MAY 2014 ISSUE # 1

"India One"
Solar Thermal Power Plant

"India One" is a R&D project of 1.0 MW el solar thermal power plant and it is executed by the World Renewal Spiritual Trust (WRST), a charitable trust. "India One" will supply power and hot water for the headquarters of Brahma Kumaris (25 000 people) in Abu Road, Rajasthan, India.

"India One" is based on a Concentrated Solar Power (CSP) technology with a unique concept of 770 nos in-house developed 60 SQM flexible paraboloid dishes which offer a static focus with fully automatic dual axis tracking mechanism.

Due to the unique feature of a static focus, there is an advantage of integrating energy storage at the focus. High intensity solar radiation can be injected into a cavity receiver that acts as thermal energy storage; energy can be stored for 16 off-sunny hours, thus enabling 24 hour operation.

Project delivers an indigenous technology suitable for India and provides standardized manufacturing process, enabling replication of the technology

"India One" is partly financed by the Ministry of New and Renewable Energy, Government of India and Ministry of Environment (BMU) Government of Germany via the GIZ.

Salient Features

- *770 nos of 60sqm paraboloid reflectors*
- *Fully automatic network enabled dual axis tracking for each reflector*
- *770 nos of static cast iron cavity receivers with thermal storage for 24 hrs continuous operation*
- *Direct super heated (DSG) steam generation on demand, with no additional heat transfer fluids required*
- *Two stage twin turbine and generator from Siemens*
- *Anticipated power generation – 24 MWH / day*
- *Cogeneration - 1 million ltrs/day hot water at 60 deg.C*
- *Cultivation of vegetables and fruits under solar reflectors*

www.india-one.net

Erection of solar reflectors

R&D Achievements Accomplished

- *Indigenous paraboloid concentrators with static focus*
- *Cost effective and reliable storage mechanism*
- *Robust, simple process control mechanism*
- *Easy operation / maintenance, readily available indigenous spares*
- *Reliability in long term operations*
- *Easy to replicate systems to higher capacities*
- *Creation of local employment & capacity building*

Testing various charging & discharging options of 10 receivers connected in series

Current Work Status

- *450 no's of reflectors were erected.*
- *Solar grade mirror were curved for 650 no's of reflectors.*
- *10 receivers in series were tested with variable flow for thermal storage, DSG and thermal losses.*
- *Turbine and generator were installed and aligned by an engineer from Siemens.*
- *Information dissemination centre for the visitors was established and is operational on the site.*

Installation and alignment of the turbine and generator

Milestones Planned

- *Fabrication, erection of the rest of reflectors.*
- *Receiver fabrication and installation along with piping.*
- *Balance of Plant, piping & instrumentation.*
- *Electricals and controls.*
- *Power evacuation.*
- *Commissioning of the plant.*

Partners, Well Wishers & Team

Ministry of New and Renewable Energy (MNRE) New Delhi, Government of India provides part of the funds under its research and development scheme.

German Federal Ministry for the Environment, Nature Conservational and Nuclear Safety (BMU) within the bilateral initiative "ComSolar" – provides part of the funds under its research and development scheme.

GIZ Deutsche Gesellshaft fur Internationale Zussamenarbeit – GIZ is an implementing agency of the German Government, coordinating support to "India One" project for the German Government.

Fraunhofer Institute for Solar Energy Systems ISE, Freiburg, Germany provides consultancy in the scope of plant simulation and then evaluation of the performance.

"India Care" Trust Berlin, Germany – a long standing partner of WRST in renewable projects.

Brahma Kumaris World Spiritual University is a parent organization of the WRST. It is an NGO that teaches meditation, values and ethics, with headquarters in Mount Abu; they are the user of the power and heat generated by the plant. (www.brahmakumaris.org; www.environment.brahmakumaris.org)

Visit of Project Director ComSolar GIZ in India

India One team of volunteers

Local team consists of abt 50 engineers and project support staff; competent and dedicated volunteers coordinating the project activities on the site. The team is in close liaison with number of engineers and manufacturers in India and abroad.

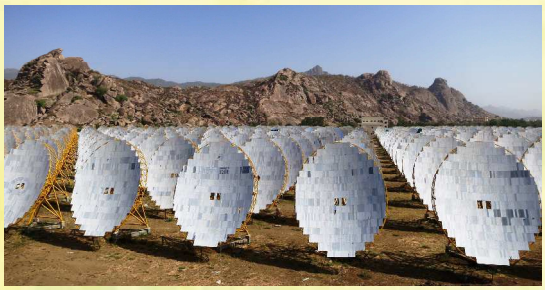
Skilled workers are contracted by the WRST in the construction and maintenance of the power plant.

"India One" project aims to build the capacity and expertise so that the technology and design can be replicated in order to offer cost effective, clean and decentralized alternative to conventional power generation.

Information Dissemination

"India One" project is daily visited by many guests who are interested and willing to learn about the solar energy and the new technology.

Among the visitors there are students of engineering colleges, potential users, both institutional and individual, companies working with renewable energy and various VIPs, from India as well from abroad.



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