



Renewable Energy - Journey

Michelle Chawla

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Prepared by the Youth Employment Summit (YES) Campaign
December 2004

A project of Education Development Center
55 Chapel Street
Newton, MA 02458

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| Application for Renewable Energy Fellowship 2003 | <h2 style="color: blue;">Youth Employment Summit – GYSD</h2> <h3 style="color: blue;">Renewable Energy Project</h3> <p style="color: blue;">A project of Education Development Center</p> <p style="color: blue;">Funded by the Global Environment Facility and the World Bank</p> | | FOR OFFICIAL USE DATE STATUS | |
| | Deadline for Applications: Feb. 28, 2003 | | | |
| Winners will be announced on: April 12, 2003 | | Date: | February 21 st , 2003 | |

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|---|---|-----------------------|------------------------|
| 1. Applicant First name: | MICHELLE | 2. Last Name | CHAWLA |
| 3. Mailing Address: | TAMARIND TREE FARMS SOGVE VILLAGE | 4. Country: | INDIA |
| | | 5. Telephone: | + 91-2528-260220 |
| 6. City: | DAHANU TALUKA | 7. Fax: | + 91-2528-260471 |
| 8. State / Province: | MAHARASHTRA | 9. E-mail: | michelle@gandhiana.org |
| 10. Postal Code: | 401602 | For Official Use Only | |
| 11. Secondary contact name: | HEMANT BABU | | |
| 12. Email: | hemant@gandhiana.org | | |
| 13. Telephone: | + 91-98210-51883 | | |
| 14. Full name of co-applicant institution | ENERGIE SOLAR | | |
| 15. Legal Status and date of establishment: | PROPRIETORSHIP, OCTOBER 2001 | | |
| 16. Technical Expertise: | SOLAR BASED APPLICATIONS | | |
| 17. Name of Contact Person: | KAUSTUBH SHAH | 18. Country: | INDIA |
| 19 Address: | 1180/7/1, INDRARAJ APARTMENTS FLAT NO. A-4 F.C ROAD SHIVAJINAGAR | | |
| 20. City: PUNE | 21. Postal Code: 411005 | | |
| 22. Email: | kaustubh.shah@energiesolar.com | | |
| 23. Telephone and Fax: | + 91- (20) - 24027280 +91 - (20)- 24027281 (fax) | | |

| | | |
|---|---|--------------------|
| 24. Full name of co-applicant YES Network | YES INDIA | |
| 25. Name of Contact Person: | Sanjay Negi/PK Joseph | 26. Country: INDIA |
| 27. Technical Expertise: | - | |
| 28. Legal Status and date of establishment: | N.A | |
| 29. Address: | YES CAMPAIGN SECRETARIAT DIRECTORATE OF YOUTH SERVICES GOVERNMENT OF ANDHRA PRADESH 5 TH FLOOR, PARSHIRAM BHAVAN HYDERABAD | |
| 30. City: HYDERABAD | 31. Postal Code: 500004 | |
| 32. Email: | yestemp13@edc.org | |
| 33. Telephone: | 91-11-2263499 | |

Please answer the following questions , use additional sheets where needed

34. What is the potential of Renewable Energy in your community?

This enterprise is proposed in the ecologically fragile Dahanu region, which has accumulated an economic and infrastructural backlog despite being in the middle of the industrialized West coast of India. Being in the backyard of the fossil fuel fired industrialization the majority tribal population of the region has been facing adverse environmental impacts without having their due share in the general prosperity. A large number of tribal households have reduced to becoming "electricity thieves" just to fulfill their basic requirement of power due to economic and bureaucratic difficulties in getting a legitimate access to the grid. As a result, of the 66 per cent tribal population, not more than 5 per cent have a registered electricity connection. Moreover, the protracted imbalance in the electricity demand and supply regime inevitably favours urban areas, resulting in inadequate and irregular supply even if connected to the grid.

In addition, Dahanu is home to a large fishing community, small and marginal farmers as well as large orchard owners. They also have their distinct needs for alternative energy. Against this vast potential for decentralized and alternative sources of energy, there is a general lack of exposure to alternatives. In fact, there is no single outlet for solar energy based applications in the 200 kilometre belt.

35. Describe 2 practical applications of Renewable Energy that can be implemented in your community.

✓ **Electrification of isolated tribal hamlets using photovoltaic (PV) home lighting systems, and lanterns.**
Meeting the minimum electricity needs of the tribal community mostly off the grid, using simple PV modules can be implemented across villages.

✓ **Meeting the need for light in indigenous fishing boats with Solar Lanterns.**
Similarly, meeting the requirement for light for the fishing community who go out fishing at night.

✓ **Solar Fruit Dryers/Dehydraters for Orchard Owners.**
Another practical application in an agricultural economy like Dahanu is the use of solar fruit and vegetable dryers for produce.

While all three applications from assembling to marketing can be carried out by the youth members of the community, products such as the solar dryers have the potential to boost the sluggish agricultural economy, by creating new industries of food processing. This can in turn lead to an overall development and help in preventing dirty industry from entering.

36. Is your Government a signatory to the Kyoto Protocol? If so, has your Government ratified it? If so, when was it ratified? If not, then what are the reasons? What is the national energy policy in your country? Is it conducive to promoting Renewable Energy?

Yes, India is a signatory to the Kyoto Protocol. India ratified the Kyoto Protocol in August 2002, a few months before the Conference of Parties (COP8) meet in New Delhi.

Currently, various agencies (Ministry of Coal, Petroleum, Natural Gas, etc) within the Indian government oversee the energy policy and there is in fact, a need for a comprehensive energy policy in the country. While India is still dependent on coal imports for a majority of its energy requirements, the propagation of renewable energy has been given priority in India. It is stated that India was the first country to dedicate a separate Ministry to the cause of renewables. Under the government run public sector undertaking – Indian Renewable Energy Development Agency (IREDA), – there are budgetary allocations for providing fiscal incentives, subsidies, and special concessions for renewable energy technologies. Based on MNES guidelines, several states of India are promoting renewable energy use and have introduced incentives, such as attractive tariffs for power purchase, wheeling, banking and third-party power sale.

In terms of programmes – While the Government of India remains committed to electrifying the far flung 80,000 villages and connecting them to the main grid, it has initiated several efforts and is working towards providing decentralized and alternative sources of energy. India now generates more than 900 megawatts from wind energy, nearly 141 megawatts from small hydroelectric generating plants, over 83 megawatts from biomass and more than 28 megawatts per installed square kilometre from solar photovoltaic systems.

The two largest renewable energy programmes of the Ministry of Non-Renewable Energy Sources (MNES) are the National Programme for Biogas Development (NPBD) and the National Programme for Improved Cookstoves (NPIC). Under these programmes, over 2.2 million biogas plants have been installed, resulting in an estimated savings of over 10 million tonnes of fuelwood. The MNES is also pursuing active programmes in a variety of other areas including solar, wind and biomass energy and several incentives are available for manufacture and utilisation of these technologies. Smaller efforts include one such as the mandatory use of Compressed natural gas (CNG) for commercial vehicles in Delhi.

India is also part of the World Solar Commission and the World Solar Programme for the decade 1996-2005. Under the Programme, India has to implement eight projects, including those of research and development, institutional improvement, capacity building, generation of grid quality power from solar energy, decentralized use of renewable energy, and construction of a 200 kilowatt solar power plant at Leh and another 100 kilowatt solar power plant at Nyomo.

In spite of the several benefits and incentives offered in the renewable energy sector, it is important to point out here that very often, these are not translated into reality. Bureaucratic obstacles, lack of publicity-awareness campaigns, rigidity in schemes and a lack of coordination between various agencies are some of the reasons for this.

37. What institutional support is available to you and your co-applicants for developing and implementing your business plan? Please provide names and contact information.

One significant support for the enterprise would be from Energie Solar – the co-applicant organization. Energie Solar's technical expertise, experience and networks would be a backing to the enterprise. We have not yet actively pursued potential partners or investors

38. In the past 3 years, what renewable energy projects or ventures have you participated in?

As part of the environmental group Greenpeace (India), I participated in a solar project in Earthquake affected Kutch, Gujarat in 2001. The aim of the initiative was to use Greenpeace's knowledge of solar solutions to take emergency light and power to the earthquake ravaged Kutch district.

The project was conducted over a period of 5 months in two phases. The first phase was geared towards supplementing the relief work in five villages. We installed solar lights in three temporary schools that had been set up with the help of Medicins Sans Frontiers (MSF). While MSF set up 17 classrooms in temporary tents, we installed the solar arrays & electrical back-up. In the second phase of the project, we electrified three villages (Gunau, Naredi, Umarsar) which were totally devastated by the earthquake and had meager hope of getting connected to the grid.

Gunau was peculiar since being on the western most tip of the coast of India, people shifted their houses depending on the tides. In Gunau, we therefore set up a 'Sunshine Library'. This was housed in the only permanent structure in the village – a school. We installed individual panels on the roof of the school, with the wires hanging low. Each household was given a

solar lantern, which they could come and charge from the main array and go back home with light. Gunau had a total of about 60 households.

The situation in Naredi was different. With a total of 32 households, all being permanent structures we installed solar panels on the roof of each house and provided one solar lantern to each household. In Umarsar, we followed the Guanau example and provided solar lanterns to 28 households.

The entire solar project was carried out with the help of a local educational institution called Saraswatam, who is now involved in propagating solar based applications with the help of their school networks.

I was part of the core team from Greenpeace India to conceptualise and implement the project.

39. Describe your business proposal in 400 – 600 words.

PLUG INTO THE SUN

Application of Solar Energy in Dahanu Taluka, Maharashtra, India

The philosophical vision of the proposed enterprise is deeply rooted in the struggle for an equitable and just society. Even as environmentalism takes on several shades globally, for us here in the South environmental protection is intimately linked to survival and is fundamentally a conflict of inappropriate and unjust utilisation of natural resources.

The proposed enterprise is a small effort to empower the youth in their communities to gain access to an ardently fought over resource – energy - and propagate it to the whole community. It is an attempt at supporting those very communities who are the vanguards of the environment, but left at the fringes of society. The primary objective of the enterprise is to empower communities to become self sufficient in their energy-electricity needs.

Technology

The proposed enterprise will retail and propagate solar based products directly to communities in the regions. The project envisages the application of solar energy among the tribal, fishing, farming and horticultural community of the region.

Location

The proposed business will be based in Dahanu Town, Dahanu Taluka, Maharashtra, India. It will operate out of an already existing outlet in the main city area, very close to the railway station. This space will act as an outlet as well as repair-maintenance workshop.

The Products

➤ Solar Lanterns

We propose to introduce two models initially, and depending on the response develop newer models.

Type 1 - Lanterns with 5W CFL, 6V, 4Ah battery with electronics comprising of over-charge and over-discharge protection Solar Photovoltaic (SPV) Module 6V, 3.2 Wp. 10 sunny hours for full charging 3-4 hours operation time, 360° light output.

Type 2 Lanterns with 7W CFL, 12V, 7Ah battery with electronics comprising of over-charge and over-discharge protection Solar Photovoltaic (SPV) Module 12V, 10 Wp. 10 sunny hours for full charging, 6 - 8 hours operation time, 360° light output.

➤ Solar Box Cookers

A simple cost effective box-style solar cooker having a capacity of 3-4 pots, appropriate for rural communities & farm labour.

➤ Parabolic Solar Cookers

This is an efficient design of solar cooker, where temperatures of over 200°C can be reached. This contributes to speedy cooking. Use of pressure cooker up to 13 liters capacity cooks, rice, lentils and other food within half an hour in good sunshine.

Specifications of Parabolic Cooker

- | | |
|--------------------------|--|
| • Material of reflectors | : Aluminium sheets of thickness 0.4–0.5 mm |
| • Reflectivity | : above 80 % |
| • Size of focal spot | : 100 mm approx. |
| • Focal length | : 280 mm |

- Aperture area of reflector : 1.54 sq m
- Power availability at cooking pot : About 0.6 kW (with over 600 W / sq m Direct / 750 W / sq m total solar isolation available on reflector)

➤ **Solar Pathway Lights, Decorative Lights**

Simple and inexpensive, unwired pathway lights to light up farms & community areas.

➤ **Solar Based Mini Home Lighting Systems**

We are looking at offering two systems

Technical Specifications:

| SR. NO. | PARTICULARS | 2 POINTS | 4 POINTS |
|---------|---------------------|--|--|
| 1 | Solar Module | 12V, 37Wp Capacity – 1 No. | 12V, 75 Wp Capacity – 1 No. |
| 2 | Tubular Battery | 12V, 40Ah – 1 No. | 12V, 80Ah – 1 No. |
| 3 | Lamp / Lamp Fixture | 2 x 11 W CFL with standard weather proof enclosure with reflector or FRP fixture. Push to ON switch. | 4 x 11 W CFL with standard weather proof enclosure with reflector or FRP fixture. Push to ON switch. |
| 4 | Controls | High efficiency inverter and charge controller unit, with over-charge and over-discharge protection | High efficiency inverter and charge controller unit, with over-charge and over-discharge protection |
| 5 | Daily Operation | 4 – 6 hours daily | 4 – 6 hours daily |
| 6 | Autonomy | 2 days 'no sun' autonomy | 2 days 'no sun' autonomy |

A Smaller System has the following specifications:

| SR. NO. | PARTICULARS | MINI HOMELIGHTING SYSTEM |
|---------|---------------------|--|
| 1 | Solar Module | 12V, 20 Wp Capacity – 1 No. |
| 2 | Tubular Battery | 12V, 30Ah – 1 No. |
| 3 | Lamp / Lamp Fixture | 2 x 9W / 11 W CFL with standard weatherproof enclosure with reflector or FRP fixture. Push to ON switch. |
| 4 | Controls | High efficiency inverter and charge controller unit, with over-charge and over-discharge protection |
| 5 | Daily Operation | 4 – 6 hours daily |
| 6 | Autonomy | 1 days 'no sun' autonomy |

Target Clientele

The plurality & diversity of communities in the Dahanu Taluka region assures a sense of financial viability to the project. In turn the diversity of people also helps create a distinct dynamic entity different in its approach, strategy, and target customers.

The clientele for the enterprise is diverse. From the tribal community completely off the grid to the orchard owner troubled

with irregular supply, the potential customer base is:-

1. **Tribals**
2. **Fisherfolk**
3. **Small and Marginal Farmers**
4. **Large Orchard Owners**

Doubts about the clients ability to pay do not arise even among the indigenous communities who are today very much a part of the monetary economy, working as agricultural labour, factory workers and so on. The only difference being that they earn their income on a daily basis, and hence stability of resources is not assured. Solar based applications which would involve payment for a short period of time only, would in fact suit them, rather than a regular monthly billing system applicable to the grid. In addition their day to day trouble of collecting firewood for cooking would be considerably reduced if they adopt a solar cooker.

Erratic supply and problems for many of the other communities is the starting ground for solar applications. Specific uses like solar lanterns while fishing, pathway lights for farms have a tremendous potential.

Procurement

Though the enterprise plans to start the project by initially procuring the products from manufacturers, the aim is to develop capacity in-house to assemble the solar based applications.

Strategy for Distribution & Sales

While the outreach strategy for sales will differ from client to client, the plan proposes to utilise the outlet in the main city area to attract customers who can purchase over the counter. The outlet which is close to the railway station and is accessible to all customers will be used as an information-sales-repair-maintenance place.

In addition to the outlet there will be a mobile sales team of rural youth traveling from village to village demonstrating and offering for sale the solar applications. They will work on the basis of a monthly salary plus sales-performance based incentives.

Innovative hire-purchase schemes will be offered to customers in collaboration with nationalized and cooperative banks, which are bound by the Governments policy to promote renewable energy.

The Team

In the start-up phase, there will be one mobile sales team of tribal youth consisting of 4-5 boys and girls. In addition one to two more youth are required in the shop for administrative work, direct sales, repair-maintenance, etc. These youth would either be from the tribal community or from modest middle class homes of the city depending on the level of expertise required. The attempt would also be to train and develop the tribal youth as technicians.

Sales Projections

| Product | Year 1 | | Year 2 | | Year 3 | |
|--|---------------|------------------|---------------|------------------|---------------|------------------|
| | Units | Turnover | Units | Turnover | Units | Turnover |
| Solar Lanterns (Type 1) | 200 | 500,000 | 320 | 800,000 | 400 | 10,00,000 |
| Solar Lanterns (Type 2) | 100 | 450,000 | 140 | 630,000 | 200 | 900,000 |
| Solar Box Cookers | 250 | 375,000 | 375 | 562,500 | 450 | 675,000 |
| Parabolic Cookers | 30 | 210,000 | 50 | 350,000 | 80 | 560,000 |
| Pathway Lights | 180 | 360,000 | 300 | 600,000 | 450 | 900,000 |
| Mini Home Lighting Systems (two types) | 6 | 90,000 | 8 | 120,000 | 10 | 150,000 |
| Total | | 1,985,000 | | 3,062,500 | | 4,185,000 |

After deducting procurement costs, administrative expenses and the interest burden, the enterprise foresees a net profit margin at the rate of 10 percent of total turnover.

Impact on Community

A tribal community that is able to meet its own minimum electricity requirements would undeniably gain a sense of self-reliance. Moreover, the problems they face by the bureaucracy when they 'tap' the main grid lines could be averted. The development of the community boys/girls as sales executives, technicians also opens up completely new avenues to an exceedingly marginalised community. The process actually opens up tremendous opportunities for further development

activities and engagement with the community.

While some sections of the population are aware of the adverse impacts of fossil-fuel based technology, the widespread and successful use of solar based applications to a cross section of the Dahanu population would lead to a greater belief in alternative sources of energy.

Budget

The budget given below is an estimate for the start-up costs:

| Sr. No | Category | Costs (USD) |
|--------|-----------------------|-------------|
| 1. | Inventory & tools | 2000 |
| 2. | Publicity & Marketing | 2000 |
| 3. | Administrative Costs | 1000 |
| | TOTAL | 5000 |

Note: 1. Inventory includes solar lanterns, panels, battery packs, solar cookers, fixing material and necessary equipment and tools.

2. This cost includes printed publicity material, salary for sales team (3 months), product display costs in the outlet and travel expenses.

40. Please write any additional comments that you deem important when considering your application.

To understand the essence of the proposed venture, it is vital to understand the location and context of the region where the enterprise is proposed. In addition, the ongoing work already undertaken by the applicant forms an important part of the project.

Profile of the Region

Located on the western coast of India, 120 kilometres north of the city of Mumbai, Dahanu is one of the three notified ecologically fragile areas in the country. Rich in natural resources, Dahanu has a vibrant coastline with creeks, wetlands, reefs, mangroves and river deltas. The Sahyadri mountain ranges running from the north to the south constitute the forest clad tribal interior. Famous for its horticulture orchards of chikoos (sapota), mango, coconuts, guavas, etc. Dahanu is also recognized for its well established agricultural economy.

Predominantly a tribal area, Dahanu is home to the indigenous Warli tribe, who constitute 65 percent of the total population. Even though the Warlis are the original settlers of the region, historically they have faced oppression and are now a marginalised community in the region – with little access to resources like land, water or electricity. In addition Dahanu has a significant fishing, farming and horticultural community.

Dahanu has also been part of a protracted legal-environmental struggle to protect it from the often mindless industrialization that takes place in a developing country. Threatened by the construction of a coal based thermal power plant and proposals to set up an industrial port in a predominantly rural and agricultural area, local groups waged an environmental campaign for fourteen years. While they were unsuccessful in their attempts to prevent the thermal power plant from being set up, they managed to thwart the plans for an industrial port by mobilizing resistance locally. Moreover, a significant outcome of the battle was the notification of Dahanu as an ecologically fragile zone, with restrictions on industrialisation and urban development.

Applicant's Role

Though being predominantly from an urban upbringing, I chose to move to a farm in Sogve village in Dahanu taluka approximately a year ago. Prior to that I had been involved in the environmental struggles in the area. I have since initiated work with the women and youth of the village – in the areas of food processing (sun drying chikoos (sapotas), making chikoo powder, etc.) promoting traditional warli paintings and related products. Familiarity with the village community, established contacts will aid the proposed enterprise to tap the youth as well as reach out to widespread villages.

Supporting Documents Required to be Submitted along with this Application are:

1. Resume/ CV/ Bio-data.
2. Two Recommendations from either an academic or professional institution.
3. Documentation indicating co-applicants legal status.

Please send the completed hard copy application form with all supporting documents to:

Mr Nugzar Meladze
4v Mazniashvili St.
Tbilisi 380002, Georgia

Email. nugzar@youthemploymentsummit.org

Deadline for receiving application form with all necessary documentation is 28th February 2003

For more information, visit www.youthemploymentsummit.org

APPLICATION INSTRUCTIONS

Questions

- 1 – 10 Indicate youth applicant's name, address, telephone, fax, and email.
- 11 – 13 Indicate alternative contact person, including telephone and email
- 14 – 23 Information relates to the first co-applicant. Co-applicant must be a legally recognized institution.
- 24 – 33 Information relates to the second co-applicant. Co-applicant must be a legally recognized institution.
34. Describe what market demands could be met with renewable energy technologies.
35. Of the opportunities described in your previous answer, which two have the most potential for meeting the goals of this project: develop employment opportunities for youth, while reducing and ameliorating environmental degradation.
36. Describe the current efforts being made by your government, if any, to improve energy production and energy supply to off-grid areas, and by what means, with special focus on renewable energy policy and projects that will be implemented through 2005.
37. Describe what additional support you would be able to receive for your business plan. In other words, are there potential partners or investors?
38. Provide information regarding experience in renewable energy projects or businesses such name, duration, participants, your position and role, and a description of results or outcomes for beneficiaries.
39. Describe your business proposal, e.g., project name, goals, how many people will participate and from what segment of society, what is the current situation, and where will the business be established, what renewable technology will be used, what will be the outputs and impact on the community. Also include a short budget, not to exceed \$5000.
40. Open

For further clarification contact

Mr Nugzar Meladze
4v Mazniashvili St.
Tbilisi 380002, Georgia

Email. nugzar@youthemploymentsummit.org

Curriculum Vitae

Name: Michelle Chawla
Date of Birth: October 29, 1974
Address: Tamarind Tree Farms, Sogve Village, Dahanu Taluka- 401602 Maharashtra, INDIA
Tel. No.: 91-2528-260220
Email: michelle@gandhiana.org

ACADEMIC HISTORY

Qualifications:

1997 Master of Social Work Degree (M.S.W) from the College of Social Work, Nirmala Niketan (affiliated to the University of Mumbai)
1995 Bachelor of Commerce Degree (B.Com) from Sydenham College, University of Mumbai

WORK EXPERIENCE

1995-1996 Worked in the Khar Danda Slum Project, Mumbai mainly on the issue of housing. Other community development issues handled-forming youth groups, working with children, organising domestic workers.
1996-1997 Worked with the Campaign Against Child Labour (CACL) in its Central Secretariat Office in Mumbai. Key assignments undertaken were a case study of child labour in the salt pans of the Rann of Kutch, Gujarat, compilation of all existing laws on child labour, co-ordination between the different State groups of CACL in the country. Grassroots work involved working with pavement children in Mahim, organising classes, camps, etc.
1997 (July-September) Conducted (along with a co-researcher) a study for Vasundhara, a Non Government Organisation working on urban environmental issues, titled 'A Study of the Socio-Economic Landscape of the South West Region of Dahanu Taluka and the Perceptions and Concerns of the People regarding the building of an Industrial Port at Vadhavan'.
1997-1998 (October-November) Joined the Dahanu Taluka Environment Welfare Association (DTEWA) to campaign against a proposed mega port to be constructed by P&O Ports, Australia in Vadhavan village which lies in ecologically fragile Dahanu. The

campaign involved mobilising local groups of farmers, fisherfolk and artisans, utilising the existing legal framework, networking with the media, lobbying with the governments of India, Australia and U.K., collaborating with other NGO's, professionals, environmentalists at national and international levels.

Co-authored a socio-economic research study (published in January 1999) titled 'Of Development amidst Fragility - A Societal and Environmental Perspective of Vadhavan Port' that analyses the impact of the proposed port on the region, it's people and resources. The study situates the project in the context of the current paradigm of development and raises various theoretical, conceptual and empirical issues.

1999
(Jan -March)

Worked in the role of a teacher in an alternative environmental school - Redstone Farm (home) School in Panchgani, Maharashtra. The essence of the school is rooted in a child- centered philosophy with a definite environment thrust. Was involved in curriculum development as well as taught social sciences.

1999
(May- September)

Worked with the Concerned for Working Children (CWC), in Bangalore, Karnataka in their Research cell on a participatory-action research project. Compiled a Process Document of the project based on extensive field work.

2000-2002
(April-May)

Worked as a campaigner with Greenpeace International in their India Project on the issue of Genetically Modified Organisms (GMO's). My primary role in Greenpeace India was to initiate and build the anti-GM campaign in India. Work involved developing campaign strategies, mobilizing local groups, lobbying with concerned ministries and so on.

As part of a small core team of campaigners, in the newly developing Greenpeace India office, I also worked on the anti-toxics campaign and the solar project.

2002-2003
(June-February)

Shifted to Sogve Village, Dahanu Taluka. Currently practicing chemical free farming. Have initiated a food processing enterprise sun drying sapotas (chikoos), manufacturing chikoo powder. In addition, promoting the local tribal art among the youth and helping in marketing of paintings, etc.

Have started a progressive internet bookshop – www.gandhiana.org promoting an alternative worldview, with a comprehensive catalogue on Gandhian Philosophy, South Asian studies and so on.

ACADEMIC RESEARCH & PAPERS

- Masters Thesis on Child Hawkers titled ' A Study on Children Working in the Informal Sector of the City of Mumbai'.
- Published researched study 'Of Development amidst Fragility - A Societal and Environmental Perspective of Vadhavan Port'

Training Program - India

Training Programme and Schedule for the Solar based Renewable Energy Enterprise in Dahanu, India.

The Training Programme has been divided into two components:

1. Training the applicant/entrepreneur to acquire the necessary knowledge and information required on setting up a Renewable Energy Enterprise specifically in the area of Solar Energy.
2. Training a team of rural youth (4 boys) to get acquainted with Solar based applications, gain technical as well as marketing skills.

Both the above will be facilitated by the co-applicant organization – Energie Solar.

Training Schedule

➤ **April**

- a) The applicant will attend a Training Workshop on “Eco-Entrepreneurship- Setting up of Green Enterprises” conducted by YES and M.S. Swaminathan Research Foundation in Chennai India. Dates April 30th – May 5th.
- b) Start building contacts with solar companies and organizations to gain knowledge on both marketing and manufacturing.

➤ **May**

- a) While the applicant works on a draft business proposal including finance and marketing plan in the month of May, a hands on Training Workshop will be held in Dahanu for the entire team to be facilitated by Energie Solar.
- b) The workshop to include the basics on Solar Energy, assembling of Solar Lanterns, torches, mounting photovoltaic cells, repair and maintenance. Familiarisation and experimenting with Solar cookers. Marketing skills and tips will also be discussed.
- c) The applicant will visit companies such as Tata- BP in Pune and others for possible tie-up for procuring of solar products.

➤ **June**

- a) Applicant-Entrepreneur to visit the Barefoot College in Tilonia, Rajasthan to see how solar based applications are being manufactured and sold. See how we can adopt it here in Dahanu.
- b) Finalise Business plan by mid-June and prepare to execute.

Training Report

REPORT OF THE THREE MONTH TRAINING PROGRAMME

Document prepared by YES Fellow, Ms. Michelle Chawla, India

Introduction - The mammoth task ahead

Though the official Training Program only commenced in June, 2003 I took the opportunity to start deliberating on the solar enterprise by attending an “Eco-Entrepreneurship” Workshop in Chennai, India (April, 2003). This was organised by YES and the M.S Swaminathan Institute in India. The field visits to various green enterprises and the subsequent analysis of each proved helpful in understanding the complexities of starting a “green enterprise”.

Meanwhile, the co-applicant Kaustubh Shah, CEO of Energie Solar prepared a rough sketch of the three months training that was to follow. The training was worked out in a manner that would maximize learning via field visits and meetings and discussions with people in the field.

Training Programme

The Training was divided into the following categories:

1. Project Management Training - Co-investment, Marketing/Publicity, etc.

In order to increase understanding of how an enterprise was to be established and managed, the first phase of the training was spent in learning Project Management.

For a start, the training included understanding how my co-applicant, Kaustubh Shah had himself set up a solar based enterprise. The legal requirements and formalities, possible sources of funding, co-investment opportunities were studied.

Co-investment

Several meetings were set up with Government Institutions, Renewable energy foundations to explore possible sources of funding and co-investment. We initiated discussions about the Dahanu project with the Khadi Village Industries Commission (KVIC), the Maharashtra Energy Development Agency (MEDA) and local government officials. In turn I understood the schemes, subsidies and government benefits available for a solar enterprise.

Marketing & Publicity

To be able to work with a better understanding of the market, once the enterprise would be set up, we designed an informal market survey to assess the market potential in Dahanu. This market survey would then eventually help in designing the final business strategy, potential clients and so on. For instance we realized that given the high entry costs of solar based applications, we would have to come up with innovative ideas so that the tribal population would be able to afford the products. The SOLAR LIBRARY concept emerged from here.

2. Renewables – Technical Analysis, Understanding

Besides visiting Energie Solar's production/fabrication unit, I also visited other enterprises in the area (Gadhia Energy Systems, Valsad, known for his large solar cooking devices) in order to understand the technical aspects of solar based applications.

Energie Solar's expertise and networks also helped in making contact with potential manufacturers and suppliers. I visited and spoke with several of them to assess the market rates.

This researching has helped in realizing that:

1. Solar products currently manufactured in India are expensive and beyond the means of the rural population. This would be our biggest stumbling block. Therefore, we would have to innovate and remodel products in order to make them affordable to our target clients. In essence, we would also have to step partially into manufacturing.
2. The availability and potential of existing products that can be converted to solar power is tremendous.
3. The quality and level of finishing of the solar lanterns, torches, etc. is poor and needs improvement.
4. Entry costs into this enterprise are high – inventory & stocks cost the earth. Working out credit deals with dealers, initial loans, etc. to build stock would be a crucial aspect to getting the enterprise going.

A deeper understanding of renewables, specifically solar energy also convinced me that solar based applications could be a potential livelihood option in this predominantly rural area. We started looking very keenly at solar dryers for agricultural produce, studying different models, understanding fabricating. The Business Plan then included a component on Solar Drying.

3. Preparation of Business Plan

Over the three month period, the co-applicant and I were constantly discussing and debating on the Business Plan. Various strategies, schemes and possible tie-ups were discussed.

Meetings with Professors from the Indian Institute of Technology, Mumbai, Pune University Energy Department and other experts helped in developing the final business plan.

Training Workshop

Instead of holding only one large workshop, we decided to hold small village level training workshops that would be hands on, while the final large workshop could be both lecture based and practical.

In all we had about 3 village level workshops with about 7-10 youth in each, and the final large workshop had 18 participants from the Dahanu urban area.

At the village level workshops, the technical session was conducted by Kaustubh Shah – with demonstrations about solar photovoltaic technology as well as solar thermal. We displayed and demonstrated how the solar lanterns and box cookers work, explained the concept of solar collectors for dryers and the technology of parabolic cookers.

The main aim of these workshops was to introduce the concept of solar energy and its various applications to the rural youth.

At the large Training Workshop held in September, 2003 – there were 18 local youth present.

The speakers and their topics were:

1. *Kaustubh Shah* – *CEO, Energy Solar*
Introduction to Renewables – The Status in India
2. *Meherban Irani* – *Energy Expert, Dahanu*
The Potential For Renewables in Dahanu – Solar, Wind, Biogas
3. *Mr. N. Mody* - *Energy Expert, Mumbai*
Livelihood Options using Renewables – A Case for Rural Development
4. *Michelle Chawla* - *Renewable Energy Fellow*
Discussion on Sogve's Initiative – proposed project

The workshop was divided into three main sessions as outlined above. Each session was followed by a question and answer session with the respective speaker.

While the macro perspective of Renewables in India was provided by Kaustubh Shah, who gave an interesting presentation filled with facts and figures, the local energy expert, Mr. Meherban Irani brought the participants back to reality with his presentation on the local conditions.

Even as a coal based thermal power plant produces and transmits electricity to the nearby city of Mumbai, Dahanu's remote and isolated hamlets remain in darkness. The way forward would be to decentralize the production and distribution of electricity, said Mr. Irani.

Mr. Mody was very eloquent in stating that renewables could prove to be a powerful livelihood option for rural areas. Discussing the potential of bio-gas, he went on to also speak about economically viable solar air heating systems that could process the agricultural produce in rural areas.

Giving the example of Uganda, Africa where a company called Fruits of the Nile is utilizing the solar drying technology with small scale solar dryers to enhance the incomes of thousands of farmers, he said such projects could easily be implemented here.

The participants had several doubts both about the technology as well as its potential. Several questions were asked to all speakers and the sessions were largely interactive.

Towards the end, I discussed my proposal for solar based project in Dahanu and talked about the ways in which the youth could be involved.

We had also kept solar lanterns, and solar box cookers for demonstration.

Business Plan

Executive Summary

Description of the Project

The Sogve's Solar Initiative envisages the application of solar energy among a varied and heterogenous population of tribals, fisherfolk, farmers and horticulturalists of the Dahanu region in Maharashtra, India. It proposes to do this through a range of multiple strategies -

1. **Retailing Solar Based Applications via a prominent physical shop in the semi-urban area of Dahanu.**
2. **Solar Library at the village level (Centralised distribution of renewable energy)**
3. **Solar Dryers for agro-processing at the community level.**

Objectives & Uniqueness of the Project

The objective of the project:

1. To set up a financially viable solar based enterprise catering to a cross section of society.
2. To create livelihood opportunities for the youth, especially the tribal youth of the region.
3. To empower tribal communities to become self sufficient for their minimum energy/electricity needs.
4. To reduce the community's dependence on fossil fuel based energy by creating a market for non conventional energy products amongst the progressive farming, orchard owning and fishing community.

Given the plurality and the diversity of communities in the Dahanu region, the distinctiveness of the project lies in having a multi-pronged strategy reaching out to all. In turn the diversity of people also helps create a distinct dynamic entity different in its approach, strategy, and target customers. Moreover, this diversity would help build the financial viability of the project, given that the target clientele varies from a tribal to a orchard owner or a prawn farmer.

Location of the Project

The Project will be implemented in the ecologically fragile Dahanu Taluk located on the western Indian coast. Approximately 130 kilometers north of Mumbai city, the Dahanu region has accumulated an economic and infrastructural backlog despite being in the middle of the industrialized West coast of India. Being in the backyard of the fossil fuel

fired industrialization the majority tribal population of the region has been facing adverse environmental impacts without having their due share in the general prosperity. In addition, Dahanu is home to a large fishing community, small and marginal farmers as well as large orchard owners.

Significance of the Project

India's dependence on imports of fossil fuel based energy sources like coal, oil, etc. continues. It is only a matter of time that conventional electricity would become more expensive for the common man in India. Currently, erratic and inconsistent supply plague most parts of rural and even urban India. Furthermore, India has an abundance of solar energy in more than 200 days of the year. A decentralized source of energy would not only help in offloading some dependence on conventional sources, but can also prove to be a more economical and sustainable option for India in the long run.

Project Implementation

Most of the ground work for the start up requirements of the enterprise is ongoing and would be complete by September, 2003. For each of the plans mentioned above (Retail Solar Shop, Solar Library, etc.) timelines and tasks lists have been made. A Phase-wise implementation is envisaged, the details of which are mentioned below. The deadline to start is October, 2003.

How does your project coincide to objectives?

The project/enterprise has well defined strategies for the fulfillment of its objectives. The retail solar shop strategy would aid in creating employment opportunities for youth as well as work towards propagating non conventional energy sources. Financial viability could be attained via the proposed commercial projects of electrifying prawn farms, etc. The Solar Library is specifically targeted at enabling rural communities to become self sufficient in their energy needs.

Business Plan

(1) Business location and setting

Sogve's Solar would be based in Dahanu Taluka, Maharashtra, on the western Indian coast of India. As mentioned earlier, the region is predominantly a tribal area but also has a heterogeneous mix of small and marginal farmers, orchard owners and fisherfolk.

(2) Product/service to be offered

The enterprise will primarily focus on solar based applications like solar cookers, lanterns, solar dryers and will also provide services on a turnkey basis to schools, community centres, etc.

(3) Goals & Objectives

The primary objective of the enterprise is to provide cleaner alternative sources of energy to a wide range of communities.

(4) Business Structure – wholesale/retail/projects/manufacture

While the initial emphasis of the enterprise would be to primarily retail, we are also looking at options of remodeling and manufacturing some of the solar applications like lights and dryers.

(5) Business ownership structure, licenses

Currently, Sogve's Solar Enterprise is being set up as a proprietary concern under the name Sogve's Products in Maharashtra, India. Legal requirements of Sales Tax Number, license will be taken up soon.

(6) Business Strategy

Sogve's Solar has developed a multi-pronged strategy to create a market for solar based applications. The strategy will simultaneously target – rural communities, farmers, orchard owners, fisherfolk, large commercial prawn farms, and other industries. The Enterprise believes that by spreading itself to a wider population it has higher chances of success and financial viability.

It proposes to do so by:

- **Retailing Solar Based Applications via a prominent physical shop in the semi-urban area of Dahanu.**
- **Solar Library at the village level (Decentralised Distribution of energy).**
- **Solar Dryers for processing the agricultural produce**

RETAIL

The enterprise will open a shop in the Municipal area of Dahanu where a variety of solar applications like lanterns, cookers, home lighting systems, torches and so on would be retailed. The retail shop is in a prominent location accessible to the semi urban population, the progressive orchard owners, as well as to the rural population. In addition, the shop will play the role of after sales and maintenance. Given the easy accessibility, the shop in the main city area will attract customers, and serve as a key promotional tool.

The enterprise also sees this shop developing into a SOLAR CENTRE of the area, with in-house knowledge and capability on solar energy.

SOLAR LIBRARY

While the concept is taken from the traditional Library housing books, here the Library would house solar photovoltaic panels. To elaborate - An innovative concept applicable at the community village level, the solar library is a space housing photovoltaic solar panels, where community members come daily to charge

their lanterns/torches. The objective of this project is to reduce the high entry costs of solar applications.

Here we would extend the solar application to the villagers without them having to purchase the expensive photovoltaic panels. Only the less expensive solar lanterns and torches would be sold/rented. The electricity generated in the Solar Library will then be made available at a very nominal fee to villagers to charge their solar lanterns and torches. It would be a mini-electricity generation project.

The place for the Solar Library could be a school, panchayat (village administration) office or a house. The community would visit the "Library" daily to charge the lantern for a minimum fee. The library would be maintained by Sogve's Initiative.

SOLAR DRYERS

The enterprise will also fabricate and retail small low cost dryers at the village level for processing of agricultural produce. Solar Dryers have tremendous potential in this predominantly agricultural and horticultural zone. Economically priced solar dryers would serve as an additional livelihood option for the marginal farmers. Sogve's Solar Initiative would also work towards training the local people in drying technology and supporting them in marketing as its longer term plan.

(7) Target Customers

The strategy clearly outlines the type of customers the enterprise is targeting. At the retail outlet, the enterprise foresees the following customers:

- ❖ Rural communities visiting the market for their weekly supplies
- ❖ Orchard Owners
- ❖ Local Shop keepers
- ❖ Informal Sector (Hawkers, Paan Shops, etc)
- ❖ Residents of the Dahanu Municipal Area

The SOLAR LIBRARY is specifically targeted at villages, rural schools, health centres - where it is beyond the capacity of the community to purchase the entire equipment. This model ensures revenue flow for the enterprise and Sogve's Solar would be able to recover its costs in a year. (See "SALES").

(8) Marketing, Publicity, Advertising

The Solar Shop and the Solar Library would be the crucial tools of marketing initially. Visibility via the shop at the semi-urban centre, and the centralized Solar library at the village would give us the necessary boost in terms of publicity. Advertising about the solar shop can be done on the local cable network, posters can be put up at prominent locations and so on. A Promotional Road tour will be held in the rural areas to promote the concept of the Solar Library. In addition, a mobile sales van would also be utilized to increase sales and propagate the values of non-conventional sources of energy.

(9) Implementation - Time Line, Tasks

Sogve's Solar Initiative proposes to start setting up the enterprise in October. There will be a two Phase implementation to get the venture moving efficiently. Phase I (3 months) would involve setting up the enterprise, infrastructure & capital costs while during Phase II (2 months) the venture would start operating on a full fledged basis.

PHASE I START-UP TASKS

Time Period 3 Months (October – December, 2003).

REGISTRATION

All formalities regarding the registration of the enterprise will be complete in this phase. The proprietorship will be registered, sales tax numbers and licenses would be applied for.

SOLAR SHOP

In the initial phase, Sogve's Solar would start by setting up the Retail Solar Shop. While the space for the shop has been finalized infrastructure, inventory and administrative facilities need to be set up.

SOLAR LIBRARY

In the first phase the enterprise also proposes to identify a location for the first demonstration SOLAR LIBRARY, with an installed capacity of 80 W. This would be mounted at a suitable place with a multi-port output hub. The villagers who become members of the Solar Library will have to purchase at least one solar application (Lantern/Torch). A fee of Rupees 10/- (US\$ 0.22) would be charged per day to visit the library to charge the lantern/torch. The enterprise would be able recover the capital investment on the solar panels within a year. One/Two youth from the village will volunteer to market the lanterns as well as run the Library.

Post the identification and finalization of a location, work on installing the Solar Library will start in November and it should be fully operational by December.

(10) Finance – Phase I

CAPITAL INVESTMENT BUDGET FOR THE SOLAR SHOP & LIBRARY

| Sr. No | Description | Rate | Quantity | Total | Cash Flow (Source) | Date |
|---------------|---------------------------|-------------|-----------------|--------------|---------------------------|-------------|
| | | US\$ | | US\$ | | |
| 1. | Computer (Administrative) | 500 | 1 | 500 | Yes Capital Expense Fund | October |
| 2. | Printer (Administrative) | 66 | 1 | 66 | Yes Capital Expense Fund | October |
| 3. | Phone Installation | 45 | 1 | 45 | Yes Capital | October |

| | (Administrative) | | | | Expense Fund | |
|----|---------------------------|----|---------|-------------|--------------|-------------------|
| 4. | Rent of the Library place | 70 | 4 month | 280 | | October-January |
| 5 | Rent of the Solar Shop | 80 | 4 month | 320 | | October - January |
| 6. | Phone | 44 | 4 month | 176 | | October – January |
| 7. | Electricity | 55 | | 55 | | |
| | TOTAL (1) | | | 1422 | | |

In addition to capital costs, there would also be inventory and operating costs in this phase. They are detailed below:

TOTAL BUDGET FOR START-UP, OPERATING COSTS & INVENTORY (PHASE I)
(Break up of main items provided below).

| Sr. No | Description | Total | Date |
|--------|---|-------------|----------|
| | | US\$ | |
| 1. | Enterprise Registration Costs (Administrative) | 178 | October |
| 2. | SOLAR LIBRARY Publicity (Advertisement, posters in villages, road tour, pamphlets, etc.) (See Table 1) | 500 | November |
| 3. | SOLAR SHOP - Publicity material, letterheads, board for shop, stationary (See Table 2) | 525 | November |
| 4. | TOOLS & INVENTORY FOR SOLAR LIBRARY Photovoltaic panels, tools, etc hubs, etc. (Details given in Table 3) | 600 | November |
| 5. | SOLAR SHOP INVENTORY Lanterns, cookers, torches, etc. (details given in Table 4) | 1400 | December |
| 7. | Volunteers (travel & honorarium) Details given in Table 5. | 375 | December |
| | Total (2) | 3578 | |

$$(1) + (2) = 1422 + 3578 = 5000$$

Break-Up of Priority Costs given below

Table 1 Solar Library – Publicity

| Sr. No. | Name | Total |
|---------|---|------------|
| 1. | Posters put up in villages | 75 |
| 2. | Information Pamphlets | 55 |
| 3. | Promotional Road Tour (car Hire, loudspeaker) | 240 |
| 4. | Film (renewable energy) screening in villages | 130 |
| | TOTAL | 500 |

Table 2 Solar Shop – Publicity Material

| Sr. No. | Name | Total |
|---------|------------------------------|------------|
| 1. | Letterheads, visiting cards | 45 |
| 2. | Posters | 50 |
| 3. | Signboards outside shop | 100 |
| 4. | Mail-outs | 80 |
| 5. | Advertisement in local cable | 250 |
| | TOTAL | 525 |

Table 3 TOOLS & INVENTORY FOR SOLAR LIBRARY

| Sr. No | Description | Rate (US\$) | Units | Total (US\$) |
|--------|--|-------------|----------|--------------|
| 1. | Photovoltaic Panels (80 Watts) | 5 per watt | 80 watts | 400 |
| 2. | Remodeled Mini Solar Lanterns | 30 | 6 | 180 |
| 3. | Miscellaneous (wires, connectors, battery) | | | 20 |
| | Total | | | 600 |

Table 4 SOLAR SHOP INVENTORY

| Sr. No. | Description of Product | Rate | Quantity | Total |
|---------|---|------|----------|-------|
| | | US\$ | | |
| 1. | Mini Mobile Solar Lanterns (6 V 10 W Module with 12 V, 7AH Battery) | 70 | 5 | 350 |
| 2. | Mobile Solar Lanterns (12 V) | 110 | 3 | 330 |
| 3. | Solar Torches | 55 | 4 | 220 |
| 4. | Solar Box Cookers | 30 | 3 | 90 |
| 5. | Solar Parabolic Cookers | 128 | 1 | 128 |

| | | | | |
|----|---------------------|-----|---|-------------|
| 6. | Solar Dryers | 200 | 1 | 200 |
| 7. | Solar Garden Lights | 44 | 2 | 88 |
| | TOTAL | | | 1406 |

Table 5 Volunteers (travel & honorarium) for two months (Jan-Feb, 2004)

| Sr. No. | Name | Travel | Honorarium | Total |
|---------|----------------|--------|------------|------------|
| 1. | Monica Mullick | 45 | 50 | 95 |
| 2. | Nitin Masiya | 45 | 50 | 95 |
| 3. | Laxmi Jagol | 45 | 50 | 95 |
| 4. | Sitaram Jagol | 45 | 50 | 95 |
| | | | | 380 |

PHASE II OPERATIONALISING VENTURE TASKS

TIME PERIOD January 2004 – February 2004 (2 months)

With the setting up of Sogve's Solar Shop and the Library, Phase II will be the crucial Phase for starting operations. The following are the tasks for Phase II:

1. Operationalising a Sales Team
A voluntary sales team of 4 youth would be taken on board for mobile sales and publicity. Training for these youth will be conducted.
2. Publicity, Advertising
An advertisement will be broadcast on the local cable network, every week Posters, pamphlets will also be distributed.

The most crucial outcome and result of this phase is that the Revenue flow starts.

A modest targeted sale for the first two months of Phase II (January-February) is as follows:

I TARGET SALES FROM SOLAR SHOP FOR PHASE II (Jan-Feb, 2004)

| Sr. No. | Description | Rate | Quantity | Total |
|---------|---------------------|------|----------|-------|
| | | US\$ | | US\$ |
| 1. | Mini Solar Lanterns | 71 | 4 | 284 |
| 2. | Solar Lanterns | 115 | 2 | 230 |
| 3. | Torches | 60 | 2 | 120 |
| 4. | Box Cookers | 35 | 3 | 105 |
| 5. | Garden Lights | 44 | 8 | 352 |
| 6. | Solar Dryers | 177 | 3 | 531 |

| | | | | |
|--|-------|--|--|------|
| | TOTAL | | | 1622 |
|--|-------|--|--|------|

Given that a 20% margin on sales is a modest calculation, the shop would make a earning of 20% on 1622 = 324.4 US\$ -----(A)

II REVENUE FROM SOLAR LIBRARY

The Solar Library would also start generating revenues from the day installation is ready. A total of 10 Lanterns and 10 Torches would be sold to the villagers. A fee of Rs. 10 (US\$ 0.22) would be the fee per day to charge each solar application.

The revenue earning in a month would be
 $0.22 \times 60 \text{ days} \times 20 \text{ Lanterns/Torches} = 264\$$ -----(B)

BI-MONTHLY WORKING CAPITAL REQUIREMENTS (Jan- Feb 2004)

| Sr. No | Description | Rate (per month) (US\$) | Total |
|--------|-------------------------|-------------------------|------------|
| 1. | Phone | 44 | 88 |
| 2. | Local Travel | 90 | 180 |
| 3. | Electricity | 55 | 55 |
| 4. | Rent for Shop & Library | | 300 |
| 5. | Volunteers Honorarium | 50 | 200 |
| | TOTAL (C) | | 823 |

Total Earnings – Revenue Expenses = Net Profit

(A) + (B) - (C) = NET PROFIT
 $324.4 + 264 - 823 = -234.6 \text{ US\$}$

It is obvious that the enterprise would have to sustain for the first few months before breaking even.

RISK FACTORS

While the overheads for the enterprise are low in the first implementation phase with volunteers, etc. these would increase slowly. Depending on the positive or negative response received, further publicity and marketing would need to be done to increase sales. The enterprise must be careful and first work towards breaking even as soon as possible.

Monthly Reports

Monthly Report Form

November 2003

1. General information

| | |
|-----------------------------------|---|
| <i>Name</i> | Michelle Chawla |
| Co-Applicant Organizations | 1. Kaustubh Shah – Energie Solar, Pune, India |
| Project Start Date | November 2003 |
| Expected Completion Date | Ongoing, given the fact that an enterprise has been set up. Specifically with regards to the YES fellowship contribution to this enterprise, the project will end in May, 2004. |
| Project Location | Dahanu, Maharashtra INDIA |

2. Project Progress

| | |
|---|---|
| Targets Achieved | <p>As mentioned in the Business Plan, October – December 2003 is the first phase of the enterprise. Most of the work was initiated in November and the tasks outlined in the Business Plan were completed in this phase.</p> <ol style="list-style-type: none"> 1. Sogve's Products became a Registered Proprietary Organisation. 2. Formalities of registering a Sales Tax Number were completed. 3. Space for the Solar Shop was remodeled and made ready for the opening of the Shop. A computer, printer and phone line installed. Letterheads, visiting cards printed. 4. Location for the Solar Library was identified. |
| Change in projections (if any) | <p>While the Business Plan envisaged the completion of the Solar Library by the end of the first phase, the amount of work involved in setting up the shop, etc did not leave enough time for this. Therefore setting up of the Solar Library has been shifted for the next phase.</p> |
| Impact of achievements | <p>At this stage it is a bit premature to discuss achievements but in terms of administrative and infrastructure, Sogve's is now geared to become a full fledged solar center, with prominent space in the semi-urban area of Dahanu.</p> |
| Impact of Changes | - |
| Factors influencing project progress (Positive & Negative) | <p>The fact that very little work has been done on Renewables in this area is a positive factor for the project. Yet the high entry costs make it prohibitive for poor communities to access. The challenge would be to make innovative and cost effective solar products.</p> |
| Problems faced (if any) | - |
| Suggestions to overcome the problems | - |

3. Work plan for the next period

The work plan for the next period includes:

1. Purchase of Inventory for the Solar Shop
2. Designing of Publicity Material for the Shop

3. Purchase of Inventory for the Solar Library
4. Design and Fabrication of Solar Dryer

4. Supporting documents of Project Progress

See Sales Tax Certificate (Attached).

5. Financial Report

Income and expenses for the period November 1, 2003 – November 30, 2003

| | |
|--|----------|
| <i>Beginning Balance</i> | |
| Incomes: | USD (\$) |
| - YES Campaign, EDC Inc. | 5000 |
| Total: | 5000 |
| Expenses : | |
| - Purchase of Computer | 500 |
| - Printer | 66 |
| - Phone | 40 |
| - Rent | 80 |
| - Printing of letterheads and visiting cards | 45 |
| - Administrative Registration Costs | 170 |
| Total: | 900 |
| <i>Ending Balance</i> | 4100 |

Comments on the changes in expense articles in comparison with submitted initial budget:

The initial budget was submitted for a three month phase – while this is a monthly report. Therefore there may be some differences. It would be best to look at the three months starting November as the first phase of the project and accordingly assess.

Monthly Report Form

December 2003

1. General information

| | |
|-----------------------------------|---|
| Name | Michelle Chawla |
| Co-Applicant Organizations | 1. Kaustubh Shah – Energie Solar, Pune, India |
| Project Start Date | November 2003 |
| Expected Completion Date | May 2004 |
| Project Location | Dahanu, Maharashtra INDIA |

2. Project Progress

| | |
|---------------------------------------|---|
| Targets Achieved | <ol style="list-style-type: none">4. Purchase of Inventory for Solar Shop (as outlined in the Business Plan)5. Purchase of Inventory for the Solar Library (as outlined in the Business Plan)6. Design of Solar Library finalized7. Solar Dryer Fabrication 90 percent complete.8. Setting up of Youth Sales Team9. Design and Printing of Posters |
| Change in projections (if any) | The work has picked up very systematically this month and the only significant change in projection is the shift in implementing the Solar Library Plan. This is because it is more prudent at this stage to initiate sales from the SOLAR SHOP in order that revenue flow starts. |

| | |
|---|--|
| Impact of achievements | The development of our own SOLAR DRYER is an enormous contribution to the renewable energy movement. With this we can experiment further with new cost effective products and new applications for Renewable Energy. The Solar Dryer is a tool for communities to process their own produce and with the value addition, get a better market price for the goods. |
| Impact of Changes | - |
| Factors influencing project progress (Positive & Negative) | The task of popularising solar energy and its applications in rural as well as semi-urban communities seems a daunting one. The challenge is to have people incorporate solar applications as part of their daily lives. Currently, one the main negative factors is the fact that conventional electricity is available at a subsidised and extremely low rate. This can be a stumbling block to the acceptance of a different form of energy. |
| Problems faced (if any) | - |
| Suggestions to overcome the problems | - |

3. Work plan for the next period

It is extremely important to focus on Sales, given the investment done on the inventory. The next two months will be focused primarily on popularising solar applications and creating a market. In addition, work on the Solar Dryer to be used for processing agricultural products will be completed.

4. Supporting documents of Project Progress

See Photos of Solar Dryer.

5. Financial Report

Income and expenses for the period December 1st 2003 - December 31st, 2003

| | |
|--------------------------|------|
| <i>Beginning Balance</i> | 4100 |
| Incomes: | - |

| | |
|--|------|
| | |
| Total: | 4100 |
| Expenses : | |
| - Solar Shop Inventory | 1300 |
| - Solar Library Inventory | 600 |
| i. Solar Dryer Fabrication (materials, etc.) | 150 |
| ii. Rent for Solar Shop | 80 |
| iii. Phone | 35 |
| iv. Design and Printing of Posters | 60 |
| Total: | 2225 |
| <i>Ending Balance</i> | 1875 |

Comments on the changes in expense articles in comparison with submitted initial budget:

It was decided that a small amount of funds be utilised for the research and development of a SOLAR DRYER. This is because the market options were both few and expensive. We believed that the development of our own in house Dryer would prove cost effective and broaden our options for sales and engagement with the community. This was not part of the budget. But it is also the project's biggest contribution.

Monthly Report Form

January 2004

1. General information

| | |
|-----------------------------------|---|
| Name | Michelle Chawla |
| Co-Applicant Organizations | 1. Kaustubh Shah – Energie Solar, Pune, India |
| Project Start Date | November 2003 |
| Expected Completion Date | May 2004 |
| Project Location | Dahanu, Maharashtra INDIA |

2. Project Progress

| | |
|---|---|
| Targets Achieved | <ul style="list-style-type: none"> - Sales start. - 3 Lanterns and 1 Torch sold. - Sales team operational. - Mail Outs regarding Solar Shop sent. - Solar Dryer complete and operational |
| Change in projections (if any) | While it may be too early to asses, but the projections regarding sales given in the Business Plan are higher that the real sales. It has become obvious that constant innovation and publicity is required to keep the enterprise going. |
| Impact of achievements | Some amount of awareness about renewables has been created. A small beginning has been made with the sale of Solar Lanterns and Torches. |
| Impact of Changes | - |
| Factors influencing project progress (Positive & Negative) | - |
| Problems faced (if any) | - |
| Suggestions to overcome the problems | - |

3. **Work plan for the next period**

- To attend a Conference on Solar Dryers for Agricultural Use and see possibilities of networking.
- To innovate and find newer and cheaper models for the Solar Shop.
- To assist the Sales Team in marketing, by coming up with newer interesting ways of propagating solar energy.

4. **Supporting documents of Project Progress**

5. **Financial Report**

Income and expenses for the period January 1, 2004 – January 31, 2004

| | |
|-----------------------------------|------|
| <i>Beginning Balance</i> | 1875 |
| Incomes: | |
| 5. Sales (3 Lanterns and 1 Torch) | 305 |
| Total: | 2180 |
| Expenses : | |
| - Honararium for Sales Team | 190 |
| v. Rent | 80 |
| vi. Phone | 50 |
| vii. Publicity material | 125 |
| Total: | 445 |
| <i>Ending Balance</i> | 1735 |

Comments on the changes in expense articles in comparison with submitted initial budget: Figures of Sales are figures of turnover, and not profits.

Monthly Report Form

February 2004

1. General information

| | |
|-----------------------------------|---|
| <i>Name</i> | Michelle Chawla |
| Co-Applicant Organizations | 1. Kaustubh Shah – Energie Solar, Pune, India |
| Project Start Date | November 2003 |
| Expected Completion Date | Ongoing |
| Project Location | Dahanu, Maharashtra, INDIA |

2. Project Progress

| | |
|---|--|
| <i>Targets Achieved</i> | 10. Sales from Shop 1 Box Cooker, 3 Garden Lights and 1 Torch sold. 11. Pamphlets published. 12. Awareness Workshop held in Solar Shop. |
| Change in projections (if any) | The entire focus of the project is now on consolidating the shop and ensuring that it works smoothly and acts as a central point for Solar Information. . Therefore, the SOLAR LIBRARY Project which also requires full attention is put on hold till the SHOP and other activities stabilize. |
| Impact of achievements | There is much more curiosity regarding solar applications in the community. Several people visit the shop just to see how the solar applications work. |
| Impact of Changes | - |
| Factors influencing project progress (Positive & Negative) | - |
| Problems faced (if any) | - |
| Suggestions to overcome the problems | - |

3. Work plan for the next period

Preliminary work on the design of the SOLAR LIBRARY

Designing of publicity material for the Solar Library

Planning a Road Show.

4. Supporting documents of Project Progress

5. Financial Report

Income and expenses for the period January 1, 2004 – January 31, 2004

| | |
|--|------|
| <i>Beginning Balance</i> | 1735 |
| Incomes: | |
| - Sales (3 Garden Lights, 1 Box Cooker, and 1 Torch) | 217 |
| Total: | 1952 |
| Expenses : | |
| - Honararium for Sales Team | 190 |
| i. Rent | 80 |
| ii. Phone | 40 |
| iii. Workshop Expenses | 100 |
| Total: | 410 |
| <i>Ending Balance</i> | 1542 |

Comments on the changes in expense articles in comparison with submitted initial Budget:

While it was not clearly stated in the budget, we felt the need to conduct an awareness workshop for the products available. Therefore the statement includes expenses for a workshop.

Monthly Report Form

March 2004

1. General information

| | |
|-----------------------------------|---|
| <i>Name</i> | Michelle Chawla |
| Co-Applicant Organizations | 1. Kaustubh Shah – Energie Solar, Pune, India |
| Project Start Date | November 2003 |
| Expected Completion Date | May 2004 |
| Project Location | Dahanu, Maharashtra, INDIA |

2. Project Progress

| | |
|---|--|
| <i>Targets Achieved</i> | 13. Sales from Shop continue 14. Road Show from village to village. (covered 10 villages) |
| Change in projections (if any) | |
| Impact of achievements | |
| Impact of Changes | As more people start using the products, word has been spreading and there is consciousness about the environment. |
| Factors influencing project progress (Positive & Negative) | The awareness road show has been of great help in propagating the concept of renewables. While there is still resistance to the use of renewables, for instance it makes more economic and environmental sense to use a Solar Box cooker for cooking rather than firewood. Yet it is not very easy to convince communities to do so. We are only at the beginning of the work in that sense. |
| Problems faced (if any) | It has been tough doing direct retail sales, also slow. A more innovative project oriented approach is required. |
| Suggestions to overcome the problems | - |

3. **Work plan for the next period**

The major task of putting up the Solar Library will be done in April.

4. **Supporting documents of Project Progress**

5. **Financial Report**

Income and expenses for the period March 1, 2004 – March 31, 2004

| | |
|-----------------------------------|------|
| <i>Beginning Balance</i> | 1542 |
| Incomes: | |
| - Sales (1lantern, 1 Box Cooker,) | 140 |
| Total: | 1682 |
| Expenses : | |
| - Honararium for Sales Team | 190 |
| iv. Rent | 80 |
| v. Phone | 40 |
| vi. Road Show Expenses | 300 |
| vii. Miscellaneous Expenses | 80 |
| Total: | 690 |
| <i>Ending Balance</i> | 992 |

Comments on the changes in expense articles in comparison with submitted initial budget:

Final Report

YES Fellowship Program

1. General Information:

| | |
|-------------------|----------------------------|
| Name: | MICHELLE CHAWLA |
| Co-applicants | ENERGIE SOLAR, PUNE, INDIA |
| Project Timeframe | November 2003-May 2004 |

2. Rollout Plan:

Please describe stage-by-stage implementation of the project: when the equipment was received and mounted; when other works were implemented.

FIRST STAGE (November 2003 –December 2003)

- The first stage saw the completion of the registration formalities of Sogve's Products as a proprietary firm . Sogve's also set up shop in the semi-urban area of Dahanu, with a computer, and phone line.
- To launch off the shop, equipment and inventory for the shop was purchased in December 2003. An innovative Solar Dryer for processing of local agricultural produce was also fabricated in this period.
- The design for the Solar Library was finalized.
- Equipment for the Solar Library was purchased. This was finally mounted in April 2004.

SECOND STAGE (January 2004-March 2004)

- In the month of January, the Shop had its first sales. Three lanterns and a torch with the photovoltaic panels was sold.
- The Solar Dryer Experiment was complete and operational.
- A small sales team was doing the round of promotions.
- Sales increased in the month of February and March.
- Research and Design to manufacture our own products was ongoing.

FINAL STAGE (April 2004 - May 2004)

- In the final stage, work on the Solar Library was carried out. Calculations to ensure its sustainability were worked on.
- A small experimental library was installed.
- Work to make it operational is ongoing in May at the time of writing this final report.

3. Project Budget

- (i) Please indicate budget articles proposed in the Application Form submitted to the YES and compare with the actual expenses in the following form:

| N o. | Items | Planned Budget | Actual Budget | Difference | Planned quantity | Actual quantity | Difference | Number of receipt or other attached document |
|------|---------------------------|----------------------------------|---------------------|------------|------------------|-----------------|------------|--|
| 1. | Computer | 500 | 500 | | 1 | 1 | | |
| 2. | Printer | 66 | 66 | | 1 | 1 | | |
| 3. | Phone | 44 per month (for 4 months) =176 | 264 (in six months) | 88 | 1 | 1 | | |
| 4. | Rent (Shop) | 80 per month | 80 per month | | 4 month | 6 months | 160 | |
| 5. | Rent (Solar Library) | 70 (4 months) | Not required | | | | | |
| 5. | Registration Costs | 178 | 170 | 8 | | | | |
| 6. | Solar Library (Publicity) | 500 | 480 | 20 | | | | |
| 7. | Solar Shop (Publicity) | 525 | 230 | 295 | | | | |
| 6. | Solar Shop Inventory | 1406 | 1300 | 100 | 19 products | 18 products | 1 | |
| 7. | Solar Library Inventory | 600 | 600 | | | | | |
| 8. | Volunteers Honararium | 375 | 570 | 190 | | | | |
| 11 . | Solar Dryer Fabrication | Unplanned | 150 | 150 | | | | |

| | | | | | | | | |
|----|--|-------------|-------------|------------|--|--|--|--|
| 12 | Solar Library (Installation and Battery) | Unplanned | 400 | 400 | | | | |
| | TOTAL | 5000 | 4730 | 270 | | | | |

One of the major factors of the project not factored in was the fabrication of a SOLAR DRYER (150\$) and the installation of the SOLAR LIBRARY (400\$).

Initially, it was assumed that we would purchase a ready Solar Dryer. As the project progressed, we realized a need for research and development into our own cost effective SOLAR DRYER, cheaper than the market models. This could be a tool for income generation for the communities and would also make us more confident of the technology. Therefore some of the resources (150USD) were utilised for this. Please see photos of SOLAR DRYER. While, this may be a procedural error on the part of the executioner of the project, to have changed the budget, it is also a contribution to the field of appropriate technology.

Additionally while planning for the centralized system of generating electricity via the SOLAR LIBRARY, a fairly new and innovative project, costs of the battery (200\$) that is required to store the energy generated was not calculated. This is because the executioner was not as familiar with the technology at the time of writing the proposal and budget. In addition, installation costs (200\$) were not taken into account.

The resources remaining – 270\$ have been utilized in developing and manufacturing Sogve's own line of SOLAR LANTERNS.

4. Achievements and status :

(In case of procurement of equipment, renovation or construction of premises, indicate their present usage).

The Solar Shop that was renovated is very much in use as a retail place for the sale of Solar based applications.

Equipment for the Solar Library is also being utilized and depending on the success of this Library, plans are on to set up in another location. With the help of the initial inventory, we are developing our own line of SOLAR LANTERNS, COOKERS and TORCHES and have developed our own SOGVE's SOLAR LANTERN that is cheaper and more cost effective.

5. Supporting documents e.g., photos etc. related to the project.

May 20th, 2004

Michelle Chawla (YES Fellow)

(Signature)

Final Evaluation Report

EVALUATION REPORT OF RENEWABLE ENERGY FELLOW MS MISHELLE CHAWLA

By P.K. Joseph

A. Introduction:

Michelle Chawla, the 27-year-old young woman entrepreneur, hailing from a rural hub in Maharashtra, India is one of the five successful Renewable Energy Fellowship Winners of the Youth Employment Summit Campaign, funded by Global Environment Facility and World Bank. Michelle ventured out in to setting up her renewable energy enterprise and successfully launched her enterprise "*Sogve's Products*" in November 2003 after 3 months long intense training and preparation. Michelle's project was evaluated with the objective of learning few lessons from the seed grant project, which will strengthen the future program design of the YES Campaign. The following is a report based on a visit to the enterprise and subsequent review of existing records, personal interviews with the Michelle as well as meetings with the training institution.

B. Executive Summary:

- On a summary note, it could be safely stated that this seed grant project has proved that a new breed of renewable energy entrepreneurs like Michelle, could be identified in rural communities and nurtured by providing the right ambience directed to challenge young applicants to develop business plans that enhance youth employment opportunities.
- The project has proved that the rural communities through youth led enterprises can promote the objectives of producing renewable energy, develop community-based solutions to energy related problems, open new and innovative jobs in using clean energy resources and provide income-generating opportunities for youth.
- It has further demonstrated that youth-led businesses to succeed, they will need the initial handholding provided in the form of imparting technical skills, project management skills, technical knowledge about renewable energy enterprises, access to technologies and tool kits, access to distribution networks and a network of young entrepreneurs.

C. About the Seed Grant Recipient:

Michelle Chawla, a young woman entrepreneur, hails from a lower middle class family in a rural hub in Maharashtra, India. Having graduated in Social Work, she always dreamt of becoming a social entrepreneur and so first fine-tuned her business acumen through work experience.

Though being predominantly from an urban upbringing, she chose to move to a farm in Sogve village in Dahanu taluka and got involved in the environmental struggles and initiated work with the women and youth of the villages – in the areas of food processing (sun drying chikoos (sapotas), making chikoo powder, etc.) and related products. As a youth, she believed in contributing her share to protect the environment.

She says “as environmentalism takes on several shades globally, for us here, environmental protection is intimately linked to survival and is fundamentally a conflict of inappropriate and unjust utilization of natural resources”.

With this mission and background, Michelle, decided to launch a renewable energy enterprise to empower the youth in their communities to gain access to an ardently fought over resource – energy - and propagate it to the whole rural community.

D. Previous Work Experience:

As part of the environmental group Greenpeace (India), she participated in a solar project in earthquake-affected Kutch, Gujarat in 2001, to use Greenpeace's knowledge of solar solutions to take emergency light and power to the earthquake ravaged Kutch district. She worked as part of the core team to conceptualize and implement the project. This gave her the needed work experience and skill to venture in to a business of her own in renewable energy.

E. First Contact with YES Campaign:

She first came to know about the announcement of the YES RE Fellowship through a friend of hers in Feb. 2003. Considering this as unique opportunity to realize her entrepreneurial dreams, she took the membership with the YES Campaign and applied for the fellowship. Seeing her entrepreneurial dreams, business acumen and vision to excel as a social and economic entrepreneur, the YES Campaign sanctioned her with a Renewable Energy Fellowship. The Fellowship was announced in April 2003, and she was one among the winners to her utter dismay.

F. About the Training Organization:

One of the significant components of the fellowship was the need for seeking the collaboration and training support of a local training institution that will become a co-applicant and support the fellowship winner. She sought the support of *Energie Solar*, a technical and capacity building institution in promoting solar energy products. Its Director and Founder, Mr. Kaustubh Shah, a renewable energy expert and entrepreneur himself trained Michelle and mentored her in setting up her business. Energie Solar is technical service providing institution in the areas of Solar thermal applications, Solar photovoltaic applications, water recycling, rain water harvesting, and manufacturing of energy saving devices. The institution manufactures solar water heaters, solar parabolic cooker, scheffler community solar cooker, solar lantern, solar indoor lighting and home lighting systems, solar street lighting systems, solar pumping and power generation systems. As a technical expert and businessman, he had a fair knowledge of the business to guide her and lead her through the pitfalls of setting up a new business and this has helped a great deal in drawing lessons from his experience and expertise.

G. Training program:

The training methodology used was both theoretical and practical along with supplementary materials. Various techniques were used to impart skills to the grantee.

Prior to undergoing a systematic Planned Training Program by the Energies Solar, which commenced in June, 2003, Michelle, started fine tuning her skills by availing the opportunity in an international workshop organized by YES Campaign on “Eco-Entrepreneurship” in Chennai, in May 2003. The field visits to various green enterprises and the subsequent analysis of each proved helpful in understanding the complexities of starting a “green enterprise”.

Subsequently, the applicant was further trained formally by the co-applicant, Mr. Kaustubh Shah, CEO of Energie Solar who helped her prepare a rough sketch of the three months training. The training was worked out in a manner that would maximize learning via field visits and meetings and discussions with people in the field.

Training Methodology used could be divided into the following categories:

1. Orientation and Exposure Visits
2. Project Management Training:
3. Preparation of Business Plan Preparation
4. Training Workshops in local communities

The details of the workshop is given in Annexure-1

H. Business Performance (as of July 2004)

- a. **Fellowship:** Michelle was granted US\$5000 (along with a training grant of US\$ 2000) as fellowship towards initial business investment towards the purchase of inventory, which includes solar lanterns, panels, and battery, packs, solar cookers, fixing material and necessary equipment and tools. She also used partial money for the printed publicity materials, fabrication of Solar Dryers, salary for sales team (3 months), product display costs in the outlet and travel expenses.

b. Products Range/Services offered:

1. **Solar Lanterns:** She introduced solar lanterns for meeting the need for light in indigenous fishing boats and for light for the fishing community who go out fishing at night. Michelle introduced two models initially, and having found sound response developed newer models and even went to the extend of branded own products. Type 1 - Lanterns with 5W CFL, 6V, 4Ah battery with electronics comprising of over-charge and over-discharge protection Solar Photovoltaic (SPV) Module 6V, 3.2 Wp. 10 sunny hours for full charging 3-4 hours operation time, 360° light output. Type 2 Lanterns with 7W CFL, 12V, 7Ah battery with electronics comprising of over-charge and over-discharge protection Solar Photovoltaic (SPV) Module 12V, 10 Wp. 10 sunny hours for full charging, 6 - 8 hours operation time, 360° light output.
 2. **Solar Box Cookers”:** A simple cost effective box-style solar cooker having a capacity of 3-4 pots appropriate for rural communities & farm labour. **Parabolic Solar Cookers:** This is an efficient design of solar cooker, where temperatures of over 200°C can be reached. This contributes to speedy cooking. Use of pressure cooker up to 13 liters capacity cooks, rice, lentils and other food within half an hour in good sunshine.
 3. **Solar Pathway Lights, Decorative Lights:** Simple and inexpensive, unwired pathway lights to light up farms & community areas.
 4. **Solar Based Mini Home Lighting Systems:** Michelle started her small business venture by assembling home lighting systems, with the objectives of electrification of isolated tribal hamlets using photovoltaic (PV) Panels. She has proved that meeting the minimum electricity needs of the tribal community in off the grid areas could be done, using simple PV modules.
- c. **Expansion and Diversification:** Michelle to her credit, having started with just three products has expanded further within few months after the business launch by introducing a very innovative **Solar Fruit Dryer** or Dehydrators for orchard owners. This has proved to be a practical application in an agricultural economy like Dahanu for

drying agricultural produce such as fruits and vegetables. This space will act as an outlet as well as repair-maintenance workshop.

d. Turnover: An overall assessment shows that the enterprise that began sales in early 2004 has just reached the break-even point in May 04 and just started earning profit margin. It is projected to reach an annual turnover of Rs 1,985,000 the end of the first year in March 05, which she is likely to achieve with sustained efforts. After deducting procurement costs, administrative expenses and the interest burden, the enterprise foresees a net profit margin at the rate of 10 percent of the total turnover. The turnover to investment ratio is expected to be 1:5. i.e. 5 times over the initial investment.

e. Employment Generated: At present she has found full time employment for six people including herself. The team comprises of one youth in the retail shop as sales man, 4 persons for assembling, repair and maintenance stationed at the workshop. She has also provided part time employment to a mobile sales team of tribal youth from the local community consisting of 3 young boys and girls. The attempt would also be to train and develop the tribal youth as technicians.

f. Special Comments: She has already branded her products under “Sogve’s” and her customers consider her lanterns cost effective, portable, and good in quality and design. Sogve’s Products became a registered Proprietary Organization early this year and completed formalities of registering to procure a Sales Tax Number. The Solar Shop was remodeled recently and a computer, printer and phone line installed to take advantage of the modern day ICT. Michelle herself takes care of marketing, accounting, procurement and managing the business operations. At present she is also planning to diversify into marketing solar hi-tech solar fancy lamps on a commission basis.

I. Support provided by the Training Institution/Mentor Support:

Mr. Kaustubh Shah supported her by technical and knowledge support. He has demonstrated on site operations of solar lamp, solar cooker, thermo water heating systems, street lighting and home-lighting systems. The initial support was provided in preparing a sound business plan, what product to start with and making her technically proficient and supplying PCBs for lanterns.

He also visited her business unit and was a resource person in organizing the training workshop for the local youth and demonstrating the potential of renewable energy in rural communities. This helped her in creating a favorable response in the local communities towards the use of renewable energy products.

He further assisted her in designing of solar fruit dryers. He continued to guide and advise her through meetings, e-mails, telephone calls and local workshops until she was able to set up the business. He has also given valuable tips on maintaining good customer relationships.

Now they contact less frequently as Michelle is able to manage her business on her own. But still she contacts him to take her mentor's advice on product design, research, sourcing raw materials and how to manage her inventory.

J. The Key Lessons Learned from the Project:

Attempt is made here to present the impact of this project on the Renewable Energy Fellow, Michelle, her community and what could be learnt from this pilot project. Also attempt is made to understand what factors would enable scaling up and ensure the success of this project. Both positive and negative sides of the lessons learnt are discussed at length in this part of the report:

a. Energy crisis being felt by the poor and vulnerable and the consequences of such a situation especially on productivity and livelihoods.

Michelle's renewable enterprise has established a case for the Renewable Energy Enterprises in the country as a viable alternative to address this situation by productively engaging youth. Michelle launched her Renewable Energy enterprise in the ecologically fragile Dahanu region, in Maharashtra, India, which has accumulated an economic and infrastructure backlog despite being in the middle of the industrialized West coast of India. Being in the backyard of the fossil fuel fired industrialization the majority tribal population of the region has been facing adverse environmental impacts without having their due share in the general prosperity. Of the 66 per cent tribal population, not more than 5 per cent have a registered electricity connection. Moreover, the protracted imbalance in the electricity demand and supply regime inevitably favours urban areas, resulting in inadequate and irregular supply even if connected to the grid. In addition, Dahanu is home to a large fishing community, small and marginal farmers as well as large orchard owners. They also have their distinct needs for alternative energy. Against this vast potential for decentralized and alternative sources of energy, there is a general lack of exposure to alternatives. In fact, there is no single outlet for solar energy based applications in the 200 kilometers belt.

b. What motivated these young person to think innovatively or differently to establish the RE enterprises?

Michelle always dreamt of becoming a social entrepreneur. She got involved in the environmental struggles in the area and initiated work with the women and youth of the village – in the areas of food processing (sun drying chikoos (sapotas), making chikoo powder, etc.). As youth she believed in contributing her share to protect the environment as she says "As environmentalism takes on several shades globally, for us here in the South environmental protection is

intimately linked to survival and is fundamentally a conflict of inappropriate and unjust utilization of natural resources”.

With this background, Michelle, decided to launch a Renewable Energy Enterprise to empower the youth in their communities to gain access to energy.

c. A demographic report of the grant recipients:

Located on the western coast of India, 120 kilometers north of the city of Mumbai, Dahanu is one of the three notified ecologically fragile areas in the country, predominantly a tribal area, Dahanu is home to the indigenous Warli tribe, who constitute 65 percent of the total population. Even though the Warlis are the original settlers of the region, historically they have faced oppression and are now a marginalized community in the region – with little access to resources like land, water or electricity. In addition Dahanu has a significant fishing, farming and horticultural community.

Dahanu has also been part of a protracted legal-environmental struggle to protect it from the often-mindless industrialization that takes place in a developing country. Threatened by the construction of a coal based thermal power plant and proposals to set up an industrial port in a predominantly rural and agricultural area, local groups waged an environmental campaign for fourteen years. While they were unsuccessful in their attempts to prevent the thermal power plant from being set up, they managed to thwart the plans for an industrial port by mobilizing resistance locally. Moreover, a significant outcome of the battle was the notification of Dahanu as an ecologically fragile zone, with restrictions on industrialization and urban development.

d. Project Achievements and Highlights:

The following are the highlights of the achievements of the projects:

- Sogve’s is now geared to become a full-fledged solar center, with prominent space in the semi-urban area of Dahanu.
- The development of her own Solar Dryer is a unique contribution to the renewable energy movement in the region. With this she could experiment further with new cost effective products and new applications for Renewable Energy. The Solar Dryer is a tool for communities to process their own produce and with the value addition, get a better market price for the goods.

- Awareness Workshop held in Solar Shop. There is much more curiosity regarding solar applications in the community. Several people visit the shop just to see how the solar applications work.
- Road Show from village to village organized covering 10 villages in the project area.
- A Solar Library installed in the village and has become operational for the benefit of the local people for re-fuelling their lanterns and torches at a very nominal rate. With the installation and use of the Solar Library by the community members, Sogve's hopes to spread more such Solar Libraries to other parts of Dahanu, for instance in Tribal schools, community centers where all the members of the community can come to one place and charge their lanterns.
- There is an increased awareness about the potential of solar energy and its efficiency. There existed a feeling that most of these things never work, but there is an increasing sense that there is a good potential.
- Greater awareness and engagement of youth in climate change issues and the need to promote renewable energies. The awareness road show has been of great help in propagating the concept of renewables. While there is still resistance to the use of renewables, for instance it makes more economic and environmental sense to use a Solar Box cooker for cooking rather than firewood. Yet it is not very easy to convince communities to do so.
- Developed an expanded business plan based on the initial learning for further or additional funding support to scale up the pilot project and potential financiers/venture capitalists are being approached.
- Produced few lessons from the pilot project. This model has showcased how diverse stakeholders can organize community based renewable energy projects that promote income-generating activities for youth.

e. What is the impact of this on the individual?

The drive to do her own business and the experiences gained has made her to be very self-confident, young woman entrepreneur capable of scaling up and expanding her new business to heights providing employment and creating wealth in local communities. She is so sure of her marketing skills and has established many contacts that she is at present also involved in dealing with other solar products. Currently, she is at a war path to innovate new and cheaper solar products.

f. What investments are needed to promote an entrepreneurial culture that nurtures and encourages the Renewable Energy sector?

- Rural communities frequently have limited access to existing knowledge base that promotes the use of renewable energy through economically and financially sustainable models. They lack knowledge of the market potential for renewable energy, the potential for providing renewable energy services to customers, successful replicable projects, potential financial partners, and means for establishing renewable energy systems.
- Rural communities, and their youth frequently lack the skills and experience to produce and promote renewable energy. This includes financial management of the businesses, creation of business plans to market renewable energy, analyzing and dissemination of information, and technical know-how to maintain and service the equipment.
- Rural communities sometimes do have access to renewable energy technologies and thus may not understand these technologies to support its promotion and adoption. In off-grid areas, there is a natural market for services that may be tapped into by young people marketing and maintaining renewable energy systems, in coordination with larger efforts to provide renewable energy systems to those areas.
- There is a lack of institutions serving youth that have expertise in renewable energy technologies and business development. Institutions that exist have an overwhelming task to do in which they need a great amount of support. There is therefore a need to find ways of integrating development initiatives, where possible, with capacity building exercises.
- Some forms of renewable energy are very expensive to produce and local institutions cannot afford to adopt these without adequate financial support from other organizations. Businesses are not always ready to invest in renewable energy technologies because of the lack of a guarantee that it will become commercially viable or profitable.

g. What factors would enable the scale up of this project and what factors should be watched for in ensuring the success.

The proposed enterprise will retail and propagate solar-based products directly to communities in the regions. The project envisages the application of solar energy among the tribal, fishing, farming and horticultural community of the region.

A tribal community that is able to meet its own minimum electricity requirements would undeniably gain a sense of self-reliance. Moreover, the

problems they face by the bureaucracy when they 'tap' the main grid lines could be averted. The development of the community boys/girls as sales executives, technicians also opens up completely new avenues to an exceedingly marginalized community. The process actually opens up tremendous opportunities for further development activities and engagement with the community.

While some sections of the population are aware of the adverse impacts of fossil fuel based technology, the widespread and successful use of solar-based applications to a cross section of the Dahanu population would lead to a greater belief in alternative sources of energy.

Over the last six months of learning, Sogve's now have a small team of people dedicated to developing own products that would equip them to beat the market. This process has already begun and they have developed own SOGVE's Solar Lantern and are gearing up to manufacture solar cookers and torches.

In off-grid areas, there is a natural market for services that may be tapped into by young people marketing and maintaining renewable energy systems, in coordination with larger efforts to provide renewable energy systems to those areas.

h. Feasibility, cost effectiveness and cost efficiency of Renewable Enterprises and the sustainability of the enterprise.

The plurality & diversity of communities in the Dahanu Taluka region assures a sense of financial viability to the project. The clientele for the enterprise is diverse. From the tribal community completely off the grid to the orchard owner troubled with irregular supply, the potential customer base is Tribals, Fisher folk, Small and Marginal Farmers, Large Orchard Owners.

Doubts about the clients ability to pay do not arise even among the indigenous communities who are today very much a part of the monetary economy, working as agricultural labour, factory workers and so on. The only difference being that they earn their income on a daily basis, and hence stability of resources is not assured. Solar-based applications, which would involve payment for a short period of time, only, would in fact suit them, rather than a regular monthly billing system applicable to the grid.

Erratic supply and problems for many of the other communities is the starting ground for solar applications. Specific uses like solar lanterns while fishing, pathway lights for farms have a tremendous potential.

Yet the high entry costs make it prohibitive for poor communities to access. The challenge would be to make innovative and cost effective solar products.

- Bureaucratic obstacles, lack of publicity-awareness campaigns, rigidity in schemes and a lack of coordination between various agencies are some of the reasons that may block the growth of this enterprise.
- Being in the business of renewables is inherently challenging and a daunting task. Given the extent of subsidy allocated to conventional forms of energy, renewables are not at a level playing field.
- One of the biggest challenges facing Sogve's Products was the disproportionately high cost of solar products versus their conventional counterparts. This proved to be a big obstacle for sales. The community targeted, the most needy for such products can simply never have the purchasing power to buy them.
- The renewable energy business specifically solar energy requires high initial investments than the amount Sogve's Products started with. Procurement of Photovoltaic panels, for instance, is undertaken only in bulk quantities else companies are not willing to deal with you.
- Peoples' resistance and skepticism of renewables has been another major factor to contend with. Free doles given out by the government in several areas have lead to the neglect and misuse of equipments. In many cases non-operational equipments were distributed causing a complete lack of faith in the technology. Awareness, discussions and use of solar applications with community leaders particularly youth was found essential to remove these barriers from people's minds.
- Another challenge is how to manage and maintain these systems. How to build the capacities of the people (human resources) to reach out to these communities and do it. Hence it is learnt that we all have to work collectively for a better future for next generations.
- The task of popularizing solar energy and its applications in rural as well as semi-urban communities seems a daunting one. The challenge is to have people incorporate solar applications as part of their daily lives.
- Currently, one the main negative factors are the fact that conventional electricity is available at a subsidized and extremely low rate. This can be a stumbling block to the acceptance of a different form of energy.

K. Recommendations:

1. **Impart Technical or Commercial Skills:** The youth lack the skills and experience to produce and promote renewable energy. This includes financial management of the businesses, creation of business plans to market renewable energy, analyzing and dissemination of information, and technical know-how to maintain and service the equipment.
2. **Create Knowledge Resource:** Rural communities have limited access to existing knowledge base that promotes the use of renewable energy through economically and financially sustainable models. They lack knowledge of the market potential for renewable energy, the potential for providing renewable energy services to customers, successful replicable projects, potential financial partners, and means for establishing renewable energy systems
3. **Reduction in High Costs through innovation:** Some forms of renewable energy are very expensive to produce and local institutions cannot afford to adopt these without adequate financial support from other organizations. Businesses are not always ready to invest in renewable energy technologies because of the lack of a guarantee that it will become commercially viable or profitable.
4. **Provide accessibility to Technology:** Rural communities often do not have access to renewable energy technologies and thus may not understand these technologies or the technical assistance to support its promotion and adoption. In off-grid areas, there is a natural market for services that may be tapped into by young people marketing and maintaining renewable energy systems, in coordination with larger efforts to provide renewable energy systems to those areas.
5. **Build Institutional Capacity for Promoting Renewable Energy:** Throughout the developing world there is a lack of institutions serving youth that have expertise in renewable energy technologies and business development. Institutions that exist have an overwhelming task to do in which they need a great amount of support. There is therefore a need to find ways of integrating development initiatives, where possible, with capacity building exercises.