



1 MWe Solar Thermal Power Project – India One

Highlights

- India One is a research project and technology such as reflectors/concentrating dishes, receivers, storage, control system etc are developed indigenously with support from internationally renowned experts including Fraunhofer ISE, Dr. Scheffler as research partners
- The plant uses 770 nos. of 60 m² Parabolic Concentrating dish and 16 hour thermal storage technology through which 24x7 operation is possible
- The Project is implemented in the middle of mountains at the spiritual Shantivan campus of Brahma Kumaris by World Renewal Spiritual Trust (WRST) in partnership with Ministry of New and Renewable Energy, Government of India and GIZ
- The project aims at generating clean energy, local employment, technology transfer and develop in-house capacities

Context

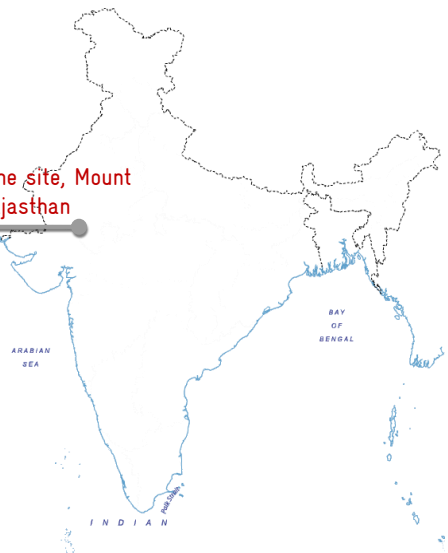
The World Renewal Spiritual Trust (WRST) is a registered public charitable trust and a sister organization of the Brahma Kumaris Institution. The Brahma Kumaris World Spiritual University (BKWSU) is an international non-governmental organisation with spiritual headquarters in Mt. Abu, Rajasthan, India with over 8,500 centres in 100 countries, territories and islands. As a learning community, it currently has more than 825,000 regular students seeking to strengthen their ability to live by their own higher nature and to

improve their contribution to society through spiritual education and reflective practices.

The WRST has initiated 6 large solar steam cooking across India which uses surplus steam for various process applications such as laundry, sterilisation and water pasteurisation. In addition WRST has installed and operates around 100 photo voltaic systems (off grid) with a total capacity of more than 900 kW peak. In 2011, the design and development and installation of “India One”, a 1 MW solar thermal power plant was initiated by the trust in the shantivan campus of



India One site, Mount Abu, Rajasthan



Brahma Kumaris. The research project uses in-house developed 60 m² parabolic dish and features an innovative thermal storage for night operation. The power plant will generate enough heat and power for a campus of 25,000 people.

GIZ's work

GIZ has been instrumental in bringing the international expertise to the project and acts as a nodal point between the Indian and the German Government. GIZ is doing the overall project management and will play an important role in the developing the roll out concept and the marketing strategy for the technology. There is enough scope for bringing the cost down to develop the enhance the attractiveness of the technology.

Activity Details

“India One” solar thermal power plant is based on the three key technologies; parabolic reflectors, thermal storage and rankine cycle. The concentrated solar rays from the 60 m² dishes are focused towards the in-house developed, highly efficient cavity receivers, which are positioned in front of each dish. The innovative receiver is integrated into a heavy iron casting and thus provides an excellent storage. The heat exchanger coil is fully embedded into the thermal storage medium and allows an improved heat transfer. Excellent insulation and an automated shutter avoid substantial energy losses at night or in cloudy condition.

The thermal storage operates between 250 °C to 450 °C and can be discharged on demand. By means of the total thermal mass, the capacity will be sufficient to run the turbine around the clock.

The plant is designed as a captive power plant (off grid) in co-generation to provide electricity and heat for the WRST & Brahma Kumaris, Shantivan Complex.

Up-scaling

The technologies i.e. the reflectors, receivers and storage technologies which are developed in-house have a great potential in different thermal applications such as industrial process heat. Efforts are being made to reduce costs, develop applicability in different sectors and develop partnership with industry sector to ensure the up-scaling and replication of the technology.

Impacts

- The pilot intervention is a means for motivating, educating and showcasing concentrating solar technology in the Indian Solar market
- The project shall directly help in reducing green house gas emissions and shall act as a light-house project for future replications.
- The plant is sufficient to meet the electrical and thermal requirement of about 25,000 people in the shantivan campus.



Imprint

Published by
Commercialisation of Solar Energy in Urban and Industrial Areas (ComSolar)
Indo-German Energy programme (IGEN)
Deutsche Gesellschaft fuer International Zusammenarbeit (GIZ) GmbH
B 5/2, 1st Floor, Safdarjung Enclave, New Delhi 110 029
T +91 11 2671 5952
F +91 11 2616 6844
E comsolar@giz.de
I www.giz.de/en; www.comsolar.in