BUSINESS & ENVIRONMENT
- BY NIRANJAN KHATRI

Andaman & Nicobar is God's own country with gin clear water, thick verdant tropical forests, rich marine and mangrove eco-systems, dormant and active volanoes and ancient tribes almost 2000 years behind time living in near total nudity, but in complete harmony with nature.

To me, the Andamans was therefore like a case study. Being a small place, one could see and study, almost to a measurable degree, the mounting pressures of modern day commercial enterprise on the beautiful environment which undoubtedly needed protection, with the parallel task of providing fuel and fodder and meeting the employment needs of the small local population of the islands.

The task was large and it required a macro vision and a harmonised effort from the entire industry promoting tourism with the help of the local administration. In order to generate CREDIBILITY, we created a FEASIBLE MODEL in our hotel to combat the resource associated problem at a micro level which could be REPLICATED BY ORGANISATIONS TO THEIR COST AND GOODWILL ADVANTAGE.

The Welcomgroup Hotel named Welcomgroup Bay Island (WGBI) is located in Port Blair, the Capital City of the Andaman & Nicobar Islands, an archipalego in the Bay of Bengal.

Being a prisoner of its geography, The Andaman & Nicobar Islands rely almost completely on the Indian mainland for all its food supplies, medicines and items of daily use. Nothing is taken for granted, including the availability of onions and potatoes. Which often run out of stock on account of shipping delays.

AIMS AND OBJECTIVES

The objective of the hotel was to create a new "Green Model" to operate the hotel in a eco-responsible manner and to create an ecotourism model for the island which could be replicated by the welcomgroup chain and by the entire industry, through the example setting method, in different locations with the local nuances.

Welcomgroup Bay Island (WGBI) modified its hotel objective to state the following :

"We are in the business of providing room, food, beverage and eco-knowledge to our hotel quests and everybody in the Islands."

The model developed by us concentrated on 4 district areas wherein the strategy employed was the four 'R's : REDUCE, REUSE, RECYCLE and RETHINK systems, procedures and policies for the hotel unit.

The unit addressed the resource / Environmental issues by adopting an internal and external strategy.

The INTERNAL GREEN STATEGY was initiated because of the fundamental belief that "we must practice what we preach". The Internal strategies were put into play by the end of 1988 until April, 1992. (when I was transferred to Delhi)

The hotel had to encounter problems pertaining to water, soil, waste, paper etc. This led to a creative addressal of the problems as they came along.

a) WATER MANAGEMENT : we had a major water crisis in Port Blair in 1991 when our filtered water supplies were cut down from 8 kilolitres to 2 kilolitres per day. In order to run our business we had to break our entire pipeline system of galvanised iron and replace it with plastic pipelines (to avoid corrosion) so that the clean salt water from the sea could be used for flushing toilets, thereby reducing the demand on filtered water supplied by the municipality.

   A well was dug in the hotel knowing fully well that we would not get underground water. However, the intention was to harvest rain water which was utilised in the summer season for gardening. The same example could be extended to our cities which are short of water today. Such harvested water could be used for washing cars, watering the garden or any other such use to reduce pressure on the supply of precious municipal filtered water. It must be remembered that "WATER SAVED IS ALSO ENERGY SAVED". Such sumps / wells dug in houses could be used for breeding fish which would be a natural predator for mosquito larvae which could otherwise breed in the stored water.

b) SOIL MANAGEMENT : Our hotel was located on a hill slope and we had a problem of soil erosion. In order to combat this problem cost effectively, we used coconut coir, which was lying on the island as garbage, in those areas where the problem of erosion existed. This had two advantages. Coir was bio-degradable and therefore environment-friendly. It was also finance friendly, as garbage in the form of coconut coir was used for solving the problem in hand.

c) WASTE MANAGEMENT : Our objective was to look at reducing waste at the top and bottom ends of the pipe.

i) Tourists went for sightseeing trips to the other islands in Port Blair with packed lunches in cardboard boxes. These boxes were invariably left behind on the islands thereby creating a garbage problem – a veritable visual assault. We stopped the usage of cardboard boxes and started giving the guests packed lunches in steel boxes. These boxes had to be brought back failing which a token fine was levied. In the bargain recurring costs were wiped off and the garbage level was reduced.

ii) Used Cooking oil was usually thrown into the drain and this enhanced the effluent level. At the hotel, we converted this cooking oil into soap, which was used for washing the utensils, thereby reducing the effluence and also creating a cost advantage as we did not have to purchase washing powder anymore.

d) PAPER CONSERVATION : All old documents of the accounts department were segregated into benign and confidential lots. The confidential lot was shredded, mixed with wet garbage and converted into manure for use in the hotel garden. The other documents were converted into rough pads for internal use. The paper caps used by chefs were replaced with cloth caps. The brown paper used as a lining in the drawers of writing desks in every room was replaced with velvet. The whole objective was to reduce the usage of paper pulp in order to lessen deforestation which is taking place at the rate of 'an acre a second'. Today the world has only 8% forest cover. IN India alone, forest extraction is to the tune of Rs. 30,000 crores per annum and only Rs. 800 crores (approximately) is spent on afforestation. According to C.S.Silver in his book 'One Earth

One Future', as per current estimates 496 million hectares of denuded land needs to be afforested worldwide.

In order to create this awareness our hotel unit started an afforestation programme in Port Blair by planting 1500 saplings in the airport complex. Since the task was very large and the awareness of the issue very low, we put up hoardings with the message that planting trees was every individual's and organisation's responsibility.

TELECOMMUNICATION : Our unit had a severe crisis on the Communication front :

a) For three months we could not call up the local taxi stand for our guests needs.

b) We needed extra lines for our telephone exchange but could not get the same because of a large backlog. This is also true for the country as whole, which led to a study in this area and I wrote a letter to the Ministry of Telecommuncation, the essence of which is as follows :

The density of telephones per capita has a co-relation with GDP. Our country requires approximately Rs. 20,000 crores to clear the backlog of applications for telephone lines. The Government could follow the idea of Cable TV networks wherein the output form 2 or 3 VCRs is passed through signal boosters and then transmitted through cables to numerous houses in a locality, thereby providing audio-visual entertainment to hundreds of home viewers. In a similar way, 10 or 15 telephone lines with 50-60 extensions could be given on a priority basis to unemployed youth or ex-servicemen to start mini 'retail telephone service' in thousands of pockets all over the country. The mechanism would be very similar to an EPABX system in an office which has 10 hunting lines but numerous extensions at various desks, with the only limitation being that of wiring up houses within technically and economically acceptable distances from the mother unit. Through this strategy, the movement of people in cities and towns, currently without phones in their houses, would be drastically reduced because a lot of daily chores could then be conducted through the retail phone connection at home. This would consequently reduce the public vehicle occupancy density and the private vehicle traffic density to a large extent. So there would be less people to board our buses, which would mean that we could reduce the number of buses playing on our roads. Similarly there would be less private cars playing and all this would mean less air and noise pollution in our lives.

POLLUTION & POVERTY : Human beings & poverty are the biggest polluters and the large growing numbers negates any positive action. WGBI therefore, created a model in these two areas.

Population : The hotel created a policy whereby a cash incentive was offered to all employees who got married but postponed starting a family for 2 years by design. The concept of "One Family One Child" was also adequately rewarded. Employees were however given a lesser amount on the birth of their second child.

Poverty – WGBI adopted one of the poorest orphanages on the islands and helped them with educational material. The services of the hotel carpenters, plumbers and electricians were provided on a gratis basis. Children in the age group of 14 to 16 years were given vocational training in the hotel for two hours so that they would have "job market value" when they left the orphanage.

The thought process behind these models was that if the entire industry accepted this model, then a lot could be done as a contribution of the industry which, when dovetailed with the government effort in this area, would lead to national advantage.

THE EXTERNAL Strategy was spearheaded by the author through the formation of the Andaman & Nicobar Tourism Guild (ANTG) to address the problems facing the hotel and tourism industry which were as follows :

1. Foreigners could not stay in the island for more than 5 days. They could not visit all the islands.
2. Liquor could not be served in the bar. Hotels were not permitted to sell foreign liquor.
3. Charter flights were not allowed to come to the islands.
4. Cooking gas was not available to the hotels for commercial use.
5. Subsidies which were due to the hotels were not paid for years.
6. The shortage of Telephones and the solution given was finally implemented by the Government of India in 19995.

The objectives of the Guild were as follows :

a) To accept responsibility for a larger canvas by identifying the issues which were hampering tourism in the islands industry and taking it up with the local government through a common platform.
b) To create a sustainable ecotourism model which would be acceptable to all arms of the tourism trade – hotels, travel agencies and boat operators.
c) To advise the government on infrastructure problems through a feasible economic solution experienced in the micro environment of the hotel.

The Guild was formed in March, 1990 with a sum of Rs. 30,000/- which was contributed by 11 members. Over and above this the Guild raised Rs. 60,000/- through advertisements in a souvenir. In short the resources were extremely limited. The Guild was run by the President (N. Khatri) aided by a treasurer Mr. A. K. Das, General Manager of Hotel Asiana. Meetings were held once a month on a rotation basis in different member locations.

ACTIVITY INITIATED THROUGH THE ANTG :

ANTG put up pictorial hoardings in the following areas in Prot Blair :

Airport arrival lounge	-	importance of tropical forest
Airport departure lounge	-	value of a tree
Airport taxi stand	-	importance of coral as a primary food chain.
Airport open space	-	“planting trees is every individual and organisations responsibility”.
Near Jolly Buoy Island	-	take minimum from mother earth jetty
Jolly Buoy Island	-	please do not litter the islands.
Every hotel	-	Do’s & Don’ts at the beach.

Employees of every hotel and travel agency were educated to prevent tourists from taking corals.
The prime mover into initiating every eco-related activity was the author of this article supported by the Chief Engineer and other members of the hotel team.

The author was at first Eco-illiterate and was totally oblivious of the infrastructural and ecological problems of the islands. As every problem cropped up, I found myself evolving / learning in consultation with the hotel management team and other people like the anthropologist in Port Blair and a businessman and member of INTACH, Mr. S. Acharya, who was keenly interested in the welfare & protection of the islands. We discovered that every problem opened up a new window of opportunity.

We were sensitive to the fact that our actions should be translated without compromising on quality and with the direct intention of influencing guest behaviur by sharing the problem and solutions in all our communications in the hotel and in the islands through creative hoardings.

In administering the activity, the problems were first identified and solutions defined and thereafter depending on the cost, each activity was completed through the concerned departmental head. Most of the problems were solved by the substitution process except water segmentation. Here it took the unit 6 months to complete the task.

The hotel was a loss making managed property and had very poor revenue because of lack of awareness of the islands and the limited number of flights to Port Blair. The average occupancy of the hotel was 30%. Limited funds were allocated to each department. These funds alone were used for R&D purpose in a very rudimentary manner. The “enthusiasm to cash ratio” was tilted heavily in favour of the former through application of innovation and reuse of a lot of waste material in the hotel engineering department.

FUNDING :

The hotels turnover was Rs. 55 Lacs in 1988 (Rs. 5.5 million) and went upto Rs. 85 Lacs (Rs. 8.5 million) in 1992. A sum of Rs. 8 Lacs per annum was used for purchase of capital equipment like a deep freezer, walk-in cooler, kitchen equipment & a generator over the four year period. All such expenses were funded through internal accruals.

RESULTS : The activities of the hotel were shared with our competitors and the local administration in the islands and hotel quests which led to a cascading effect in terms of “echoing” of our practices.

ENVIRONMENT MUSEUM : Towards the end of my tenure in WGBI we made a small environment museum (see attached detailed concept note) with Rs. 25,000/- which was a drastic dilution of my dream. The original concept would have costed Rs. 100 crore (Rs 1000 million) The essence of this museum was to educate and trigger people’s minds into thinking of the environment and to emulate our hotels simple but effective strategy. The 3 key objectives of this museum was as follows :

a) To educate people about environmental degradation.
b) To learn from people of other walks of life on how to improve our museum.
c) The hope that somebody would improve on and make a better museum than ours.

Two months later, at Port Blair, the same was replicated by the navy on a better scale – my objective was thus attained on a small scale but with the hope that in future a good one would be made in Delhi, Calcutta, Bombay or Madras.

Four years later, The Federation of Indian Chamber of Commerce & Industry (FICCI) decided to make a big environment museum in Ghaziabad with a sum of Rs. 7 crore (Rs. 70 million) – enclosed paper cutting.

The action & results of our activity : The result of our activities led to cost, image and operational advantage in the hotel and within the chain. WG chain decided to become the first eco-responsible chain the country and thereafter when I was moved to our Travel House, an Association called "Basant Lok Jagriti Association" was formed in 1993. Through this Association, Eco-awareness is being created in the Capital of India. (See details in enclosed Shelter Magazine – Page 14)

The local administration decided to accept the concept of ECO-TOURISM conceptualised by our association, The Andaman & Nicobar Tourism Guild (ANTG), the founder president being the author himself.

After being transferred to Delhi the WGBI model was shared with the intention of creating a ripple effect amongst decision makers, politicians, opinion makers and industrialists to form a consensus through controversy and debate on the various concepts. (Task large and ongoing).

The author has influenced the following bodies with the objective of continuing the "Eco-awareness campaign"

1) Have given substantial inputs to CII on green industrial issues.
2) Have been influencing Ministry of Environment & Forest, Ministry of popularisation of Solar Photovoltaic (SPV in the urban areas.
3) Being a member of a National Energy Committee, have given marketing inputs and environment inputs to the SPV Industry.
4) Continuously giving inputs to Travel House (TH), welcomgroup and ITC HQ. Through the ITC Safety, Security & Environment Cell other divisions have been triggered into environment activism.

The organisations which were addressed by the author on the subject of Business & Environment are listed as follows :

a) Architect Association of Delhi.
b) Xavier Labour Relations Institute (XLRI), (an MBA College) Students in Jamshedpur.
c) Participants of a seminar called "Handling Innovation" organised by XLRI. Participants were from different industries like – Insurance, Finance, Telecommunication, Hotels, Airconditioning and Ordnance factory.
d) Hindustan Motors (Car factory) Senior and middle level Managers in Madras.
e) Addressed the National Conservation conference of WWF-India in 1994 September.
f) Accountants Training Institute of ITC (Parent Company of WGBI).
g) Builders Association of Delhi at Pragati Maidan (participants – who is who is who of the Government of India, Architects, NGO's, Press).
h) INVESTOUR Conference organised by CII (confederation of Indian Industry) at Jaipur in December, 1995 on eco-tourism attended by the travel trade and media.
i) Presented a paer for the tripartite meeting organised by ILO at Delhi in 1995.
j) Took a session for Indira Gandhi National Open University (IGNOU) model accepted for dissemination.

ACHIEVEMENT : WGBI received The British Airways Tourism Award for Environment.

ASSESSMENT OF PROCESS :

1) Every strategy employed has not only worked but has been accepted by internal / external organisations gradually, but VERY SLOWLY. The reason for this is that environment issues are little understood because of skepticism and perhaps because of painful changes required in systems.
2) The eco model was created by the smallest hotel in the chain (bottom to top approach) hence it was difficult to accept as in any organisation world over.

- There is a need for further follow up action.
  A whole lot has to be done. The barriers are as follows :

a) Lack of understanding of the environment issue because of scarcity of models to emulate. It is a pioneering arena.
b) Organisational pressures on the bottomline and short term measures get more focus.
c) Lack of policies on fiscal incentives / disincentives by GOI (Government of India) to accelerate eco-ethics in business.
d) Lack of example setting by the western countries in reducing their consumption style and simultaneously introducing these very strategies without modification in third world countries. Example :- clean technologies are still not being passed on to third world countries. On the contrary, such countries are being used as a dumping ground for obsolete technology and waste.
e) Organisations need to institute a separate environment cell in every organisations which will network with all departments by taking a look at their existing systems, procedures and policies to see how it can be re-engineered through the eco-philosophy of the 4 R's : Reduce, Reuse, Recycle & Rethink, spread over a specific time frame in concurrance with all concerned. Change is hard work and change can take place through collective vision. Collective vision will only emerge after discussion, training & policy changes.

All industrialists know the importance of CAPITAL DEPRECIATION, REPAIR AND RENEWALS. In a similar way, to avoid major calamities, the natural capital i.e. air, water and soil must not be tinkered with, as has been done in the past. And just the way all efforts are made to cure a family member afflicted with cancer, so too should be the proactive effort put in by industries, in a collective manner, to save our entire wold family from the far too many signs of cancer be it in our local Yamuna or the Great Lakes of Michigan.

The Chinese people in their awesome wisdom depict the word 'crisis' using a combination of Chinese Characters representing danger and opportunity. In today's scenario where the environment crisis poses a great challenge for all humanity, let us take cognizance of the danger and focus now on the OPPORTUNITY.

(** The views expressed in this article are that of the author)

ANDAMAN AND NICOBAR ISLANDS
GEOGRAPHICAL POSITION

MAP

Perspectives on Entrepreneur Development : Some Innovative Strategies

A critical analysis is made of the financial, institutional and market-related barriers to commercialization of products of the renewable energy industry, in particular those in photovoltaic and solar thermal segments. A major lacuna identified is the lack of people with marketing discipline, specially people with experience in selling consumer durable products. Pragmatic strategies are proposed for overcoming various bariers to commercialization.

"Don't let others talk you out of your opportunities. Most of the things worth doing in the world had been declared impossible before they were done" – Louis D. Brendeis.

Introduction

Muscle power and tree power are the oldest forms of Renewable Energy in use since mankind appeared on the "earthscape". However, due to excessive population and the absence of compensatory / depository afforestation, tree cover has come down to 8% globally and cannot be termed as a renewable source of power with the current high volume consumption pattern.

The following sources of energy are defined as Renewable Energy :
(a) Solar Photovoltaic (SPV)
(b) Solar Termal (ST)
(c) Wind
(d) Cogeneration
(e) Biomass (agri-waste-based power)
(f) Mini liydel plants

Coal, oil and gas are finite sources of power and in view of the fact that there is a global climate change, these have been identified as a necessary eco-villainous source of power to fulfil the energy needs of the ever growing population (Annexure A)

The production, refining, transportation and use of these sources of power cause immense damage to the local, regional and global atmosphere, not to forget the sea lanes which are routinely littered with oil spills due to tanker washing.

For the purpose of t his paper, the focus will be on solar photovoltaic / solar thermal dovertailed with tree / muscle power, because they are not terrain-specific unlike (c) to (f) om the above-mentioned list.

The world over, in order to give due thrust to Salar Photovoltaic and Solar Thermal, governments have given huge subsidies to popularize such technologies till the commercialization stage is reached and economies of scale have been developed.

If one may use a biological analogy, the Solar Photovoltaic and Solar Thermal, governments have given huge subsidies to popularize such technologies till the commercialization stage is reached and economies of scale have been developed.

If one may use a biological analogy, the Solar Photovoltaic and Solar Thermal industry is only approximately 27 years old (started in the early seventies with the first oil shock) and hence it requires subsidy and nurturing on a national scale in a User Friendly Manner to develop huge volumes and bring the price down. We must also bear in mind that mature conventional source of power is subsidised to the tune of approximately Rs. 20,000 crore per annum in India.

Bariers to Commercialization/Solutions

The Renewable Energy industry (PV/ST in particular) has the following barriers :

- Financial
- Institutional
- Mindset

Once again, because of the subsidy syndrome, new ideas have not been applied by industry through marketing imagination. As a matter of fact, there has been no concerted effort by any industry worldwide, including the USA, WHICH IS THE Mecca of marketing ideas to build brand identity, advertise, build distribution networks, provide warranty and after-sale service. One of the reasons for the absence of this strategy in the USA is the abundant availability of cheap power and hence the absence of demand stimuli.

In the developing world, where there is an acute shortage/non-availability of power, marketing forces have not come into play for two reasons :

(i) The energy regulatory authority has still not recognized the sun as a major source of power. Although India is the sun as a major source of power. Although India is the second largest producer of solar products after the USA and its photovoltaic production is 9 MW per annum, i.e. 10% of world capacity, this is a miniscule considering the fact that there are 80,000 unelectrified villages in India and the so-called electrified villages have power for irrigation only.

There are innumerable opportunities for SEB's to hybridize the grid power in urban areas to clip peak load through roof-grid interactive systems or in rural areas invest in hybrid systems :

photovoltaic / diesel

photovoltaic / biomass

photovoltaic / hydro concepts

depending on local / social relities by the empowerment of panchayats or other local bodies, so that initial investments are recovered over a period of time instead of like-long unsustainable financial haemorrages. The Rajasthan farmers are paying utility @ Rs. 1.40 per kWh for reliable source of power. Hence, this proves that farmers are not hungry for free or subsidized power.

(ii) The photovoltaic and solar thermal industry is generally headed by technocrats and bureaucrats world over and in the subsidy / tax driven market it has by and large achieved its internal targets. The most important lacuna amongst all the major players

is the lack of people with marketing discipline and specifically people with experience in selling consumer durable products.

In a power-starved country like India, only marketing discipline will help to bring about due focus on problems and design strategies to straddle the urban market first both individual and industrial segments.

The logic of the urban strategy is that diffusion of products has taken place from the urban area to the rural area; example : transistor, TV and many other consumer durable products, without the subsidy crutch.

It must be understood that marketisation of Renewable Energy in urban area is a LATENT MARKETING STRATEGY. The logic is that people in urban areas have money and are already investing in 'polluting audio / visually insulting' gensets. They are also investing in invertors which consume two units for every one unit they give. This market is growing by 100% per annum vis-à-vis genset. Herein lies an opportunity to hybridize the two technologies to reduce cost and pollution.

For all this to happen, the market has to be developed through quality products, warranty, after-sales service and distribution network.

The people's awareness on pollution is very high and through clear ecopositioning of the SOLAR products, the industry has to get into the perceptual area of the consumer's mind. It is an established fact that there is a disposable income for purchasing expensive but reliable products.

There is no need for creating a separate distribution channel, as the existing electrical shops network can be value added at a low cost.

Corporate Solar Loan Plan

The capital investment on photovoltaic products is perceived to be high; to break this barrier, the photovoltaic industry must launch aggressive sales calls, designed for the top management of companies, so that in their existing menu of loan items, solar products are included. The objectives of this strategy are :

a) It gives the opportunity to employees to buy expensive capital goods at interest free/low interest cost on optional basis.
b) This will help to build up a critical mass, as neighbours who see such products will aspire to acquire the products through the "me too" strategy.
c) Help to bring down the cost.
d) Help to establish a reliable dealers network providing after-sale service.

On a long time horizon, people can get freedom form grid power. 16,000 MW of domestic energy use can be put to productive industrial use and to an extent reduce reliance on imported fossil fuels which come from politically unstable countries.

FI/Banks

Institutions like HDFC, LIC housing Financing, HUDCO should make it mandatory that loanees will have to integrate photovoltaic and solar thermal in low rise buildings. This can only happen if the building bye-laws are changed. For a country like India, it makes abundant economic sense to have such forward looking/energy independent laws, when small countries like Israel, Cyprus and Mauritius have implemented such change.

Rural Strategy

a) Industry rural marketing wing strategy

It is important for all large Indian industry players to establish a rural marketing wing, since their current strategy is to send products to unelectrified areas.

The strategy that one would like to suggest to the industry is (a) to identify a region where each player will have a comparative advantage in terms of locations, political contacts, purchasing capacity and other factors, (b) conduct demographic psycographic studies in order to have some kind of map in terms of earning capacity, paying capacity, willingness to pay and the cash flows or harvest flow cycles, and (c) synchronize the sales to the studied patterns which emerge.

Car vs Petrol Bunk Model for Rural Area

In villages where purchasing power is poor, the cost of a Solar Photovoltaic lantern can be brought down by creative breakup. It is well known that the panel costs 60% and the lantern with built-in battery costs 40%. Therefore, instead of selling a Solar Photovoltaic latern for Rs. 4500 each, the industry must identify and develop rich villagers or villagers inclined to do business to establish a Solar Photovoltaic charging station.

The advantages of this new model are as follows :

a) The cost of a Solar Photovoltaic lantern will drop by 60%.
b) New jobs will be created in each village, approximately 10 lakh @10 per unelectrified village.
c) Solar Photovoltaic panel owners will provide charging facility at a cost of Rs. 50 or Rs. 70 per month and will also provide R & M facilities.

Needless to mention that it will improve the quality of life of the villagers. The incidence of indoor air pollution will come down and productivity will be increased through quality light for knitting, stitching and other such activities. This will help augment the economic status of the villagers. The intangible benefits are difficult to quantify, but the subsidy of Rs. 5 per litre of kerosene can be stopped within a specified timeframe.

This model is ideal for women to operate as a home-based business and will lead to their empowerment, which is a currently apolitical issue.

Micro-Credit

Currently, low cost money is not available through the existing banking network. Therefore, IREDA my like to identify institutions like NABARD or rural cooperative banks to identify projects and help in extending micro-credit to entrepreneurs. NGO's like SEWA, Development Alternatives, Anand Cooperative and others can be used as a vehicle to popularize the above concepts.

It has been observed that the banking community is still not fully sensitized to the advantages of photovoltaic and it is imperative that bank employees be trained / familiarized with the advantages of the sun technology, since they can transform the countryside through sun revolution.

Space for drying agricultural products is not easily available in rural areas and the existing open method is time-consuming and results in wastage. Herein lies the opportunity to build and own simple solar dryers. Women can be taught to make solar oven for cottage industry food processing application.

Credit through Rural-based Sugar / Food Industry

There are a number of companies in the rural area like the food and tobacco industry which have a symbiotic relationship with the farmers. The more enlightened industries such as HILL, HEINZ, Pepsico, S. K. Beecham, ILTD, etc. could extend low cost IREDA funds to the farmers in this region for propagation of photovoltaic technology for improving their quality of life. The industry could take a part of the depreciation advantage or pass on the benefit to them as a goodwill measure to improve their relationship with the farmer. These companies, instead of receiving cash for photovoltaic products, could get an equivalent value through specific agricultural products.

In conclusion, it will be pertinent to highlight that 70% India's population resides in the villages and 30% of GDP comes from agriculture. Therefore, it is of paramount importance that politicians, bureaucrats and industry must collectively apply their minds to bring about transference of quality ideas to the rural areas and upgrade the quality of life through price and market mechanism. Otherwise, we will not be able to stem the flow of people from rural to urban India and our town and city infrastructure will further crumble under the sheer volume of people migrating to urban areas in search of jobs and better life.

"Small opportunities are often the beginning of great enterprises" – Demasthenes.

Annexure A. Population and Energy Scenario

- current population 93 crore
- by 2005, 105 crore
- fossil fuel self-sufficiency percentage

1991	:	55.66%
1995-96	:	43.7%
1996-97	:	41.6%
* 2006-07	:	23.5% (estimated)

(Source : Ministry of Petroleum & Natural Gas)