

Statesman, 22 Oct 2008

# Green power

A decade old technology to produce electricity should suggest SUSANTA DAS GUPTA

As the world searches for alternative, renewable energy, a technology which is more than a decade old is attracting the interest of researchers and technocrats - converting heat from the sun into generating thermal electricity.

This is different from our known photovoltaic cells converting light energy into electricity and stored in battery. This technology utilises the sun's heat to heat a liquid in a pipe which in turn boils water to produce steam that rotates a turbine and produces electricity in large quantity.

This technology was not pursued vigorously during the past decade as the production costs were estimated to be higher than that of producing thermal electricity through traditional fuels as coal, oil or gas. But with rising prices of these fuels, the cost of producing thermal electricity with the sun as fuel provider is becoming comparable and in time will become competitive.

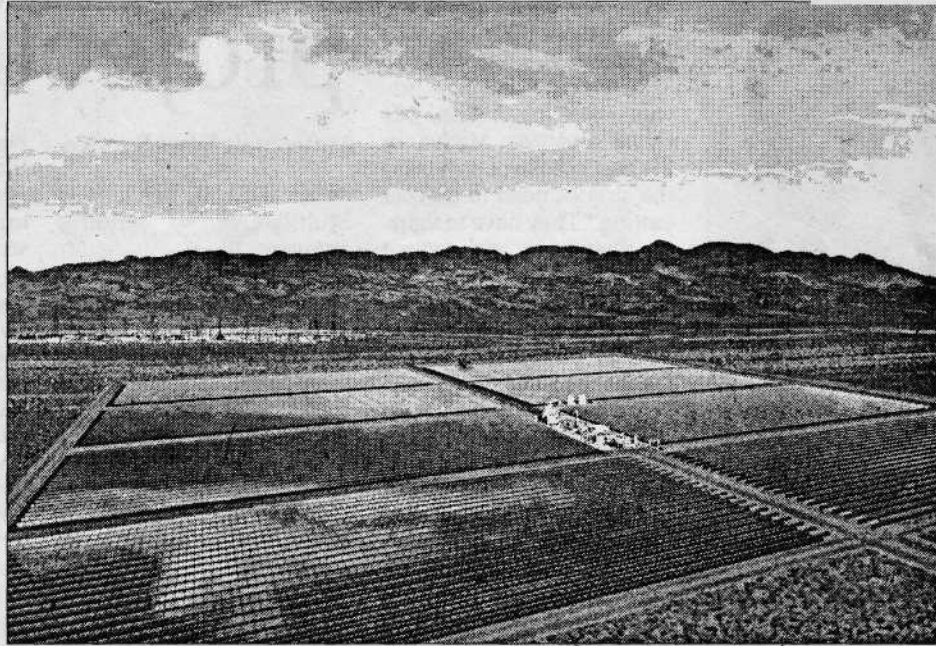
Public opinion throughout the world is rising against indiscriminate plundering of mother earth's resources to meet today's needs, ignoring the future catastrophe. This technology will be a boon to mankind if put to use properly. It is an environment-friendly technology which will reduce global warming by not using any fossil fuels.

Simply put, the technology acts in the following manner: The sun's heat is reflected through U-shaped mirrors which enhances the intensity of the heat up to almost 70 times; it heats up a liquid in a pipe which is used to boil water into steam that rotates a turbine to produce electricity.

Experimental plants in a desert area of California produced 354 megawatts in the 1980s. In the initial stages, heat from the sun used to be harnessed by installing U-shaped mirrors in hundreds of rows covering a large area. But the latest technology involves harnessing solar-thermal power by building tall "power-towers" surrounded by thousands of mirrors reflecting the sun's heat on to the tower and heating the oil inside it. Power-towers can store the heat generated during the day to produce power for up to six hours after sunset.

Electricity produced by a series of power-towers can easily be integrated into electrical grids, taking the total production to 280 MW which is a real and meaningful power plant. According to a new study, the production cost is likely to come down drastically with economies of scale, experience and newer technologies.

The solar plants produce more power during the hottest part of the day when the demand is also at its highest and can fetch better prices and competes fairly with the conventional energy. It is also more dependable than other forms of renewable energy like wind power and are more predictable.



In India, there is abundant sunshine throughout the year in almost all areas. India is positioned between 7 degree and 37 degree North Axis and owing to the positional advantage, the country gets much more solar energy than many other nations.

The Thar desert has a great potential. It is spread over 20,000 square km. Even if one per cent of that area, that is, only 200 km square is utilised for the purpose of converting solar heat into electricity, it would be possible to produce 6,000 MW of electricity.

We get two kinds of energy from the sun. One is its light energy and the other heat energy. Presently light energy is converted into electricity through the photovoltaic process using solar cells in many states. The process through which solar heat is collected and used to produce electricity is known as Solar Thermal Energy Conversion (STEC).

The quantum of electricity produced depends on the quantum of solar heat. There are a couple of processes to do this. With this STEC process, Japan and Italy started producing 1,000 KW electricity in 1981. France started production of 2,000 KW in 1983 with Spain producing 1,200 KW the same year. However, commercial production started first in the USA in 1984. Even India was not lagging behind with one small plant of 50 KW capacity at Goalpahari in Haryana in 1989.

Though STEC is a comparatively new technology, it has already proven to be successful. It is green power from start to end.

There may be some problems if a large number of plants are built in the desert. It would require large tracts of land and affect environment and bio-diversity. However, the problems could be taken care of as they would be far less than those in densely populated areas.

It is reported that India's present power generation capacity is 129,000 MW but the deficit is 70,000 MW. It will take a minimum of five years to produce that much of electricity. The Union minister for power has since reported that production capacity should have been enhanced each year to

# unlimited

produce electricity should be vigorously explored,

cope with the demand, but for the past 10 years no step was taken to add to the existing capacity.

During the Tenth Five Year Plan (2002-07), capacity addition was targeted at 41,110 MW but reduced later to 30,641 MW; till December 2006, only 17,995 MW could be achieved. This gap between the projected need, target for expansion and achievement is so high that solution in the near future seems to be utterly impossible and with each passing day further demand will add to the current need. The only solution before the policy makers appears to be nuclear power generation, which is not only time

consuming but also extremely expensive and hazardous.

While nuclear power plants can produce much larger quantities of electricity, it is not that safe for men and material. The radioactive waste it discharges is extremely harmful for human beings, vegetation, water sources, etc. Radioactive wastes remain permanently radioactive and no technology has as yet been evolved to neutralise the wastes wholly and permanently. The present methods of disposal of these wastes are highly costly.

Accidents may take place in any area of activity, nuclear power plants are no exception. But in the event, such an accident will bring untold destruction, disaster and misery for men and material and continue for a long time. No one has forgotten the Chernobyl disaster.

All these taken together, opting for nuclear power generation does not seem to be an ideal proposition. Uninterrupted availability of nuclear fuel (uranium), acquisition of plant and machinery and spares for maintenance etc from outside sources should also be taken into consideration before opting for such a costly venture. Already a debate is raging throughout the country on this issue.

In the face of it, it appears that the solar thermal energy conversion technique, which is far more environment-friendly, much less costly and having a less gestation period, is a much valid and effective option to produce electricity to meet India's ever growing demand. It is not that the government is not aware of the development in other parts of the world, but India is yet go beyond discussions and seminars. It is high time, things started moving fast in the corridors of power. The government and captains of industries should come forward and explore this new technology for the benefit of future generations and for the benefit of mother earth.

*(The writer is a senior faculty member of Ramakrishna Mission Loksiksha Parishad, Narendrapur)*