
Foreword

India suffers from chronic energy poverty. Even after 65 years of independence, one-third of its households have no access to grid power. In rural India, about 45 per cent of the households use largely kerosene to light their homes and shops. With no access to any sources of lighting, more than a million households go dark after sunset.

The problem is those who are connected to the grid, can't call themselves 'energy rich'. In many parts of the India, both rural and urban, the electricity supply is erratic and just for few hours. Very few cities in the country can claim to have 24x7 electricity supply. The country is paying huge developmental costs for this energy poverty – education, health and economic development is getting stymied because of this.

But India's energy poverty also provides an opportunity to design a new energy future for the world: those who are currently unconnected to the polluting fossil fuel grid can be leapfrogged to a clean and futuristic energy source. It could be the way the world solves its twin problems of energy poverty and climate change, in one stroke. The good news is that across India, small experiments are being conducted; some successfully some not so successfully; some with the support of the government and some without, to exactly chart this future.

From isolated houses in Chin hills in Mizoram to villages located in the Barnawapara Wildlife Sanctuary in Mahasamund district, Chhattisgarh, from remote villages in Pithoragarh district of Uttarakhand to houses and shops in Sagar island in Sunderbans in West Bengal, more than a million households use small-scale solar systems to light-up their homes and shops. Varied models are being implemented; from installation of solar housing systems to lights few bulbs to installation of few kilowatts mini-grids to supply electricity to few hundred households. Models include fully or partly government-subsidised systems to systems supplied by social entrepreneurs based on micro-credits to systems directly purchased by the consumers from the market.

The good news, as is documented in this report, is that these solar energy systems are changing the lives and the livelihoods of the unconnected. These systems are therefore, accepted and demanded. In fact, in many parts of rural India solar energy is preferred over grid-based power because of the unreliability of the grid. We came across villages connected to the grid where households have paid to set-up solar housing systems.

The bad news, so to say, is that the most distributed solar energy models beings implemented are designed to limit the usage and potential of the distributed solar energy.

Firstly, even the most successful experiments are built on limited opportunity models – such as the lantern or the solar panel with a few light-bulbs, which works when people are poor. It does not meet the needs or aspirations as people become richer or have more energy needs. In this way, existing solar energy systems have been designed only for the poor and only when they are poor.

Also, the model to up-scale these efforts is not available. Social entrepreneurs and NGOs give solutions as per the needs of the households and also have successful models to support after sales services – the most important component of the distributed solar power. But they have failed to upscale their programmes. Where the state has stepped in to upscale, the programmes have fallen apart due to lack of a well established and working delivery systems as well as apathy. The issue is made more difficult as

solar energy is still expensive and people who need it still poor. Therefore, the models demand some form of subsidies. The problem is that the government off-grid programme is built on assumption that the ultimate solution is to bring conventionally powered grid to the villages; distributed solar energy is a transitory solution and the design of the subsidy.

The real challenge is, how do we upscale the distributed energy systems to make them the real option in the real world.

From our year long research in which we have travelled to seven states of India – Assam, Uttar Pradesh, Chhattisgarh, Bihar, Uttrakhand, Karnataka and Haryana – to understand what is working and what is not, we are convinced that unless distributed energy systems can provide the same level of services as a fully function grid – energy when it is needed and in the required amount – it will remain a fringe and transitory solution. Distributed energy systems, therefore, require a radically different model that what is being widely implemented today. The good news is that we have such a model and with some improvements it could be made a winner.

We found the solar mini-grid projects being implemented by the Chhattisgarh government to be the most successful in terms of quality of services as well performance. However, the model is designed as an isolated grid for remote village electrification. And, a 100 per cent capital subsidy is provided by the state with users paying a small fee to meet only some parts of the operation and maintenance costs. The model is therefore not financially sustainable. However, what if we make this model grid-interactive and also financially viable?

Our proposal is simple: government needs to incentivise mini-grids with the same financial model as that of the grid-connected large solar power plants. We are proposing that the government come out with a major programme which allows entrepreneurs to set-up mini-grids across the country. Like grid-connected projects, these mini-grids projects should be provided with an assured feed-in-tariff. These mini-grids will meet the local energy needs and when the grid reaches the villages they could be made grid-interactive. That is, it can export power to the grid as well as import from it for growing needs or deficits. The difference is, instead of few big businesses setting-up megawatt scale solar power plants, we will be promoting thousands of small businesses and social entrepreneurs who will set up small power plants to serve the local population. They will create local jobs and help build the local economy. This model can also be used in urban areas for rooftop power producers.

If this concept is operationalised, it will revolutionise the way power is produced and consumed in India. This, we believe, is the way ahead.

– Chandra Bhushan