

# SERVING FROM THE FRONT

## Solar energy development in Ladakh



**T**he Ladakh province of the state of Jammu and Kashmir is surrounded by two of the world's mightiest mountain ranges, that is, the Karakoram in the north and the Great Himalayas in the south. It lies at altitudes ranging from about 9000 feet at Kargil to 25,170 feet at Saser Kangri in the Karakoram range. The total population of Ladakh spread over the two districts of Leh and Kargil is barely 2.45 lakh. The summer temperatures seldom cross 27 °C in the shade, as against 20 °C at times even in Leh. The thin air makes the heat of the sun even more intense than at the lower altitudes. It is often said that a man basking in the sun with his feet in the shade can run the risk of getting a heat stroke and frost bite at the same time. Such a situation is possible only in this picturesque location of Ladakh, which presents many challenges.

Taking such a challenge in its stride is the Ladakh Ecological Development Group or LEDeG for short. It is an NGO (non-governmental organization), which came into being in 1983, and has

been actively involved in awareness generation programmes related to the environment and sustainable development.

### Practicing what it preaches

LEDeG is a firm believer in being a real practitioner of alternate energy technologies like solar PV (photovoltaic). This is proved by the fact that it has installed a 960-watt SPV plant on the roof of its office at Leh. Solar power thus produced is being used to run lighting systems, computers, and fax machines besides video systems. The underlying philosophy of this organization is to put in place a more decentralized approach of energy production based essentially on freely available renewable energy resources like sun and water.

### Achieving milestones under duress

LEDeG has successfully developed various technologies like Trombe (solar)

walls and direct gain system for solar space heating. In addition to this, it has been instrumental in demonstrating the usefulness of the following product technologies.

- Solar ovens
- Solar water heating systems
- Solar parabolic reflector cookers (both for family and community use)
- Improved water mills
- Micro hydroelectric installations
- Solar dryers
- Solar PV lanterns and home lighting units
- Hydraulic ram pumps

### The big change

There are many rural blocks in the Ladakh region without any conventional power. In a few areas, diesel generators have been at work, though at the cost of the ecological balance of those areas. Besides, it has not been an easy affair to run and maintain the DG sets in such hostile locations. The LEDeG has been trying to replace such generators gradually by introducing solar power systems. It has been successful in



installing a 100-kWp solar PV power plant in place of a generator, thus signaling a major transformation in an otherwise ecologically disturbed habitat. Yet another major achievement of this group has been the installation of about 57 micro-hydro units in far flung areas of Ladakh. The capacity of these systems varies from 0.5 kW to 15 kW.

### Think global act local

One of the major objectives of LEDeG is to increase the penetration of SHS (solar home systems) across the vast geographical terrain. The Dubruk block is a standing example of the change brought about through the use of solar lighting systems. The LEDeG has made many efforts to popularize the use of locally manufactured technologies based on an effective utilization of solar energy. It also includes a small-scale waterpower system for grinding of grain. It is a common but pleasing sight today to see solar energy technologies in use in nearly every village of Ladakh. Many parts of Ladakh face the problem of water scarcity. LEDeG has remedied this situation by introducing technologies like Hydram.

### Using renewable energy for heating

People in the hilly areas have to combat severe cold weather when the

temperature dips to as low as  $-40^{\circ}\text{C}$ . The way out is to use Bukhari for room heating on a very large scale. However, the fallout is the over-exploitation of scarce natural resources besides health-related problems like respiratory diseases. Realizing this, LEDeG has been taking the following measures to combat these problems.

- Use of solar energy for space heating
- Use of local resource based insulation techniques
- Efficiency improvements in cook-stoves
- Incorporation of improved architectural designs

The group has innovated a simple-looking system, that is, the Trombe system developed around the concept of solar gain and minimization of heat loss through use of various design and insulation techniques. It is a perfect example of how a successfully experimented technique can be replicated on a large scale. LEDeG had installed about 75 solar passive systems barely a year after its inception on the Ladakhi horizon. Of late, solar passive architecture has found quite a few takers ranging from individuals to more rigorous users like the Indian army units stationed there. Experimental observations point to a gain of nearly  $16\text{--}20^{\circ}\text{C}$  above the ambient temperature through the use of

Trombe wall—quite a pioneering effort by this NGO. Another outcome is reduced dependence on heating fuels by as much as 66% and better environmental and health conditions.

### Reaping the rewards

This upcoming organization has been rewarded in the past with the prestigious Right Livelihood Award—deemed as an alternative Nobel Prize. The SESI (Solar Energy Society of India) also conferred on it the SESI-NGO award in 2005 in view of its path-breaking practical transformation of rural communities living in the inhospitable terrains of Ladakh.

The endeavours taken by this NGO should be replicated in other remote areas of the country as well. Only then will there be a renewable energy revolution that would bring about global sustainable development.

