the average yield of groundnut is 300-400 kg/acre. The soil here is mostly red, sandy soil with plenty of pebbles and rock out crops. Thus the climate and the soil are ideally suited for growing groundnuts. Since the crop is rain-fed, the yield entirely depends on the distribution of rainfall. With monsoon failures during the last 2 years, yields of groundnut have bottomed and the economy is limping. Last year because of poor monsoon (rainfall was only 250 mm), yields dropped to 50-100 kg/acre. Many of the farmers have not even recovered the seed sown. Still in some pockets where distribution of the rainfall was good, farmers have got normal yield of the crop.

³⁶ The shells account for about 30 percent of the unshelled groundnut by weight but the majority by volume. Not accounting for the value of the shell, this price for the unshelled groundnuts implies a range of INR 2400-2700 for the shelled groundnuts; plus the farmer does not capture the shell value.

³⁷In principle additional steps to capture value added could be considered such as making and packaging peanut snacks.

Analogous investment cum business models can be considered for other crops for which de-shelling or similar process steps are required and for which the residue has some uses; examples include mustard, sorghum and maize.

Candidate Investment Site

The project will be in Molakalmuru Taluk, Chitradurga District. The concept is also applicable to other areas where there are sufficient numbers of smallholder groundnut growers such as Chintamani Taluk, Kolar District, Karnataka. In the course of the pre-feasibility study and in conjunction with possible collaborators specific sites will be considered.

Know-how and Technology Partners and Supply Chain Issues

Specific technology suppliers of both the itinerant model and stationary models of decorticators and stationary models for the other process steps (e.g. oil extraction) have to be identified. But as there is market presence of these technologies, this identification should be relatively straightforward (and is already underway). And since there is already such market presence, there does not appear to be any significant technology supply chain issues.

Other Partners Stakeholders and Beneficiaries and Related Issues

Possible other partners may emerge from ongoing contacts that are being pursued. But at this concept point it warrants noting that in the context of this Task Order there are two Molakalmuru based entities with whom S³IDF is in dialogue about various project concepts. We envision Chitradurga Grameen Bank and MYRADA, a non-profit organization that has been doing watershed projects in the area and has programs working with many SHGs, as possible partners.

Implementation and Other Issues

This is a complex project concept that will have a long timeline to implementation. The necessary pre-investment study must consider the options outlined above and all this must be done against a thorough understanding (to be developed) of such matters as the exact cost benefit between the prices of unshelled groundnut versus groundnut with shell. And there are other issues such as whether the de-shelling of the groundnut might have an impact on its keeping quality, such as fungal attacks. But based on what has been learned in developing the concept, this is a type III Project “Long Timeline (could be a year, even more)/But Doable”. Further pre-investment work will continue and it is anticipated that at least a preliminary version of a pre-feasibility analysis might be completed within the schedule of this Task Order assignment. But, in any case, given the distinct possibility of such investment cum business model option leading to cases meeting S³IDF’s pro-poor, pro-environment criteria, this pre-investment work will have to continue beyond this Task Order.

10) Project Concept Number 10:- Molakalmuru: Lighting Options for Weavers’ SHG

Project Description/Concept

The project concept is to provide lighting for weavers and help them increase their income by facilitating extended hours of work. Molakalmuru town has colonies of weavers and there are nearly 500 weavers in this town. Most of these weavers are members of Self-Help Groups (SHG),

which may have both men and women as members. Each SHG has 10 to 15 members. Weavers' SHGs are currently connected to an energy grid but the power supply is very erratic and affects the weavers' work and thus their income. Most SHG members use candles or kerosene based lanterns as backup for their minimal lighting needs; but this light is not adequate for the weaving work.

At this concept stage, the idea is to intervene in one of three technically feasible options mentioned below:

- **Individual Uninterruptible Power System (UPS):** UPS is essentially a back-up battery and a simple controller and converter. An individual UPS operates in the event of a power failure or other electrical line problems, by allowing the existing lighting to draw power from the UPS, thus allowing the weavers to continue working without any interruption. This will be AC/AC UPS where the energy source is the 240 V alternating current (AC), and the output is the same voltage through an inverter. Every participating member of the SHG will have an individual UPS installed.
- **Photo Voltaic (PV) based stand-alone systems (two options)**
 - **PV-Grid Hybrid Individual Lighting System:** This type of PV-Grid hybrid system works the same as the concept mentioned above. The solar panels charge the battery and the inverter converts the direct current (DC) electricity stored in the battery to AC. This will again be individual installation at the participating SHG member's location.
 - **PV Individual Lighting System:** This is a solar home system model that consists of a photovoltaic panel that converts the sun's energy to electrical energy that is stored in the battery through a charge controller. The battery runs the DC-powered lighting. This system is in parallel to the existing grid-based lighting.
- **PV Powered/PV-Grid Hybrid Charging station:** The concept will be similar to the Light Points project model for hawkers which was originally conceived by S³IDF in partnership with SELCO (more below) to bring affordable lighting services to poor customers without access to the grid (or a reliable grid). The same model can be used to ensure better (more reliable) lighting for the SHG members. The lighting will be from rechargeable battery-based light points (battery charging powered by photovoltaic (PV) panels or PV-Grid hybrid) that are provided to the SHG members on a "pay for charge" basis. The centralized solar power system consisting of solar panels, batteries, lights and such other accessories as required, will be located in land owned or rented by SHGs.

Finalizing the project, using one of the above-mentioned concepts requires further pre-investment work. The organizational and financing details of the project and the particulars of the SHG's roles and responsibilities still need to be worked out (and are ongoing). The choices on these matters depend on the concept option being both financially feasible and acceptable to the SHG.

In the case of concepts I, II-A and II-B mentioned above, the SHG would invest a small portion of the total capital required. S³IDF's provision of partial guarantee will allow the SHG to access loan from a local bank and provide the remaining investment capital. The SHG will lend money to its members for the purchase of either UPS or Individual PV-Grid hybrid systems.

In the case of concept III, S³IDF conducted initial surveys and discussions with the SHGs. As a result of these discussions, S³IDF learnt about the SHGs' concern regarding the quality of lighting as weaving requires focused and better light. The charging station model was identified as an option that the SHGs wanted to pursue, provided it operates on a "no loss, no profit" basis and batteries are delivered to its members at minimum cost. This option requires that three or four

SHGs join together to have one centralized charging station unit run by an association of SHGs. This association of SHGs will invest a small proportion of the total capital needed and S³IDF's provision of partial guarantee in the form of a fixed deposit will allow the association of SHGs to access a loan from a local bank such that financing can be done under the UNEP scheme³⁸. At the end of the loan repayment, the association of SHGs will own the unit.

The SHGs will benefit from better lighting at a lesser cost and improve their members' economic condition. Unemployed or underemployed members of SHG will fill all employment opportunities in the enterprise, such as maintaining and operating the charging station, daily distribution and collection of batteries and collection of rental payments. Further pre-investment work is being carried out to determine the quality of light required by the SHG. Subsequent pre-investment work will evaluate the aforementioned options.

Candidate Investment Site

The project will be in KHDC Colony, Molakalmuru Taluk, Chitradurga District. As mentioned above, the area is connected by gridlines, but the power supply is erratic. The three concepts mentioned above are easily replicable in other areas where SHGs are in a specific neighborhood and the lighting helps in increasing their income as well as improving the quality of living for the entire family³⁹.

The charging station concept requires about 20 members⁴⁰ to make the idea feasible, thus making the project cost effective. This also ensures that the distribution and collection (of batteries as well as the rental payment) is simplified. Earlier similar projects fostered by S³IDF have shown that such a project is viable for the entrepreneur as well in terms of his/her investment. Here the idea is to replicate the entrepreneur model with the SHG owning and operating a charging station. The supplier insures the equipment under warranty for a limited time after which maintenance coverage can be bought annually for a very small amount. The financial institution's investment is also considerably risk-free given that S³IDF will provide a partial guarantee and the technology supplier will provide a buy-back guarantee under its terms and conditions.

Know-how and Technology Partners and Supply Chain Issues

Depending on further pre-investment work and discussions with the SHGs, one of the concepts mentioned above will be finalized. As regards the UPS concept, there are suppliers of UPS in Chitradurga (although there appears to be none in Molakalmuru), and the process of identifying

³⁸ Launched in 2003, the UNEP Project's objective is to accelerate the market development for solar home systems in southern India by helping to overcome the relative lack of consumer financing options. The project is a partnership between United Nations Environment Programme (UNEP), and its Risoe Centre on Energy, Climate and Sustainable Development (URC), and two of India's major banking groups - Canara Bank and Syndicate Bank. The aim is to help these Bank groups develop lending portfolios specifically targeted at financing solar home systems (SHS). With the support of the UN Foundation and Shell Foundation, the project provides an interest rate subsidy to lower customers financing costs; the banks make the transaction decisions and bear the transaction risks. Only SHS of certain technical specifications and provided by approved suppliers are eligible; SELCO, the proposed technology partner in this project is one of these approved suppliers. After many months of meetings and discussions with UNEP about the benefit of these pro-poor Light Points schemes (not just for hawkers but other poorer communities such as self help groups [SHGs]), UNEP has agreed to extend the scheme to cover such S³IDF Light Points schemes. As in other projects under the UNEP Project, the banks make the transaction decisions and take transaction risks.

³⁹ SHG members are typically involved in small-scale businesses that are normally run from their homes. As a result of the improved lighting, not only can these businesses thrive because of extended hours, it also provides the additional utility of providing home lighting for purposes such as cooking and other household chores, reading, children's schooling etc.

⁴⁰ This number is based on our current experience with analogous projects. The feasibility is dependent on the amount members/customers are willing to pay and the cost that have to be covered, the latter is dominated by the loan payments for the investment capital. Obviously longer loan terms and lower interest rates and higher willingness of customers to pay allow such projects to be viable with fewer members/customers.

these is ongoing. For the PV Powered charging station and PV-Grid Hybrid, SELCO Solar Light Pvt. Ltd., which has a registered office in Bangalore, Karnataka and has branch offices in adjacent districts, will be the local PV equipment supplier. SELCO has extensive experience in sales and service of various lighting and other PV based systems in Karnataka and has an established working relationship with various financial institutions. SELCO has a wide network and has built a solid rural power delivery infrastructure in Karnataka and adjacent states in Southern India.

Other Partners, Stakeholders and Beneficiaries and Related Issues

The SHG members who are candidate project beneficiaries have all been trained under the supervision of one of three institutions; two NGOs, namely GUARD and KAWAD (a part of another NGO called MYRADA) and KHDC (Karnataka Handloom Development Corporation, Ltd.). Depending on the particulars of the project option as it goes forward one (or more) of these entities are candidate partners.

Preliminary discussions with two financial institutions have been initiated – the local branch of Canara Bank and Chitradurga Grameen Bank (CGB) (a Canara Bank sponsored Grameen Bank), as these banks are covered under the UNEP scheme. CGB is open to financing the SHG; it is perhaps a more likely partner.

The SHG members will be the beneficiaries. As mentioned above, lighting will open the possibility of increased productivity and earnings. Through this and analogous projects, S³IDF wants to prove the validity of its business model which serves poor communities with services they need and creates cost-savings, employment and other benefits among socially and economically disadvantaged communities.

Implementation and Other Issues

The concept options I, II-A and II-B as outlined above are unlikely to have any complexities other than occasional maintenance and service of the system. The agreement with the supplier will cover the equipment under warranty for a limited time and provide maintenance. In the case of UPS system, once the specific supplier is chosen, it will be the supplier's responsibility for the installation and maintenance of the equipment. This project concept is without complications and hence should have a relatively short timeline to implementation. Depending on the project's cost and viability, and based on the SHGs' preference, one of the above mentioned concepts would be taken forward to implementation.

In the case of option III, the PV Powered charging station or PV-Grid Hybrid concept, SELCO will be responsible for the installation and maintenance (for a specified time) of the system. SELCO will also provide the necessary training to operate the charging station. Timely collection of the agreed-upon tariff will be a key factor to the success of the project. Timely distribution and collection of the batteries is also essential to avoid overuse of the batteries resulting in reduced life of the batteries. Timely collection of batteries also ensures maximum recharging period during the daytime. The financial viability of the proposed scheme can only be assessed after further surveys, costing and other pre-investment work; which is continuing. The formation, roles and responsibilities, and operation of the association of SHGs that will be created for managing the MEU have to be decided as well. Assuming positive results from this pre-investment work and the arrangements of financing under the UNEP scheme, this is a project concept without complications and hence should have a relatively short timeline to implementation.

This is a type I Project I Short Timeline (possible within a few months)/Straightforward. As noted, further pre-investment work is continuing.

11) Project Concept Number 11:- Chintamani: Light Points for Hawkers

Project Description/Concept

This project is a variation of an innovative project concept originally conceived by S³IDF in partnership with SELCO (more below) to bring affordable lighting services to poor customers without access to the grid (or a reliable grid). The concept involves creation of a Micro Enterprise Investment, which, located in the un-electrified/under-electrified Hawker's (street sellers) community will provide lighting to the Hawkers. The hawkers are mostly petty sellers of fruits, vegetables etc. and some even use moveable carts to ply their trade. Most hawkers currently use kerosene-based Petromax lanterns, which are comparatively expensive to maintain given the cost of kerosene and frequent replacement of the mantle. Also the kerosene lanterns generate considerable heat (more than a light) that has been known to damage the fruits and vegetables that the hawkers vend.

The light points, which run on batteries charged by solar photovoltaic (PV) panels, are charged during the daytime at a centralized charging station and in the evening, the batteries are delivered to the hawkers for their use. The hawkers need the light points for an average of 4 hours every evening, after which the batteries are returned to the charging station. These are supplied to the hawkers on a daily rental payment for use, which is pre-decided based on their Willingness to pay (WTP). The hawkers benefit with better lighting at a lesser cost, thus improving their economic condition. Local unemployed or underemployed persons will fill all employment opportunities in the micro-enterprise, such as maintaining and operating the charging station, distribution/collection of batteries daily and collection of rental payments. The entrepreneur will invest a small proportion of the total capital needed and S³IDF's provision of partial guarantee in the form of a fixed deposit will allow the entrepreneur to access a loan from the local branch of Canara Bank or Syndicate Bank under the UNEP scheme⁴¹. The cost for the project is being worked out based on the number of hawkers willing to participate.

Candidate Investment Site

The location of the project will be in Chintamani Taluk, Kolar District, Karnataka. The concept is easily replicable in other areas where there are a number of hawkers (at least 20 to make the idea of a centralized charging station feasible, thus making the project cost effective) in a neighborhood. This also ensures that the distribution and collection (of batteries as well as the rental payment) is simplified. Although the neighborhood has a number of hawkers, present

⁴¹ Launched in 2003, the UNEP Project's objective is to accelerate the market development for solar home systems in southern India by helping to overcome the relative lack of consumer financing options. The project is a partnership between United Nations Environment Programme (UNEP), and its Risoe Centre on Energy, Climate and Sustainable Development (URC), and two of India's major banking groups - Canara Bank and Syndicate Bank. The aim is to help these Bank groups develop lending portfolios specifically targeted at financing solar home systems (SHS). With the support of the UN Foundation and Shell Foundation, the project provides an interest rate subsidy to lower customers financing costs; the banks make the transaction decisions and bear the transaction risks. Only SHS of certain technical specifications and provided by approved suppliers are eligible; SELCO, the proposed technology partner in this project is one of these approved suppliers. After many months of meetings and discussions with UNEP about the benefit of these pro-poor Light Points schemes (not just for hawkers but other poorer communities such as rural women's self help groups [SHGs]), UNEP has agreed to extend the scheme to cover such S³IDF Light Points schemes. As in other projects under the UNEP Project, the banks make the transaction decisions and take transaction risks.

estimate is that about 35-40 hawkers would participate in the project. Earlier similar projects fostered by S³IDF have also shown that such a project is viable for the entrepreneur as well in terms of his/her investment. The supplier covers the equipment under warranty for a limited time after which maintenance coverage can be bought annually for a very small amount. The financial institution's investment is also considerably risk-free given that S³IDF would put in a partial guarantee and the technology supplier would provide a buy-back guarantee under its terms and conditions.

Know-how and Technology Partners and Supply Chain Issues

SELCO Solar Light Pvt. Ltd., with its registered office in Bangalore, Karnataka will be, the local PV equipment supplier. SELCO has extensive experience in sales and service of various lighting and other PV based systems in Karnataka and has an established working relationship with various financial institutions. SELCO has a wide network and has built a solid rural power delivery infrastructure in Karnataka and adjacent states in Southern India. SELCO from its prior experience and feedback from projects dealing with street hawkers has proposed an innovative Light Points that provides good lighting for the hawkers' wares and comes with a lighter weight battery for easier transportation. SELCO's branch in Kolar will be responsible for the installation, training and post-implementation complications if any.

Other Partners Stakeholders and Beneficiaries and Related Issues

The micro-enterprise unit (MEU) will be operated and managed by the entrepreneur, who is yet to be finalized. The lighting will be from rechargeable battery-based light points (battery charging powered by individual photovoltaic (PV) panels) that are provided to the hawkers on a "pay for charge" basis. The centralized solar power system consisting of Solar Panels, Batteries, Lights and such other accessories as required, will be located in land owned/rented by MEU and will be purchased using a loan from the local financial institution which the entrepreneur can access based on S³IDF's partial guarantee. At the end of the loan repayment, the entrepreneur will own the MEU. A prospective financial institution to approach is the local branch of the Canara Bank or Syndicate Bank as only these banks are covered under the UNEP scheme. As mentioned above, these light points will result in increased savings and better lighting. Through this and analogous projects, S³IDF wants to prove the validity of a business model having a unique blend of adoption of renewable energy for commercial purposes, serving poor communities with services they need and creating cost-savings, employment and other benefits among socially and economically disadvantaged communities.

Implementation and Other Issues

SELCO will be responsible for the installation and maintenance (for a specified time) of the system. SELCO will also provide the necessary training to operate the charging station. The hawkers have been identified, but a reliable entrepreneur is yet to be identified. It is anticipated that the entrepreneur will be identified in a short time. The entrepreneur will conduct a survey with S³IDF's guidance to determine the feasibility of the project. Timely collection of the agreed-upon tariff will be a key factor to the success of the project. Timely distribution and collection of the batteries is also essential to avoid overuse of the batteries resulting in reduced life of the batteries. This is a project concept without complications and hence should have a relatively short timeline to implementation. It is a type I Project I Short Timeline (possible within a few months)/Straightforward. Further pre-investment work will continue.

12) Project Concept Number 12: - Gubbi: Light Points for Hawkers

Project Description/Concept

This project is a variation of an innovative project concept originally conceived by S³IDF in partnership with SELCO (more below) to bring affordable lighting services to poor customers without access to the grid (or a reliable grid). The concept involves creation of a Micro Enterprise Investment, which, located in the un-electrified/under-electrified Hawker's (street sellers) community will provide lighting to the Hawkers. The hawkers are mostly petty sellers of fruits, vegetables, eateries, tea-stalls etc. and some even use moveable carts to ply their trade. Most hawkers currently use kerosene-based Petromax lanterns, which are comparatively expensive to maintain given the cost of kerosene and frequent replacement of the mantle. Also the kerosene lanterns generate considerable heat (more than a light) that has been known to damage the fruits and vegetables that the hawkers vend.

The light points, which run on batteries charged by solar photovoltaic (PV) panels, are charged during the daytime at a centralized charging station and in the evening, the batteries are delivered to the hawkers for their use. The hawkers require the light points for an average of 4 hours every evening, after which the batteries are returned to the charging station. These are supplied to the hawkers on a daily rental payment for use, which is pre-decided based on their willingness to pay (WTP). The hawkers benefit with better lighting at a lesser cost, thus improving their economic condition. Local unemployed or underemployed persons will fill all employment opportunities in the micro-enterprise, such as maintaining and operating the charging station, distribution/collection of batteries daily and collection of rental payments. The entrepreneur will invest a small percentage of the total capital needed and S³IDF's provision of partial guarantee in the form of a fixed deposit will allow the entrepreneur to access a loan from one of the local branches of either the Kalpatharu Grameen Bank (KGB) or the Canara Bank that have been identified as possible local partners (more below). The cost for the project is being worked out based on the number of hawkers willing to participate.

Candidate Investment Site

The location of the project will be in Gubbi Taluk, Tumkur District, Karnataka. The concept is easily replicable in other areas where there are a number of hawkers (at least 20 to make the idea of a centralized charging station feasible, thus making the project cost effective) in a neighborhood. This also ensures that the distribution and collection (of batteries as well as the rental payment) is simplified. Although the neighborhood around M.G.Road in Gubbi has a number of hawkers, present estimate is that about 25 hawkers out of the 40 hawkers would participate in the project. Earlier similar projects fostered by S³IDF have also shown that such a project is viable for the entrepreneur as well in terms of his/her investment. The supplier covers the equipment under warranty for a limited time after which maintenance coverage can be bought annually for a very small amount. The financial institution's investment is also considerably risk-free given that S³IDF would put in a partial guarantee and the technology supplier would provide a buy-back guarantee under its terms and conditions.

Know-how and Technology Partners and Supply Chain Issues

SELCO Solar Light Pvt. Ltd., with its registered office in Bangalore, Karnataka will be, the local PV equipment supplier. SELCO has extensive experience in sales and service of various lighting and other PV based systems in Karnataka and has an established working relationship with various

financial institutions. SELCO has a wide network and has built a solid rural power delivery infrastructure in Karnataka and adjacent states in Southern India. SELCO from its prior experience and feedback from projects dealing with street hawkers has proposed an innovative Light Points that provides good lighting for the hawkers' wares and comes with a lighter weight battery for easier transportation. Since SELCO does not have a branch in Tumkur or Gubbi, the Head office in Bangalore will be responsible for the installation, training and post-implementation complications if any.

Other Partners Stakeholders and Beneficiaries and Related Issues

The micro-enterprise unit (MEU) will be operated and managed by the entrepreneur, Mr. A.B.Vivekananda, who is a trader in the neighborhood and has a history of savings with the KGB. The lighting will be from rechargeable battery-based light points (battery charging powered by individual photovoltaic (PV) panels) that are provided to the hawkers on a "pay for charge" basis. The centralized solar power system consisting of Solar Panels, Batteries, Lights and such other accessories as required, will be located in land rented by MEU and will be purchased using a loan from the local financial institution which the entrepreneur can access based on S³IDF's partial guarantee. Entrepreneur runs an electrical shop & also has the dealer ship with Colgate Company to sell their products at Gubbi. At the end of the loan repayment, the entrepreneur will own the MEU. A prospective financial institution to approach is the local branch of the KGB or Canara Bank. Preliminary discussions with the local branch of Canara Bank have revealed that they are willing to finance provided S³IDF puts up a **100%** guarantee, since Gubbi does not come under their service area. The Kalpatharu Grameen Bank, which is sponsored by the State Bank of Mysore is willing to finance the project at an interest rate of **14%**. Discussions with KGB and Canara Bank are ongoing and the financial institution will be finalized in the feasibility study.

As mentioned above, these light points will result in increased savings and better lighting. Through this and analogous projects, S³IDF wants to prove the validity of a business model having a unique blend of adoption of renewable energy for commercial purposes, serving poor communities with services they need and creating cost-savings, employment and other benefits among socially and economically disadvantaged communities.

Implementation and Other Issues

SELCO will be responsible for the installation and maintenance (for a specified time) of the system. SELCO will also provide the necessary training to operate the charging station. The hawkers have been identified, and a preliminary survey will be conducted with S³IDF's guidance to determine the feasibility of the project. Timely collection of the agreed-upon tariff will be a key factor to the success of the project. Timely distribution and collection of the batteries is also essential to avoid overuse of the batteries resulting in reduced life of the batteries. This is a project concept without complications and hence should have a relatively short timeline to implementation. Using the labeling terms introduced in the Methodology and Criteria Note (Deliverable #1), this is a type I Project I Short Timeline (possible within a few months)/Straightforward. Further pre-investment work will continue.

13) Project Concept Number 13: - Molakalmuru: Light Points for Hawkers

Project Description/Concept

This project is a variation of an innovative project concept originally conceived by S³IDF in partnership with SELCO (more below) to bring affordable lighting services to poor customers without access to the grid (or a reliable grid). The concept involves creation of a Micro Enterprise Investment, which, located in the un-electrified/under-electrified Hawker's (street sellers) community will provide lighting to the hawkers. The hawkers are mostly petty sellers of fruits, vegetables, eateries, tea-stalls etc. and some even use moveable carts to ply their trade. Most hawkers currently use kerosene-based Petromax lanterns, which are comparatively expensive to maintain given the cost of kerosene and frequent replacement of the mantle. Also the kerosene lanterns generate considerable heat (more than a light) that has been known to damage the fruits and vegetables that the hawkers vend.

The light points, which run on batteries charged by solar photovoltaic (PV) panels, are charged during the daytime at a centralized charging station and in the evening, the batteries are delivered to the hawkers for their use. The hawkers use the light points for an average of 4 hours every evening, after which the batteries are returned to the charging station. These are supplied to the hawkers on a daily rental payment for use, which is pre-decided based on their willingness to pay (WTP). The hawkers benefit with better lighting at a lesser cost, thus improving their economic condition. Local unemployed or underemployed persons will fill all employment opportunities in the micro-enterprise, such as maintaining and operating the charging station, distribution/collection of batteries daily and collection of rental payments. The entrepreneur (more below) will invest a small proportion of the total capital needed and S³IDF's provision of partial guarantee in the form of a fixed deposit will allow the entrepreneur to access a loan from the local branch of Canara Bank or Syndicate Bank (or a Grameen bank sponsored by these banks) under the UNEP scheme⁴². The cost for the project is being worked out based on the number of hawkers willing to participate.

Candidate Investment Site

The location of the project will be in Molakalmuru Taluk, Chitradurga District, Karnataka. There are three probable project sites; the first site is Rampur village, where about 40 hawkers might be willing to participate and a women's self help group (members of which are already involved in other income generating activities) under the supervision of GUARD, an NGO would own and operate the charging station. The second site is in Bejikeri village, where 30 hawkers might be willing to participate; an entrepreneur has also been identified but not yet finalized. The third site is in Molakalmuru town with about 40 hawkers participating; however, an entrepreneur is yet to be identified. The concept is easily replicable in other areas where there are a number of hawkers (at least 20 to make the idea of a centralized charging station feasible, thus making the project cost effective) in a neighborhood. This also ensures that the distribution and collection (of batteries as well as the rental payment) is simplified. Earlier similar projects fostered by S³IDF have also

⁴² Launched in 2003, the UNEP Project's objective is to accelerate the market development for solar home systems in southern India by helping to overcome the relative lack of consumer financing options. The project is a partnership between United Nations Environment Programme (UNEP), and its Risoe Centre on Energy, Climate and Sustainable Development (URC), and two of India's major banking groups - Canara Bank and Syndicate Bank. The aim is to help these Bank groups develop lending portfolios specifically targeted at financing solar home systems (SHS). With the support of the UN Foundation and Shell Foundation, the project provides an interest rate subsidy to lower customers financing costs; the banks make the transaction decisions and bear the transaction risks. Only SHS of certain technical specifications and provided by approved suppliers are eligible; SELCO, the proposed technology partner in this project is one of these approved suppliers. After many months of meetings and discussions with UNEP about the benefit of these pro-poor Light Points schemes (not just for hawkers but other poorer communities such as rural women's self help groups [SHGs]), UNEP has agreed to extend the scheme to cover such S³IDF Light Points schemes. As in other projects under the UNEP Project, the banks make the transaction decisions and take transaction risks.

shown that such a project is viable for the entrepreneur as well in terms of his/her investment. The supplier covers the equipment under warranty for a limited time after which maintenance coverage can be bought annually for a very small amount. The financial institution's investment is also considerably risk-free given that S³IDF would put in a partial guarantee and the technology supplier would provide a buy-back guarantee under its terms and conditions.

Know-how and Technology Partners and Supply Chain Issues

SELCO Solar Light Pvt. Ltd., with its registered office in Bangalore, Karnataka will be, the local PV equipment supplier. SELCO has extensive experience in sales and service of various lighting and other PV based systems in Karnataka and has an established working relationship with various financial institutions. SELCO has a wide network and has built a solid rural power delivery infrastructure in Karnataka and adjacent states in Southern India. SELCO from its prior experience and feedback from projects dealing with street hawkers has proposed an innovative Light Points that provides good lighting for the hawkers' wares and comes with a lighter weight battery for easier transportation. SELCO's nearest branch in Harappanhalli will be responsible for the installation, training and post-implementation complications if any.

Other Partners Stakeholders and Beneficiaries and Related Issues

The micro-enterprise unit (MEU) will be operated and managed by the entrepreneur (yet to be decided as mentioned above). The lighting will be from rechargeable battery-based light points (battery charging powered by individual photovoltaic (PV) panels) that are provided to the hawkers on a "pay for charge" basis. The centralized solar power system consisting of Solar Panels, Batteries, Lights and such other accessories as required, will be located in land rented by MEU and will be purchased using a loan from the local financial institution which the entrepreneur can access based on S³IDF's partial guarantee. At the end of the loan repayment, the entrepreneur will own the MEU. A prospective financial institution to approach is the local branch of Chitradurga Grameen Bank (CGB), a Canara Bank sponsored Grameen bank, which is covered under UNEP scheme. As mentioned above, these light points will result in increased savings and better lighting. Through this and analogous projects, S³IDF wants to prove the validity of a business model having a unique blend of adoption of renewable energy for commercial purposes, serving poor communities with services they need and creating cost-savings, employment and other benefits among socially and economically disadvantaged communities.

Implementation and Other Issues

SELCO will be responsible for the installation and maintenance (for a specified time) of the system. SELCO will also provide the necessary training to operate the charging station. The hawkers have been identified, but the specific project site will be determined after the entrepreneur has been finalized. A preliminary survey will be conducted with S³IDF's guidance to determine the feasibility of the project. Timely collection of the agreed-upon tariff will be a key factor to the success of the project. Timely distribution and collection of the batteries is also essential to avoid overuse of the batteries resulting in reduced life of the batteries. This is a project concept without complications and hence should have a relatively short timeline to implementation. This is a type I Project I Short Timeline (possible within a few months)/Straightforward. Further pre-investment work will continue.

14) Project Concept Number 14: - Molakalmuru: Last Mile Electricity Project for a Weavers' Colony at NMS Badawane -

Project Description/Concept

The concept is to provide last mile electricity connection to a weavers' colony in NMS Badawane in Molakalmuru Town, Chitradurga District. Currently, the colony has eighty houses with only six houses having grid electricity. The families residing in these six houses obtained grid electricity by personally paying for the grid connection. The rest of the households do not have the financial ability to pay the regional electricity company (BESCOM) the required charges for individual electricity connections and the initial cost of internal electrical wiring of their houses. A possible extension of the last mile connectivity project would also be to:

- Ensure reliable electricity supply through supply augmentation, as the grid is currently not reliable at the colony.
- Introduce electricity linked end use productivity investments⁴³.

Candidate Investment Site

The weavers' colony is on the outskirts of Molakalmuru town. The colony is two kilometers away from Molakalmuru town in a locality called NMS Badawane. The colony does not have a proper approach road; the current approach road is through private land. The colony also does not have proper water supply. Discussions with the village locals indicate that, if the availability of services, such as water, electricity, and transport improves, the size of the colony could grow to four hundred households.

About **75%** of the households are weavers who work at nearby handlooms as laborers. They are unable to install handlooms in their homes and weave from home due to the lack of sufficient light. The remaining households work as tailors, and as daily laborers. If electricity is supplied, people have expressed their willingness to have their own handlooms as they would have enough light to carry out quality handloom weaving. Additionally with electricity supply, the productivity of the existing weaving units will increase as weavers will be able to work after dark and introduce productivity improvements in the handlooms. Other self-employment opportunities dependent on electricity will open to the households of the village. Providing electricity will also help children to study at night, which is one of the most important needs of electricity expressed by the households.

Know-how and Technology Partners and Supply Chain Issues

Since BESCOM is the existing regional electricity utility, BESCOM will be the logical choice as the electricity supplier. For extending the grid to individual households through BESCOM, BESCOM requires electricity meters to be installed in every household and the households to pay for the electricity meter charge and the cost of laying the transmission lines in the colony. One option for community households to avoid the cost of installing individual electricity meters and simplify the process of dealing with BESCOM is to form an electricity users' association, as allowed by the Electricity Act of 2003. In accordance with this Act, the electricity users' association installs the transmission lines for the households, draws power from BESCOM as a single entity, and manages the distribution of electricity to the households. This arrangement might require the electricity users' association design tariff structures with the installation of a single electricity meter to avoid the cost of installing individual household electricity meters. If this

⁴³ See concept piece, Molakalmuru: Energy Productive Use for Silk Weaving Units

arrangement is pursued, the collection of the electricity user charges will be entirely managed by the electricity users' association and the association will pay BESCO for the electricity usage of the households drawing power through the association.

To ensure reliable electricity supply, the weavers' colony can look into various grid electricity augmentation options. Technological solutions for the augmentation can be through energy generation based on biomass, biogas, uninterrupted power supply (UPS) system, and solar power, etc. The ownership and operating responsibility of augmentation will largely depend on the technological option that is chosen.

The choice of biomass or biogas sources for supply augmentation will depend on the availability of feed supply and the existence of technology suppliers in and around Molakalmuru. With regard to biogas feed, the colony currently has twenty cows, which could be utilized for biogas feed. The various supply augmentation options with respect to UPS and solar power will be considered in the pre-feasibility of the Molakalmuru weavers' light point project.

Other Partners Stakeholders and Beneficiaries and Related Issues

The beneficiaries of the project will be the people of the community. The quality of life in the colony will improve as, for example, productivity-linked employment options will open up and children will be able to study at night. The households in the colony are in the process of forming an association, which can be extended to be an electricity users' association.

Implementation and Other Issues

This project requires the following activities to be in place before it can move into implementation:

- The weavers' colony should form an electricity users' association.
- With S³IDF's help, the association will bring in BESCO as a technology partner and look into the requirements of electricity supply augmentation and doing the augmentation if required.
- The association will also have to choose the appropriate technology, ownership, and operational model.

This is a type III Project – “Long Timeline (could be a year, even more)/But Doable.

15) Project Concept Number 15:- Molakalmuru: Energy linked ICT project at Kondlahally Rural High School

Project Description/Concept

This Information and Communication technology (ICT) project concept is to provide computers to a high school (Kondlahally Rural High School) in Kondlahally village. The computers will provide computer training to children during the school hours. The computers will be utilized as a revenue generation source after school hours by providing computer related services, such as accessing agricultural information through the Internet, to the village locals. Telephone lines exist in the village for Internet connectivity. Since the village experiences power cuts, especially during the summer months, providing reliable electrical supply to the computers, such as by means of an uninterrupted power supply (UPS) system and/or supplemental supply by PV system, will also be part of the project.

Candidate Investment Site

The school is the only high school in Kondlahally village, Molakalmuru Taluk, Chitradurga District, Karnataka. There are approximately five hundred children in the school and eleven teachers. As the school is a government aided Kannada medium school, the government pays the teachers' salaries. A committee comprising of Kondlahally residents manages the school. There is no computer center in the entire village and hence, a computer center at the school will help children and locals in bridging the digital divide. A room for the computer center in the school has already been identified. The school has grid electricity. Although the school experiences a few hours of power shut down everyday, the electricity supply appears adequate to run the computers on a UPS system during electricity shut downs.

Know-how and Technology Partners and Supply Chain Issues

Mr. Revenna, a local village businessman, champions the computer center in the school. Mr. Revenna is the Secretary of the school committee and has the backing of the committee for setting up the computer center. Mr. Revenna previously funded the extension of the school building. By housing the computers in an existing schoolroom, the capital cost of physical premises for the computers is avoided. To reduce the capital cost for the computers, second-hand computers will be procured. The first choice of procuring second-hand computers is Indian IT companies, such as Infosys and Wipro. The second choice for second-hand computers is World Computer Exchange (WCE) based in Boston, USA. WCE procures second-hand computers from industrialized countries and supplies these computers to schools in developing countries. S³IDF staff has been in dialogue with WCE, which has agreed in principle to support school's project such as the one in Kondlahally.

Providing the appropriate educational content for the children is another essential requirement. One of the candidate partners for the children's educational content is the Azim Premji Foundation, which has agreed in principle to support schools, such as Kondlahally Rural High School. Azim Premji Foundation works with a large number of government schools in the state of Karnataka and their material is largely in the local language.

A critical component for the success of the computer education project will be the presence of a well trained instructor who can provide appropriate computer training to the children and an entrepreneur who can run the center on a for profit basis after school hours. Both the instructor and the entrepreneur will be selected from the villages by the school authorities. The training for the instructor will be done by the Azim Premji foundation, whereas the training for the entrepreneur will be provided if required, through a yet to be identified organization.

To run the computer center after school hours on a financially sustainable basis will largely depend on the center being able to provide value added services to the local population. This requires an understanding of the services that would attract the local population. Other than providing vocational computer training, most services require Internet connectivity. The village has telephone lines and hence Internet connectivity can be provided through telephone lines. However, the reliability of Internet connectivity through telephone lines needs to be examined. Another requirement for revenue generation services would require collaboration with other partners, such as with the state government that has plans to implement e-government services through village kiosks. Further work needs to be done on identifying ways in which the computer center can be run on a financially sustainable basis and in forming collaborations with various service partners.

Other Partners Stakeholders and Beneficiaries and Related Issues

The school will be the key partner in the project. The school will participate by putting up a certain minimum initial investment through the school committee and in running the computer center on a financially sustainable basis by requiring the students utilizing the computers to pay a nominal fee that will cover the computer instructor's salary and the center's maintenance. The school will also work to ensure that the benefit of the computer center is extended to the local population by opening the computer center for the local population after school hours and also in running this set up through an entrepreneur on a financially sustainable basis.

School children are benefited through computer education, the locals are benefited by access to information and other computer related services, and local employment is generated through people employed to teach the children and run the computer center after school hours.

Implementation and Other Issues

This project requires a number of further activities to be undertaken before it can go to implementation, including:

- Identifying the suppliers for the computers.
- Identifying a computer instructor and providing training;
- Establishing partnerships for revenue generating services after school hours;
- Identifying ways of running the computer center after school hours on a financially sustainable basis;
- And identifying an entrepreneur to run the computer center after school hours.

In effect, a business plan is needed for the education cum Internet service enterprise that is to be a collaboration of various parties. Using the labeling terms introduced in the Methodology and Criteria Note (Deliverable #1), this is a type III Project – “Long Timeline (could be a year, even more)/But Doable

16) Project Concept Number 16:- Molakalmuru: Energy Productive Use for Improved Silk Weaving Units

Project Description/Concept

The concept is to increase the productivity of the handloom-weaving units by assisting an entrepreneur to install an electric driven thread-rolling unit that spins threads onto cylinders. When used on existing retrofitted hand-weaving machines, an electric-driven thread rolling unit increases the productivity of the handlooms by around **30%**. One rolling unit can serve many weavers, depending on the hours worked. The project could also extend to providing financial assistance to individual weavers to retrofit their handlooms so that that machine rolls can be used in their handlooms. Currently, only around **1%** of weavers in Kondlahally have retrofitted handlooms and those with the retrofit get their cylinders thread rolled by traveling to the nearest rolling unit at Molakalmuru.

Candidate Investment Site

The weavers' colony is in a village called Kondlahally, 15 kilometers from Molakalmuru town. The village has five hundred handlooms and less than ten handlooms have the necessary retrofit to use the machine rolled thread. The weavers are organized into Self Help Groups (SHGs). Brahmputra SHG is one of the SHGs interested in retrofitting the handlooms of its members.

Brahmaputra SHG has fourteen members and one of its members, the entrepreneur, is keen on investing in the thread-rolling unit. The investment required for the thread rolling unit is INR 25,000 and the investment required for retrofitting each handloom unit is INR 1,000.

Know-how and Technology Partners and Supply Chain Issues

There are a number of suppliers who can supply the thread rolling machine, but none in Molakalmuru taluk. Nearest suppliers of this machine are in Bangalore or Dharmavaram, Andhra Pradesh. A possible supplier of this machine is Mr. Byrappa and Sons in Bangalore. Local suppliers in Molakalmuru can do the retrofit required for the individual handlooms.

Other Partners Stakeholders and Beneficiaries and Related Issues

The Brahmaputra SHG will be the key partner. Members can avail financing for individual retrofitting through their SHG. The entrepreneur putting up the initial investment for the thread rolling machine would require financial assistance to install the system. The weavers, entrepreneur and employees in the rolling unit will be the main beneficiaries. The weavers gain from increased productivity, which in turn leads to higher incomes. Village weavers also avoid traveling 15 kilometers or more to the nearest rolling unit, saving time and transportation costs. The entrepreneur will gain from running the enterprise on a for profit basis. By providing employment opportunities other village locals also benefit. The threading machine runs on a 2 HP motor and hence would be dependent on reliable grid electricity. As of now the village does not have severe power cuts (shut down of 4 to 5 hours in a day) and hence the availability of power should not be a problem. Although, currently power cuts are not a problem, there is a possibility that the supply situation might deteriorate. In case the supply of power deteriorates, the working of the unit can get affected and additional backup supply will be needed.

Implementation and Other Issues

The capability of the identified entrepreneur to undertake the enterprise and the ability of a minimum number of weavers to undertake the retrofit needs to be determined. Once this is done, the suppliers for the cylinder equipment and the local retrofitters also need to be finalized. Considering the above, this will be a project concept without complications and hence should have a relatively short timeline to implementation. It is a type II Project Timeline (many months)/Relatively Straight Forward. Further pre-investment work will continue.

Investment Feasibility Assessment

- Chintamani: Solar Home Systems for SHG members at Iragampalli
- Doddaballapur: Light Points for Hawkers
- Molakalmuru: Lighting Options for Weavers' SHG
- Chintamani: Light Points for Hawkers
- Gubbi: Light Points for Hawkers
- Molakalmuru: Light Points for Hawkers

Each of these six Feasibility project assessments is presented in stand-alone notes.

Feasibility Assessment Number 1⁴⁴ - Chintamani: Solar Home Systems for SHG members at Iragampalli

Project Description/Concept

The project concept entails providing individual solar photovoltaic (PV) systems with single light points to members of a women's self-help group (SHG), Chintamani Taluk, Kolar District, Karnataka. The 20-member strong SHG has a very good credit record of saving and borrowing and repaying loans from the local branch of Canara Bank. The SHG members are involved in income generating activities like making masala powder. The light points will help the SHG members increase their income by allowing them to work extended hours. The area is connected by gridlines, but the power transmission is erratic. There are daily power outages for a minimum of six to eight hours, usually during the evenings, during which most residents use candles or kerosene lamps for their lighting needs. The alternative lighting option provided in this project is from rechargeable battery-based light points (battery charging powered by individual PV panels). The light points have been provided initially to five members of the SHG. Based on the experience and feedback of the initial five members, the remaining SHG members may join the project at a later time. At the outset, the SHG did not have the capacity to pay the margin money (loan down payment) in one installment. S³IDF's provision of guarantee (security) for the margin money in the form of a fixed deposit allowed the initial five SHG members to access loans from the local branch of Canara Bank under the UNEP scheme⁴⁵. S³IDF will continue to make similar financial arrangements for other SHG members that wish to join the project.

⁴⁴ This project "leaped" since it was first identified as a concept for inclusion on "the long list." This project went from concept to feasibility to agreement between the parties on a very short timeline. The project has already been implemented. Reported here is the feasibility note.

⁴⁵ Launched in 2003, the UNEP Project's objective is to accelerate the market development for solar home systems in southern India by helping to overcome the relative lack of consumer financing options. The project is a partnership between United Nations Environment Programme (UNEP), and its Risoe Centre on Energy, Climate and Sustainable Development (URC), and two of India's major banking groups - Canara Bank and Syndicate Bank. The aim is to help these Bank groups develop lending portfolios specifically targeted at financing solar home systems (SHS). With the support of the UN Foundation and Shell Foundation, the project provides an interest rate subsidy to lower customers' financing costs. The banks make the transaction decisions and bear the transaction risks. Only SHS of certain technical specifications and provided by approved suppliers are eligible; SELCO the proposed technology partner in this project is one of these approved suppliers.

Specific Investment Site

The project is in Iragampalli village, Chintamani Taluk, Kolar District, Karnataka, where members of the SHG, Jyoti Mahila Sahaaya Sangha reside. A common charging station was considered and determined not financially feasible for just the initial five members interested in light points. Instead, individual solar PV systems were recommended as this was found to be more financially viable (and easily managed), and the women were willing to pay for these systems as well. Each participating SHG member has a single solar home lighting system installed which consists of an individual panel, charge controller, battery and a light point.

Further Pre- Investment Activities, Know-how and Technology Partners and Going Forward-Implementation Related Issues

SELCO Solar Light Pvt. Ltd., with its registered office in Bangalore, Karnataka, and a branch office in Kolar is the local PV equipment supplier. SELCO completed the installation for the initial five systems and is responsible for the maintenance (for a specified time) of the system. SELCO also provided the necessary training to operate the equipment. SELCO's Kolar office is responsible for post implementation problems that could arise because of its proximity to Iragampalli, Chintamani (approximately 50 Kilometers).

The cost of the equipment is INR 30,000 (INR 6,000 per Light Point system). The solar panels have been installed on the houses of participating SHG members. As the PV systems are operated by the women themselves for their personal use, the project does not involve any operating costs. However, there will be maintenance required for the batteries (topping of battery with distilled water). The responsibilities of the SHG members are to maintain and operate the equipment in accordance with any instructions that SELCO provides and to promptly pay the loan and guarantee fees.

As mentioned above, S³IDF's provision of the guarantee money in the form of fixed deposit for the margin money on behalf of the SHG enabled the SHG to access **100%** of the loan amount from the Iragampalli branch of Canara Bank. S³IDF has been instrumental in developing working relationships between Resource Service Center (RSC), the non-profit organization that groomed and helped form the SHG, the SHG, Jyoti Mahila Sahaaya Sangha (the beneficiaries), SELCO (the technology supplier), and Canara Bank (the financial institution). S³IDF will continue in this role and see the project through completion. Later, S³IDF will be involved in the monitoring and evaluation of the project to determine the extent of success of the project. S³IDF's monitoring activities will include assessing whether there is compliance with covenants in the financial institution's loan agreement with the SHG. If an assessment reveals the SHG is not meeting these standards, S³IDF shall take necessary steps to encourage or compel compliance⁴⁶.

Critical factors that will need to be managed post implementation, to ensure success and sustainability are:

- Punctual charging and discharging of batteries and diligent battery maintenance are critical to ensuring high battery life.
- A small amount (maintenance fee) should be kept aside for the replacement of any parts, especially the battery, if the parts deteriorate after the warranty period.

⁴⁶ S³IDF has a signed Memorandum of Understanding (MoU) with the SHG and technology supplier and a Letter of Understanding (LoU) with the Iragampalli branch of Canara Bank. The MoU defines the terms and conditions and the responsibilities of each partner. The LoU and MoU are presented in Appendix F.

- Prompt service from the technology provider (in this case SELCO) to the entrepreneur.

Benefits and Beneficiaries and Related Issues

The SHG, Jyoti Mahila Sahaaya Sangha was formed under the supervision of RSC, an active NGO in Chintamani, and is the primary beneficiary of this project. At the end of the loan repayment, the individual SHG members will own the PV systems.

As mentioned above, the small-scale businesses operated by these women thrive due to extended work hours. Further, since the location of the light points is in their homes, it provides the additional non-quantifiable utility of home lighting for purposes such as cooking and other household chores, reading, children's schooling etc. As seen with earlier projects, these light points are safer to handle and also result in increased savings over the traditional kerosene-based lamps.

The concept and innovative financing is intended to set an example for other Financial Institutions to change their business as usual practices (BAUs). The concept is easily replicable and sustainable in other similar areas where residents are without access to the grid (or a reliable grid) and local SHGs already have an established banking relationship and they have a willingness to pay for reliable home lighting. The economic benefits are higher especially if the SHG members are involved in small-scale income generating businesses.

This project concept replaces the current usage of kerosene fuels for the lamps, resulting in Green House Gases (GHGs) benefits as well⁴⁷.

Project Viability at the Feasibility Level: Cost versus Benefits for the Specific Investment [with Site(s) Specific Details]

The overall cost of the system is INR 30,000 for five units (INR 6,000 per Light Points system). As per the norms of the UNEP scheme, the SHG was required to make the down payment of **15%** of the cost of the system. A loan from the bank was needed to cover the remaining **85%** of the system's total cost. S³IDF provided the guarantee for the **15%** margin money on behalf of the SHG⁴⁸ in the form of a fixed deposit at the bank and the bank financed **100%** loan to the SHG. The spreadsheet analysis⁴⁹ indicates that for a five-year term loan, the SHG will have to collect INR 6 every day for the loan repayment.

Bottom Line

The viability of the project is dependent on the following three perspectives:

The SHG's Perspectives:

Pre-investment surveys indicated that the SHG's current expenditure on kerosene lamps, candles and other lighting usage (e.g. unreliable electricity) varied somewhat but was typically about INR 3 to INR 5 per day, including occasional replacement and maintenance. Despite projected financial

⁴⁷ The GHG benefits will be calculated either on the basis of kerosene substitution or by the calculation of GHG benefits from previous solar photovoltaic use since there is a standard formula.

⁴⁸ S³IDF collects guarantee fees from the SHG based on the amount kept in the bank as security.

⁴⁹ The operating and maintenance cost, including funds available for battery replacements after the term of the loan is factored into the spreadsheet for calculating the daily repayment.

calculations which show the daily payment for the PV light points system to be INR 6, there was a preference and willingness to pay for light points over kerosene lamps based on the SHG's existing expenditure and because the light points were ascertained to illuminate better. From the SHG's perspective, the crucial factor in pursuing the Light Points option was making the down payment for the loan. As a result of S³IDF's support, the bank agreed to provide **100%** financing for the loan and the SHG was able to choose its Solar Light preference over any other technology option.

The Bank and S³IDF's Perspectives

The SHG has a very good track record of saving, borrowing and repaying loans from the local branch (Iragampalli) of Canara Bank. The SHG members are involved in income generating activities like making masala powder. Using light points would help SHG members increase their income by allowing them to work extended hours. The Bank was willing to provide financing for the project based on the SHG's credit record and the benefits mentioned above. The financing was independent on the term of loan, regardless of whether the **15%** of the capital cost of the system was provided by the SHG or another representative on behalf of the SHG (in this case S³IDF in the form of a guarantee). S³IDF was confident that the investment was feasible from the SHG's perspective and provided the guarantee for the first five SHG members' down payment in order to facilitate the bank's participation. S³IDF plans to make similar financial arrangements for other SHG members that wish to join the project. The Bank's investment is also considerably risk-free given that S³IDF provided a guarantee and the technology supplier provided a buy-back guarantee under its terms and conditions.

From the above perspectives, the project appeared viable, sufficiently pro-poor according to S³IDF's mission, and straightforward with a short time-line. S³IDF proceeded to move the project to closure. This included further discussions with Canara Bank and with SELCO to finalize the cost estimates and agreements between all the parties. The project is in implementation.

Feasibility Assessment Number 2 - Doddaballapur: Light Points for Hawkers

Project Description/Concept

This project is a variation of an innovative project concept, originally conceived by S³IDF in partnership with SELCO (more below), to bring affordable lighting services to poor customers without access to the grid (or a reliable grid). The concept involves the creation of a Micro Enterprise Investment, which, located in the un-electrified/under-electrified hawker's (street sellers) community will provide lighting to the hawkers. The hawkers are mostly petty sellers of fruits, flowers, vegetables etc. and some even use moveable carts to ply their trade. Most hawkers currently use kerosene-based Petromax lanterns, which are comparatively expensive to maintain given the cost of kerosene and frequent replacement of the mantle. Also, the kerosene lanterns generate considerable heat that is known to damage the fruits, flowers and vegetables that the hawkers vend.

The light points, which run on batteries charged by solar photovoltaic (PV) panels, are charged during the daytime at a centralized charging station and in the evening, the batteries are delivered to the hawkers for their use. The hawkers need the light points for an average of four hours every evening, after which the batteries are returned to the charging station. These are supplied to the hawkers on a daily rental payment for use, which is pre-determined based on their Willingness to

pay (WTP). The hawkers benefit with better lighting at a lesser cost, thus improving their economic condition. Local unemployed or underemployed persons will fill all employment opportunities in the micro-enterprise, such as maintaining and operating the charging station, daily distribution and collection of batteries and collection of rental payments. The original concept was that the entrepreneur would invest a small proportion of the total capital needed and S³IDF's provision of partial guarantee, in the form of a fixed deposit, would allow the entrepreneur to access a loan from the local branch of Canara Bank or Syndicate Bank under the UNEP scheme⁵⁰. Subsequent discussions and preliminary agreements (more below) have been conducted with only the Canara Bank.

Specific Investment Site

This project involves the creation of a Micro Enterprise Investment owned and operated by a local small businessman, Mr. Nagaraj Naik B (who currently runs a computer education center). The charging station will be located on land that is already being rented by him for running the computer education centre. The micro-enterprise will serve un-electrified hawkers' around Doddaballapur Bus Station, D cross, TB cross and Railway Station in Doddaballapur Taluk and provide lighting to these hawkers. There are about 250 hawkers in the above-mentioned neighborhood, but this project will start with 35 hawkers and depending on the progress and success others might join at a later time.

Further Pre- Investment Activities, Know-how and Technology Partners and Going Forward-Implementation Related Issues

SELCO Solar Light Pvt. Ltd., with its registered office in Bangalore, Karnataka will be the local PV equipment supplier. The estimated cost at the Feasibility level for the equipment (including all the components of the project) is approximately INR 200,000⁵¹. The ongoing expenses for the personnel in-charge of operating and maintaining the charging station and the batteries, distribution and collection of the batteries, as well as for collection of the rental payment will be disbursed from the income generated. The work involved will be on a daily basis but for a few hours only. The estimated salary for this part-time work is about INR 1500-2000 per month. Rental for the land where the charging station will be installed is not an additional expense, since the entrepreneur is already renting the land for operating the computer center.

SELCO will also be responsible for the installation and maintenance (for a specified time) of the system. SELCO will also provide the necessary training to operate the charging station. SELCO's Bangalore office will be responsible for post implementation problems that could arise, because of its proximity to Doddaballapur (approximately 40 kilometres).

⁵⁰ Launched in 2003, the UNEP Project's objective is to accelerate the market development for solar home systems in southern India by helping to overcome the relative lack of consumer financing options. The project is a partnership between United Nations Environment Programme (UNEP), and its Risoe Centre on Energy, Climate and Sustainable Development (URC), and two of India's major banking groups - Canara Bank and Syndicate Bank. The aim is to help these Bank groups develop lending portfolios specifically targeted at financing solar home systems (SHS). With the support of the UN Foundation and Shell Foundation, the project provides an interest rate subsidy to lower customers financing costs; the banks make the transaction decisions and bear the transaction risks. Only SHS of certain technical specifications and provided by approved suppliers are eligible; SELCO, the proposed technology partner in this project is one of these approved suppliers. After many months of meetings and discussions with UNEP about the benefit of these pro-poor Light Points schemes (not just for hawkers but other poorer communities such as rural women's self help groups [SHGs]), UNEP has agreed to extend the scheme to cover such S³IDF Light Points schemes. As in other projects under the UNEP Project, the banks make the transaction decisions and take transaction risks.

⁵¹ The estimates given are based on the Feasibility analysis. There could be $\pm 5\%$ tolerance.

The entrepreneur conducted a survey under S³IDF's guidance to determine the feasibility of the project. The Doddaballapur branch of Canara Bank has been approached to help finance the project under the UNEP scheme. The entrepreneur will be able to access a loan from the Bank based on S³IDF's partial guarantee to the bank. The responsibilities of the micro-enterprise unit (MEU) are to operate the scheme and its equipment in accordance with any instructions that SELCO provides and to promptly pay the loan and guarantee fees. S³IDF's monitoring activities will include assessing if S³IDF's mission is being met with regard to how the MEU is being operated, and/or whether there is compliance with covenants in the financial institution's loan agreement with the MEU. If an assessment reveals the MEU is not meeting these standards S³IDF shall take necessary steps to encourage or compel compliance⁵².

Critical factors that will need to be managed post implementation, to ensure success and sustainability are:

- Good relationship building and management by the entrepreneur with his client hawkers to ensure that rental payments by the hawkers are prompt and regular. For this:
 - Punctual distribution of batteries and diligent battery maintenance are critical to ensuring good service to the hawkers, which is the heart of any customer relationship management.
 - Punctual collection of batteries is equally important as it can otherwise lead to over discharge of the batteries coupled with incomplete recharge due to less availability of sunlight hours. Such incomplete discharge will in turn result in low battery life, high battery maintenance costs and adverse impacts on quality of service to the hawkers.
- Prompt service from the technology provider (in this case SELCO) to the entrepreneur.

Benefits and Beneficiaries and Related Issues

The business model enables diffusion of solar technology in such a way that the benefits and beneficiaries are multiple. The main beneficiaries are the hawkers, as the light points will result in savings and better lighting. Savings for the hawkers could translate into better quality of living for their families. The perishable wares that the hawkers sell last longer due to reduced heat from the light points (as compared to the traditional lighting sources used). This adds to the economic benefit for the hawkers.

The micro-enterprise unit (MEU), operated and managed by the entrepreneur, has increased income generation; thus the entrepreneur is another beneficiary. At the end of the loan repayment, the entrepreneur will own the MEU. Person(s) employed by the MEU for the various responsibilities (as mentioned above) are the other beneficiaries. This project concept replaces the current usage of kerosene and LPG as fuels for the lanterns, resulting in Green House Gases (GHGs) benefits as well⁵³.

Project Viability at the Feasibility Level: Cost versus Benefits for the Specific Investment [with Site(s) Specific Details]

The overall cost of the system is estimated to be INR 200,000. The entrepreneur will have to make the down payment of **15%** of the cost of the system as per the norms of UNEP scheme under which the project will be financed. The remaining **85%** amount will be the loan from the bank

⁵² S³IDF has prepared a draft of Memorandum of Understanding (MoU) with the entrepreneur and technology supplier. The MoU defines the terms and conditions and the responsibilities of each partner.

⁵³ S³IDF has calculated GHG benefits from analogist hawkers Light Points projects that are in operation. Similar calculations will be done for other hawkers Light Points projects.

with S³IDF providing the partial guarantee on behalf of the entrepreneur⁵⁴. The cash flow is calculated on the basis of return on labour and equity of the entrepreneur. Based on three-year loan term, the equity payback period for the entrepreneur will be less than two years. The return on the investment is attractive and viable for the entrepreneur to undertake the project. See attached spreadsheet on the detailed cash flow analysis⁵⁵.

Initial Bottom Line

The viability of the project is dependent on the following four perspectives:

The Hawkers Perspectives:

Pre-investment surveys indicated that the hawkers' current expenditure on kerosene lanterns varied somewhat but was typically about INR 15 to INR 17 per day, including occasional lantern part replacement. The preference and willingness to pay studies indicated a clear preference for light points over kerosene lanterns as these were ascertained to better illuminate the hawkers' goods. A willingness to pay of INR 10 to 12 per day was determined for four hours of use of the light points, as well as a willingness to pay an additional fee for increased usage beyond the stipulated time. The pre-investment analysis suggested that in order to achieve viability from the entrepreneur's perspective, a minimum pay-for-charge fee of INR 10 would be required.

The Entrepreneur's Perspectives:

From the entrepreneur's perspective, the scheme's capital and operating costs fall into four categories: i) investment financing costs, ii) other costs for the charging station (premises rent and maintenance), iii) battery transport (two wheeler transport or hired three-wheeler), maintenance and periodic replacement, and iv) labor (self or wage employee). The key question is the residual margin or entrepreneurial returns after all these costs are netted from the total revenue. Revenues are obviously a function of the pay-for-charge fee and the number of hawker customers. The entrepreneur's capital and operating costs are strongly influenced by financing costs that in turn are a function of interest rates, guarantee fees and term of the loan. And further from the entrepreneur's perspective when weighing risks versus return, there is some consideration of short and medium term versus longer term, the former being when the debt is financed and the latter after the debt is paid but the scheme continues and the margins are higher. The spreadsheet shows the feasibility of the project from the entrepreneur's perspective.

The Bank and S³IDF's Perspectives:

Due to the apparent financial viability of the business, based on a financial analysis (see above and attached spreadsheet) included in detailed project reports along with prior case studies and the attractive returns from this proposed project, the Bank has shown the willingness to provide financing for the project on a shorter-term loan of three years. From S³IDF's perspective, it is clear that the investment is feasible from the hawkers' and entrepreneur's perspectives and S³IDF is prepared to provide the guarantee to facilitate the bank's participation. The Bank's investment is also considerably risk-free given that S³IDF will provide a partial guarantee and the technology supplier will provide a buy-back guarantee under its terms and conditions. At the point of financial closure, based on 35 hawker customers and the three-year financing, the entrepreneur's margin

⁵⁴ S³IDF collects guarantee fees on the partial guarantee from the entrepreneur and will be putting 25% of the loan amount as the partial guarantee. More details provided in the spreadsheet.

⁵⁵ The operating and maintenance cost has been taken in the spreadsheet. This is on the basis of analogist hawkers' Light Points projects under operations and calculating the numbers after discussing with the entrepreneur and technology supplier.

(INR 1400 per month [\$30 per month]) will be sufficient for him to take the investment decision⁵⁶ (and risk).

From the above perspectives, the project appears viable, sufficiently pro-poor according to S³IDF's mission and straightforward with a short time-line. S³IDF will proceed to move the project to closure. This will include further discussions with Canara Bank and with SELCO to finalize the cost estimates and agreements with all the parties within the concept of this TO. This documentation will be part of Deliverable #4.

Doddaballapur Light Point Project - Costs and Recovery through battery rentals under UNEP scheme - Canara Bank Procedure

Canara bank procedure

1. Investment from the Entrepreneur/SHG/Owner Operator has to be 15% of the total cost (Margin)
2. Estimated Monthly Instalments (EMI) will be calculated on the interest rate of
3. Maximum loan tenure of 5 years and minimum of 3
4. EMI Holiday case: EMI is waived off for the last 3 months of the loan tenure for a loan term of 3
5. EMI Holiday case: EMI is waived off for the first 3 months and last 5 months of the loan tenure for a loan term of 5
6. Non EMI Holiday case: 15% of the 85% loan amount will be waived off from last 8 months of loan payment under 5 year

Financing Costs

Number of Shop keepers	35
Cost of system (See Note 1)	200,000
Cost of Vehicle	
Total Cost	200,000
Promoter Contribution	30,000
Loan Amount	170,000
Interest Rate per month (Taking	0.90%
Loan Tenure	3
Loan Tenure	36
Repayment Installment (Interest and	5,545.48
Total Interest Paid on the	29,637.17
Interest per month	823.25

Cash flows from the PV Lantern Rentals (monthly)

	In Year 1	In Year 2	In Year 3	Last 3 months	Post Loan Period
Rent per Lantern per day (See Note	10	10	10	10	10
Receipts per day	350	350	350	350	350
Monthly Revenue (assuming 25	8,750	8,750	8,750	8,750	8,750
Less: :Monthly Expenditure (sum of	7,331	7,481	7,646	2,101	2,282
Monthly Loan	5,545	5,545	5,545		
Cost of Delivery to Hawkers (Transport + Delivery boy Salary) (See Note	1,500	1,650	1,815	1,815	1,997
Premises: Rent for placing panels and batteries (See Note					
Other Maintenance Cost (See Note	286	286	286	286	286
Monthly Surplus (Return on labour & equity for Entrepreneur)	1,419	1,269	1,104	6,649	6,468
Annual	17,026	15,226	13,246		
Equity Payback	2				

Note 1: Additional 5 spare batteries and Light Points are factored in for any

Note 2: Depends on site survey - Rs 10/day is likely minimum based on existing experience but hawkers' willingness to pay is Rs

Note 3: Assume 10% per annum

Note 4: We are not taking this in the project cash flows as the site is already owned by

Note 5: Monthly Maintenance Cost Ploughed back for any

	285.71	5% of per Light Point Cost
No. of month of collections of Maintenance	36	(assumption based on analagous hawkers light point project discussions with
Total Collected	10,286	
Cash available per light point for maintenance (replacement) at the end of term	294	5.14% of the cost per Light

⁵⁶ The entrepreneur margin includes returns on labor and equity. This is on the assumption that the entrepreneur is not hiring any employee for maintaining and operating the unit.

Feasibility Assessment Number 3 - Molakalmuru: Lighting Options for Weavers' SHG

Project Description/Concept

This project is to provide lighting for weavers in Kondlahally village in Molakalmuru taluk and help them increase their income by allowing them to work uninterrupted during grid interruptions and for extended hours. Kondlahally village is 15 kilometers from Molakalmuru town. Kondlahally village has around five hundred handloom units housed in individual households. Currently, all the handlooms use either a 60W light bulb or a 40 W tube light to provide light for a single handloom unit. The presence of bright light at all times is necessary for ensuring good quality weaving. Currently, most weavers stop weaving when there is no grid electricity, unless there is adequate sunlight and their weaving units are positioned in the house to receive the sunlight at the weaving section. Hence, power shutdown affects the productivity of the weavers. With reliable lighting, the weaving will not be solely dependent on the supply of grid electricity for lighting, thus increasing the productivity of the weavers.

Field studies conducted by S³IDF at Molakalmuru indicate that, based on the existing supply of grid electricity, weaver's need a few hours of independent light per day (independent-backup from the grid) for their weaving needs⁵⁷. Studies conducted indicate that an 11 W CFL lamp with proper reflecting surface is adequate for their lighting needs. Most of the weavers are organized into Self Help Groups (SHG's). The SHG's have expressed willingness to invest in grid independent lighting. S³IDF has initiated discussions with the Brahmaputra SHG, a SHG with fourteen members, to introduce light points for its members.

The various options by which grid-independent lighting can be provided to the weavers can be categorized on the basis of technology, ownership and operations responsibilities:

Option 1: Individual Lighting Systems – Charging through Grid: This system consists of a battery and an inverter system at each household. The battery is charged from the grid. When there is no grid electricity, the Light Points is plugged manually or automatically to the battery to draw power from the battery through the inverter.

Option 2: PV Individual Lighting Systems: This system is a single Light Points solar home system. The system consists of a battery, a charge control unit (CCU), and a PV panel at each household. The battery is charged from the PV panel. This system will be parallel to the grid.

Option 3: PV-Grid Hybrid Individual Lighting System: This system is similar to Option 2, with the battery charged through a combination of PV and grid. This system consists of a battery, a CCU, a PV panel, and an inverter system. However, a single light of 11 Watts expected to provide grid independent lighting for only four hours in a day represents too small a load to design a small enough PV component in a Grid-PV hybrid. Thus, investing in a PV-Grid hybrid will necessarily lead to over-engineering the system and this option is therefore an expensive option. Hence this option has not been further considered in the Feasibility study.

⁵⁷ Through the pre-investment survey conducted by S³IDF for the weavers', a requirement of 3 to 5 hours of grid-independent light was found to be necessary. However, 4 hours of grid-independent light has been considered for the Feasibility analysis.

Option 4: Centralized charging station - charging through Grid: This system consists of a centralized battery bank that is charged from the grid. The main components of the system are: a centralized battery bank and a UPS (Uninterruptible Power System) system. The centralized battery bank is charged from the grid. The UPS automatically supplies power stored in the battery during power shutdowns. Power from the battery bank is distributed to the individual light points through distribution wires. The inverter in the UPS converts DC power from the battery to AC power and supplies it to the households through distribution lines. The battery bank will be located at a central location from all the households. The location will be owned or rented by the SHG/entrepreneur.

	Type of system	Power source	Distribution	Ownership	Operational responsibility
1.	Individual Lighting Systems – charging through grid	Grid	NA	Individual households/SHG /collective	Individual households
2.	PV Individual Lighting Systems	PV	NA	Same as above	Individual households
3.	PV-Grid Hybrid Individual Lighting Systems	Grid/PV	NA	Same as above	Individual households
4.	Centralized Charging Station - charging through grid	Grid	Distribution wires	SHG/entrepreneur	SHG/entrepreneur
5.	Centralized Charging Station - charging through grid	Grid	Physical transport of batteries	SHG/entrepreneur	SHG/entrepreneur
6.	Centralized Charging Station - charging through PV	PV	Physical transport of batteries	SHG/entrepreneur	SHG/entrepreneur
7.	Centralized Charging Station- charging through PV/grid hybrid	Grid/PV	Physical transport of batteries	SHG/entrepreneur	SHG/entrepreneur

Option 5: Centralized charging station - charging through Grid: This option is similar to option four, with the difference being that, there will be no distribution lines. Individual batteries will be

charged at the centralized charging station and transported to the households when light is required.

Option 6: Centralized charging station for all light points - charging through PV: This option is similar to the Light Points project model for hawkers, which was originally conceived by S³IDF in partnership with SELCO Solar Light Pvt. Ltd. to bring affordable lighting services to poor customers without access to the grid (or a reliable grid). The same model can be used to ensure better (more reliable) lighting for the SHG members. The lighting will be from rechargeable battery-based light points (battery charging powered by photovoltaic (PV) panels) that are provided to the SHG members on a “pay for charge” basis. The centralized solar power system consisting of solar panels, CCU, batteries, lights, and other accessories as required will be located in land owned or rented by the SHG.

Option 7: Centralized charging station for all light points - charging through PV/grid hybrid: This is also a modification of option six, where the charging of the batteries is done through a combination of grid and PV. The main components of the system are: PV panels, batteries and a charger. The PV panel size required by this system reduces in comparison with option five as the charging of the batteries is simultaneously done through grid and PV. Although this system requires an additional charger compared to option six, the overall initial cost of the system reduces, due to a reduction in the PV panel size.

Specific Investment Site

As mentioned above, the project will be at Kondlahally village, fifteen kilometers from Molakalmuru town. The initial project will involve fourteen members of the Brahmputra SHG. Depending on the progress and success of the project, other weavers in Kondlahally might replicate the project through their SHGs.

Further Pre- Investment Activities, Know-how and Technology Partners and Going Forward-Implementation Related Issues

Know-how and technology Partners: For options with grid charging of batteries (Options 1, 4, and 5), a reliable technology partner and supplier of the equipment is yet to be identified. The search for a partner outside Molakalmuru town is ongoing as there is no such supplier in Molakalmuru. Preliminary discussions have been initiated with suppliers of grid charged battery systems in Bangalore. Based on the suppliers’ quotations, the initial estimated capital costs for options one, four and five are indicated below. Option 4 will require an additional initial investment in distribution lines. The distribution costs are based on supplier quotations and an initial estimate of the distances of the households from each other. A more accurate estimate of the distribution costs would require a detailed survey of the layout of the houses.

The initial capital costs for the various grid-based options have been estimated as below:

	Type of System	Total Capital Cost	Capital cost/Light Points (INR)
Option 1	Individual lighting systems - charging through grid	INR 92400	INR 6600
Option 4	Centralized charging station-charging through grid (distribution through wires)	INR 30900 – INR 34900	INR 2207 – INR 2493
Option 5	Centralized charging station-charging through grid (distribution through transport of batteries)	INR 59900	INR 4279

For options with PV technology (Options 2, 6, and 7), SELCO, with its registered office in Bangalore, Karnataka will be the technology partner and the equipment supplier. SELCO's Bellary office, due to its proximity to Molakalmuru, will be responsible for post implementation problems that could arise, if they happen to supply the systems. The estimated initial capital costs for the various PV options are as follows:

No.	Type of System	Total Capital Cost	Capital cost/Light Points (INR)
Option 2	PV Individual Lighting Systems	INR 103600	INR 7400
Option 6	Centralized charging station-charging through PV	INR 115900	INR 8279
Option 7	Centralized charging station-charging through PV grid hybrid	INR 92900	INR 6636

Operational Responsibility and Maintenance and Going Forward-Implementation Related Issues:

In the case of the individual systems (Options 1 and 2), the ownership of the systems can be with the individual members of the SHG or with the SHG; this is dependent on the structuring of the loan. However, for individual systems, the operational responsibility will always be with the individual households. The centralized systems will be run as a Micro Enterprise Unit (MEU) with the ownership of the MEU with an entrepreneur or with the SHG itself. The entrepreneur model will be analogous to the S³IDF hawkers Light Points projects managed by an entrepreneur. In the case of the SHG owning the charging station, the SHG either appoints a person to operate the charging station and collect the service charges from the users or the SHG members themselves take up the responsibilities of the operator. Unlike the hawkers Light Points enterprise, in this MEU, the time period in the day at which the lights will be required will not be fixed since the light points will be required at times of power shutdowns, which are not predictable. In this MEU,

the lights will be delivered to the users at such times of the day, when it is required. However, this situation will not arise in the case of grid charged centralized station as power is transmitted through distribution lines.

The respective suppliers of the systems will be responsible for the installation and maintenance (for a specified time) of all the systems. The suppliers will also provide the necessary training for the weavers in maintaining the individual systems after the initial warranty period. In the case of the centralized system, the supplier will provide training to the entrepreneur or the person responsible from the SHG for maintaining the system.

S³IDF's monitoring activities will include assessing if S³IDF's mission is being met with regard to how the project is being operated, and/or whether there is compliance with covenants in the financial institution's loan agreement with the SHG or the entrepreneur. If an assessment reveals that the SHG or the entrepreneur is not meeting these standards, S³IDF shall take necessary steps to encourage or compel compliance.

Critical factors that will need to be managed post implementation to ensure success and sustainability of the systems are:

- In the case of the individual systems, proper maintenance of the systems by the households.
- In the case of the centralized grid charging station through distribution lines, proper maintenance of the battery bank and the UPS system at the central location.
- In the case of the other centralized charging station options, punctual distribution and collection of batteries and diligent battery maintenance at the central location.
- Prompt service from the technology provider to individual households or the MEU.
- Prompt payment by the users of the centralized charging station for the services provided by the MEU.
- Prompt payment of the loan by the members of the SHG or the SHG or the entrepreneur, depending on how the loan is structured.

In the case of PV systems, the systems can be financed through the UNEP financing scheme⁵⁸. However, a necessary requirement for availing the UNEP financing is that the SHG should access loan from either Canara Bank or Syndicate Bank or sponsored grameen banks of these two banks. The Chitradurga Grameen Bank (CGB) would be the eligible candidate banking partner in this case. Currently, the Brahmaputra SHG banks with Vyavasaya Sahakara Sanga Bank (VSSB), which is neither a Canara Bank nor a Syndicate Bank sponsored bank. Therefore, the SHG will have to shift its bank if it has to avail the UNEP financing. Brahmaputra SHG has indicated its willingness to shift its bank account to CGB if necessary, and CGB has also indicated its willingness to finance Brahmaputra SHG under the UNEP scheme if the SHG shifts its account. Based on the final Light Points option chosen by the SHG, the decision of shifting the bank will be

⁵⁸ Launched in 2003, the UNEP Project's objective is to accelerate the market development for solar home systems in southern India by helping to overcome the relative lack of consumer financing options. The project is a partnership between United Nations Environment Programme (UNEP), and its Riseo Centre on Energy, Climate and Sustainable Development (URC), and two of India's major banking groups - Canara Bank and Syndicate Bank. The aim is to help these Bank groups develop lending portfolios specifically targeted at financing solar home systems (SHS). With the support of the UN Foundation and Shell Foundation, the project provides an interest rate subsidy to lower customers financing costs; the banks make the transaction decisions and bear the transaction risks. Only SHS of certain technical specifications and provided by approved suppliers are eligible; SELCO, the proposed technology partner in this project is one of these approved suppliers. After many months of meetings and discussions with UNEP about the benefit of these pro-poor Light Points schemes (not just for hawkers but other poorer communities such as self help groups [SHGs]), UNEP has agreed to extend the scheme to cover such S³IDF Light Points schemes. As in other projects under the UNEP Project, the banks make the transaction decisions and take transaction risks.

taken. Parallel talks with VSSB will be initiated to avail VSSB financing for non-PV options, if a non-PV option is the final chosen option.

Benefits and Beneficiaries and Related Issues

The primary beneficiaries are the weavers. With reliable light, the productivity of the weavers improves. Improved lighting will also increase the quality of weaving. Improved productivity and better quality weaving will lead to higher incomes for the weavers. By using a more energy efficient 11W CFL lamp compared to the existing higher wattage light source, power consumption is reduced. In case the final chosen option is a PV based option, there may be GHG emission reduction benefits.

Project Viability at the Feasibility Level: Cost versus Benefits for the Specific Investment [with Site(s) Specific Details]

Cash flow analysis for determining the project viability at the Feasibility level for the various system options have been done by taking the following assumptions: The loan amount will be for **85%** of the total cost of the system. The loan term will be for three years at the standard bank rate of **12%** p.a. for non-PV based systems, and **5%** p.a. (through UNEP scheme-see foot note 1 for additional information) for PV based systems. S³IDF will be putting partial guarantee on behalf of the SHG or entrepreneur to access the loan from the bank. The results of the monthly cash flows analysis considering the monthly loan repayment and the monthly operating expenditure for the various options are as follows:

	Type of System	Monthly expenditures per household in the first three years (INR)
1	Individual Lighting Systems-charging through grid	332
2	PV Individual Lighting Systems	346
3	PV-Grid Hybrid Individual Lighting Systems	Option not considered
4	Centralized charging station - charging through grid (for a range of transmission costs)	168 – 177
5	Centralized charging station - charging through grid (physical transport of batteries)	222
6	Centralized charging station - charging through PV	322
7	Centralized charging station charging through PV/grid hybrid	296

Based on the monthly expenditure on households, the centralized charging station is the least cost option. As indicated earlier, the calculations for this option were done based on a range for the distribution costs. The range was obtained on the basis of an initial estimate of the distances of the houses in the village.

Although the centralized grid charging station is the least cost option, there are various other issues that need to be addressed with this option. Some of the issues are: all the households should agree to having wires drawn to their houses; they will have to agree on the tariff structure as there will be no electricity meter at the household level; to lay the wires on public land, permission will be required from the appropriate authorities; to run the MEU, the enterprise will need to be registered as an electricity users association to be legally allowed to transmit electricity as per the Electricity Act of 2003.

Initial Bottom Line

The viability of the project is dependent on the following four perspectives:

The Weavers' Perspectives:

Pre-investment surveys indicated that the members' current monthly expenditure on electricity is around INR 100 per household (a house with around four to five light points and a TV). The preference and willingness to pay studies indicated a clear preference for reliable light points for increased weaving time and better quality weaving. The cost per day for the various options considered is between INR 6 (centralized grid charging) to INR 12 per day (individual PV systems) for each household. Although, the centralized grid charging option is the least cost option, this option as mentioned above, involves several regulatory and operational issues. Similar to the centralized grid option, the other centralized charging station options also involve operational issues of running the MEU. Therefore, the final choice by the SHG members will be based on costs as well as their confidence in addressing the regulatory and operational issues.

The SHG's Perspectives:

In the case of the individual light points loaned through the SHG, the SHG will be concerned with the members paying the required loan repayment amount, so that the SHG can in turn pay the bank. In the case of the centralized Light Points model, the scheme's capital and operating costs fall into four categories: i) investment financing costs, ii) other costs for the charging station (premises rent and maintenance), iii a) battery transport (for charging station options other than the grid charging), maintenance and periodic replacement, iii b) distribution investment and maintenance costs (for the centralized grid charging station option) and iv) labor.

The primary question for the SHG is whether to run the MEU through an entrepreneur or to run the MEU by the SHG itself - through an appointed operator or the members of the SHG rotating the responsibilities of the MEU. The MEU's capital and operating costs are strongly influenced by financing costs, which in turn are a function of interest rates, guarantee fees, and the term of the loan. Further, from the SHG's perspective when weighing risks versus return, there is some consideration of short and medium term versus longer term, the former being when the debt is financed and the latter after the debt is paid but the scheme continues and the margins are higher.

The Bank and S³IDF's Perspectives:

The bank from which the loan will be eventually taken will depend on the option chosen. In the case of PV options, the bank would be CGB. Initial discussions with CGB have indicated their willingness to provide financing for the project. In the case of the other options, the preferred bank will be VSSB, the existing bank of Brahmaputra SHG. Discussions with VSSB will be taken up in the regard.

From S³IDF's perspective, it is clear that the investment will lead to increased productivity and quality of output for the weavers. S³IDF is prepared to provide the guarantee to facilitate the banks' participation. The Bank's investment is also considerably risk-free given that S³IDF will provide a partial guarantee.

From S³IDF's perspective, the project appears viable, sufficiently pro-poor according to S³IDF's mission.

Feasibility Discussions with the Weavers

The above options were discussed with the concerned weavers of Brahmaputra SHG. The weavers then indicated that, they no longer are keen on investing in light points as the power supply condition has improved after the recent monsoon rains. Currently, there is less than four hours of power cut in five days. However it warrants noting that the situation is likely to change as the government has announced that the current power supply situation may not continue and rural areas might face more power cuts.

Since the weavers are not keen on investing in any of the options mentioned above due to the improved power situation, S³IDF will not proceed to move the project forward till such time the weavers again feel the necessity of light points.

Feasibility Number 4 - Chintamani: Light Points for Hawkers

Project Description/Concept

This project is a variation of an innovative project concept, originally conceived by S³IDF in partnership with SELCO (more below), to bring affordable lighting services to poor customers without access to the grid (or a reliable grid). The concept involves the creation of a Micro Enterprise Investment, which, located in the un-electrified/under-electrified Hawker's (street sellers) community will provide lighting to the Hawkers. The hawkers are mostly petty sellers of fruits, flowers, vegetables, cooked food etc. and some even use moveable carts to ply their trade. Most hawkers currently use kerosene-based Petromax lanterns or Liquid petroleum gas (LPG) based lights, which are comparatively expensive to maintain given the cost of kerosene and frequent replacement of the mantle. Also, the kerosene lanterns generate considerable heat that is known to damage the produce that the hawkers vend.

The light points, which run on batteries charged by solar photovoltaic (PV) panels, are charged during the daytime at a centralized charging station and in the evening, the batteries are delivered to the hawkers for their use. The hawkers need the light points for an average of four hours every evening, after which the batteries are returned to the charging station. These are supplied to the hawkers on a daily rental payment for use, which is pre-determined based on their Willingness to pay (WTP). The hawkers' benefit with better lighting at a lesser cost, thus improving their economic condition. Local unemployed or underemployed persons will fill all employment opportunities in the micro-enterprise, such as maintaining and operating the charging station, daily distribution and collection of batteries and collection of rental payments. The original concept was that the entrepreneur would invest a small proportion of the total capital needed and S³IDF's provision of a partial guarantee, in the form of a fixed deposit, would allow the entrepreneur to

access a loan from the local branch of Kolar Grameen Bank (sponsored by Canara Bank) under the UNEP scheme⁵⁹.

Specific Investment Site

This project involves the creation of a Micro Enterprise Investment to be owned and operated by a team of three local youth who currently run their own small businesses. Mr. Laxman Kumar runs a flourmill, a milk bar, and a distribution business. Mr. Niranjana and Mr. Badrinath run a dealership of bulbs, pickle, etc. These three friends in Chintamani have been identified as the entrepreneurs for this project. Mr. Laxman Kumar has an existing banking relationship with the Kolar Grameen Bank (the Financial institution identified for this project) and has agreed to be the candidate under whose name the loan will be disbursed. The three friends have agreed to share the **15%** down payment investment costs and define their roles and responsibilities in running the Micro-Enterprise Unit (MEU). The charging station will be located in premises owned by Mr. Laxman Kumar adjacent to his flourmill. The micro-enterprise will serve un-electrified hawkers' (street sellers) of the Chintamani town and provide lighting to the hawkers at two locations, namely, the Azad Chowk area (approximately 200 meters from the charging station) and near the Bus Stand (approximately less than a kilometer from the charging station). Both the targeted hawker areas are less than a kilometer apart. There are about 70 hawkers in the above-mentioned neighborhoods that sell vegetables, fruits and cooked food but the project will start with 35 hawkers and depending on the progress and success, expand to include the other hawkers.

Further Pre- Investment Activities, Know-how and Technology Partners and Going Forward-Implementation Related Issues

SELCO Solar Light Pvt. Ltd., with its registered office in Bangalore, Karnataka will be the local PV equipment supplier. The cost for the equipment (including all the components of the project) is INR 2,00,000. The ongoing expenses for the personnel in-charge of operating and maintaining the charging station and batteries, and the distribution and collection of the batteries, as well as for collection of the rental payment will be disbursed from the income generated. The work involved will be on a daily basis but for a few hours only. The identified entrepreneurs will take up this part time work.

SELCO is responsible for the installation and maintenance (for a specified time) of the system. SELCO will also provide the necessary training to operate the charging station. SELCO's Kolar office is responsible for post implementation problems that could arise, because of its proximity to Chintamani.

⁵⁹ Launched in 2003, the UNEP Project's objective is to accelerate the market development for solar home systems in southern India by helping to overcome the relative lack of consumer financing options. The project is a partnership between United Nations Environment Programme (UNEP), and its Risoe Centre on Energy, Climate and Sustainable Development (URC), and two of India's major banking groups - Canara Bank and Syndicate Bank. The aim is to help these Bank groups develop lending portfolios specifically targeted at financing solar home systems (SHS). With the support of the UN Foundation and Shell Foundation, the project provides an interest rate subsidy to lower customers' financing costs. The banks make the transaction decisions and bear the transaction risks. Only SHS of certain technical specifications and provided by approved suppliers are eligible; SELCO, the proposed technology partner in this project is one of these approved suppliers. After many months of meetings and discussions with UNEP about the benefit of these pro-poor Light Points schemes (not just for hawkers but other poorer communities such as rural women's self help groups [SHGs]), UNEP has agreed to extend the scheme to cover such S³IDF Light Points schemes. As in other projects under the UNEP Project, the banks make the transaction decisions and take transaction risks.

The identified entrepreneurs have conducted a survey under the guidance of S³IDF to determine the feasibility of the project. The Chintamani branch of the Kolar Grameen Bank has been approached to help finance the project under the UNEP scheme and has expressed interest. The entrepreneurs will be able to access a loan from the Bank based on S³IDF's partial guarantee to the bank. The responsibilities of the MEU are to operate the scheme and its equipment in accordance with any instructions that SELCO provides and to promptly pay the loan and guarantee fees. S³IDF's monitoring activities will include assessing if S³IDF's mission is being met with regard to how the MEU is being operated, and/or whether there is compliance with covenants in the financial institution's loan agreement with the MEU. If an assessment reveals the MEU is not meeting these standards, S³IDF shall take necessary steps to encourage or compel compliance⁶⁰.

Critical factors that will need to be managed post implementation, to ensure success and sustainability are:

- Good relationship building and management by the entrepreneurs with their clients (hawkers) to ensure that rental payments by the hawkers are prompt and regular. For this;
 - Punctual distribution of batteries and diligent battery maintenance are critical to ensuring good service to the hawkers, which is the heart of any customer relationship management.
 - Punctual collection of batteries is equally important as it can otherwise lead to over discharge of the batteries coupled with incomplete recharge due to less availability of sunlight hours. Such incomplete recharge will in turn result in low battery life, high battery maintenance costs and adverse impacts on quality of service to the hawkers.
- Prompt service from the technology provider (in this case SELCO) to the Entrepreneurs.

Benefits and Beneficiaries and Related Issues

The business model enables diffusion of solar technology in such a way that the benefits and beneficiaries are multiple. The main beneficiaries are the hawkers as the light points will result in savings and better lighting. Savings for the hawkers could translate into better quality of living for their families (more immediately below under the hawkers' perspective). The perishable wares that the hawkers sell last longer due to reduced heat from the light points (as compared to the traditional lighting sources used). This adds to the economic benefit for the hawkers.

The micro-enterprise unit (MEU), operated and managed by the entrepreneurs, has increased income generation; thus the entrepreneurs are other beneficiaries. At the end of the loan repayment, the entrepreneurs will own the MEU.

This project concept replaces the current usage of kerosene and LPG as fuels for the lanterns, resulting in Green House Gases (GHGs) benefits as well⁶¹.

Project Viability at the Feasibility Level: Cost versus Benefits for the Specific Investment [with Site(s) Specific Details]

The overall cost of the system is INR 2,00,000. The entrepreneur is responsible for a down payment of **15%** of the cost of the system, as per the norms of UNEP scheme under which the project will be financed. The remaining **85%** amount will be covered by the loan from the bank

⁶⁰ S³IDF has prepared a draft of Memorandum of Understanding (MoU) with the entrepreneurs and the technology supplier. The MoU defines the terms and conditions and the responsibilities of each partner.

⁶¹ S³IDF has calculated GHG benefits from analogous hawkers Light Points projects that are in operation. Similar calculations will be done for other hawkers Light Points projects.

with S³IDF providing the partial guarantee on behalf of the entrepreneurs⁶². The cash flow is calculated on the basis of return on labor and equity of the entrepreneurs. Based on three-year loan term, the equity payback period for the entrepreneurs will be less than two years. The return on the investment is attractive and viable for the entrepreneurs to undertake the project. See attached spreadsheet on the detailed cash flow analysis⁶³.

Initial Bottom Line

The viability of the project is dependent on the following four perspectives:

The Hawkers Perspectives:

Pre-investment surveys indicated that the hawkers' current expenditure on kerosene lanterns varied somewhat but was typically about INR 15 to INR 22 per day including occasional lantern part replacement. The expenditure on lighting from LPG based light varies from INR 15 to INR 20 per day inclusive of maintenance. The preference and Willingness to pay studies indicated a clear preference for light points over kerosene lanterns or LPG based lights as these were ascertained to better illuminate the hawkers' goods. A Willingness to pay of INR 10 per day was determined for four hours of use of the light points, as well as a Willingness to pay an additional fee for increased usage beyond the stipulated time. The pre-investment analysis suggested that in order to achieve viability from the entrepreneur's perspective, a minimum pay-for-charge fee of INR 10 would be required.

The Entrepreneurs' Perspectives:

From the entrepreneurs' perspective, the scheme's capital and operating costs fall into four categories: i) investment financing costs, ii) other costs for the charging station (premises rent and maintenance), iii) battery transport (two-wheeler transport or hired three-wheeler), maintenance and periodic replacement, and iv) labor (self or wage employee). The key question is the residual margin or entrepreneurial returns after all costs are netted from the total revenue. Revenues are obviously a function of the pay-for-charge fee and the number of hawker customers. The entrepreneurs' capital and operating costs are strongly influenced by financing costs that in turn are a function of interest rates, guarantee fees, and term of the loan. And further, from the entrepreneurs' perspective when weighing risks versus return, there is some consideration of short and medium term versus longer term, the former being when the debt is financed and the latter after the debt is paid but the scheme continues and the margins are higher. The spreadsheet shows the feasibility of the project from the entrepreneurs' perspective.

The Bank and S³IDF's Perspectives:

Due to the apparent financial viability of the business, based on a financial analysis (see above and attached spreadsheet) included in detailed project reports along with prior case studies and the attractive returns from this proposed project, the Bank has shown the willingness to provide financing for the project on a shorter-term loan of three years. From S³IDF's perspective, it is clear that the investment is feasible from the hawkers' and entrepreneurs' perspectives and thus S³IDF is prepared to provide the guarantee to facilitate the bank's participation. The Bank's investment is also considerably risk-free given that S³IDF will provide a partial guarantee and the technology supplier will provide a buy-back guarantee under its terms and conditions. At the point of financial

⁶² S³IDF collects guarantee fees on the partial guarantee from the entrepreneurs and provides 25% of the loan amount as the partial guarantee. More details provided in the spreadsheet.

⁶³ The operating and maintenance cost has been taken in the spreadsheet. This is on the basis of analogous hawkers' Light Points projects under operations and calculating the numbers after discussing with the entrepreneurs and technology supplier.

closure, based on 35 hawker customers and the three-year financing, the entrepreneurs' margin (INR 1300 per month [\$26 per month]) will be sufficient for them to take the investment decision⁶⁴ (and risk).

From the above perspectives, the project appears viable, sufficiently pro-poor according to S³IDF's mission and straightforward with a short time-line. S³IDF will proceed to move the project to closure. This will include further discussions with Kolar Grameen Bank and SELCO to finalize the cost estimates and agreements with all the parties within the concept of this TO. This documentation will be part of Deliverable #4. There is also a possibility that this project may go to implementation within the time frame of this TO.

⁶⁴ The entrepreneur margin includes returns on labor and equity. This is based on the assumption that the entrepreneur is not hiring employees to maintain and operate the unit.

Chintamani Hawkers' Light Point Project**Costs and Recovery through battery rentals under UNEP scheme - Canara Bank Procedure****Canara bank procedure**

1. Investment from the Entrepreneur/SHG/Owner Operator has to be 15% of the total cost (Margin Money)
2. Estimated Monthly Instalments (EMI) will be calculated on the interest rate of 10.75%
3. Maximum loan tenure of 5 years and minimum of 3 years
4. EMI Holiday case: EMI is waived off for the last 3 months of the loan tenure for a loan term of 3 years.
5. EMI Holiday case: EMI is waived off for the first 3 months and last 5 months of the loan tenure for a loan term of 5 years
6. Non EMI Holiday case: 15% of the 85% loan amount will be waived off from last 8 months of loan payment under 5 year term

Financing Costs

Number of Shop keepers (hawkers)	35
Cost of system (See Note 1)	200,000
Cost of Vehicle	
Total Cost	200,000
Promoter Contribution (15%)	30,000
Loan Amount	170,000
Interest Rate per month (Taking 10.75%)	0.90%
Loan Tenure (years)	3
Loan Tenure (months)	36
Repayment Installment (Interest & Principle)	5,545.48
Total Interest Paid on the Loan	29,637.17
Interest per month (average)	823.25

Cash flows from the PV Lantern Rentals

	In Year 1	In Year 2	In Year 3	Last 3 months	Post Loan Period
Rent per Lantern per day (See Note 2)	10	10	10	10	10
Receipts per day	350	350	350	350	350
Monthly Revenue (assuming 25 days)	8750	8750	8750	8750	8750
Less: :Monthly Expenditure (sum of below)	7,378.81	7,528.81	7,693.81	2,148.33	2,329.83
Monthly Loan Repayment	5,545.48	5,545.48	5,545.48		
Cost of Delivery to Hawkers (Transport + Delivery boy Salary) (See Note 3)	1,500.00	1,650.00	1,815.00	1,815.00	1,996.50
Premises: Rent for placing panels and batteries (See Note 4)					
Other Maintenance Cost (See Note 5)	333.33	333.33	333.33	333.33	333.33
Monthly Surplus (Return on labour and equity for Entrepreneur)	1,371.19	1,221.19	1,056.19	6,601.67	6,420.17

Note 1: Additional 5 spare batteries and Light Points are factored in for any emergencies.

Note 2: Depends on site survey - Rs 10/day is likely minimum based on existing experience but hawkers have willingness to pay of Rs 15/day

Note 3: Assume 10% per annum increase

Note 4: We are not taking this in the project cash flows as the site is already owned by entrepreneur

Note 5: Monthly Maintenance Cost Ploughed back for any replacement	333.33	5% of per Light Point Cost
		(assumption based on analagous hawkers light point project and discussions with SELCO)
No. of month of collections of Maintenance Cost	36	
Total Collected amount	12000	
Cash available per light point for maintenance (replacement) at the end of loan term	342.86	6.00% of the cost per Light Point

Feasibility Assessment 5 - Gubbi: Light Points for Hawkers

Project Description/Concept

This project is a variation of an innovative project concept, originally conceived by S³IDF in partnership with SELCO (more below), to bring affordable lighting services to poor customers without access to the grid (or a reliable grid). The concept involves the creation of a Micro Enterprise Investment, which, located in the un-electrified/under-electrified hawkers' (street sellers) community will provide lighting to the hawkers. The hawkers are mostly petty sellers of fruits, flowers, vegetables etc. and some even use moveable carts to ply their trade. Most hawkers currently use kerosene-based Petromax lanterns, which are comparatively expensive to maintain given the cost of kerosene and frequent replacement of the mantle. Also, the kerosene lanterns generate considerable heat that is known to damage the fruits, flowers and vegetables that the hawkers vend.

The light points, which run on batteries charged by solar photovoltaic (PV) panels, are charged during the daytime at a centralized charging station and in the evening, the batteries are delivered to the hawkers for their use. The hawkers need the light points for an average of four hours every evening, after which the batteries are returned to the charging station. These are supplied to the hawkers on a daily rental payment for use, which is pre-determined based on their Willingness to Pay (WTP). The hawkers benefit with better lighting at a lesser cost, thus improving their economic condition. Local unemployed or underemployed persons will fill all employment opportunities in the micro-enterprise, such as maintaining and operating the charging station, daily distribution and collection of batteries and daily collection of rental payments. The original concept was that the entrepreneur would invest a small proportion of the total capital needed and S³IDF's provision of a partial guarantee, in the form of a fixed deposit, would allow the entrepreneur to access a loan from Canara Bank or the local branch of Kalpatharu Grameen Bank (KGB). Discussions are going on with Canara Bank and KGB (more below).

Specific Investment Site

This project involves the creation of a Micro Enterprise Investment owned and operated by a local small businessman, Mr. A.B.Vivekananda, who runs an electrical shop and also has a dealership with Colgate Company to sell their products at Gubbi. The charging station will be located on land that is already being rented by Mr. Vivekananda for running his electrical business. The micro-enterprise will serve un-electrified hawkers (street sellers) around M.G. Road in Gubbi and provide lighting to these hawkers. There are about 45 hawkers in the above-mentioned neighborhood, but this project will start with 25 hawkers. Depending on the progress and success, others might join at a later time.

Further Pre- Investment Activities, Know-how and Technology Partners and Going Forward-Implementation Related Issues

SELCO Solar Light Pvt. Ltd., with its registered office in Bangalore, Karnataka will be the local PV equipment supplier. The estimated cost at the Feasibility level for the equipment (including all the components of the project) is approximately INR 1,25,000⁶⁵. The ongoing expenses for the personnel in-charge of operating and maintaining the charging station and the batteries,

⁶⁵ The estimates given are based on the Feasibility analysis. There could be $\pm 5\%$ tolerance.

distribution and collection of the batteries, as well as for collection of the rental payment will be disbursed from the income generated. The work involved will be on a daily basis but for a few hours only. The estimated salary for this part-time work is about INR 1000-1500 per month. Rental for the land where the charging station will be installed is not an additional expense, since the entrepreneur is already renting the land for operating his electrical shop.

SELCO will be responsible for the installation and maintenance (for a specified time) of the system. SELCO will also provide the necessary training to operate the charging station. SELCO's Bangalore office, because of its proximity to Gubbi, will be responsible for post implementation problems that could arise.

The entrepreneur conducted a survey under S³IDF's guidance to determine the feasibility of the project. As stated earlier, Canara Bank and Kalpatharu Grameen Bank (KGB) have been approached to help finance the project. As of now, Canara Bank has expressed its inability to extend the loan to the entrepreneur, since they do not have a branch in Gubbi. However, the Bank is willing to finance the project, if S³IDF puts up **100%** guarantee or when Canara Bank opens a branch in Gubbi, which they are expected to do in the next three months. KGB, on the other hand, which is sponsored by the State Bank of Mysore, is willing to finance the project at a **14%** interest rate. However, at an interest rate of **14%** the project will not be economically viable and attractive to the entrepreneur to make the investment even with longer term financing as the net combined return to entrepreneur's cash equity and every day work will be too low. Due to this reason, S³IDF has decided to pursue the project with Canara Bank under the UNEP scheme⁶⁶ and wait until Canara Bank opens a branch at Gubbi. S³IDF anticipates that the entrepreneur will then be able to access a loan based on S³IDF's partial guarantee to the Canara Bank.

The responsibilities of the micro-enterprise unit (MEU) are to operate the scheme and its equipment in accordance with instructions that SELCO provides and to promptly pay the loan and guarantee fees. S³IDF's monitoring activities will include assessing if S³IDF's mission is being met with regard to how the MEU is being operated, and/or whether there is compliance with covenants in the financial institution's loan agreement with the MEU. If an assessment reveals the MEU is not meeting these standards S³IDF shall take necessary steps to encourage or compel compliance⁶⁷.

Critical factors that will need to be managed post implementation, to ensure success and sustainability are:

- Good relationship building and management by the entrepreneur with his clients (hawkers) to ensure that rental payments by the hawkers are prompt and regular. For this:

⁶⁶ Launched in 2003, the UNEP Project's objective is to accelerate the market development for solar home systems in southern India by helping to overcome the relative lack of consumer financing options. The project is a partnership between United Nations Environment Programme (UNEP), and its Risoe Centre on Energy, Climate and Sustainable Development (URC), and two of India's major banking groups - Canara Bank and Syndicate Bank. The aim is to help these Bank groups develop lending portfolios specifically targeted at financing solar home systems (SHS). With the support of the UN Foundation and Shell Foundation, the project provides an interest rate subsidy to lower customer-financing costs; the banks make the transaction decisions and bear the transaction risks. Only SHS of certain technical specifications and provided by approved suppliers are eligible; SELCO, the proposed technology partner in this project is one of these approved suppliers. After many months of meetings and discussions with UNEP about the benefit of these pro-poor Light Points schemes (not just for hawkers but other poorer communities such as rural women's self help groups [SHGs]), UNEP has agreed to extend the scheme to cover such S³IDF Light Points schemes. As in other projects under the UNEP Project, the banks make the transaction decisions and take transaction risks.

⁶⁷ S³IDF has prepared a draft of Memorandum of Understanding (MoU) with the entrepreneur and technology supplier. The MoU defines the terms and conditions and the responsibilities of each partner.

- Punctual distribution of batteries and diligent battery maintenance are critical to ensuring good service to the hawkers, which is the heart of any customer relationship management.
- Punctual collection of batteries is equally important as it can otherwise lead to over discharge of the batteries coupled with incomplete recharge due to less available sunlight hours. Such incomplete recharge will in turn result in low battery life, high battery maintenance costs and adverse impacts on quality of service to the hawkers.
- Prompt service from the technology provider (in this case SELCO) to the entrepreneur.

Benefits and Beneficiaries and Related Issues

The business model enables diffusion of solar technology in such a way that the benefits and beneficiaries are multiple. The main beneficiaries are the hawkers as the light points will result in increased savings and better lighting. Increased savings for the hawkers could translate into better quality of living for their families. The perishable wares that the hawkers sell last longer due to reduced heat from the light points (as compared to the traditional lighting sources used). This adds to the economic benefit for the hawkers.

The micro-enterprise unit (MEU), operated and managed by the entrepreneur, has increased income generation; thus the entrepreneur is another beneficiary. At the end of the loan repayment, the entrepreneur will own the MEU. Person(s) employed by the MEU for the various responsibilities (as mentioned above) are the other beneficiaries. This project concept replaces the current usage of kerosene and LPG as fuels for the lanterns, resulting in Green House Gas (GHG) benefits as well⁶⁸.

Project Viability at the Feasibility Level: Cost versus Benefits for the Specific Investment [with Site(s) Specific Details]

The overall cost of the system is estimated to be INR 1, 25, 000. The entrepreneur will have to make the down payment of **15%** of the cost of the system as per the norms of UNEP scheme under which the project will most likely be financed. The remaining **85%** amount will be the loan from the bank with S³IDF providing the partial guarantee on behalf of the entrepreneur⁶⁹. The cash flow is calculated on the basis of return on labor and equity of the entrepreneur. Based on three-year loan term, the equity payback period for the entrepreneur will be less than two years. The return on the investment is attractive and viable for the entrepreneur to undertake the project. See attached spreadsheet on the detailed cash flow analysis⁷⁰.

Initial Bottom Line

The viability of the project is dependent on the following four perspectives:

The Hawkers' Perspectives:

Pre-investment surveys indicated that the hawkers' current expenditure on kerosene lanterns varied somewhat but was typically about INR 15 to INR 17 per day, including occasional lantern part replacement. The preference and willingness to pay studies indicated a clear preference for light

⁶⁸ S³IDF has calculated GHG benefits from analogous hawkers Light Points projects that are in operation. Similar calculations will be done for other hawkers Light Points projects.

⁶⁹ S³IDF collects guarantee fees on the partial guarantee from the entrepreneur and will provide **25%** of the loan amount as the partial guarantee. More details provided in the spreadsheet.

⁷⁰ The operating and maintenance cost has been taken into account in the spreadsheet. This is on the basis of analogous hawkers' Light Points projects under operations and running the numbers after discussions with the entrepreneur and technology supplier.

points over kerosene lanterns as these were ascertained to better illuminate the hawkers' goods. Willingness to Pay of INR 10 to INR 12 per day was determined for four hours of use of the light points, as well as a Willingness to pay an additional fee for increased usage beyond the stipulated time. The pre-investment analysis suggested that in order to achieve viability from the entrepreneur's perspective, a minimum pay-for-charge fee of INR 10 would be required.

The Entrepreneur's Perspectives:

From the entrepreneur's perspective, the scheme's capital and operating costs fall into four categories: i) investment financing costs, ii) other costs for the charging station (premises rent and maintenance), iii) battery transport (two-wheeler transport or hired three-wheeler), maintenance and periodic replacement, and iv) labor (self or wage employee). The key question is the residual margin or entrepreneurial returns after all these costs are netted from the total revenue. Revenues are obviously a function of the pay-for-charge fee and the number of hawker customers. The entrepreneur's capital and operating costs are strongly influenced by financing costs that in turn are a function of interest rates, guarantee fees and the term of the loan. Further from the entrepreneur's perspective when weighing risks versus return, there is some consideration of short and medium term versus longer term, the former being when the debt is financed and the latter after the debt is paid but the scheme continues and the margins are higher. Also the entrepreneur is prepared to wait for accessing lower interest rate finance for getting higher margins. The spreadsheet shows the feasibility of the project from the entrepreneur's perspective.

The Bank and S³IDF's Perspectives:

Due to the apparent financial viability of the business, based on a financial analysis (see below and attached spreadsheet) included in detailed project reports along with prior case studies and the attractive returns from this proposed project, the Banks (both Canara Bank and KGB) have shown the willingness to provide financing for the project on a shorter-term loan of three years. From S³IDF's perspective, it is clear that the investment is feasible from both the hawkers' and entrepreneur's perspectives and S³IDF is prepared to provide the guarantee to facilitate the banks' participation. The Banks' investment is also considerably risk-free given that S³IDF will provide a partial guarantee (as mentioned above Canara Bank is also willing once it has its branch opened in Gubbi) and the technology supplier will provide a buy-back guarantee under its terms and conditions. At the point of financial closure, based on 25 hawker customers and the three-year financing, the entrepreneur's margin of INR 1000 will be sufficient for him to make the investment decision⁷¹ (and assume the risk).

From the above perspectives, the project appears viable, sufficiently pro-poor according to S³IDF's mission and straightforward with a short time-line. S³IDF will proceed to move the project to closure. This will include further discussions with Canara Bank and with SELCO to finalize the cost estimates and agreements with all the parties within the concept of this TO. It is unlikely for this project go to implementation within the time frame of the TO.

⁷¹ The entrepreneur margin includes returns on labor and equity. This is based on the assumption that the entrepreneur is not hiring any employee for maintaining and operating the unit.

Gubbi Light Point Project - Costs and Recovery through battery rentals under UNEP scheme - Canara Bank Procedure**Canara bank procedure**

- Investment from the Entrepreneur/SHG/Owner Operator has to be 15% of the total cost (Margin Money)
- Estimated Monthly Instalments (EMI) will be calculated on the interest rate of 10.75%
- Maximum loan tenure of 5 years and minimum of 3 years
- EMI Holiday case: EMI is waived off for the last 3 months of the loan tenure for a loan term of 3 years.
- EMI Holiday case: EMI is waived off for the first 3 months and last 5 months of the loan tenure for a loan term of 5 years
- Non EMI Holiday case: 15% of the 85% loan amount will be waived off from last 8 months of loan payment under 5 year term

Financing Costs

Number of Shop keepers (hawkers)	25
Cost of system (See Note 1)	125,000
Cost of Vehicle	
Total Cost	125,000
Promoter Contribution (15%)	18,750
Loan Amount	106,250
Interest Rate per month (Taking 10.75%)	0.90%
Loan Tenure (years)	3
Loan Tenure (months)	36
Repayment Installment (Interest & Principle)	3,465.92
Total Interest Paid on the Loan	18,523.23
Interest per month (average)	514.53

Cash flows from the PV Lantern Rentals

	In Year 1	In Year 2	In Year 3	Last 3 months	Post Loan Period
Rent per Lantern per day (See Note 2)	10	10	10	10	10
Receipts per day	250	250	250	250	250
Monthly Revenue (assuming 25 days)	6250	6250	6250	6250	6250
Less: :Monthly Expenditure (sum of below)	5,215.92	5,365.92	5,530.92	2,065.00	2,246.50
Monthly Loan Repayment	3,465.92	3,465.92	3,465.92		
Cost of Delivery to Hawkers (Transport + Delivery boy Salary) (See Note 3)	1,500.00	1,650.00	1,815.00	1,815.00	1,996.50
Premises: Rent for placing panels and batteries (See Note 4)	-	-	-	-	-
Other Maintenance Cost (See Note 5)	250.00	250.00	250.00	250.00	250.00
Monthly Surplus (Return on labour & equity for entrepreneur)	1,034.08	884.08	719.08	4,185.00	4,003.50

Note 1: This price quoted is the approximate cost. Final costing is yet to be finalised. Additional spare batteries & Light Points of 5 numbers are factored in for any emergencies.

Note 2: Depends on site survey - Rs 10/day is likely minimum based on existing experience but hawkers have willingness to pay of Rs 12/day

Note 3: Assume 10% per annum increase

Note 4: We are not taking this in the project cash flows as the site is already owned by entrepreneur

Note 5: Monthly Maintenance Cost Ploughed back for any replacement	250.00	5% of per Light Point Cost
		(assumption based on analagous hawkers light point project and discussions with SELCO)
No. of month of collections of Maintenance Cost	36	
Total Collected amount	9000	
Cash available per light point for maintenance (replacement) at the end of loan term	360.00	7.20% of the cost per Light Point

Feasibility Assessment 6 - Molakalmuru: Light Points for Hawkers

Project Description/Concept

This project is a variation of an innovative project concept, originally conceived by S³IDF in partnership with SELCO (more below), to bring affordable lighting services to poor customers without access to the grid (or a reliable grid). The concept involves the creation of a Micro-Enterprise Unit (MEU), which, located in the un-electrified/under-electrified Hawker's (street sellers) community will provide lighting to the Hawkers. The hawkers are mostly petty sellers of fruits, flowers, vegetables, cooked foods etc. and some use moveable carts to ply their trade. Most hawkers currently use kerosene-based Petromax lanterns, which are comparatively expensive to maintain given the cost of kerosene and frequent replacement of the mantle. Also, the kerosene lanterns generate considerable heat that is known to damage the fruits, flowers and vegetables that the hawkers vend.

The light points, which run on batteries charged by solar photovoltaic (PV) panels, are charged during the daytime at a centralized charging station and in the evening, the batteries are delivered to the hawkers for their use. The hawkers need the light points for an average of four hours every evening, after which the batteries are returned to the charging station. These are supplied to the hawkers on a daily rental payment for use, which is pre-determined based on their Willingness to pay (WTP). The hawkers benefit with better lighting at a lesser cost, thus improving their economic condition. A local women's Self Help Group (SHG) will fill all employment opportunities in the micro-enterprise, such as maintaining and operating the charging station, daily distribution and collection of batteries and collection of rental payments. As part of this concept, the SHG will invest a small proportion of the total capital needed and S³IDF's provision of partial guarantee, in the form of a fixed deposit, would allow the SHG to access a loan from the local branch of Chitradurga Grameen Bank (CGB) under the UNEP scheme⁷².

Specific Investment Site

This project involves the creation of a Micro-Enterprise Unit (MEU) to be owned and operated by members of the 'Sindu' women's SHG, in the village of Rampura. The Sindu SHG has a good banking relationship with the Vyavasaya Sahakara Sangha Bank (VSSB), a local bank. Ten members of the SHG are willing to be part of the micro-enterprise. The micro-enterprise will serve un-electrified hawkers (street sellers) in the village by providing them with lighting. There are about 40 hawkers in the above-mentioned neighborhood, who sell produce and cooked food. The MEU will begin by providing services to the 20 hawkers willing to use PV light points. Others might join at a later time, depending on the project's progress and success.

⁷² Launched in 2003, the UNEP Project's objective is to accelerate the market development for solar home systems in southern India by helping to overcome the relative lack of consumer financing options. The project is a partnership between United Nations Environment Programme (UNEP), and its Risoe Centre on Energy, Climate and Sustainable Development (URC), and two of India's major banking groups - Canara Bank and Syndicate Bank. The aim is to help these Bank groups develop lending portfolios specifically targeted at financing solar home systems (SHS). With the support of the UN Foundation and Shell Foundation, the project provides an interest rate subsidy to lower customers' financing costs. The banks make the transaction decisions and bear the transaction risks. Only SHS of certain technical specifications and provided by approved suppliers are eligible; SELCO, the proposed technology partner in this project is one of these approved suppliers. After many months of meetings and discussions with UNEP about the benefit of these pro-poor Light Points schemes (not just for hawkers but other poorer communities such as rural women's self help groups [SHGs]), UNEP has agreed to extend the scheme to cover such S³IDF Light Points schemes. As in other projects under the UNEP Project, the banks make the transaction decisions and take transaction risks.

Further Pre- Investment Activities, Know-how and Technology Partners and Going Forward-Implementation Related Issues

SELCO Solar Light Pvt. Ltd., with its registered office in Bangalore, Karnataka will be the local PV equipment supplier. The estimated cost at the Feasibility level for the equipment (including all the components of the project) is approximately INR 1,00,000⁷³. The ongoing expenses for the personnel in-charge of operating and maintaining the charging station and the batteries, distribution and collection of the batteries, as well as for collection of the rental payment will be disbursed from the income generated. The Sindu SHG will employ a local youth part-time for an estimated salary of INR 400-500 per month, as the daily work requires only a few hours. Participating SHG members are prepared to take up this part time work when necessary. Rental for the land where the charging station will be installed is not an additional expense since one of the SHG members already owns the land (as part of her house) and is willing to allow the use of her premises for the charging station without any rental payment.

SELCO is responsible for the installation and maintenance (for a specified time) of the system. SELCO will also provide the necessary training to operate the charging station. SELCO's Bellary office is responsible for post implementation problems that could arise, because of its proximity to Rampura (approximately 30 kilometres).

The SHG conducted a survey under S³IDF's guidance to determine the feasibility of the project. Currently, the SHG banks with the Vyavasaya Sahakara Sanga Bank (VSSB). However, there has been no loan history with this bank. The branch of Chitradurga Grameen Bank (CGB) at T Cross, which is five kilometres from Rampura, has been approached to help finance the project under the UNEP scheme. The bank has indicated an interest in financing this micro-enterprise. After preliminary discussions with this branch of CGB, all parties agreed that subsequent business transactions would be transferred to this CGB branch. Furthermore, CGB as a part of its administrative revamp has decided to move this branch to Rampura, thus facilitating the SHG's banking needs. If required, the SHG is willing to transfer their banking relationship from VSSB to the CGB to access the loan. The SHG will have access to a loan from the CGB based on S³IDF's partial guarantee to the bank.

The responsibilities of the MEU are to operate the scheme and its equipment in accordance with any instructions that SELCO provides and to promptly pay the loan and guarantee fees. S³IDF's monitoring activities will include assessing if S³IDF's mission is being met with regard to how the MEU operates, and/or whether there is compliance with covenants in the financial institution's loan agreement with the MEU. If an assessment reveals the MEU is not meeting these standards S³IDF shall take necessary steps to encourage or compel compliance⁷⁴.

Critical factors to be managed post implementation, to ensure success and sustainability are:

- Good relationship building and management by the SHG with its clients (hawkers) to ensure that rental payments by the hawkers are prompt and regular. For this;
 - Punctual distribution of batteries and diligent battery maintenance are critical to ensuring good service to the hawkers, which is the heart of any customer relationship management.
 - Punctual collection of batteries is equally important as it can otherwise lead over discharge of the batteries coupled with incomplete recharge due to less availability of sunlight hours.

⁷³ The estimates given are based on the Feasibility analysis. There could be $\pm 5\%$ variance.

⁷⁴ S³IDF has prepared a draft of Memorandum of Understanding (MoU) with the SHG and technology supplier. The MoU defines the terms and conditions and the responsibilities of each partner.

Such incomplete recharge will in turn result in low battery life, high battery maintenance costs and adverse impacts on quality of service to the hawkers.

- Prompt service from the technology provider (in this case SELCO) to the SHG.

Benefits and Beneficiaries and Related Issues

The business model enables diffusion of solar technology in such a way that the benefits and beneficiaries are multiple. The main beneficiaries are the hawkers, as the light points will result in savings and better lighting. The perishable wares that the hawkers sell last longer due to reduced heat from the light points (as compared to the traditional lighting sources used). Savings for the hawkers could also translate into better quality of living for their families.

As the MEU is operated and managed by the participating members of the SHG, they share the profits and they (and their families) thus benefit from increased income generation. At the end of the loan repayment, the SHG will own the MEU.

This project concept replaces the current usage of kerosene and LPG as fuels for the lanterns, resulting in Green House Gases (GHGs) benefits as well⁷⁵.

Project Viability at the Feasibility Level: Cost versus Benefits for the Specific Investment [with Site(s) Specific Details]

The overall cost of the system is estimated to be INR 1,00,000. The SHG will have to make the down payment of **15%** of the cost of the system as per the norms of UNEP scheme under which the project will be financed. The remaining **85%** amount will be the loan from the bank with S³IDF providing the partial guarantee on behalf of the SHG⁷⁶. The cash flow is calculated on the basis of return on the SHG's labor and equity of the SHG on a five-year term loan. The equity payback period for the SHG will be less than a year. The return on the investment is attractive and viable for the SHG to undertake the project. See attached spreadsheet on the detailed cash flow analysis⁷⁷.

Initial Bottom Line

The viability of the project is dependent on the following four perspectives:

The Hawkers' Perspectives:

Pre-investment surveys indicated that the hawkers' current expenditure on kerosene lanterns varied somewhat but was typically about INR 13 to INR 17 per day, including occasional lantern part replacement. The preference and willingness to pay studies indicated a clear preference for light points over kerosene lanterns as these were ascertained to better illuminate the hawkers' goods. A willingness to pay of INR 10 was determined for four hours of use of the light points, as well as a willingness to pay an additional fee for increased usage beyond the stipulated time. The pre-investment analysis suggested that in order to achieve viability from the SHG's perspective, a minimum pay-for-charge fee of INR 10 would be required.

⁷⁵ S³IDF has calculated GHG benefits from analogist hawkers Light Points projects that are in operation. Similar calculations will be done for other hawkers Light Points projects.

⁷⁶ S³IDF collects guarantee fees on the partial guarantee from the entrepreneur and will be putting **25%** of the loan amount as the partial guarantee. More details provided in the spreadsheet.

⁷⁷ The operating and maintenance cost is included in the spreadsheet. This is based on the basis of analogous hawkers' Light Points projects under operations and calculating the numbers after discussing with the SHG and technology supplier.

The SHG's Perspectives:

From the SHG's perspective, the scheme's capital and operating costs fall into four categories: i) investment financing costs, ii) other costs for the charging station (premises rent and maintenance), iii) battery transport (two-wheeler transport or hired three-wheeler), maintenance and periodic replacement, and iv) labor (self or wage employee). The key question is the residual margin or entrepreneurial returns after all these costs are netted from the total revenue. Revenues are obviously a function of the pay-for-charge fee and the number of hawker customers. The SHG's capital and operating costs are strongly influenced by financing costs that in turn are a function of interest rates, guarantee fees and term of the loan. Further, from the SHG's perspective when weighing risks versus return, there is some consideration of short and medium term versus longer term, the former being when the debt is financed and the latter after the debt is paid but the scheme continues and the margins are higher. The spreadsheet shows the feasibility of the project from the SHG's perspective.

The Bank and S³IDF's Perspectives:

Due to the apparent financial viability of the business, based on a financial analysis (see above and attached spreadsheet) included in detailed project reports along with prior case studies and the attractive returns from this proposed project, the Bank has shown the willingness to provide financing for the project on a term loan of five years. From S³IDF's perspective, it is clear that the investment is feasible from the hawkers' and SHG's perspectives and S³IDF is prepared to provide the guarantee to facilitate the bank's participation. The Bank's investment is also considerably risk-free given that S³IDF will provide a partial guarantee and the technology supplier will provide a buy-back guarantee under its terms and conditions. At the point of financial closure, based on 20 hawker customers and the five-year financing, the SHG's margin (INR 2000 per month [\$40 USD per month]) will be sufficient for the Sindu SHG to take on the investment decision⁷⁸ (and risk).

From the above perspectives, the project appears viable, sufficiently pro-poor according to S³IDF's mission, and straightforward with a short time-line. S³IDF will proceed to move the project to closure. This will include further discussions with CGB and SELCO to finalize the cost estimates and agreements with all the parties within the concept of this TO. This documentation will be part of Deliverable #4. There is possibility that this project may go to implementation within the time frame of this TO.

⁷⁸ The SHG margin includes returns on labor and equity. This is based on the assumption that the SHG is not hiring any employee to maintain and operate the unit.

Molakalmuru Hawkers' Light Point Project

Costs and Recovery through battery rentals under UNEP scheme at 5% interest rate

Canara bank procedure

1. Investment from the Entrepreneur/SHG/Owner Operator has to be 15% of the total cost
2. Estimated Monthly Instalments (EMI) will be calculated on the interest
3. Maximum loan tenure of 5 years and minimum of
4. EMI Holiday case: EMI is waived off for the last 3 months of the loan tenure for a loan
5. EMI Holiday case: EMI is waived off for the first 3 months and last 5 months of the loan tenure for a loan
6. Non EMI Holiday case: 15% of the 85% loan amount will be waived off from last 8 months of loan payment

Financing Costs

Number of Shop keepers	20
Cost of system (See Note)	115,000
Cost of	-
Total Cost	115,000
Promoter Contribution	17,250
Loan	97,750
Interest Rate per month (taking	0.42%
Loan Tenure	5
Loan Tenure	60
Monthly Repayment Installment (Interest &	1845
Total Interest Paid on the	12930
Interest per month	215

Cash flows from the PV Lantern Rentals

	In Year 1	In Year 2	In Year 3	In Year 4	In Year 5	Post Loan Period
Rent per Lantern per day (See	10	10	10	10	10	10
Receipts per	200	200	200	200	200	200
Monthly Revenue (assuming 25	5000	5000	5000	5000	5000	5000
Less: :Monthly Expenditure (sum of	2,632.16	2,647.16	2,662.61	2,678.53	2,694.92	867.14
Monthly Loan	1,844.66	1,844.66	1,844.66	1,844.66	1,844.66	
Cost of Delivery to Hawkers (Transport + Delivery person Salary)	500.00	515.00	530.45	546.36	562.75	579.64
Premises: Rent for placing panels and batteries (See		-	-	-	-	-
Other Maintenance Cost (See	287.50	287.50	287.50	287.50	287.50	287.50
Monthly Surplus (Return on labour & equity for SHG)	2,367.84	2,352.84	2,337.39	2,321.47	2,305.08	4,132.86

Note 1: This is an approximate cost. Additional spare batteries are factored in for any

Note 2: Depends on site survey - Rs 10/day is likely minimum based on existing

Note 3: Assume 3% per annum

Note 4: We are not taking this in the project cash flows as the site is already owned by an

Note 5: Monthly Maintenance Cost Ploughed back for any 287.50

5% of per Light Point

(assumption based on analogous hawkers point project and discussions with

No. of month of collections of

60

Total Collected

17250

Cash available per light point for maintenance (replacement) at the

ter

862.50

15.00% of the cost per Light

Business Document Projects

- Chintamani: Solar Home Systems for SHG Members at Iragampalli
 - Memorandum of Understanding between S³IDF, Selco Solar Light Pvt. Ltd., and Jyothi Mahila Sahaya Sangha, for Financing Support
 - Letter of Understanding, from Canara Bank, Iragampalli, Chintamani, to S³IDF
- Doddaballapur: Light Points for Hawkers
 - Memorandum of Understanding between S³IDF, Selco Solar Light Pvt. Ltd., and Nagaraj Naik B. for Financing Support
 - Letter of Understanding, from Canara Bank, Doddaballapur, Bangalore Rural District, to S³IDF
- Chintamani: Light Points for Hawkers
 - Memorandum of Understanding between S³IDF, Selco Solar Light Pvt. Ltd., and Mr. Laxman Kumar, Mr. Niranjana and Mr. Badrinath for Financing Support
 - Letter of Understanding, from Kolar Grameen Bank, Chintamani, to S³IDF
- Gubbi: Light Points for Hawkers
 - Memorandum of Understanding between S³IDF, Selco Solar Light Pvt. Ltd., and A.B.Vivekananda for Financing Support
 - Letter of Understanding, from Canara Bank, Gubbi, to S³IDF
- Molakalmuru: Light Points for Hawkers
 - Memorandum of Understanding Between S³IDF, Selco Solar Light Pvt. Ltd., and the Sindu Mahila Sahaya Sangha for Financing Support
 - Letter of Understanding, from Chitradurga Grameen Bank, Molakalmuru Taluk, Chitradurgeto S³IDF

Business Documents – Project Number 1**Solar Home Systems for SHG members at Iragampalli, Chintamani 111****MEMORANDUM OF UNDERSTANDING - SOLAR HOME SYSTEMS FOR SHG MEMBERS AT IRAGAMPALLI, CHINTAMANI****Financing Support Agreement**

MEMORANDUM OF UNDERSTANDING between the Small-Scale Sustainable Infrastructure Development Fund, Inc., Selco Solar Light Pvt. Ltd., and Jyothi Mahila Sahaya Sangha, for Financing Support for its PV-Powered Lighting Systems at Iragampalli, Chintamani Taluk, Kolar District, Karnataka, India

Introduction: The Parties, the Purpose, PV Lighting Investment

- This Memorandum of Understanding (MoU) is between three parties for the purpose of presenting the terms and conditions under which there will be provision of technology/equipment, and financing support for an innovative small photovoltaic (PV) powered lighting scheme. Support for this investment will be fully consistent with the missions of the various parties.
 - The Small-Scale Sustainable Infrastructure Development Fund (S³IDF), incorporated under Section 25 of the Companies Act in India and having its registered office at #720, 1st Floor, 15th Cross, 24th Main, 6th Phase J.P. Nagar, Bangalore – 560078. S³IDF’s mission is to facilitate small-scale infrastructure and related investments needed for poverty alleviation and economic advancement in the developing world.
 - Selco Solar Light Pvt. Ltd. (SELCO), having its registered office at #313, 12th Cross, 15th Main, J.P. Nagar 5th Phase, Ring Road Bangalore - 560078 is a for-profit Company operating in India. SELCO has extensive experience in sales and service of PV based systems in Karnataka and has an established working relationship with Canara Banks.
 - Jyothi Mahila Sahaya Sangha, a Self Help Group (SHG), operating under the Resource Service Centre, a non-profit organization, and located at Iragampalli, Chintamani Taluk, Kolar District, Karnataka, is the third party and is an owner and operator of the PV-Based Lighting units at Iragampalli (hereafter referred to as the SHG). The SHG has a very good track record of saving, borrowing and repaying loans from the local branch of Canara Bank.
- It is noted that S³IDF (the Indian-based organization) is an official affiliate of the non-profit corporation, The Small-Scale Sustainable Infrastructure Development Fund, Inc., a US 501(c)(3) entity (public charity) incorporated in Massachusetts, having the same mission as S³IDF (the Indian-based organization), and having its office at The Carriage House, 5 Hastings Square, Cambridge, MA 02139, USA. Hereafter any reference to S³IDF should be interpreted to encompass both the Indian-based organization and its US affiliate.
- The particulars of this MoU follow from the results of pre-investment work that was originally agreed upon between S³IDF and SELCO whereby surveys and preliminary studies identified appropriate group of poor families as candidates for such productive use PV based investments. This particular scheme, to serve SHG members in Chintamani is a result of such pre-investment work co-financed by the USAID South Asia Regional Initiative for Energy; this initiative is underwriting pilot work in Karnataka as part of the PRESK (Private Rural Energy Services in Karnataka) Program. The PRESK Program is focused in four taluks in Karnataka (of which Chintamani is one)⁷⁹. Under this USAID support if the results of the pre-investment work are to lead to an investment that S³IDF would endeavor to help take forward to implementation, such investment must meet S³IDF’s criteria.
- The proposed investment covered by this MoU meets these criteria. Amongst the main criteria were: i) the families/customers to benefit from the investment would be low-income/poor in accordance with the international standards which S³IDF employs⁸⁰; ii) analysis would indicate feasibility – subject to an innovative financing arrangement; and iii) the families/customers

⁷⁹ This support is provided under an agreement between S³IDF and Nexant Inc., which is the implementing contractor for the USAID South Asia Regional Initiative for Energy.

⁸⁰ S³IDF employs international poverty line indicators such as those used by the international agencies such as the World Bank, World Development Indicators, 2002.

indicate a willingness to pay for the investment – assuming the increased income and/or savings and other benefits it would allow them.

- Based on the pre-investment studies, the project will have the following physical/ operational elements:
 - A solar power system consisting of Solar Panels, Batteries, Lights and such other accessories as required, located in five individual houses at Iragampalli, Chintamani Taluk, Kolar District, Karnataka,
 - A schedule that the SHG will agree upon in order to pay the loan and guarantee fees (more below),
 - The SHG will operate the system and ultimately own it (after payments completed). The equipment will be supplied by SELCO; the estimated cost for the scheme is about Rs. 30,000.

- Below are the responsibilities of the three parties and the terms and conditions under which financial support in the form of a guarantee can be provided on behalf of the SHG so as to meet the Canara Bank's requirements for making available loan financing for the SHG. Given that the Canara Bank will also have call on the asset value of components noted in element i, it has been agreed upon that S³IDF guarantee financing will be for only a portion of the total loan amount.

Parties' Responsibilities

Purpose: The SHG, its planned operation of the project and the terms of S³IDF's participation described below in this agreement are fully consistent with S³IDF's mission and its charitable purpose under US laws and regulations, and the investment and operational details cannot be changed without permission from S³IDF.

Responsibilities: This agreement assumes that Canara Bank will provide loan financing to the SHG and will undertake credit appraisal as per their normal practices. Although the Canara Bank is not a formal signatory of this agreement, S³IDF participation is contingent on Canara Bank also providing this loan. Hence in the paragraphs below, the Bank's role is also detailed. The responsibilities of SELCO are to provide and install the equipment noted above and to provide any necessary service during its operations for the period of the loan. The responsibilities of the SHG are to operate the scheme and its equipment in accordance with any instructions SELCO shall provide and to promptly pay the loan and guarantee fees.

Limits of Commitments and Responsibilities: This agreement is limited only to the financing of the SHG and the responsibilities of all parties for this arrangement. The maximum amount of the loan financing that the Canara Bank is committed to provide is **85%** of project cost (under the UNEP⁸¹

⁸¹ Launched in 2003, the UNEP Project's objective is to accelerate the market development for solar home systems in southern India by helping to overcome the relative lack of consumer financing options. The project is a partnership between United Nations Environment Programme (UNEP), and its Riseo Centre on Energy, Climate and Sustainable Development (URC), and two of India's major banking groups - Canara Bank and Syndicate Bank. The aim is to help these Bank groups develop lending portfolios specifically targeted at financing solar home systems (SHS). With the support of the UN Foundation and Shell Foundation, the project provides an interest rate subsidy to lower customers financing costs; the banks make the transaction decisions and bear the transaction risks. Only SHS of certain technical specifications and provided by approved suppliers are eligible, SELCO the proposed technology partner in this project is one of these approved suppliers.

scheme) and the maximum guarantee investment to be provided by S³IDF is **25%** of the loan amount. However, for this project, Canara Bank will provide **100%** of the loan amount.

Fixation of Fee for Service: There is no tariff associated with the project, as the lighting system is used by the individual owning it to increase their income. Any change in the use will be discussed and determined after consultation with S³IDF. If the SHG is found violating such guiding principles at any point of time during the S³IDF Monitoring and Evaluation, S³IDF shall withdraw their support. S³IDF may also withdraw from participation in the transaction and pursue any legal remedies available to recover its costs/investment or minimize any losses and/or remedy the problem.

Accounting, Record Keeping, Reporting and Access Responsibilities: Only the SHG and S³IDF are the direct parties and they agree to the following responsibilities:

- At a minimum, on an annual basis, the SHG will report on the timeliness of its loan and guarantee fee payments, and any problems that have incurred in making these payments. The SHG shall also report on the physical/operating condition of all equipment. Any measures taken to address any problems shall be noted. During the first year, more frequent reporting will be required from the SHG.
- The SHG will provide access during the tenure of this agreement and after for S³IDF representatives, to the physical site of the equipment and to beneficiaries of the investment. This access may be needed to survey the investment's use including interviewing customers to monitor status and benefits. S³IDF will be monitoring the site during implementation, within six months of beginning operations, and then on an annual basis.
- If there is a violation of covenants in Canara Bank's loan agreement with the SHG, S³IDF shall take necessary steps in bringing any and all pressures it can so that the SHG will rectify the situation.

Terms and Exit Requirements for S³IDF's Guarantee Investment

Specified below are the terms and exit conditions for the financing support to be availed from Canara Bank (loan finance) and S³IDF (guarantee, development and financing fee):

Indian Rupees: All financing transactions will be made in the local currency, which is the Indian Rupee.

Loan Financing Support To Be Availed from Canara Bank, Chintamani Taluk, Kolar District, Karnataka: The following are the terms and conditions under which the SHG should avail loan financing from Canara Bank:

- Irrespective of any collateral (see e. below), loan financing will only be made if there is an acceptable guarantee provided by S³IDF (see B.3 below)
- Loan financing is availed for a period of only five years with monthly repayment of principal and interest. SHG will give necessary instructions to Canara Bank to disperse the loan money directly to SELCO for the supply of material, equipment construction or other services.
- The loan amount will be the entire cost as indicated in SELCO's quotation.

- Interest payment on loan availed by SHG from the Canara Bank will be based on the UNEP scheme for which the project qualifies.
- The loan terms of SHG with Canara Bank will be such that S³IDF's liability is limited to its guarantee support contribution placed as a fixed deposit account with Canara Bank, Iragampalli branch, Kolar District.

Guarantee (partial) Financing Support to be Provided by S³IDF: The following are the terms and conditions for the guarantee financing that S³IDF will provide for the SHG.

- S³IDF will provide a guarantee of Rs. 5,000 provided that:
 - The subsequent items b. and c. are appropriately finalized.
 - S³IDF's overall financial liability does not exceed the initial guarantee investment.
- The guarantee fees charged will reflect the following:
 - The amount/degree of the guarantee exposure.
 - The interest rate that the guarantee monies' term deposit earns.
 - The relevant market norms for analogous guarantees, if any.
 - The lowest market loan rate the SHG could access under a hypothetical "best case" collateral situation, such as prime unencumbered land of value greater than the loan.
 - The lowest market loan rate, if any, the SHG could access under a "representative case" of little/poor collateral and an informal sector lender.
- As mentioned above, the SHG will be charged and pay a guarantee fee equivalent to **4%** of the project cost.

All three parties are in agreement with their obligations as presented above and the final version of this financing agreement will be negotiated in a timely manner and in good faith.

Greenhouse Gas Benefits and Sharing SHG's Know-how and Experience

All the parties acknowledge that there will be Green House Gas (GHG) benefits from the project. In light of the support that SHG has received from S³IDF, the former agrees to transfer the ownership of all of the GHG credits from the investment to S³IDF. Any financial benefit that S³IDF gains from the subsequent sale or transfer of these credits will be used for S³IDF's pro-poor and pro-environment mission.

All the parties acknowledge that as the project proceeds there will be know-how, information and experience that SHG will gather that could be helpful to other parties interested in promoting analogous projects that are pro-poor and pro-environment. Subject to appropriate limits and conditions, SHG agrees to share its know-how and experience with other parties that S³IDF collaborates with. The appropriate limits and conditions encompass the following: a) SHG will not be expected to share any information details it wishes to hold in a proprietary fashion b) requests for visits or interviews will not be unduly burdensome in terms of schedule or time requirements as SHG judges, c) if this sharing of know-how experience places cash opportunity costs on SHG for which it thinks it should be compensated, S³IDF will work out (with SHG) mutually agreeable arrangements.

As long as the S³IDF guarantee is in place the SHG will not allow any outside parties (e.g. academic or research groups) to study or survey the project and/or its customers without S³IDF

being informed and having the option to require such third parties to have a formal survey/study agreement with S³IDF.

M. R. Pai
Executive Director
SELCO

Chief Functionary
Jyoti Mahila Sahaya Sangha SHG

T. L. Sankar
Director
S³IDF

LETTER OF UNDERSTANDING - SOLAR HOME SYSTEMS FOR SHG MEMBERS AT IRAGAMPALLI, CHINTAMANI

Date: July 08, 2004

M/s. Small Scale Sustainable Infrastructure Development Fund
No. 720, 1st Floor,
15th Cross, 24th Main,
J.P.Nagar, 6th Phase,
Bangalore - 560 078

Dear Sirs,
Letter of Understanding

We are happy to know your organization's initiatives in developing sustainable infrastructure projects in the fields of energy, sanitation, water and transport; catering to the poorer sections and under served communities. Your financial and technical contributions in developing projects to ensure the financial viability and at the same time meeting your pro-poor agenda is an unique business model.

We are in receipt of loan assistance request from Jyothi Mahila Sahaya Sangha, a women's self help group (SHG) planning to set up and own a individual solar powered lighting system for use in their business initiatives at Iragampalli village, Chintamani Taluk, Kolar District, Karnataka. We understand that your organization is actively involved in putting together this project. We are pleased to be associated with you in this project and provide necessary financing for the Solar Powered Light Points Project on the following terms and conditions:

Name of Borrower	Jyothi Mahila Sahaya Sangha, Iragampalli village, Chintamani Taluk, Kolar District, Karnataka
Name of Project	Solar Powered Lighting Points
Location of Project	Iragampalli village, Chintamani Taluk, Kolar District, Karnataka
Description of the project	<p>The Jyothi Mahila Sahaya Sangha-owned individual solar powered lighting system will serve the business initiatives of 5 of its members and provide lighting for the same. The lighting is based on light points powered by solar powered rechargeable batteries and will replace kerosene lanterns or candles currently used. The women are working poor and under the scheme their lighting costs are decreased and the lighting quality improved. There are also local and global environmental benefits of the project. In addition, the light points shall improve the women's financial situation. S³IDF's provision of a partial guarantee is allowing the SHG to access 100% of the loan from the Bank.</p> <p>5 women and their families will benefit under this project by having hassle free, reliable and lower cost clean light illuminating their homes and small businesses. Better lighting conditions are expected to increase their business by extended business hours.</p>
Cost of the project	Rs. 30,000

S ³ IDF's Contribution on promoter's behalf in the form of fixed deposit	Rs. 5,000
Loan Amount	Rs. 30,000
Scheme under which Loan granted	UNEP
Interest Rate on the Borrowing	5% (as under the UNEP programme)
Security for the borrowing	<ul style="list-style-type: none"> ▪ Hypothecation of Equipment (with buy back guarantee from equipment supplier, in case of repossession) ▪ Partial Financial Guarantee (Rs. 5,000.00) backed by Fixed Deposit in the Bank from Small Scale Sustainable Infrastructure Development Fund, a Section 25 Company.
Loan Tenure	5 years
Repayment Frequency	Monthly
Equipment Supplier	SELCO Solar Light Pvt. Ltd. #313, 12 th Cross, 15 th Main, J.P. Nagar 5 th Phase, Ring Road, Bangalore - 560078

On submission of the loan application and requirement documentation in support of the guarantee, we shall issue the loan sanction letter. On setting up the project and submission of the invoices and fulfilling the conditions mentioned in the sanction letter, the loan shall be disbursed directly to the Equipment supplier.

Yours Sincerely,

Sd/-

Bank Manager

Canara Bank,

Iragampalli, Chintamani Taluk,

Kolar District, Karnataka

Project Documentation Number 2 - Light Points for Hawkers: Doddaballapur

MEMORANDUM OF UNDERSTANDING – LIGHT POINTS FOR HAWKERS, DODDABALLAPUR

Financing Support Agreement

Memorandum of Understanding Between the Small-Scale Sustainable Infrastructure Development Fund, Inc., Selco Solar Light Pvt. Ltd., and Nagaraj Naik B. for Financing Support for PV-Powered Small Lighting Systems for Hawkers and Petty Shopkeepers in Doddaballapur, Bangalore Rural District, Karnataka, India

Introduction: The Parties, the Purpose and PV Lighting Charging Investment and Micro-Enterprise Context

- This Memorandum of Understanding (MoU) is between three parties for the purpose of presenting the terms and conditions under which there will be provision of technology/equipment, and financing support for an innovative small photovoltaic (PV) powered lighting scheme and an enterprise that will operate and ultimately own the complete investment scheme. Support for this investment and the associated micro enterprise will be consistent with the missions of the various parties given below:
 - The Small-Scale Sustainable Infrastructure Development Fund (S³IDF), incorporated under Section 25 of the Companies Act in India and having its registered office at #720, 1st Floor, 15th Cross, 24th Main, 6th Phase J.P. Nagar, Bangalore - 560078, with the charge to supporting S³IDF's mission throughout South Asia. S³IDF's mission is to facilitate small-scale infrastructure and related investments needed for poverty alleviation and economic advancement in the developing world. It focuses on infrastructure system owners/operators who are small and medium sized entities working in unserved or underserved poor communities.
 - Selco Solar Light Pvt. Ltd. (SELCO), having its registered office at #313, 12th Cross, 15th Main, J.P. Nagar 5th Phase, Ring Road Bangalore - 560078 is a for-profit Company operating in India. SELCO has extensive experience in sales and service of various lighting and other PV based systems in Karnataka and has an established working relationship with Canara Bank.
 - Nagaraj Naik B., (hereafter the entrepreneur) s/o Bhema Naik, residing Gollahalli, Antharahalli(P), Doddaballapur – 561203, Bangalore Rural District, Karnataka and having an office at TMC Computer Education Centre, No. 13, 1st Floor, Nagaraj Complex, Taluk office circle, Doddaballapur - 561203, Bangalore Rural District, Karnataka, is the third party and is an owner and the operator of the PV-Based Lighting Charging Micro-Enterprise Unit (hereafter the MEU) proposed to come up in Doddaballapur, Bangalore Rural District in Karnataka. MEU is a for-profit micro-enterprise formed to serve customers drawn from the Hawkers' Community.
- It is noted that S³IDF (the Indian-based organization) is an official affiliate of the non-profit corporation, The Small-Scale Sustainable Infrastructure Development Fund, Inc., a US 501(c) (3) entity (public charity) incorporated in Massachusetts, having the same mission as S³IDF (the Indian-based organization), and having its office at The Carriage House, 5 Hastings

Square, Cambridge, MA 02139, USA. Hereafter whenever there is reference to S³IDF it should be interpreted to encompass both the Indian-based organization as well as its US affiliate.

- The particulars of this MoU below follow from the results of a series of on-going pre-investment work that was agreed upon between S³IDF and SELCO whereby they jointly undertake surveys and preliminary studies to identify poor communities (households, hawkers/petty traders and other) that could benefit from the innovative Light Points schemes the two entities have developed (and other pro-poor, pro-environment schemes). This original agreement included an understanding between S³IDF and SELCO that if such an appropriate group were identified and certain criteria were met they would attempt to facilitate an investment scheme where a key aspect of this facilitation would be innovative financing provided by S³IDF. This particular scheme, to serve a hawkers' community in Doddaballapur is a result of such pre-investment work co-financed by the USAID South Asia Regional Initiative for Energy; this initiative is underwriting pilot work in Karnataka as part of the PRESK (Private Rural Energy Services in Karnataka) Program. The PRESK program is focused in four taluks in Karnataka (of which Doddaballapur is one). Under this USAID support⁸² if the results of the pre-investment work are to lead to an investment that S³IDF would endeavor to help take forward to implementation, such investment must meet S³IDF's criteria.
- The proposed investment covered by this MoU meets these criteria. Amongst the main criteria were: i) that the families/customers to benefit from the investment would be low-income/poor in accordance with the international standards which S³IDF employs⁸³; ii) analysis would indicate feasibility – subject to an innovative financing arrangement; and iii) the families/customers indicate a willingness to pay for the investment – assuming the increased income and/or savings and other benefits it would allow them. This pre-investment work proceeded in various steps with consultation between S³IDF, SELCO, Entrepreneur and subsequently having Canara Bank, Doddaballapur join the discussion and then a separate letter of understanding between S³IDF and the Bank covering the Bank's participation agreement.
- Based on these pre-investment studies, the MEU will have the following physical and operational elements:
 - A centralized solar power system consisting of Solar Panels, Batteries, Lights and such other accessories as required, located in land owned by entrepreneur at Doddaballapur,
 - A fee-for-service that the MEU will agree upon amongst the hawkers/petty shop owners in order to pay the loan and guarantee fees and development and financing arrangement fees (more below),
 - The MEU will operate the system and ultimately own it (after payments completed).

The equipment will be supplied by SELCO; the estimated cost for the scheme is about Rs. 2,00,000. Pre-investment work done indicates that the participants of the hawkers' community are willing and able to pay a fee-for-service that will allow the MEU to pay a loan and guarantee fee that will be sufficient to make the investment financially viable in accordance with the loan, guarantee fee, development and financing fee arrangements outlined below.

⁸² This support is provided under an agreement between S³IDF and Nexant, Inc, which is the implementing contractor for the USAID South Asia Regional Initiative for Energy

⁸³ S³IDF employs international poverty line indicators such as those used by the international agencies such as the World Bank, World Development Indicators, 2002.

- The paragraphs below present the responsibilities of the three parties and the terms and conditions under which financial support in the form of a guarantee can be provided on behalf of the MEU to the Canara Bank so that the MEU can meet the Canara Bank's requirements for making available loan financing for the MEU. Given that the Canara Bank will also have call on the asset value of components noted in element i. in the previous paragraph, it has been agreed upon that S³IDF guarantee financing will be for only a portion of the total loan amount.

A. Parties' Responsibilities

Purpose: The MEU, its planned operation and the terms of S³IDF's participation described below in this agreement are fully consistent with S³IDF's mission and its charitable purpose under US laws and regulations, and the investment and operational details cannot be changed without permission from S³IDF.

Responsibilities: This agreement assumes that the Canara Bank will provide loan financing to the MEU and will undertake credit appraisal as per their normal practices. S³IDF will provide a guarantee so that the Canara Bank can provide the loan towards purchase financing. Although the Canara Bank is not a formal signatory of this agreement, S³IDF participation is contingent on the Canara Bank also providing this loan. Hence in the paragraphs below, the Bank's role is also detailed. The responsibilities of SELCO are to provide and install the equipment noted above and to provide any necessary service during its operations for the period of the loan. The arrangements and terms for this transaction shall be in accordance with its normal commercial practice namely the same, as SELCO would make with the MEU where such group would not require a guarantor such as S³IDF. The responsibilities of the MEU are to operate the scheme and its equipment in accordance with any instructions SELCO shall provide and to promptly pay the loan and guarantee fees. The details of these financial responsibilities and arrangements are presented below in Section B. The remainder of this section addresses other responsibilities of the parties and their limits.

Limits of Commitments and Responsibilities: This agreement is limited only to the financing of the MEU and the responsibilities of all parties for this arrangement. The maximum amount of the loan financing that the Canara Bank is committed to provide is **85%** of project cost and the maximum guarantee investment to be provided by S³IDF is **25%** of the loan amount. The period of this agreement will be that of the loan agreement as detailed in Section B below. One exception to this period may be with regard to a longer period for the Access Responsibility (see item b. in A.5 below).

Fixation of Fee for Service: The MEU's tariff for the lighting system to the hawkers will be restricted to an amount of Rs. 15 for 4-5 hours per day and any change in the tariff will be discussed and determined after consultation with S³IDF. The overall guiding factor in fixation of fee for service is while the MEU earns a decent rate of return on investments, the aim is to ensure that the fee is attractive enough that the hawkers benefit (through a mix of savings and better lighting) sufficient to encourage the hawkers' community to change from other polluting and unreliable fuel sources for their lighting requirement. If the MEU is found violating such tariff and guiding principles at any point of time during S³IDF's Monitoring and Evaluation, S³IDF shall withdraw their support. S³IDF may also withdraw from participation in the transaction and pursue any legal remedies available to recover its costs/investment or minimize any losses and/or remedy the problem.

Accounting, Record Keeping, Reporting and Access Responsibilities: Responsibilities with regard to accounting, record keeping, reporting, and investment site access are integral to the fiduciary responsibilities under this financing agreement as well as to the needed monitoring to ensure that the MEU's implementation and operation is consistent with S³IDF's Mission. With respect to the guaranteed loan financing arrangements, only the MEU and S³IDF are the direct parties and these two parties agree to the following responsibilities:

- At a minimum, on an annual basis, the MEU will report on the timelines of its loan and guarantee fee payments, and any problems that have incurred in making these payments. In addition, the MEU shall report on the physical/operating condition of all equipment and a list of employees. All problems whether financial or otherwise will be noted as well as any measures taken to address them. During the first year, more frequent reporting will be required from the MEU, such as initial reporting within the first four months.
- The MEU will provide access during the tenure of this agreement and after for S³IDF personnel and its representatives, including any independent experts it might appoint, to the physical site of the equipment and to beneficiaries of the investment. This access may be needed to examine and survey the investment's use including interviewing customers to monitor status and benefits. At a minimum, S³IDF will be monitoring the site during implementation, within six months of beginning operations, and then on an annual basis.
- S³IDF's aforementioned monitoring activities will include assessing if S³IDF's Mission is being compromised with regard to how the MEU is being operated, and/or whether there is a violation of covenants in Canara Bank's loan agreement with the MEU. In such an instance, S³IDF shall take necessary steps in bringing any and all pressures it can so that the MEU will rectify the situation. If not rectified, S³IDF shall withdraw its support and take such steps judged feasible including canceling the loan and if necessary removing the equipment. S³IDF may also withdraw from participation in the transaction and pursue any legal remedies available to recover its costs/investment or minimize any losses and/or remedy the problem.

B. Terms and Exit Requirements for S³IDF's Guarantee Investment

The paragraphs below specify the terms and exit conditions for the financing support to be availed from Canara Bank (loan finance) and S³IDF (guarantee, development and financing fee). These terms reflect the fact that the guaranteed loan for the MEU and the Hawkers Community may qualify for some subsidy under one or another of current special financing schemes (e.g. the UNEP or other special programs).

Indian Rupees: All financing transactions will be made in the local currency, which is the Indian Rupee.

Project Development and Financing arrangement fees: The MEU understands and acknowledges that this project has involved a significant amount of Pre-investment effort that S³IDF has expended. This effort has resulted in the conception of the MEU, identification of actors/linkages that will enable the MEU to start up and operate, and in the involvement of the relevant financial institution which will potentially provide the appropriate form of financing necessary for all investments that the MEU will need to make. The MEU further understands and acknowledges

that the costs of this pre-investment activity is significant and that S³IDF shall charge a fee for its enabling role to recover in part or whole these costs⁸⁴.

Noting the matters immediately above, it is understood by all parties that the MEU will be charged and it will pay a development and financing arrangement fee equivalent to __ % of the project cost. It is further noted that this fee will be capitalized into the investment costs of the MEU.

Loan Financing Support To Be Availed from Canara Bank, Doddaballapur branch: The following paragraphs present the terms and conditions under which MEU should avail loan financing from Canara Bank:

- Irrespective of any collateral (see e. below), loan financing will only be made if there is an acceptable guarantee provided by S³IDF (see B.4 below):
- Loan financing is availed for a period of only three years with monthly repayment of principal and interest. MEU will give necessary instructions to Canara Bank to disperse the loan money directly to SELCO for the supply of material, equipment or construction or other services based in accordance with the costs.
- The loan amounts will be up to a limit of **85%** of the costs indicated in SELCO's quotation.
- Interest payment on loan availed by MEU from the Canara Bank will be based on the UNEP scheme for which the project qualifies.
- In the absence of collateral that meets its commercial practice standards, Canara Bank is providing the loan financing as a result of the guarantee provided by S³IDF (see B.4 below). Nonetheless, if Canara Bank requires any ownership/lien arrangements on some or all of the MEU's, then the MEU should provide the same to Canara Bank.
- The loan terms of MEU with Canara Bank will be such that S³IDF's liability is limited to its guarantee support contribution to be placed in a fixed deposit account with Canara Bank, Doddaballapur Branch.

Guarantee (partial) Financing Support to be Provided by S³IDF: The following paragraphs present the amount and guidelines for the terms and conditions with regard to the guarantee financing that S³IDF will provide for the MEU.

- Assuming other conditions of this agreement, in particular Canara Bank's loan commitment and terms as presented in B.3 immediately above, S³IDF will provide a partial guarantee which is equivalent to **25%** of the loan amount, provided that:
 - The subsequent items b., c. and d. are appropriately finalized.
 - S³IDF's overall financial liability does not exceed the initial guarantee investment.
 - The MEU contributes **15%** (as under the UNEP scheme) of project costs as its investment.
- The guarantee fees charged will reflect the following:
 - The amount/degree of the *partial* guarantee exposure.

⁸⁴ The development and financing arrangement fee will reflect the following:

- Incurred cost of the development effort
- Extent of financial support for the pre-investment activities of this project S³IDF has successfully mobilized by its external fund raising efforts. Since this project has been conducted under the USAID support, the development and financing arrangement fee for this project will reflect the partial coverage of the pre-investment costs by the USAID under the South Asia Regional Initiative for energy
- Extent of augmentation/creation of disposable income that this MEU will achieve by this project because of the interventions of S³IDF.

- The interest rate that the guarantee monies' term deposit earns.
 - What are the relevant market norms for analogous guarantees, if any.
 - What is the lowest market loan rate the MEU could access under a hypothetical "best case" collateral situation, such as prime unencumbered land of value greater than the loan.
 - What is the lowest market loan rate, if any, the Micro Enterprise investor/operator could access under a "representative case" of little/poor collateral and an informal sector lender.
- Noting the matters immediately above, it is understood by all parties that the MEU will be charged and it will pay a guarantee fee equivalent to **4%**
 - of the project cost.
 - To the extent feasible and appropriate, guarantee fee payment schedules shall be mutually decided between S³IDF and MEU.

All three parties are in agreement with their obligations as presented above and note that this agreement will allow any necessary additional pre-investment work and negotiations to continue and be finalized and the final version of this financing agreement will be negotiated in a timely manner and in good faith. Moreover, the parties further specify that at the time this financing support agreement is finalized and the equity and loan financing are provided, their obligations as first presented above and subsequently finalized can also be incorporated and/or made integral attachments to other appropriate documentation, such as the loan financing agreements that may be with registered pertinent authorities.

C. Greenhouse Gas Benefits and Sharing MEU's Know-how and Experience

All the parties acknowledge that there will be Green House Gas (GHG) benefits from the project. Whether any financial benefit can be captured is unclear because these benefits have to be estimated and a market for them under verification procedures that are not too costly in transaction costs must be explored. In light of these uncertainties and the support that MEU has received from S³IDF, the former agrees to transfer the ownership of all of the GHG credits from the investment to S³IDF. Any financial benefit that S³IDF gains from the subsequent sale or transfer of these credits will be used for S³IDF's pro-poor and pro-environment mission. S³IDF will undertake any and all studies and measurement that may be required to estimate and/or verify these GHG credits, providing its preliminary estimates suggest such efforts as being worthwhile and/or it is able to secure appropriate assistance for these estimate and verification efforts. MEU and SELCO agree to share with S³IDF its knowledge and experience with regard to such estimation and verification effort.

All the parties acknowledge that as the project proceeds there will be know-how, information and experience that MEU will gather that could be helpful to other parties interested in promoting analogous projects that are pro-poor and pro-environment. This knowledge will grow in the course of implementation and operation of the scheme for which S³IDF is providing financing. Subject to appropriate limits and conditions, MEU agrees to share its know-how and experience with other parties that S³IDF is or may consider supporting in pro-poor, pro-environment projects. Here the phrase appropriate limits and conditions is meant to encompass the following: a) MEU will not be expected to share any information details it wishes to hold in a proprietary fashion b) requests for visits or interviews will not be unduly burdensome in terms of schedule or time requirements as

MEU judges, c) if in certain instances, this sharing of know-how and experience places cash or opportunity costs on MEU for which it thinks it should be compensated at least on a “no loss/cost-covered” basis, S³IDF will work out (with MEU) mutually agreeable cost-covering arrangements.

The MEU agrees that as long as the S³IDF guarantee is in place the MEU will not allow any outside parties (e.g. academic or research groups) to study or survey the project and/or its customers without S³IDF being informed and having the option to require such third parties to have a formal survey/study agreement with S³IDF.

M. R. Pai
Executive Director
SELCO

Nagaraj Naik B.
Entrepreneur
MEU

T. L. Sankar
Director
S³IDF

LETTER OF UNDERSTANDING – LIGHT POINTS FOR HAWKERS, DODDABALLAPUR

Date: _____, 2004

M/s. Small Scale Sustainable Infrastructure Development Fund
No. 720, 1st Floor,
15th Cross, 24th Main,
J.P.Nagar, 6th Phase,
Bangalore - 560 078

Dear Sirs,

Sub: Letter of Understanding

We are happy to know your organization's initiatives in developing sustainable infrastructure projects in the fields of energy, sanitation, water and transport; catering to the poorer sections and under served communities. And we understand that your organization has recently been focusing on Doddaballapur and other taluks in conjunction with the PRESK Program with USAID support. Your financial and technical contributions in developing projects to ensure the financial viability and at the same time meeting your pro-poor agenda is an unique business model.

We are in receipt of loan assistance request from Mr. Nagaraj Naik B., planning to set up and own a micro-enterprise project involving solar powered charging station to provide lighting points to shopkeepers and hawkers in Doddaballapur, Bangalore Rural District, Karnataka. We understand that your organization is actively involved in putting together this project. We are pleased to be associated with you in this project and provide necessary financing for the Solar Powered Lighting Points Charging Station Project on the following terms and conditions:

Name of Borrower	Nagaraj Naik B., s/o Bhema Naik, Gollahalli, Antharahalli(P), Doddaballapur – 561203, Bangalore Rural District, Karnataka
Name of Project	Solar Powered Charging Station for Lighting Points
Location of Project	Doddaballapur, Bangalore Rural District, Karnataka
Description of the project	<p>The micro-enterprise will serve an un-electrified Hawkers'/shopkeeper's community and provide lighting for their street stalls. The lighting is based on light points powered by solar powered rechargeable batteries. Recharged batteries are provided on a "pay for charge" basis and replace kerosene lanterns. The hawkers are working poor and under the scheme their lighting costs are decreased and the lighting quality improved. There are also local and global environmental benefits of the project. In addition, the micro-enterprise shall generate some local employment. S³IDF's provision of a partial guarantee is allowing the entrepreneur to access a loan from the Bank.</p> <p>35 Hawkers will benefit under this project by having hassle free, reliable and lower cost clean light illuminating their shops. Better lighting conditions are expected to increase their business by</p>

	extended business hours.
Cost of the project	Rs. _____
Promoter Contribution	15 % of loan amount i.e., Rs. _____
Loan Amount	Rs. _____
Scheme under which Loan granted	UNEP
Interest Rate on the Borrowing	5 % (as under the UNEP programme)
Security for the borrowing	1. Hypothecation of Equipment (with buy back guarantee from equipment supplier, in case of repossession) 2. Partial Financial Guarantee (25% of loan amount) backed by Fixed Deposit in the Bank from Small Scale Sustainable Infrastructure Development Fund, a Section 25 Company.
Loan Tenure	3 years
Repayment Frequency	Monthly
Equipment Supplier	SELCO Solar Light Pvt. Ltd. #313, 12 th Cross, 15 th Main, J.P. Nagar 5 th Phase, Ring Road, Bangalore – 560078

On submission of the loan application and requirement documentation in support of the guarantee, we shall issue the loan sanction letter. On setting up the project and submission of the invoices and fulfilling the conditions mentioned in the sanction letter, the loan shall be disbursed directly to the Equipment supplier.

Yours Sincerely,

Sd/-

Name

Branch Manager

Canara Bank, Doddaballapur

Project Documentation Number 3 - Light Points for Hawkers: Chintamani

MEMORANDUM OF UNDERSTANDING – LIGHT POINTS FOR HAWKERS, CHINTAMANI

Financing Support Agreement

Memorandum of Understanding Between the Small-Scale Sustainable Infrastructure Development Fund, Inc., Selco Solar Light Pvt. Ltd., and Mr. Laxman Kumar, Mr. Niranjana and Mr. Badrinath for Financing Support for PV-Powered Small Lighting Systems for Hawkers and Petty Shopkeepers in Chintamani, Kolar District, Karnataka, India

Introduction: The Parties, the Purpose and PV Lighting Charging Investment and Micro-Enterprise Context

- This Memorandum of Understanding (MoU) is between three parties for the purpose of presenting the terms and conditions under which there will be provision of technology/equipment, and financing support for an innovative small photovoltaic (PV) powered lighting scheme and an enterprise that will operate and ultimately own the complete investment scheme. Support for this investment and the associated micro enterprise will be consistent with the missions of the various parties given below:
 - The Small-Scale Sustainable Infrastructure Development Fund (S³IDF), incorporated under Section 25 of the Companies Act in India and having its registered office at #720, 1st Floor, 15th Cross, 24th Main, 6th Phase J.P. Nagar, Bangalore - 560078, with the charge to supporting S³IDF's mission throughout South Asia. S³IDF's mission is to facilitate small-scale infrastructure and related investments needed for poverty alleviation and economic advancement in the developing world. It focuses on infrastructure system owners/operators who are small and medium sized entities working in unserved or underserved poor communities.
 - Selco Solar Light Pvt. Ltd. (SELCO), having its registered office at #313, 12th Cross, 15th Main, J.P. Nagar 5th Phase, Ring Road Bangalore - 560078 is a for-profit Company operating in India. SELCO has extensive experience in sales and service of various lighting and other PV based systems in Karnataka and has an established working relationship with Canara Bank.
 - The team of Mr. Laxman Kumar, Mr. Niranjana and Mr. Badrinath (hereafter the entrepreneurs) having office at Vyshnawi milk center, opposite Jamiya mosque, Doddapet, Chintamani - 563125, Kolar District, Karnataka, is the third party and is the owner and the operator of the PV-Based Lighting Charging Micro-Enterprise Unit (hereafter the MEU) proposed to come up in Chintamani, Kolar District in Karnataka. The MEU is a for-profit micro-enterprise formed to serve customers drawn from the Hawkers' Community.
- It is noted that S³IDF (the Indian-based organization) is an official affiliate of the non-profit corporation, The Small-Scale Sustainable Infrastructure Development Fund, Inc., a US 501(c) (3) entity (public charity) incorporated in Massachusetts, having the same mission as S³IDF (the Indian-based organization), and having its office at The Carriage House, 5 Hastings Square, Cambridge, MA 02139, USA. Hereafter whenever there is reference to S³IDF it should be interpreted to encompass both the Indian-based organization as well as its US affiliate.

- The particulars of this MoU below follow from the results of a series of on-going pre-investment work that was agreed upon between S³IDF and SELCO whereby they jointly undertake surveys and preliminary studies to identify poor communities (households, hawkers/petty traders and other) that could benefit from the innovative Light Points schemes the two entities have developed (and other pro-poor, pro-environment schemes). This original agreement included an understanding between S³IDF and SELCO that if such an appropriate group were identified and certain criteria were met they would attempt to facilitate an investment scheme where a key aspect of this facilitation would be innovative financing provided by S³IDF. This particular scheme, to serve a hawkers' community in Chintamani is a result of such pre-investment work co-financed by the USAID South Asia Regional Initiative for Energy; this initiative is underwriting pilot work in Karnataka as part of the PRESK (Private Rural Energy Services in Karnataka) Program. The PRESK program is focused in four taluks in Karnataka (of which Chintamani is one). Under this USAID support⁸⁵ if the results of the pre-investment work are to lead to an investment that S³IDF would endeavor to help take forward to implementation, such investment must meet S³IDF's criteria.
- The proposed investment covered by this MoU meets these criteria. Amongst the main criteria were: i) that the families/customers to benefit from the investment would be low-income/poor in accordance with the international standards which S³IDF employs⁸⁶; ii) analysis would indicate feasibility – subject to an innovative financing arrangement; and iii) the families/customers indicate a willingness to pay for the investment – assuming the increased income and/or savings and other benefits it would allow them. This pre-investment work proceeded in various steps with consultation between S³IDF, SELCO, and the entrepreneurs and subsequently having Kolar Grameen Bank, Chintamani join the discussion and then a separate letter of understanding between S³IDF and the Bank covering the Bank's participation agreement.
- Based on these pre-investment studies, the MEU will have the following physical and operational elements:
 - A centralized solar power system consisting of Solar Panels, Batteries, Lights and such other accessories as required, located in land owned by the entrepreneur at Chintamani.
 - A fee-for-service that the MEU will agree upon amongst the hawkers/petty shop owners in order to pay the loan and guarantee fees, development and financing arrangement fees (more below),
 - The MEU will operate the system and ultimately own it (after payments completed).

The equipment will be supplied by SELCO; the estimated cost for the scheme is about Rs. 2,00,000/-. Pre-investment work done indicates that the participants of the hawkers' community are willing and able to pay a fee-for-service that will allow the MEU to pay a loan and guarantee fee that will be sufficient to make the investment financially viable in accordance with the loan, guarantee fee, development and financing arrangement fees outlined below.

- The paragraphs below present the responsibilities of the three parties and the terms and conditions under which financial support in the form of a guarantee can be provided on behalf

⁸⁵ This support is provided under an agreement between S³IDF and Nexant, Inc, which is the implementing contractor for the USAID South Asia Regional Initiative for Energy

⁸⁶ S³IDF employs international poverty line indicators such as those used by the international agencies such as the World Bank, World Development Indicators, 2002.

of the MEU to the Kolar Grameen Bank so that the MEU can meet the Kolar Grameen Bank's requirements for making available loan financing for the MEU. Given that the Kolar Grameen Bank will also have call on the asset value of components noted in element i. in the previous paragraph, it has been agreed upon that S³IDF guarantee financing will be for only a portion of the total loan amount.

A. Parties' Responsibilities

Purpose: The MEU, its planned operation and the terms of S³IDF's participation described below in this agreement are fully consistent with S³IDF's mission and its charitable purpose under US laws and regulations, and the investment and operational details cannot be changed without permission from S³IDF.

Responsibilities: This agreement assumes that the Kolar Grameen Bank will provide loan financing to the MEU and will undertake credit appraisal as per their normal practices. S³IDF will provide a guarantee so that the Kolar Grameen Bank can provide the loan towards purchase financing. Although the Kolar Grameen Bank is not a formal signatory of this agreement, S³IDF participation is contingent on the Kolar Grameen Bank also providing this loan. Hence in the paragraphs below, the Bank's role is also detailed. The responsibilities of SELCO are to provide and install the equipment noted above and to provide any necessary service during its operations for the period of the loan. The arrangements and terms for this transaction shall be in accordance with its normal commercial practice namely the same as SELCO would make with the MEU where such group would not require a guarantor such as S³IDF. The responsibilities of the MEU are to operate the scheme and its equipment in accordance with any instructions SELCO shall provide and to promptly pay the loan and guarantee fees. The details of these financial responsibilities and arrangements are presented below in Section B. The remainder of this section addresses other responsibilities of the parties and their limits.

Limits of Commitments and Responsibilities This agreement is limited only to the financing of the MEU and the responsibilities of all parties for this arrangement. The maximum amount of the loan financing that the Kolar Grameen Bank is committed to provide is **85%** of project cost and the maximum guarantee investment to be provided by S³IDF is **25%** of the loan amount. The period of this agreement will be that of the loan agreement as detailed in Section B below. One exception to this period may be with regard to a longer period for the Access Responsibility (see *below*).

Fixation of Fee for Service The MEU's tariff for the lighting system to the hawkers will be restricted to an amount of Rs. 15 for 4-5 hours per day and any change in the tariff will be discussed and determined after consultation with S³IDF. The overall guiding factor in fixation of fee for service is while the MEU earns a decent rate of return on investments, the aim is to ensure that the fee is attractive enough that the hawkers benefit (through a mix of savings and better lighting) sufficiently to encourage the hawkers' community to change from other polluting and unreliable fuel sources for their lighting requirement. If the MEU is found violating such tariff and guiding principles at any point of time during S³IDF's Monitoring and Evaluation, S³IDF shall withdraw their support. S³IDF may also withdraw from participation in the transaction and pursue any legal remedies available to recover its costs/investment or minimize any losses and/or remedy the problem.

Accounting, Record Keeping, Reporting and Access Responsibilities: Responsibilities with regard to accounting, record keeping, reporting, and investment site access are integral to the fiduciary responsibilities under this financing agreement as well as to the needed monitoring to ensure that the MEU's implementation and operation is consistent with S³IDF's Mission. With respect to the guaranteed loan financing arrangements, only the MEU and S³IDF are the direct parties and these two parties agree to the following responsibilities:

- At a minimum, on an annual basis, the MEU will report on the timelines of its loan and guarantee fee payments, and any problems that have incurred in making these payments. In addition, the MEU shall report on the physical/operating condition of all equipment and a list of employees. All problems whether financial or otherwise will be noted as well as any measures taken to address them. During the first year, more frequent reporting will be required from the MEU, such as initial reporting within the first four months.
- The MEU will provide access during the tenure of this agreement and after for S³IDF personnel and its representatives, including any independent experts it might appoint, to the physical site of the equipment and to beneficiaries of the investment. This access may be needed to examine and survey the investment's use including interviewing customers to monitor status and benefits. At a minimum, S³IDF will be monitoring the site during implementation, within six months of beginning operations, and then on an annual basis.
- S³IDF's aforementioned monitoring activities will include assessing if S³IDF's Mission is being compromised with regard to how the MEU is being operated, and/or whether there is a violation of covenants in Kolar Grameen Bank's loan agreement with the MEU. In such an instance, S³IDF shall take necessary steps in bringing any and all pressures it can so that the MEU will rectify the situation. If not rectified, S³IDF shall withdraw its support and take such steps judged feasible including canceling the loan and if necessary removing the equipment. S³IDF may also withdraw from participation in the transaction and pursue any legal remedies available to recover its costs/investment or minimize any losses and/or remedy the problem.

B. Terms and Exit Requirements for S³IDF's participation and Guarantee Investment

The paragraphs below specify the terms and exit conditions for the financing support to be availed from Kolar Grameen Bank (loan finance) and S³IDF (guarantee). These terms reflect the fact that the guaranteed loan for the MEU and the Hawkers Community may qualify for some subsidy under one or another of current special financing schemes (e.g. the UNEP or other special programs).

Indian Rupees: All financing transactions will be made in the local currency, which is the Indian Rupee.

Project Development and Financing arrangement fees: The MEU understands and acknowledges that this project has involved a significant amount of Pre-investment effort that S³IDF has expended. This effort has resulted in the conception of the MEU, identification of actors/linkages that will enable the MEU to start up and operate, and in the involvement of the relevant financial institution which will potentially provide the appropriate form of financing necessary for all investments that the MEU will need to make. The MEU further understands and acknowledges

that the costs of this pre-investment activity is significant and that S³IDF shall charge a fee for its enabling role to recover in part or whole these costs⁸⁷.

Noting the matters immediately above, it is understood by all parties that the MEU will be charged and it will pay a development & financing arrangement fee equivalent to ____ % of the project cost. It is further noted that this fee will be capitalized into the investment costs of the MEU.

Loan Financing Support To Be Availed from Kolar Grameen Bank, Chintamani branch: The following paragraphs present the terms and conditions under which MEU should avail loan financing from Kolar Grameen Bank:

- Irrespective of any collateral (see e. below), loan financing will only be made if there is an acceptable guarantee provided by S³IDF (see B.4 below):
- Loan financing is availed for a period of only three years with monthly repayment of principal and interest. MEU will give necessary instructions to Kolar Grameen Bank to disperse the loan money directly to SELCO for the supply of material, equipment or construction or other services based in accordance with the costs.
- The loan amounts will be up to a limit of **85%** of the costs indicated in SELCO's quotation.
- Interest payment on loan availed by MEU from the Kolar Grameen Bank will be based on the UNEP scheme for which the project qualifies.
- In the absence of collateral that meets its commercial practice standards, Kolar Grameen Bank is providing the loan financing as a result of the guarantee provided by S³IDF (see B.4 below). Nonetheless, if Kolar Grameen Bank requires any ownership/lien arrangements on some or all of the MEU's, then the MEU should provide the same to the Kolar Grameen Bank.
- The loan terms of MEU with Kolar Grameen Bank will be such that S³IDF's liability is limited to its guarantee support contribution to be placed in a fixed deposit account with the Kolar Grameen Bank, Chintamani Branch.

Guarantee (partial) Financing Support to be Provided by S³IDF: The following paragraphs present the amount and guidelines for the terms and conditions with regard to the guarantee financing that S³IDF will provide for the MEU.

- Assuming other conditions of this agreement, in particular the Kolar Grameen Bank's loan commitment and terms as presented in B.3 immediately above, S³IDF will provide a partial guarantee which is equivalent to **25%** of the loan amount, provided that:
 - The subsequent items b., c. and d. are appropriately finalized.
 - S³IDF's overall financial liability does not exceed the initial guarantee investment.
 - The MEU contributes **15%** (as under the UNEP scheme) of project costs as its investment.
- The guarantee fees charged will reflect the following:
 - The amount/degree of the *partial* guarantee exposure.
 - The interest rate that the guarantee monies' term deposit earns.

⁸⁷ The development and financing arrangement fee will reflect the following:

- Incurred cost of the development effort
- Extent of financial support for the pre-investment activities of this project S³IDF has successfully mobilized by its external fund raising efforts. Since this project has been conducted under the USAID support, the development and financing arrangement fee for this project will reflect the partial coverage of the pre-investment costs by the USAID under the South Asia Regional Initiative for energy
- Extent of augmentation/creation of disposable income that this MEU will achieve by this project because of the interventions of S³IDF.

- What are the relevant market norms for analogous guarantees, if any.
- What is the lowest market loan rate the MEU could access under a hypothetical “best case” collateral situation, such as prime unencumbered land of value greater than the loan.
- What is the lowest market loan rate, if any, the Micro Enterprise investor/operator could access under a “representative case” of little/poor collateral and an informal sector lender.

Noting the matters in immediately above, it is understood by all parties that the MEU will be charged and it will pay a guarantee fee equivalent to ____ % of the project cost.

- To the extent feasible and appropriate, guarantee fee payment schedules shall be mutually decided between S³IDF and MEU.

All three parties are in agreement with their obligations as presented above and note that this agreement will allow any necessary additional pre-investment work and negotiations to continue and be finalized and the final version of this financing agreement will be negotiated in a timely manner and in good faith. Moreover, the parties further specify that at the time this financing support agreement is finalized and the equity and loan financing are provided, their obligations as first presented above and subsequently finalized can also be incorporated and/or made integral attachments to other appropriate documentation, such as the loan financing agreements that may be with registered pertinent authorities.

C. Greenhouse Gas Benefits and Sharing MEU’s Know-how and Experience

All the parties acknowledge that there will be Green House Gas (GHG) benefits from the project. Whether any financial benefit can be captured is unclear because these benefits have to be estimated and a market for them under verification procedures that are not too costly in transaction costs must be explored. In light of these uncertainties and the support that MEU has received from S³IDF, the former agrees to transfer the ownership of all of the GHG credits from the investment to S³IDF. Any financial benefit that S³IDF gains from the subsequent sale or transfer of these credits will be used for S³IDF’s pro-poor and pro-environment mission. S³IDF will undertake any and all studies and measurement that may be required to estimate and/or verify these GHG credits, providing its preliminary estimates suggest such efforts as being worthwhile and/or it is able to secure appropriate assistance for these estimate and verification efforts. MEU and SELCO agree to share with S³IDF its knowledge and experience with regard to such estimation and verification effort.

All the parties acknowledge that as the project proceeds there will be know-how, information and experience that MEU will gather that could be helpful to other parties interested in promoting analogous projects that are pro-poor and pro-environment. This knowledge will grow in the course of implementation and operation of the scheme for which S³IDF is providing financing. Subject to appropriate limits and conditions, MEU agrees to share its know-how and experience with other parties that S³IDF is or may consider supporting in pro-poor, pro-environment projects. Here the phrase appropriate limits and conditions is meant to encompass the following: a) MEU will not be expected to share any information details it wishes to hold in a proprietary fashion b) requests for visits or interviews will not be unduly burdensome in terms of schedule or time requirements as MEU judges, c) if in certain instances, this sharing of know-how and experience places cash or opportunity costs on MEU for which it thinks it should be compensated at least on a “no loss/cost-covered” basis, S³IDF will work out (with MEU) mutually agreeable cost-covering arrangements.

The MEU agrees that as long as the S³IDF guarantee is in place the MEU will not allow any outside parties (e.g. academic or research groups) to study or survey the project and/or its customers without S³IDF being informed and having the option to require such third parties to have a formal survey/study agreement with S³IDF.

M. R. Pai
Executive Director
SELCO

Laxman Kumar
Niranjan D V
S Badrinath
Entrepreneurs
MEU

T. L. Sankar
Director
S³IDF

LETTER OF UNDERSTANDING – LIGHT POINTS FOR HAWKERS, CHINTAMANI

Date: _____, 2004

M/s. Small Scale Sustainable Infrastructure Development Fund
 No. 720, 1st Floor,
 15th Cross, 24th Main,
 J.P.Nagar, 6th Phase,
 Bangalore - 560 078

Dear Sirs,

Letter of Understanding

We are happy to know your organization's initiatives in developing sustainable infrastructure projects in the fields of energy, sanitation, water and transport; catering to the poorer sections and under served communities. Your financial and technical contributions in developing projects to ensure the financial viability and at the same time meeting your pro-poor agenda is an unique business model.

We are in receipt of loan assistance request from Mr. Laxman Kumar, an entrepreneur planning to set up and own a micro-enterprise project involving solar powered charging station to provide lighting points to shopkeepers and hawkers in the Azad Chowk area of Chintamani Town, Karnataka. We understand that your organization is actively involved in putting together this project. We are pleased to be associated with you in this project and provide necessary financing for the Solar Powered Lighting Points Charging Station Project on the following terms and conditions:

Name of Borrower	Mr. Laxman Kumar, Vyshwani Milk Centre, Opposite Jamiya Macedi (mosque), Doddapet, Chintamani
Name of Project	Solar Powered Charging Station for Lighting Points
Location of Project	Azad Chowk, Chintamani Town, Kolar District, Karnataka
Description of the project	The entrepreneur-owned micro-enterprise will serve an un-electrified Hawkers'/shopkeeper's community and provides lighting for their street stalls. The lighting is based on light points powered by solar powered rechargeable batteries. Recharged batteries are provided on a "pay for charge" basis and replace kerosene lanterns. The hawkers are working poor and under the scheme their lighting costs are decreased and the lighting quality improved. There are also local and global environmental benefits of the project. In addition, the micro-enterprise shall generate some local employment. S ³ IDF's provision of a partial guarantee is allowing the entrepreneur-owned micro-enterprise to access a loan from the Bank. 35 Hawkers will benefit under this project by having hassle free, reliable and lower cost clean light illuminating their shops. Better lighting conditions are expected to increase their business by extended business hours.
Cost of the project	Rs. _____

Promoter Contribution	15 % of project cost i.e., Rs. _____
Loan Amount	Rs. _____
Scheme under which Loan granted	UNEP
Interest Rate on the Borrowing	5 % (as under the UNEP programme)
Security for the borrowing	1) Hypothecation of Equipment (with buy back guarantee from equipment supplier, in case of repossession) 2) Partial Financial Guarantee (25% of loan amount) backed by Fixed Deposit in the Bank from Small Scale Sustainable Infrastructure Development Fund, a Section 25 Company.
Loan Tenure	3 years
Repayment Frequency	Monthly
Equipment Supplier	SELCO Solar Light Pvt. Ltd. #313, 12 th Cross, 15 th Main, J.P. Nagar 5 th Phase, Ring Road, Bangalore - 560078

On submission of the loan application and requirement documentation in support of the guarantee, we shall issue the loan sanction letter. On setting up the project and submission of the invoices and fulfilling the conditions mentioned in the sanction letter, the loan shall be disbursed directly to the Equipment supplier.

Yours Sincerely,

Sd/-

Name

Branch Manager

Kolar Grameen Bank,

Chintamani, Kolar District,

Karnataka

Project Documentation Number 4 - Light Points for Hawkers: Gubbi

MEMORANDUM OF UNDERSTANDING – LIGHT POINTS FOR HAWKERS, GUBBI

Financing Support Agreement

Memorandum of Understanding Between the Small-Scale Sustainable Infrastructure Development Fund, Inc., Selco Solar Light Pvt. Ltd., and A.B.Vivekananda for Financing Support for PV-Powered Small Lighting Systems for Hawkers and Petty Shopkeepers in Gubbi, Tumkur District, Karnataka, India

Introduction: The Parties, The Purpose And PV Lighting Charging Investment And Micro-Enterprise Context

- This Memorandum of Understanding (MoU) is between three parties for the purpose of presenting the terms and conditions under which there will be provision of technology/equipment, and financing support for an innovative small photovoltaic (PV) powered lighting scheme and an enterprise that will operate and ultimately own the complete investment scheme. Support for this investment and the associated micro enterprise will be consistent with the missions of the various parties given below:
 - The Small-Scale Sustainable Infrastructure Development Fund (S³IDF), incorporated under Section 25 of the Companies Act in India and having its registered office at #720, 1st Floor, 15th Cross, 24th Main, 6th Phase J.P. Nagar, Bangalore - 560078, with the charge to supporting S³IDF's mission throughout South Asia. S³IDF's mission is to facilitate small-scale infrastructure and related investments needed for poverty alleviation and economic advancement in the developing world. It focuses on infrastructure system owners/operators who are small and medium sized entities working in unserved or underserved poor communities.
 - Selco Solar Light Pvt. Ltd. (SELCO), having its registered office at #313, 12th Cross, 15th Main, J.P. Nagar 5th Phase, Ring Road Bangalore - 560078 is a for-profit Company operating in India. SELCO has extensive experience in sales and service of various lighting and other PV based systems in Karnataka and has an established working relationship with Canara Bank.
 - A.B.Vivekananda, (hereafter the entrepreneur) located at Veerabadreshwara Trader, Gubbi, Tumkur District - 572216, is the third party and is an owner and the operator of the PV-Based Lighting Charging Micro-Enterprise Unit (hereafter the MEU) proposed to come up in Gubbi, Tumkur District, Karnataka. MEU is a for-profit micro-enterprise formed to serve customers drawn from the Hawkers' Community.
- It is noted that S³IDF (the Indian-based organization) is an official affiliate of the non-profit corporation, The Small-Scale Sustainable Infrastructure Development Fund, Inc., a US 501(c)(3) entity (public charity) incorporated in Massachusetts, having the same mission as S³IDF (the Indian-based organization), and having its office at The Carriage House, 5 Hastings Square, Cambridge, MA 02139, USA. Hereafter whenever there is reference to S³IDF it should be interpreted to encompass both the Indian-based organization as well as its US affiliate.
- The particulars of this MoU below follow from the results of a series of ongoing pre-investment work that was agreed upon between S³IDF and SELCO whereby they jointly

undertake surveys and preliminary studies to identify poor communities (households, hawkers/petty traders and other) that could benefit from the innovative Light Points schemes the two entities have developed (and other pro-poor, pro-environment schemes). This original agreement included an understanding between S³IDF and SELCO that if such an appropriate group were identified and certain criteria were met they would attempt to facilitate an investment scheme where a key aspect of this facilitation would be innovative financing provided by S³IDF. This particular scheme, to serve a hawkers' community in Gubbi is a result of such pre-investment work co-financed by the USAID South Asia Regional Initiative for Energy; this initiative is underwriting pilot work in Karnataka as part of the PRESK (Private Rural Energy Services in Karnataka) Program. The PRESK program is focused in four taluks in Karnataka (of which Gubbi is one). Under this USAID support⁸⁸ if the results of the pre-investment work are to lead to an investment that S³IDF would endeavor to help take forward to implementation, such investment must meet S³IDF's criteria.

- The proposed investment covered by this MoU meets these criteria. Amongst the main criteria were: i) that the families/customers to benefit from the investment would be low-income/poor in accordance with the international standards which S³IDF employs⁸⁹; ii) analysis would indicate feasibility – subject to an innovative financing arrangement; and iii) the families/customers indicate a willingness to pay for the investment – assuming the increased income and/or savings and other benefits it would allow them. This pre-investment work proceeded in various steps with consultation between S³IDF, SELCO, Entrepreneur and subsequently having Canara Bank, join the discussion and then a separate letter of understanding between S³IDF and the Bank covering the Bank's participation agreement.
- It is noted that, Canara Bank does not have a branch at Gubbi. However, during the discussions with Canara Bank, the Bank has indicated that it will be opening a branch at Gubbi in the coming months. The entrepreneur has indicated a strong preference for a loan with a lower rate available under special financing schemes (e.g. the UNEP⁹⁰ or other special programs). Thus the current implementation plan is to wait until a loan under the UNEP scheme can be accessed from Canara Bank, when its Gubbi branch is opened. A loan from the local branch of Kalpatharu Grameen Bank (KGB), a bank with which the entrepreneur has a banking relationship, was ruled out, as the loan terms from KGB for the project were not attractive.
- Based on these pre-investment studies, the MEU will have the following physical and operational elements:

⁸⁸ This support is provided under an agreement between S³IDF and Nexant, Inc, which is the implementing contractor for the USAID South Asia Regional Initiative for Energy

⁸⁹ S³IDF employs international poverty line indicators such as those used by the international agencies such as the World Bank, World Development Indicators, 2002.

⁹⁰ Launched in 2003, the UNEP Project's objective is to accelerate the market development for solar home systems in southern India by helping to overcome the relative lack of consumer financing options. The project is a partnership between United Nations Environment Programme (UNEP), and its Risoe Centre on Energy, Climate and Sustainable Development (URC), and two of India's major banking groups - Canara Bank and Syndicate Bank. The aim is to help these Bank groups develop lending portfolios specifically targeted at financing solar home systems (SHS). With the support of the UN Foundation and Shell Foundation, the project provides an interest rate subsidy to lower customer-financing costs; the banks make the transaction decisions and bear the transaction risks. Only SHS of certain technical specifications and provided by approved suppliers are eligible; SELCO, the proposed technology partner in this project is one of these approved suppliers. After many months of meetings and discussions with UNEP about the benefit of these pro-poor Light Points schemes (not just for hawkers but other poorer communities such as rural women's self help groups [SHGs]), UNEP has agreed to extend the scheme to cover such S³IDF Light Points schemes. As in other projects under the UNEP Project, the banks make the transaction decisions and take transaction risks.

- A centralized solar power system consisting of Solar Panels, Batteries, Lights and such other accessories as required, located in land owned by entrepreneur at Gubbi,
- A fee-for-service that the MEU will agree upon amongst the hawkers/petty shop owners in order to pay the loan and guarantee fees (more below),
- The MEU will operate the system and ultimately own it (after payments completed).

The equipment will be supplied by SELCO; the estimated cost for the scheme is about Rs.1,25,000. Pre-investment work done indicates that the participants of the hawkers' community are willing and able to pay a fee-for-service that will allow the MEU to pay a loan and guarantee fee that will be sufficient to make the investment financially viable in accordance with the loan, guarantee fee, development and financing fee arrangements outlined below.

- The paragraphs below present the responsibilities of the three parties and the terms and conditions under which financial support in the form of a guarantee can be provided on behalf of the MEU to the Canara Bank so that the MEU can meet the Canara Bank's requirements for making available loan financing for the MEU. Given that the Canara Bank will also have call on the asset value of components noted in element i. in the previous paragraph, it has been agreed upon that S³IDF guarantee financing will be for only a portion of the total loan amount.

A. Parties' Responsibilities

Purpose: The MEU, its planned operation and the terms of S³IDF's participation described below in this agreement are fully consistent with S³IDF's mission and its charitable purpose under US laws and regulations, and the investment and operational details cannot be changed without permission from S³IDF.

Responsibilities: This agreement assumes that the Canara Bank will provide loan financing to the MEU and will undertake credit appraisal as per their normal practices. S³IDF will provide a guarantee so that the Canara Bank can provide the loan towards purchase financing. Although the Canara Bank is not a formal signatory of this agreement, S³IDF participation is contingent on the Canara Bank also providing this loan. Hence in the paragraphs below, the Bank's role is also detailed. The responsibilities of SELCO are to provide and install the equipment noted above and to provide any necessary service during its operations for the period of the loan. The arrangements and terms for this transaction shall be in accordance with its normal commercial practice namely the same as SELCO would make with the MEU where such group would not require a guarantor such as S³IDF. The responsibilities of the MEU are to operate the scheme and its equipment in accordance with any instructions SELCO shall provide and to promptly pay the loan and guarantee fees. The details of these financial responsibilities and arrangements are presented below in Section B. The remainder of this section addresses other responsibilities of the parties and their limits.

Limits of Commitments and Responsibilities: This agreement is limited only to the financing of the MEU and the responsibilities of all parties for this arrangement. The maximum amount of the loan financing that the Canara Bank is committed to provide is **85%** of project cost and the maximum guarantee investment to be provided by S³IDF is **25%** of the loan amount. The period of this agreement will be that of the loan agreement as detailed in Section B below. One exception to this period may be with regard to a longer period for the Access Responsibility (see below).

Fixation of Fee for Service: The MEU's tariff for the lighting system to the hawkers will be restricted to an amount of Rs. 15 for 4-5 hours per day and any change in the tariff will be discussed and determined after consultation with S³IDF. The overall guiding factor in fixation of fee for service is while the MEU earns a decent rate of return on investments, the aim is to ensure that the fee is attractive enough that the hawkers benefit (through a mix of savings and better lighting) sufficient to encourage the hawkers' community to change from other polluting and unreliable fuel sources for their lighting requirement. If the MEU is found violating such tariff and guiding principles at any point of time during S³IDF's Monitoring and Evaluation, S³IDF shall withdraw their support. S³IDF may also withdraw from participation in the transaction and pursue any legal remedies available to recover its costs/investment or minimize any losses and/or remedy the problem.

Accounting, Record Keeping, Reporting and Access Responsibilities: Responsibilities with regard to accounting, record keeping, reporting, and investment site access are integral to the fiduciary responsibilities under this financing agreement as well as to the needed monitoring to ensure that the MEU's implementation and operation is consistent with S³IDF's Mission. With respect to the guaranteed loan financing arrangements, only the MEU and S³IDF are the direct parties and these two parties agree to the following responsibilities:

- At a minimum, on an annual basis, the MEU will report on the timeliness of its loan and guarantee fee payments, and any problems that have incurred in making these payments. In addition, the MEU shall report on the physical/operating condition of all equipment and a list of employees. All problems whether financial or otherwise will be noted as well as any measures taken to address them. During the first year, more frequent reporting will be required from the MEU, such as initial reporting within the first four months.
- The MEU will provide access during the tenure of this agreement and after for S³IDF personnel and its representatives, including any independent experts it might appoint, to the physical site of the equipment and to beneficiaries of the investment. This access may be needed to examine and survey the investment's use including interviewing customers to monitor status and benefits. At a minimum, S³IDF will be monitoring the site during implementation, within six months of beginning operations, and then on an annual basis.
- S³IDF's aforementioned monitoring activities will include assessing if S³IDF's Mission is being compromised with regard to how the MEU is being operated, and/or whether there is a violation of covenants in Canara Bank's loan agreement with the MEU. In such an instance, S³IDF shall take necessary steps in bringing any and all pressures it can so that the MEU will rectify the situation. If not rectified, S³IDF shall withdraw its support and take such steps judged feasible including canceling the loan and if necessary removing the equipment. S³IDF may also withdraw from participation in the transaction and pursue any legal remedies available to recover its costs/investment or minimize any losses and/or remedy the problem.

B. Terms and Exit Requirements for S³IDF's participation and Guarantee Investment

The paragraphs below specify the terms and exit conditions for the financing support to be availed from Canara Bank (loan finance) and S³IDF (guarantee). These terms reflect the fact that the guaranteed loan for the MEU and the Hawkers Community may qualify for some subsidy under one or another of current special financing schemes (e.g. the UNEP or other special programs).

Indian Rupees: All financing transactions will be made in the local currency, which is the Indian Rupee.

Project Development and Financing arrangement fees: The MEU understands and acknowledges that this project has involved a significant amount of Pre-investment effort that S³IDF has expended. This effort has resulted in the conception of the MEU, identification of actors/linkages that will enable the MEU to start up and operate, and in the involvement of the relevant financial institution which will potentially provide the appropriate form of financing necessary for all investments that the MEU will need to make. The MEU further understands and acknowledges that the costs of this pre-investment activity is significant and that S³IDF shall charge a fee for its enabling role to recover in part or whole these costs⁹¹.

Noting the matters immediately above, it is understood by all parties that the MEU will be charged and it will pay a development & financing arrangement fee equivalent to ____ % of the project cost. It is further noted that this fee will be capitalized into the investment costs of the MEU.

Loan Financing Support To Be Availed from Canara Bank, Gubbi branch: The following paragraphs present the terms and conditions under which MEU should avail loan financing from Canara Bank:

- Irrespective of any collateral (see e. below), loan financing will only be made if there is an acceptable guarantee provided by S³IDF (see B.4. below):
- Loan financing is availed for a period of only three years with monthly repayment of principal and interest. MEU will give necessary instructions to Canara Bank to disperse the loan money directly to SELCO for the supply of material, equipment or construction or other services based in accordance with the costs.
- The loan amounts will be up to a limit of **85%** of the costs indicated in SELCO's quotation.
- Interest payment on loan availed by MEU from the Canara Bank will be based on the UNEP scheme for which the project qualifies.
- In the absence of collateral that meets its commercial practice standards, Canara Bank is providing the loan financing as a result of the guarantee provided by S³IDF (see B.3 below). Nonetheless, if Canara Bank requires any ownership/lien arrangements on some or all of the MEU's, then the MEU should provide the same to Canara Bank.
- The loan terms of MEU with Canara Bank will be such that S³IDF's liability is limited to its guarantee support contribution to be placed in a fixed deposit account with Canara Bank, Gubbi Branch.

Guarantee (partial) Financing Support to be Provided by S³IDF: The following paragraphs present the amount and guidelines for the terms and conditions with regard to the guarantee financing that S³IDF will provide for the MEU.

⁹¹ The development and financing arrangement fee will reflect the following:

- Incurred cost of the development effort
- Extent of financial support for the pre-investment activities of this project S³IDF has successfully mobilized by its external fund raising efforts. Since this project has been conducted under the USAID support, the development & financing arrangement fee for this project will reflect the partial coverage of the pre-investment costs by the USAID under the South Asia Regional Initiative for energy
- Extent of augmentation/creation of disposable income that this MEU will achieve by this project because of the interventions of S³IDF.

- Assuming other conditions of this agreement, in particular Canara Bank’s loan commitment and terms as presented in B.3 immediately above, S³IDF will provide a partial guarantee which is equivalent to **25%** of the loan amount, provided that:
 - The subsequent items b., c. and d. are appropriately finalized.
 - S³IDF’s overall financial liability does not exceed the initial guarantee investment.
 - The MEU contributes **15%** (as under the UNEP scheme) of project costs as its investment.
- The guarantee fees charged will reflect the following:
 - The amount/degree of the *partial* guarantee exposure.
 - The interest rate that the guarantee monies’ term deposit earns.
 - What are the relevant market norms for analogous guarantees, if any.
 - What is the lowest market loan rate the MEU could access under a hypothetical “best case” collateral situation, such as prime unencumbered land of value greater than the loan.
 - What is the lowest market loan rate, if any, the Micro Enterprise investor/operator could access under a “representative case” of little/poor collateral and an informal sector lender.
- Noting the matters immediately above, it is understood by all parties that the MEU will be charged and it will pay a guarantee fee equivalent to ____ % of the project cost.
- To the extent feasible and appropriate, guarantee fee payment schedules shall be mutually decided between S³IDF and MEU.

All three parties are in agreement with their obligations as presented above and note that this agreement will allow any necessary additional pre-investment work and negotiations to continue and be finalized and the final version of this financing agreement will be negotiated in a timely manner and in good faith. Moreover, the parties further specify that at the time this financing support agreement is finalized and the equity and loan financing are provided, their obligations as first presented above and subsequently finalized can also be incorporated and/or made integral attachments to other appropriate documentation, such as the loan financing agreements that may be with registered pertinent authorities.

C. Greenhouse Gas Benefits and Sharing MEU’s Know-how and Experience

All the parties acknowledge that there will be Green House Gas (GHG) benefits from the project. Whether any financial benefit can be captured is unclear because these benefits have to be estimated and a market for them under verification procedures that are not too costly in transaction costs must be explored. In light of these uncertainties and the support that MEU has received from S³IDF, the former agrees to transfer the ownership of all of the GHG credits from the investment to S³IDF. Any financial benefit that S³IDF gains from the subsequent sale or transfer of these credits will be used for S³IDF’s pro-poor and pro-environment mission. S³IDF will undertake any and all studies and measurement that may be required to estimate and/or verify these GHG credits, providing its preliminary estimates suggest such efforts as being worthwhile and/or it is able to secure appropriate assistance for these estimate and verification efforts. MEU and SELCO agree to share with S³IDF its knowledge and experience with regard to such estimation and verification effort.

All the parties acknowledge that as the project proceeds there will be know-how, information and experience that MEU will gather that could be helpful to other parties interested in promoting analogous projects that are pro-poor and pro-environment. This knowledge will grow in the course

of implementation and operation of the scheme for which S³IDF is providing financing. Subject to appropriate limits and conditions, MEU agrees to share its know-how and experience with other parties that S³IDF is or may consider supporting in pro-poor, pro-environment projects. Here the phrase appropriate limits and conditions is meant to encompass the following: a) MEU will not be expected to share any information details it wishes to hold in a proprietary fashion b) requests for visits or interviews will not be unduly burdensome in terms of schedule or time requirements as MEU judges, c) if in certain instances, this sharing of know-how and experience places cash or opportunity costs on MEU for which it thinks it should be compensated at least on a “no loss/cost-covered” basis, S³IDF will work out (with MEU) mutually agreeable cost-covering arrangements.

The MEU agrees that as long as the S³IDF guarantee is in place the MEU will not allow any outside parties (e.g. academic or research groups) to study or survey the project and/or its customers without S³IDF being informed and having the option to require such third parties to have a formal survey/study agreement with S³IDF.

M. R. Pai
Executive Director
SELCO

A.B.Vivekananda
Entrepreneur
MEU

T. L. Sankar
Director
S³IDF

LETTER OF UNDERSTANDING – LIGHT POINTS FOR HAWKERS, GUBBI

Date: _____, 2004

M/s. Small Scale Sustainable Infrastructure Development Fund
 No. 720, 1st Floor,
 15th Cross, 24th Main,
 J.P.Nagar, 6th Phase,
 Bangalore - 560 078

Dear Sirs,

Sub: Letter of Understanding

We are happy to know your organization's initiatives in developing sustainable infrastructure projects in the fields of energy, sanitation, water and transport; catering to the poorer sections and under served communities. And we understand that your organization has recently been focusing on Gubbi and other taluks in conjunction with the PRESK Program with USAID support. Your financial and technical contributions in developing projects to ensure the financial viability and at the same time meeting your pro-poor agenda is a unique business model.

We are in receipt of loan assistance request from Mr. A.B.Vivekananda, planning to set up and own a micro-enterprise project involving solar powered charging station to provide lighting points to shopkeepers and hawkers in Gubbi, Tumkur District, Karnataka. We understand that your Organization is actively involved in putting together this project. We are pleased to be associated with you in this project and provide necessary financing for the Solar Powered Lighting Points Charging Station Project on the following terms and conditions:

Name of Borrower	A. B. Vivekananda, Veerabadreshwara Trader, Gubbi, Tumkur District – 572216, Karnataka
Name of Project	Solar Powered Charging Station for Lighting Points
Location of Project	M G Road, Gubbi, Tumkur District, Karnataka
Description of the project	<p>The micro-enterprise will serve an un-electrified Hawkers'/shopkeeper's community and provide lighting for their street stalls. The lighting is based on light points powered by solar powered rechargeable batteries. Recharged batteries are provided on a "pay for charge" basis and replace kerosene lanterns. The hawkers are working poor and under the scheme their lighting costs are decreased and the lighting quality improved. There are also local and global environmental benefits of the project. In addition, the micro-enterprise shall generate some local employment. S³IDF's provision of a partial guarantee is allowing the entrepreneur to access a loan from the Bank.</p> <p>25 Hawkers will benefit under this project by having hassle free, reliable and lower cost clean light illuminating their shops. Better lighting conditions are expected to increase their business by extended business hours.</p>

Cost of the project	Rs. _____
Promoter Contribution	15 % of project cost i.e., Rs. _____
Loan Amount	Rs. _____
Scheme under which Loan granted	UNEP
Interest Rate on the Borrowing	5 % (as under the UNEP programme)
Security for the borrowing	<ul style="list-style-type: none"> ▪ Hypothecation of Equipment (with buy back guarantee from equipment supplier, in case of repossession) ▪ Partial Financial Guarantee (25% of loan amount) backed by Fixed Deposit in the Bank from Small Scale Sustainable Infrastructure Development Fund, a Section 25 Company.
Loan Tenure	3 years
Repayment Frequency	Monthly
Equipment Supplier	SELCO Solar Light Pvt. Ltd. #313, 12 th Cross, 15 th Main, J.P. Nagar 5 th Phase, Ring Road, Bangalore – 560078

On submission of the loan application and requirement documentation in support of the guarantee, we shall issue the loan sanction letter. On setting up the project and submission of the invoices and fulfilling the conditions mentioned in the sanction letter, the loan shall be disbursed directly to the Equipment supplier.

Yours Sincerely,
Sd/-Name
Branch Manager
Canara Bank, Gubbi,
Tumkur District, Karnataka

Project Documentation Number 5 - Light Points for Hawkers: Molakalmuru

MEMORANDUM OF UNDERSTANDING – LIGHT POINTS FOR HAWKERS, MOLAKALMURU

Financing Support Agreement

Memorandum of Understanding Between the Small-Scale Sustainable Infrastructure Development Fund, Inc., Selco Solar Light Pvt. Ltd., and the Sindu Mahila Sahaya Sangha for Financing Support for PV-Powered Small Lighting Systems for Hawkers and Petty Shopkeepers in Rampura, Molakalmuru Taluk, Chitradurga District, Karnataka, India.

Introduction: The Parties, The Purpose And PV Lighting Charging Investment And Micro-Enterprise Context

- This Memorandum of Understanding (MoU) is between three parties for the purpose of presenting the terms and conditions under which there will be provision of technology/equipment, and financing support for an innovative small photovoltaic (PV) powered lighting scheme and an enterprise that will operate and ultimately own the complete investment scheme. Support for this investment and the associated micro enterprise will be consistent with the missions of the various parties given below:
 - The Small-Scale Sustainable Infrastructure Development Fund (S³IDF), incorporated under Section 25 of the Companies Act in India and having its registered office at #720, 1st Floor, 15th Cross, 24th Main, 6th Phase J.P. Nagar, Bangalore - 560078, with the charge to supporting S³IDF's mission throughout South Asia. S³IDF's mission is to facilitate small-scale infrastructure and related investments needed for poverty alleviation and economic advancement in the developing world. It focuses on infrastructure system owners/operators who are small and medium sized entities working in unserved or underserved poor communities.
 - Selco Solar Light Pvt. Ltd. (SELCO), having its registered office at #313, 12th Cross, 15th Main, J.P. Nagar 5th Phase, Ring Road Bangalore - 560078 is a for-profit Company operating in India. SELCO has extensive experience in sales and service of various lighting and other PV based systems in Karnataka and has an established working relationship with Canara Bank.
 - The Sindu Mahila Sahaya Sangha, a Self Help Group (hereafter the SHG) currently represented by Mrs. Aruna, C/o M Chellapathi Rao, Behind Juma Masjid, Rampura, Molakalmuru Taluk, Chitradurga District, Karnataka, is the third party and is the owner and the operator of the PV-Based Lighting Charging Micro-Enterprise Unit (hereafter the MEU) proposed to come up in Rampura, Chitradurga District in Karnataka. The MEU is a for-profit micro-enterprise formed to serve customers drawn from the Hawkers' Community.
- It is noted that S³IDF (the Indian-based organization) is an official affiliate of the non-profit corporation, The Small-Scale Sustainable Infrastructure Development Fund, Inc., a US 501(c) (3) entity (public charity) incorporated in Massachusetts, having the same mission as S³IDF (the Indian-based organization), and having its office at The Carriage House, 5 Hastings

Square, Cambridge, MA 02139, USA. Hereafter whenever there is reference to S³IDF it should be interpreted to encompass both the Indian-based organization as well as its US affiliate.

- The particulars of this MoU below follow from the results of a series of on-going pre-investment work that was agreed upon between S³IDF and SELCO whereby they jointly undertake surveys and preliminary studies to identify poor communities (households, hawkers/petty traders and other) that could benefit from the innovative Light Points schemes the two entities have developed (and other pro-poor, pro-environment schemes). This original agreement included an understanding between S³IDF and SELCO that if such an appropriate group were identified and certain criteria were met they would attempt to facilitate an investment scheme where a key aspect of this facilitation would be innovative financing provided by S³IDF. This particular scheme, to serve a hawkers' community in Rampura village, Molakalmuru Taluk Chitradurga district, is a result of such pre-investment work co-financed by the USAID South Asia Regional Initiative for Energy; this initiative is underwriting pilot work in Karnataka as part of the PRESK (Private Rural Energy Services in Karnataka) Program. The PRESK program is focused in four taluks in Karnataka (of which Molakalmuru is one). Under this USAID support⁹² if the results of the pre-investment work are to lead to an investment that S³IDF would endeavor to help take forward to implementation, such investment must meet S³IDF's criteria.
- The proposed investment covered by this MoU meets these criteria. Amongst the main criteria were: i) that the families/customers to benefit from the investment would be low-income/poor in accordance with the international standards which S³IDF employs⁹³; ii) analysis would indicate feasibility – subject to an innovative financing arrangement; and iii) the families/customers indicate a willingness to pay for the investment – assuming the increased income and/or savings and other benefits it would allow them. This pre-investment work proceeded in various steps with consultation between S³IDF, SELCO, and the SHG and subsequently having Chitradurga Grameen Bank, at T-Cross (which is five kilometers from Rampur) join the discussion and then a separate letter of understanding between S³IDF and the Bank covering the Bank's participation agreement.
- It is noted that the SHG currently has a banking relationship with the Vyavasaya Sahakara Sangha Bank (VSSB). It is also noted that the Chitradurga Grameen Bank is planning to establish a branch in Rampura. Given that the proposed financing arrangement detailed in points below is possible only with the participation of the Chitradurga Grameen Bank, it is agreed that if required the SHG will transfer its banking relationship to the closest branch of the Chitradurga Grameen Bank – The T-Cross Branch.
- Based on these pre-investment studies, the MEU will have the following physical and operational elements:
 - A centralized solar power system consisting of Solar Panels, Batteries, Lights and such other accessories as required, located in land owned by one of the members of the SHG at Rampura.
 - A fee-for-service that the MEU will agree upon amongst the hawkers/petty shop owners in order to pay the loan, guarantee fees, development and financing fees (more below),
 - The MEU will operate the system and ultimately own it (after payments completed).

⁹² This support is provided under an agreement between S³IDF and Nexant, Inc, which is the implementing contractor for the USAID South Asia Regional Initiative for Energy

⁹³ S³IDF employs international poverty line indicators such as those used by the international agencies such as the World Bank, World Development Indicators, 2002.

The equipment will be supplied by SELCO; the estimated cost for the scheme is about Rs. 1,10,000/-. Pre-investment work done indicates that the participants of the hawkers' community are willing and able to pay a fee-for-service that will allow the MEU to pay a loan and guarantee fee that will be sufficient to make the investment financially viable in accordance with the loan, guarantee fee, development and financing fee arrangements outlined below.

- The paragraphs below present the responsibilities of the three parties and the terms and conditions under which financial support in the form of a guarantee can be provided on behalf of the MEU to the Chitradurga Grameen Bank so that the MEU can meet the Chitradurga Grameen Bank's requirements for making available loan financing for the MEU. Given that the Chitradurga Grameen Bank will also have call on the asset value of components noted in element i. in the previous paragraph, it has been agreed upon that S³IDF guarantee financing will be for only a portion of the total loan amount.

A. Parties' Responsibilities

Purpose: The MEU, its planned operation and the terms of S³IDF's participation described below in this agreement are fully consistent with S³IDF's mission and its charitable purpose under US laws and regulations, and the investment and operational details cannot be changed without permission from S³IDF.

Responsibilities: This agreement assumes that the Chitradurga Grameen Bank will provide loan financing to the MEU and will undertake credit appraisal as per their normal practices. S³IDF will provide a guarantee so that the Chitradurga Grameen Bank can provide the loan towards purchase financing. Although the Chitradurga Grameen Bank is not a formal signatory of this agreement, S³IDF participation is contingent on the Chitradurga Grameen Bank also providing this loan. Hence in the paragraphs below, the Bank's role is also detailed. The responsibilities of SELCO are to provide and install the equipment noted above and to provide any necessary service during its operations for the period of the loan. The arrangements and terms for this transaction shall be in accordance with its normal commercial practice namely the same as SELCO would make with the MEU where such group would not require a guarantor such as S³IDF. The responsibilities of the MEU are to operate the scheme and its equipment in accordance with any instructions SELCO shall provide and to promptly pay the loan and guarantee fees. The details of these financial responsibilities and arrangements are presented below in Section B. The remainder of this section addresses other responsibilities of the parties and their limits.

Limits of Commitments and Responsibilities: This agreement is limited only to the financing of the MEU and the responsibilities of all parties for this arrangement. The maximum amount of the loan financing that the Chitradurga Grameen Bank is committed to provide is **85%** of project cost and the maximum guarantee investment to be provided by S³IDF is **25%** of the loan amount. The period of this agreement will be that of the loan agreement as detailed in Section B below. One exception to this period may be with regard to a longer period for the Access Responsibility

Fixation of Fee for Service: The MEU's tariff for the lighting system to the hawkers will be restricted to an amount of Rs. 15 for 4-5 hours per day and any change in the tariff will be discussed and determined after consultation with S³IDF. The overall guiding factor in fixation of fee for service is while the MEU earns a decent rate of return on investments, the aim is to ensure that the fee is attractive enough that the hawkers benefit (through a mix of savings and better

lighting) sufficiently to encourage the hawkers' community to change from other polluting and unreliable fuel sources for their lighting requirement. If the MEU is found violating such tariff and guiding principles at any point of time during S³IDF's Monitoring & Evaluation, S³IDF shall withdraw their support. S³IDF may also withdraw from participation in the transaction and pursue any legal remedies available to recover its costs/investment or minimize any losses and/or remedy the problem.

Accounting, Record Keeping, Reporting and Access Responsibilities: Responsibilities with regard to accounting, record keeping, reporting, and investment site access are integral to the fiduciary responsibilities under this financing agreement as well as to the needed monitoring to ensure that the MEU's implementation and operation is consistent with S³IDF's Mission. With respect to the guaranteed loan financing arrangements, only the MEU and S³IDF are the direct parties and these two parties agree to the following responsibilities:

- At a minimum, on an annual basis, the MEU will report on the timelines of its loan and guarantee fee payments, and any problems that have incurred in making these payments. In addition, the MEU shall report on the physical/operating condition of all equipment and a list of employees. All problems whether financial or otherwise will be noted as well as any measures taken to address them. During the first year, more frequent reporting will be required from the MEU, such as initial reporting within the first four months.
- The MEU will provide access during the tenure of this agreement and after for S³IDF personnel and its representatives, including any independent experts it might appoint, to the physical site of the equipment and to beneficiaries of the investment. This access may be needed to examine and survey the investment's use including interviewing customers to monitor status and benefits. At a minimum, S³IDF will be monitoring the site during implementation, within six months of beginning operations, and then on an annual basis.
- S³IDF's aforementioned monitoring activities will include assessing if S³IDF's Mission is being compromised with regard to how the MEU is being operated, and/or whether there is a violation of covenants in Chitradurga Grameen Bank's loan agreement with the MEU. In such an instance, S³IDF shall take necessary steps in bringing any and all pressures it can so that the MEU will rectify the situation. If not rectified, S³IDF shall withdraw its support and take such steps judged feasible including canceling the loan and if necessary removing the equipment. S³IDF may also withdraw from participation in the transaction and pursue any legal remedies available to recover its costs/investment or minimize any losses and/or remedy the problem.

B. Terms and Exit Requirements for S³IDF's Guarantee Investment

The paragraphs below specify the terms and exit conditions for the financing support to be availed from Chitradurga Grameen Bank (loan finance) and S³IDF (guarantee, development and financing fees). These terms reflect the fact that the guaranteed loan for the MEU and the Hawkers Community may qualify for some subsidy under one or another of current special financing schemes (e.g. the UNEP or other special programs).

Indian Rupees: All financing transactions will be made in the local currency, which is the Indian Rupee.

Project Development and Financing arrangement fees: The MEU understands and acknowledges that this project has involved a significant amount of Pre-investment effort that S³IDF has

expended. This effort has resulted in the conception of the MEU, identification of actors/linkages that will enable the MEU to start up and operate, and in the involvement of the relevant financial institution which will potentially provide the appropriate form of financing necessary for all investments that the MEU will need to make. The MEU further understands and acknowledges that the costs of this pre-investment activity is significant and that S³IDF shall charge a fee for its enabling role to recover in part or whole these costs⁹⁴.

Noting the matters immediately above, it is understood by all parties that the MEU will be charged and it will pay a development and financing arrangement fee equivalent to ____ % of the project cost. It is further noted that this fee will be capitalized into the investment costs of the MEU.

Loan Financing Support To Be Availed from Chitradurga Grameen Bank, T-Cross/Rampura branch: The following paragraphs present the terms and conditions under which MEU should avail loan financing from Chitradurga Grameen Bank:

- Irrespective of any collateral (see e. below), loan financing will only be made if there is an acceptable guarantee provided by S³IDF (see B.4 below):
- Loan financing is availed for a period of only five years with monthly repayment of principal and interest. MEU will give necessary instructions to Chitradurga Grameen Bank to disperse the loan money directly to SELCO for the supply of material, equipment or construction or other services based in accordance with the costs.
- The loan amounts will be up to a limit of **85%** of the costs indicated in SELCO's quotation.
- Interest payment on loan availed by MEU from the Chitradurga Grameen Bank will be based on the UNEP scheme for which the project qualifies.
- In the absence of collateral that meets its commercial practice standards, Chitradurga Grameen Bank is providing the loan financing as a result of the guarantee provided by S³IDF (see B.4 below). Nonetheless, if Chitradurga Grameen Bank requires any ownership/lien arrangements on some or all of the MEU's, then the MEU should provide the same to the Chitradurga Grameen Bank.
- The loan terms of MEU with Chitradurga Grameen Bank will be such that S³IDF's liability is limited to its guarantee support contribution to be placed in a fixed deposit account with the Chitradurga Grameen Bank, T-Cross Branch.

Guarantee (partial) Financing Support to be Provided by S³IDF: The following paragraphs present the amount and guidelines for the terms and conditions with regard to the guarantee financing that S³IDF will provide for the MEU.

- Assuming other conditions of this agreement, in particular the Chitradurga Grameen Bank's loan commitment and terms as presented in B.3 immediately above, S³IDF will provide a partial guarantee which is equivalent to **25%** of the loan amount, provided that:
 - The subsequent items b., c. and d. are appropriately finalized.
 - S³IDF's overall financial liability does not exceed the initial guarantee investment.

⁹⁴ The development and financing arrangement fee will reflect the following:

- Incurred cost of the development effort
- Extent of financial support for the pre-investment activities of this project S³IDF has successfully mobilized by its external fund raising efforts. Since this project has been conducted under the USAID support, the development & financing arrangement fee for this project will reflect the partial coverage of the pre-investment costs by the USAID under the South Asia Regional Initiative for energy
- Extent of augmentation/creation of disposable income that this MEU will achieve by this project because of the interventions of S³IDF.

- The MEU contributes **15%** (as under the UNEP scheme) of project costs as its investment.
- The guarantee fees charged will reflect the following:
 - The amount/degree of the *partial* guarantee exposure.
 - The interest rate that the guarantee monies' term deposit earns.
 - What are the relevant market norms for analogous guarantees, if any.
 - What is the lowest market loan rate the MEU could access under a hypothetical "best case" collateral situation, such as prime unencumbered land of value greater than the loan.
 - What is the lowest market loan rate, if any, the Micro Enterprise investor/operator could access under a "representative case" of little/poor collateral and an informal sector lender.
- Noting the matters immediately above, it is understood by all parties that the MEU will be charged and it will pay a guarantee fee equivalent to ____ % of the project cost.
- To the extent feasible and appropriate, guarantee fee payment schedules shall be mutually decided between S³IDF and MEU.

All three parties are in agreement with their obligations as presented above and note that this agreement will allow any necessary additional pre-investment work and negotiations to continue and be finalized and the final version of this financing agreement will be negotiated in a timely manner and in good faith. Moreover, the parties further specify that at the time this financing support agreement is finalized and the equity and loan financing are provided, their obligations as first presented above and subsequently finalized can also be incorporated and/or made integral attachments to other appropriate documentation, such as the loan financing agreements that may be with registered pertinent authorities.

C. Greenhouse Gas Benefits and Sharing MEU's Know-how and Experience

All the parties acknowledge that there will be Green House Gas (GHG) benefits from the project. Whether any financial benefit can be captured is unclear because these benefits have to be estimated and a market for them under verification procedures that are not too costly in transaction costs must be explored. In light of these uncertainties and the support that MEU has received from S³IDF, the former agrees to transfer the ownership of all of the GHG credits from the investment to S³IDF. Any financial benefit that S³IDF gains from the subsequent sale or transfer of these credits will be used for S³IDF's pro-poor and pro-environment mission. S³IDF will undertake any and all studies and measurement that may be required to estimate and/or verify these GHG credits, providing its preliminary estimates suggest such efforts as being worthwhile and/or it is able to secure appropriate assistance for these estimate and verification efforts. MEU and SELCO agree to share with S³IDF its knowledge and experience with regard to such estimation and verification effort.

All the parties acknowledge that as the project proceeds there will be know-how, information and experience that MEU will gather that could be helpful to other parties interested in promoting analogous projects that are pro-poor and pro-environment. This knowledge will grow in the course of implementation and operation of the scheme for which S³IDF is providing financing. Subject to appropriate limits and conditions, MEU agrees to share its know-how and experience with other parties that S³IDF is or may consider supporting in pro-poor, pro-environment projects. Here the phrase appropriate limits and conditions is meant to encompass the following: a) MEU will not be

expected to share any information details it wishes to hold in a proprietary fashion b) requests for visits or interviews will not be unduly burdensome in terms of schedule or time requirements as MEU judges, c) if in certain instances, this sharing of know-how and experience places cash or opportunity costs on MEU for which it thinks it should be compensated at least on a “no loss/cost-covered” basis, S³IDF will work out (with MEU) mutually agreeable cost-covering arrangements.

The MEU agrees that as long as the S³IDF guarantee is in place the MEU will not allow any outside parties (e.g. academic or research groups) to study or survey the project and/or its customers without S³IDF being informed and having the option to require such third parties to have a formal survey/study agreement with S³IDF.

M. R. Pai
Executive Director
SELCO

Mrs. Aruna
Representative 1
and Representative 2
Sindu Mahila Sahaya Sangha

T. L. Sankar
Director
S³IDF

LETTER OF UNDERSTANDING – LIGHT POINTS FOR HAWKERS, MOLAKALMURU

Date: _____, 2004

M/s. Small Scale Sustainable Infrastructure Development Fund
 No. 720, 1st Floor,
 15th Cross, 24th Main,
 J.P.Nagar, 6th Phase,
 Bangalore - 560 078

Dear Sirs,

Sub: Letter of Understanding

We are happy to know your organization's initiatives in developing sustainable infrastructure projects in the fields of energy, sanitation, water and transport; catering to the poorer sections and under served communities. Your financial and technical contributions in developing projects to ensure the financial viability and at the same time meeting your pro-poor agenda is an unique business model.

We are in receipt of loan assistance request from the Sindu Mahila Sahaya Sangha, the Self Help Group planning to set up and own a micro-enterprise project involving solar powered charging station to provide lighting points to shopkeepers and hawkers on the Rampura Main Road, Rampura, Molakalmuru, Chitradurga District, Karnataka. We understand that your Organization is actively involved in putting together this project. We are pleased to be associated with you in this project and provide necessary financing for the Solar Powered Lighting Points Charging Station Project on the following terms and conditions:

Name of Borrower	Sindu Mahila Sahaya Sangha, currently represented by: Mrs. Aruna, C/o M Chellapathi Rao Behind Juma Masjid Rampura Molakalmuru, Chitradurga District, Karnataka.
Name of Project	Solar Powered Charging Station for Lighting Points
Location of Project (location of charging station)	Behind Juma Masjid, Rampura, Molakalmuru, Chitradurga District, Karnataka.
Description of the project	The SHG-owned micro-enterprise will serve an un-electrified Hawkers'/shopkeeper's community and provides lighting for their street stalls. The lighting is based on light points powered by solar powered rechargeable batteries. Recharged batteries are provided on a "pay for charge" basis and replace kerosene lanterns. The hawkers are working poor and under the scheme their lighting costs are decreased and the lighting quality improved. There are also local and global environmental benefits of the project. In addition, the micro-enterprise shall generate some local employment. S ³ IDF's provision of a partial

	guarantee is allowing the SHG-owned micro-enterprise to access a loan from the Bank. 20 Hawkers will benefit under this project by having hassle free, reliable and lower cost clean light illuminating their shops. Better lighting conditions are expected to increase their business by extended business hours.
Cost of the project	Rs. _____
Promoter Contribution	15 % of project cost i.e., Rs. _____
Loan Amount	Rs. _____
Scheme under which Loan granted	UNEP
Interest Rate on the Borrowing	5 % (as under the UNEP programme)
Security for the borrowing	<ul style="list-style-type: none"> ▪ Hypothecation of Equipment (with buy back guarantee from equipment supplier, in case of repossession) ▪ Partial Financial Guarantee (25% of loan amount) backed by Fixed Deposit in the Bank from Small Scale Sustainable Infrastructure Development Fund, a Section 25 Company.
Loan Tenure	5 years
Repayment Frequency	Monthly
Equipment Supplier	SELCO Solar Light Pvt. Ltd. #313, 12 th Cross, 15 th Main, J.P. Nagar 5 th Phase, Ring Road, Bangalore - 560078

On submission of the loan application and requirement documentation in support of the guarantee, we shall issue the loan sanction letter. On setting up the project and submission of the invoices and fulfilling the conditions mentioned in the sanction letter, the loan shall be disbursed directly to the Equipment supplier.

Yours Sincerely,

Sd/-

Name

Branch Manager

Chitradurga Grameen Bank,

T - Cross, Molakalmuru Taluk

Chitradurga District, Karnataka