

## WARMING UP TO THE HEAT FROM THE SUN

Relevant for: Indian Economy | Topic: Infrastructure: Energy incl. Renewable & Non-renewable

Hot idea: Solar thermal is not new to industry. TTK Prestige put up a system (above) years ago at its Salem pressure cooker plant. But adoption across industry has been tepid. M. Ramesh

At the mention of 'solar', most of us think about arrays of blue, sun-facing panels that generate electricity. That is because 'solar photovoltaic', for historical reasons, grew very fast, in India and elsewhere, and became ubiquitous. But there is another 'solar', simpler and traditional, which is known to give a better bang for every buck invested. To wit, 'solar thermal'.

'Solar PV' works by photons in sun's rays knocking off electrons in the semi-conducting material in the panels and channels them through a wire—the stream of electrons is electricity. Solar PV, therefore, works best where there is lot of sunlight. Solar thermal systems, in contrast, suck up sun's heat and conduct it to where it is needed – such as for drying of spices or fish or wet paint.

### Use of collectors

Just as we call the sun-facing photovoltaic sheets 'panels' or 'modules', in solar thermal the stuff that lies open to sun are called 'collectors' and are measured in terms of square metres. They come in different forms, but primarily, as tubes, flat plates or reflectors that focus sunlight on to a heat-picking 'thermic fluid'. The interesting aspect of these solar collectors is their juicy economics. Chidambaram Palaniappan, who has a PhD in solar drying and runs a solar thermal company called Sun Best, which supplies tube-based systems, provides some telling data. He says that 100 sq m of collector area can generate heat energy of 40 kW, and costs about Rs. 7.5 lakh.

Comparatively, to generate 40 kW of electric energy it would cost some Rs. 20 lakh. Another expert, Siddharth Malik, Managing Director of Megawatt Solutions (which makes reflector-based systems,) compares solar thermal with coal and diesel.

He says to produce a thousand units (kWhr) of electricity using diesel, it costs \$100; with solar thermal you could do it in \$15. One big reason for this is, in solar PV, there is some loss in conversion of light energy into electric energy, whereas in solar thermal, there is no conversion—it is just heat all through.

Now, there is nothing esoteric about using sun's heat for drying. Solar water heaters, for instance, have been around for long. If you go to Shirdi or Tirupathi and peep into the kitchens, you would see solar thermal used for cooking meals for thousands of pilgrims.

Even the use of solar heat in industries is not uncommon. For instance, the cycle manufacturer, TI Cycles, has been using it for drying paint for nearly a decade. TTK Prestige put up a system (pictured here) years ago on the roof of its Salem plant that makes pressure cookers. But the adoption of solar thermal has been tepid, relative to its potential.

Experts reason that the earlier systems were expensive and the bang they gave vis-a-vis the incumbent, fossil-fuel based systems was not that high.

But just as it began to become cheaper, 'solar PV' took off in a major way, due to precipitous fall in module prices (due, in turn, to over supply from China). Users and financiers learned solar PV fast and became comfortable with it; solar thermal just fell behind, lost mindshare.

## Picking up only now

Good news is that it is picking up now. The not-so-good news is that it is still not growing as fast as it could. Jaideep Malaviya, an expert with solar market research and communications agency called Solrico, has estimated that India's solar thermal industry grew 18 per cent in 2018, slower than in 2017, when it jumped 26%; Siddharth Malik feels that the "absolute minimum" growth ought to be 100%.

The question therefore is, how to ginger up things?

A good first step would be to get the government to also pay solar thermal as much attention as solar PV. Well, there is a 30% subsidy for solar thermal equipment, but ironically, as every expert that *The Hindu* has spoken to says it only hinders rather than help.

Customers see the subsidy on paper and want to avail themselves of it, while the administration of the subsidy is so complex that it tires them out. The industry would rather not have it at all. "Subsidy is killing, it causes a lot of heartburn," says Dr. Palaniappan.

Mr. Malaviya suggests that the subsidy scheme be retooled so that it is given to Indian manufacturers, in order to encourage local production rather than in China.

## Key user missing

The meat lies in getting the highest potential user — the industry — to adopt solar thermal. Industry's role is so well recognised that it has given birth to an acronym 'SHIP', which stands for 'solar heating for industrial processes'.

But solar thermal is space-consuming and in a given space, industries tend to use it for the old-familiar, the PV. A move to convince the industry to give solar thermal a shot has emerged in the form of a 'solar payback project', funded by the German 'International Climate Initiative'.

The project aims to promote SHIP in India, South Africa, Mexico and Brazil, and the report on where India should first focus is due soon. Mr. Malaviya, who's involved with the project, says the report has identified three areas — dairy, food processing and pharmaceuticals, and auto components, for early adoption of solar heating.

The dairy sector has tee'd off — biggies such as Hatsun Agro and Amul have begun using steam produced with sun's heat in their processes. (Hatsun fancifully calls its product 'solar ice-cream'.) There are 1,200-odd milk processors; they need most of their energy in the form of heat.

So the ball is rolling, but it needs a good kick towards the goal post. The trick lies in getting the industry deliver the kick. Experts believe that in due course the example set by the early adopters will get more following.

Technology is mature enough on the collectors side, though, according to Mr. Malaviya, in concentrated solar thermal, it could do with some improvements in the trackers, devices that keep the dishes facing the sun. Today's solar thermal plants are capable of producing heat of even around 250 degrees celsius. Once the comfort level goes up, financiers would grow more confident and will chip in, because the returns are decent — upwards of 22%, according to Mr. Malik.

## Opex model coming up

As funds flood in, companies like Sun Best and Megawatt Solutions can do the 'opex model', where they own the equipment and the user industry pays only for the heat delivered. Common in solar PV, the 'opex model' is beginning to happen in thermal, but it needs financial fuel for growth. Solar thermal is a fledgling industry, of limitless potential. In the industry there is a resounding call for the government to be the springboard.

Dr. Palaniappan remembers an idea that used to be floating in the bureaucracy many years ago, for setting up a 'Centre for Solar Drying'. Bring it back, he says. Using the sun for heating is as old as civilisation — solar thermal is, therefore, just going back to basics.

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