III

Using a combination of Salt Heaps and Parabolic Mirrors under controlled conditions for power generation

Objective:-

To set up a pilot for generating power by using heat energy generated by a combination of salt heaps and parabolic mirrors which will be used to heat-up pipes containing heating oil so as to produce steam using heat exchangers fed by salt water.

Justification:-

The large salt lakes in Rajasthan provide an ideal backdrop for setting up power generation plants based on using salt heaps. Salt heaps 10-15 meters high are to be covered by transparent heat resistant canopy, and parabolic mirrors are used to heat the heaps thus supplementing the solar energy. The heaps contain an intricate network of pipes carrying heating oil. Once the sunlight starts, the heaps will get heated up and hot heating oil is pushed through heat exchangers to produce steam. Here again, salt water could be used for steam production, vitally the cooled steam could be a good source for potable water. Such pilot plants are already operational in the US, but not a single pilot has been up in India. It would be appropriate to locate such a plant near the famous salt lakes of Sambar and Panchatra, which produce mountains of salt every year.

As solar panels are arranged in a particular fashion that ensure beams are collectively directed towards the tower, thus generating very high temperature. This collective beam is passed onto salt which melts at 1200•C. The molten salt is stored, and it is used for producing steam through heat exchangers and stored again at appropriate temperatures. During this process the loss of temperature is less than 1%. Since there are very few consumables this process becomes self-sustainable. In states like Rajasthan and Gujarat where there are large salt works and salt lakes, pilot projects could be erected to test the feasibility for a commercial plant.

Annually, Rajasthan/Gujarat has 300 sunny days with 65-70% normal light, therefore such pilots are justified. Besides sweet water is a by-product. This power could be used for feeding greenhouses or cold storages, which can produce and store high-value organic vegetables and food products. It could be a boon to the rural community and the energy waste during transmission of energy from urban to rural areas could also be minimised.