

## **Solar powered pumps and solar feeders**

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Recently the government introduced two separate schemes: one relating to solar powered pumps and the other to solar feeders.

In the first scheme, pumps that run on solar energy, were to be distributed at subsidized rates to farmers. These farmers would then have no electricity bills, and could operate their pump during the day. This is an advantage because farmers who get their electricity from the grid, are supplied power in the night for half the days of the week. The reason for this is that night time supply is cheaper for electricity distribution companies. But it is very inconvenient, and even unsafe, to farmers.

Maharashtra State Electricity Distribution Co. Ltd. (MSEDCL) supplies subsidized electricity to farmers at the rate of around Rs.2 per unit, but it costs them around Rs.6 per unit. Solar pumps meant they would save on this subsidy loss. Instead the government and MSEDCL would incur a one-time cost for the solar pumps of 3 to 7 lakhs per pump. So the question is why not convert all farmers to solar pumps.

In general, considering all costs, a solar pump becomes more cost effective compared to a grid connected pump if it is further from the grid, and if it is used consistently for most of the year. Maharashtra has 43 lakh electric pumps, and gives out around 1 to 1.5 lakh new connections every year. Since the grid network has relatively good penetration, and irrigation is required only in certain months of the year in most regions, replacing all existing connections with solar pumps would be expensive.

In 2015-17, the government announced the scheme mostly limited to Vidarbha, to distribute 5 lakh pumps. This was later revised to 10,000 and then further to 7500 pumps. Uptake was found to be slow. Some of the reasons for this were found in a study conducted by IIT Bombay. MSEDCL officials, beneficiary and non-beneficiary farmers were interviewed, and surveys conducted at solar pump sites in 10 villages of Buldhana and Akola.

Firstly, the beneficiaries were happy with the system. But many farmers did not apply for the following reasons. The main reason was that beneficiaries would not be given a grid connection for ten years. This was a very big disincentive. Farmers preferred to wait for a grid connection rather than give up the flexibility of applying as required. Secondly, the scheme provided maintenance for 5 years, but beyond that the farmers were unsure of local support for repairs and maintenance. Thirdly, most farmers live far from the fields. They are known to remove pumps, and other equipment and take it home in the off season fearing for its safety. Solar pumps are ten times as expensive, and they feared for its safety from wild animals and also from miscreants who may damage or steal. Fourthly, a few farmers did not have a 7/12 form (legal document indicating farmland ownership) of their land, due to various familial complications. Hence they could not avail the benefits of the scheme.

The study also concluded that many farmers could have done with smaller pumps. The smallest size available in the scheme was 3 HP. Some of the beneficiary farmers were using their systems only for 30 minutes a day. Considering the low water availability in the region, small plots of less than 5 acres, 1 to 2 HP pumps would have sufficed for some. Some diesel farmers in the region could have made up for the payment for such a small pump through one to two seasons savings on diesel.

The government has announced a new scheme to distribute one lakh solar pumps. While the above issues can be addressed for better outcomes of the scheme, in general, considering the widespread electricity network in Maharashtra, solar pumps make sense mostly in remote locations. Instead, the government and MSEDCL need to make an effort to work with farmers to take steps that would improve grid supply and service. And farmers in turn are persuaded to pay bills regularly.

In the solar feeders scheme, agricultural feeders are being connected to small scale solar power plants. Agricultural feeders supply power mainly to agricultural pumps. Each feeder has around 500 to 800 pumps. The advantage to farmers in such a scheme will be enforced daytime supply. However, many small power plants are not a practical solution for all 8000 agricultural feeders. And the same is possible with a few large power plants as explained below.

The grid is like a network of pipes, and power plants are like many tanks of water connected to the network. When a consumer draws water from a tap connected to the network it is not clear which tank it comes from and it does not matter much. Similarly, it makes very little difference if the power to a pump comes from a solar plant connected to a particular feeder, or a few large solar power plants connected at a different locations. The latter is a more easily manageable solution. And the utility could still give daytime supply to farmers.