Himal Prakriti Solar Energy Program, Munsiari , Uttarakhand

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Himal Prakriti has been implementing a Solar Lighting (and Energy) Program since June 2009, with support extended by the Royal Bank of Scotland (RBS) and facilitated by AID Delhi. The following is progress report on the program achievements.

The initial program Objectives and the subsequent achievements are as follows:

1. ***To make Sarmoli a model energy village***
   - After the promotion and distribution of a range of solar devices (lanterns, lamps and solar cookers) the home stay families who are part of the Nature Tourism programme have placed themselves as users and promoters of cutting edge Solar Technology. Information spread by the use and demonstration of the efficacy of these devices through neighboring communities has resulted in an increase in requests for assistance to invest in Solar as well and an increase in demand for the specific devices promoted through the project.
   - Guests arriving for the Tourism programme have been impressed with the adoption of Solar and have, apart from benefiting from quality lighting, also sought to learn more to either implement it in their own homes or to pass on to other groups working on similar issues.

2. ***To improve the Quality of home lighting in 52 Households***
   - At present Solar Lighting devices have been provided to 97 families in 15 villages as against the original plan of 52 households in 2 villages. This was possible in part because of the investment in smaller capacity Solar Lamps and largely because of generating funds from the sale of some of the solar devices on partial subsidy as opposed to full subsidy as was originally envisaged.

3. ***To achieve 502 watts of Solar Power in the program villages***
   - With the initial support of RBS, and with the subsequent effort and initiative by Himal Prakriti to reinvest and spread the benefit, it has been possible to invest the resources in procuring 705 watts of Solar Power. A total of 178 devices have been purchased as against the initial plan of 53 devices. The details are provided in the table below:

Details	**Kiran S 10** [*1]	**Nova S 200**[*1]	**4 LED System**[*2]	**6 LED System**[*2]	**Total**
Agency	**D.light**		**UREDA**		
Per Unit Solar Output (Watts)	0.3	1.3	25	37	
Number of Devices (Sold or being received)	72	84	20	2	178
Total Wattage (Achieved / Being Achieved)	21.6	109.2	500	74	704.8
[*1] - *The Devices have been bought and are either distributed / sold or are being distributed*					
[*2] - *The Devices have been paid for and we are awaiting delivery from UREDA under a subsidy scheme*					

4. ***Research for the most appropriate technology and services***

- Over the last year the program spent some time in investigating the various options for solar devices as available in the market and to choose a set of options most suited for the region. For the past two decades UREDA – the Uttarakhand State Renewable Energy Development

Agency was the sole supplier of Solar products in the region. Most of the products distributed by them were on some kind of subsidy. UREDA's program combined with the often large subsidy has resulted in a fairly widespread awareness of Solar devices but not necessarily translating into its wider usage. In the last few years a large number of private enterprises have entered the sellers market with a limited range of products. These agencies have focused on low quality devices and low quality Solar Photovoltaic panels in order to remain competitive. Most of these agencies have shied away from innovation and from looking at the long term requirement of the end users. The last few years have also resulted in widespread adoption of two significant technologies that are in the process of changing human lives – the first being mobile telephony and the second affordable LED lighting. Traditional Solar manufacturers have responded by incorporating these needs and technologies and have succeeded to some extent. At the same time while UREDA has been slower to change and adopt to the new demands they are still the only agency that is in a position to provide the large initial subsidy required by many of the poorer households to be able to invest in Solar Lighting

- During the research period we purchased and trialled units from Ganpati Electro and D.Light Company and researched in products of a few others including Avani Berinag

- Ganpati Electro - The unit purchased from Ganpati Electro was a lantern with mobile charging facility as well as the option of being charged by electricity. It has two additional extendable LED (bulb array) lights. During the initial period of use it malfunctioned on many counts – the charging stopped, individual LED's stopped working, bits of pieces of the lantern came loose and the LED bulb arrays did not work. Since then Ganpati Electro have improved the quality of their devices but not adequately.

- Avani Berinag – their inability to provide any subsidy or any substantial discount for a similar range of devices provided by UREDA forced us to look closely at the UREDA options.

- D.Light Designs: We trialled the Nova S 200 and the Kiran S 10 from D.light Designs . These devices showed good build quality, were innovative in design and incorporated good features. They were backed by an implementation of globally accepted standards. Further D.light were offering a substantial discount on bulk sales, which no other agency were offering. Finally when displayed and used by members of the community (during the trial period) they all found these devices to hold the potential to solve many of their lighting needs like having easy portability, long lighting hours, ease of use and ease in charging. Women were particularly enthused by the Kiran and young people by the mobile charging Nova S 200. (website http://www.dlightdesign.com)

- UREDA – The benefit of procuring devices from this Government agency has primarily been the subsidy that they pass on from various Alternate Energy Conservation Schemes. The variety of products they provide are dependent on what other agencies may contract supply to them. After detailed research into the products being supplied by UREDA it was decided not to invest in their Solar Lanterns, which though being of higher wattage were heavy and unwieldy and also more expensive than the D.Light devices. Their quality, as observed over the years, has been average to good. Upon discussions with UREDA it was found possible to avail of a subsidy on some of the larger 4 and 6 LED light home lighting systems. In coordination with the Gram Sabha of Sarmoli and Khartoli applications for 22 LED based home lighting systems were forwarded. However as the subsidy was not available for the financial year 2009-2010 the entire money for the purchase of these 22 units was paid up. UREDA would deliver the devices in May – June 2010 and would also try and provide the program the subsidy available for the financial year '10-'11. The subsidy amount would then be ploughed back into the Solar revolving fund for purchase of additional units for interested households.

5. ***To ensure high initial quality of devices and to have ease in follow up maintenance and service***
    - As a follow up to our research into specific devices we looked into the aspect of maintenance and follow up.
        - Ganpati Electro were providing local support but their initial poor quality far out weighed the local service being provided
        - D.Light Designs – their external and internal designs are both simple and high quality off setting any need for regular maintenance. However D.Light Designs are seeking to expand their market into Uttarakhand and are facilitating follow up service and maintenance in the region which will be to the greater benefit of the users
        - UREDA have people who visit the region often and have a well frequented office in Pithoragarh making follow up service and maintenance fairly non complicated

Some additional objectives that were developed and achieved during the course of the programme were:

1. ***Expanding the coverage to more than the initial two focus villages***
    - Because of the extensive promotion of Solar powered devices by Himal Prakriti, especially the D.Light devices we received requests from many villages across the region for the new innovative and high quality devices. The program was able to distribute and sell Solar lamps and lanterns in 15 villages of which 8 are neither electrified nor have road access, the furthermost being about 45 kilometers from the Munsiari road head. Apart from this, these solar devices is serving as the only source of lighting for some of the way side dhabas that are located along the high altitude trekking routes of the region as well as for those families migrating to their high altitude alpine villages for the season.

2. ***Beginning a revolving fund to expand scope of procurement and delivery of Solar Products***
    - The initial programe envisaged offering the Solar Devices to 52 families of Shankhdhura and Sarmoli, primarily those who were involved in the Nature Tourism and Conservation Initiative. During the discussions with the community it was decided that the users would purchase the Solar Units, as opposed to receiving them free and that such money generated would be ploughed back into purchasing more units for other families across the village and region. This idea was well received and the program was able to both save money and generate a revolving fund to be used to purchase additional units.

    - In August 2009, Himal Prakriti's Solar Program received Rs 2.93 Lakh from the RBS as a grant towards the purchase and distributing of 52 Solar units worth 502 watts in 52 households. With this amount serving as seed money, Himal Prakriti has since gone on to procured a total of 183 units of different types worth Rs 4.31 Lakh. Money has also been generated from the subsidized sale of the solar units. Funds worth Rs.104980 have been applied for as subsidy from purchase of the 22 home lighting units from UREDA. Though it is still uncertain that the subsidy will come through, Himal Prakriti would reinvest it in purchase of more solar units for distribution in the region.

Summary Details of RBS Supported Solar Progam	
Total Beneficiary Familes	97
Total Beneficiary Villages	15
Units Purchased	183
Cost Incurred on Purchase (Rs)	4,31,550
Grant Received from RBS (Rs)	2,93,000
Seed Money Generated from Sale of Units on Part Subsidy (Rs)	1,38,200

3. ***Reaching out to a urban and global audience***
    - Many of the guests visiting Sarmoli and Shankdhura have been inspired and enthused by the Solar devices and the adoption in a remote rural area of cutting edge solar technology. One consequence has been an increased awareness among the more urban and international visitors to the viability and accessibility of solar energy. This disparate group of people have been enthused enough to want to adopt similar measures in their own homes and landscapes. Trekkers and travelers have found the devices to be a solution to their constant need for decent portable lighting and mobile charging. The rural community in Sarmoli has not just become an adopter but a model as well.

4. ***Expanding the scope to include other forms of Solar Energy (Solar Heat based cookers)***
    - The initial scope of the program was limited to solar lighting. However a demonstration of a Solar Cooker to cook food kindled a desire among more families to try this option out. Given the daily unpredictable weather patterns the Solar Cooker may not be a permanent alternative but for some months of the year it will prove to be an effective energy saving device. 5 Solar Cookers were procured from UREDA Pithoragarh, an additional request for 5 more is pending and are to be delivered soon.

Other Features of the Program

1. ***Comparison of Kerosene Oil for lighting and the D.Light Kiran S 10***

One of the users of the Kiran S 10 solar lantern from Sai Village, located 8 Kilometers from the Munsiari road head provided this interesting insight into how the Kiran could effectively reduce a families dependence on Kerosene Oil.

A Typical family in a non–electrified village like Sai uses on an average 5- 6 litres of kerosene oil per month for just lighting. This is a lower side average for a small family and excludes kerosene oil purchase for lighting fires. Kerosene oil sells at the local government run fair price shop for about Rs 11 a litre. The annual expenditure on kerosene oil for such a family runs up to Rs 660 per year. Apart from this there is is cost of replacing the lamp glass and maintenance of the glass, the wick and the lamp. Also part of the this kerosene oil package is the essential non mobility of such lamps, its danger in grass-thatched roofed homes and it has an ability to contaminate food when used nearby and the odorous fumes are offensive.

In contrast, the Kiran S 10 sells at Rs 500 (at its full rate or Rs 420 at the bulk discounted rate). It is highly portable, does not need the purchase of any fuel or accessories. It is not polluting, safe and can hung anywhere and used in any direction. Added to this is the annual savings on the purchase highly subsidized of fossil fuel and its associated negative fallouts.

2. ***Promotional Events***

During the year Himal Prakriti's Solar Programme invested time and effort in promoting the use of solar devices at different venues and events. Some of them are listed below

1. *Renewable Energy Day 20th August 2009* – Himal Prakrit visited the Government Girls Inter College to discuss alternate energy and promote the use of solar energy. Different solar devices like lanterns, solar cookers etc were demonstrated.
2. *Sarmoli Women's Market* – At the bi-monthly Women's Market different solar devices are displayed and discussed, products cooked in solar cookers were also put out for sale.
3. *Trekking and Camping Events:* The smaller solar lanterns were used during trekking and camping programmes undertaken through the year. This helped tourists as well as those involved in providing services to see the benefits of the portable solar products. In night stays at trek route dhaba's the portable solar devices were demonstrated by

actual use.

4. *Van Panchayat and Other Village Meetings* – At various meetings of the Sarmoli Van Panchayat and at other village meetings the Solar Energy Programme was promoted and discussed, many decisions regarding which devices and some of the modalities were thought out at these discussions
5. *Mesar Forest Fair 2010* – At the Mesar Forest Fair 2010, Himal Prakriti put up a demonstration and sales stall for the Solar devices. The Kiran solar lantern was also awarded as a special prize to the person chosen for the 'Lok Prakriti Puraskar' that is annually awarded by the Fair Committee.

3. Grid Electricity Failure in Uttarakhand

The summer of 2010 has been one of the hottest and driest and it follows a similarly dry and low snowfall winter. This has led to a much lower production of electricity from the hydro electric plants of the state of Uttarakhand. This in turn has resulted in a.) the State having to purchase power from other sources at exorbitant costs and b.) a huge shortfall in electricity supply.

The remote mountain communities connected to Grid electricity have had to face the brunt of this shortfall. Supply has been at best intermittent and at worst non existent. People dependent on such electricity for lighting have been worst effected. In these hours of darkness, homes that have invested in solar devices have shone like stars against the dark sky and have had the effect of making more people look towards small and large solar setups to meet their day to day needs. Students have persuaded their families to invest, at least, in the smallest device so that their studies could continue uninterrupted. People have flocked to homes where the mobile charging solar units were available to recharge their phones. It was yet another reminder to the community that its better to invest in local and more controllable solutions rather than look to the large, unwieldy systems that are in place.

Challenges and Future Outlook

1. *The real test of the quality of the solar devices and their efficacy would be in the monsoons (mid June to mid September). The region would receive the lowest direct Solar irradiation and the sun will largely be absent. We will closely monitor the feedback from the various users and try and incorporate any requirements for changes.*
2. *The wider adoption of solar and other renewable alternatives and a move away from dependence on centralized solution would be the biggest social and technological challenge. A part of the solution exists in solar electricity. This however would require adoption at a much wider and deeper level.*
3. *We would like to distribute solar devices to some of the more remote and unelectrified villages and specifically focus on some groups of people like families migrating to the unelectrified and distant alpine villages and nomadic shepherds who spend a significant part of the lives away from established habitation. Trekkers and campers who pass by would be encouraged to use these devices and also take back the knowledge of solar energy use.*
4. *We would like to inculcate the use of renewables in a wider range of devices (making everything renewable based) batteries for lights and torches, radio etc.*
5. *To make Energy Conservation a way of living. To use more alternative sources of energy or other ways of use – solar heat, fuel wood conservation, heat conservation, wind energy etc. To encourage the move away from fossil fuels and those that need to be transported from long distances or have large associated extraction costs.*
6. *To examine carefully the life span of solar photo voltaics and battery technology and the economics of production via-a-vis the traditional fossil fuel sources and their economics.*

End Notes

With a growing number of solar product manufacturers in the market today, cost has come down a bit and its wider availability has made it more accessible. Today one can go into a shop and come back with a ready to work device with no need for installation. The expanding use of solar devices over the last 20 years has given the people the confidence to invest in new solar services. The recent improvements in technology (LED, better quality circuits) has resulted in a change from fixed home lighting to more portable and flexible usage as well incorporating new features. This collective sapience has also meant that people are more conscious of conservative use of solar or grid electricity (where it is available) something that a significantly large group of humans need to learn fast in order to be able to save the planet from the various ills that extraordinary fuel consumption is causing. Solar is the one alternate source of power which is capable of being very low tech and highly decentralized, making it an effective part solution to the fuel crisis.

Support to expand solar coverage is helping us achieve this goal

Himal Prakriti
Village Sarmoli, Munsiari,
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