

Solar cooking profits socially challenged people



Photo courtesy: Clique Solar

Clique Solar have designed, installed and commissioned two separate cooking systems, one with Arun®100 and another with Arun®30 at Maharogi Sewa Samiti's (MSS) headquarter Anandwan in Chandrapur district in Maharashtra state. Arun®100 caters to MSS Kitchen while Arun®30 is installed at their guest house.

The Arun®100 system is installed on the ground near the kitchen and supplies steam directly / through accumulator to cooking equipment. This facility cooks close to 4,000 meals (for 2,000 inmates out of 2,500 who dine at Mega Kitchen) of Anandwan on a daily basis. The meals include breakfast, lunch and dinner. It consists of 8 stainless steel cooking vessels. While 4 of these are steam injection type the other 4 are with steam jacket. This enables flexibility to the cooks to cook different foods.

The Arun®30 system is also similar to the system described above except for the size of the storage and cooking vessels. Cooking from steam delivered by Arun®30 is carried out in 3 cooking vessels.

This dish maintains the face of the collector surface normal to the solar radiation at all times thus avoiding cosine losses and maximising the dish efficiency. Solar radiation falling on the reflecting Fresnel paraboloid collector surface comprising high reflectivity low-iron imported solar-grade mirrors, carefully assembled into specially designed and aligned frames, is concentrated at a single point (the focus) at which the receiver is placed. The delivered steam flows in stainless steel to an accumulator vessel. Depending on the demand for steam at the cooking vessels, the steam is delivered for cooking or stored in the specially designed pressure vessel. Storages in both the systems enable cooking for breakfast even during dark hours with the use of stored steam.

Both installations are supported with backup boilers. The back-up boiler for Arun®100 operates on biogas generated within the Anandwan premises while the Arun 30 backup boiler operates on LPG.

To take care of the hardness in water Clique Solar a softening plant is utilized which feeds to the solar thermal concentrators. The system is provided with several inherent safety features to protect the plant from potentially harmful situations such as high temperature, high pressure, lack of flow, high winds etc.

MSS Anandwan is a nonprofit organization in Central India helping socially challenged people to enhance their livelihood capabilities through self-discovery and empowering them to contribute back to the society. It has set an excellent example of using environment friendly technology for its cooking needs. Use of steam from solar energy reduces the greenhouse gas emissions making a small contribution to the global environment while making the kitchen environment healthier for the kitchen personnel.

Fiscal incentives draws attention of Telangana industries



Photo courtesy: GEF-UNIDO CST project, India office

In continuation of the series of workshops on promoting penetration of high temperature solar thermal systems Global Environment Facility and United Nations Industrial Development Organization (GEF-UNIDO) in partnership with the Ministry of New and Renewable Energy (MNRE) organised an event at Hyderabad on 15th September 2016. Wide participation and support from industry has been ensured through close cooperation with the State Nodal Agency Telangana New and Renewable Energy Development Corporation Ltd. (TNREDCL) and Confederation of Indian Industry (CII) for the workshop.

The workshop focusing on promotion of “CST technologies for Industries” provided a platform to a large number of senior industrial representatives in and around Hyderabad to have open discussions with the consumers and manufacturers of CST systems.

Dr. Anil Misra, National Project Manager, UNIDO in his welcome address explained the barriers associated with technology adoption, and also shared details on the most suitable solar thermal technologies. The financial viability of scheme through interest subvention was explained in detail by K P Phillip, Assistant General Manager, IREDA.

Dr. Ram P Goswami, Director, Ministry of New and Renewable Energy (MNRE), in his address placed a great emphasis on the fact that industries should be proactive and come forward to contribute by implementing high temperature solar thermal projects and help the government realise the goals. Outlining some of the facilities extended by the Government, Goswami said the CST installation includes MNRE subsidy of 30 per cent of the solar project cost, tax benefit from the Government apart from additional finance support from UNDP and UNIDO projects.

Mahesh Desai, Convenor, CII Telangana MSME and EXIM Panel shared that a circular on the potential sectors present in Telangana which could adopt CST technology would be prepared and circulated with all members and workshop participants. G V S Prasad, General Manager, Telangana New and Renewable Energy Development Corporation Ltd. (TNREDCL) praised the scheme operated under GEF-UNIDO for industries and makes the projects affordable. The presentation from (TNREDCL) shared a few details on the concentrated solar thermal projects commissioned and underway in different locations in Telangana.

Earlier in the day, a number of companies shared their experiences in implementing CST projects. Unique Biotech, a Hyderabad based company, which had been using about 200 litres of furnace oil a day, has managed to fully replace the use of the furnace oil with a CST project.

The workshop highly benefitted the participating industries to understand the gains that can be obtained under the GEF-UNIDO programme in alliance with the MNRE and IREDA fiscal incentives.

<http://www.mnre.gov.in>

Industry demands equal assertive publicity for solar thermal



Photo: (L-R), Rigal Patel, Bhoovarhan Thirumalai, Devinder Kaushal, Jaideep Malaviya (STFI), Saurabh Bhandari and Chandrakant Shah, courtesy: STFI

A panel discussion involving solar thermal industry majors on “Policy and regulatory Framework for Solar Water Heater Market development in India” was held during the Renewable Energy India Exhibition and Conference 2016 held near New Delhi. It was conducted by Solar Thermal Federation of India (STFI).

Devinder Kaushal (Inter Solar Systems), Saurabh Bhandari (SolarMaxx), Chandrakant Shah (Kosol Hiramrut Energies), Rigal Patel (Redsun Solar) and Bhoovarahan **Thirumalai (Aspiration Energy)**.

Solar energy in India is a fast developing industry and ranks amongst the top five growing nations globally. However solar thermal seldom receives attention as much of the development is focused around Photovoltaics (PV). This was a common concern raised by the panellists despite the fact solar thermal particularly solar water heater had immense potential in India. They urged the government to provide equal assertive publicity that PV receives and common masses still need to be made aware on the benefits of solar thermal. This is somehow taking away the attention of a common man and given an open space the first thought comes to mind is to put a solar power system. Earlier a solar water heater would find priority as the solar energy system for any house. The message should be made clear that unlike PV that generates power solar water heater saves power, which is one of the uppermost electricity cost for a typical residential family.

Saurabh Bhandari advocated for print and the social media publicity to be intensified as the present times offer various channels to reach the masses. According to him newspaper publicity still is an eye-catcher for educating masses.

Post subsidy halt in mid-2014, the markets descended but the graph has once again started moving northwards in the last 12 months as per statistics collected by STFI. This is also keeping in mind oil prices are softening and challenging the prospects. Shah said “Subsidy was introduced to create awareness about the product and once the masses who have already accepted it as an essential commodity hence removal of subsidy have hardly impacted business”. “Hilly regions in northern India where utilisation is lesser compared to the flat regions of India have witnessed maximum drop in sales as they received 60% capital subsidy” informs Kaushal.

The introduction of Bureau of Indian Standards (BIS) was appreciated however panellists called on the government to make it mandatory for all future systems in order to keep check on spurious quality, largely imported. Poor performance is also one of the factors for not keeping up people’s confidence hence resting from buying solar thermal systems. Contrary Bhoovarahan of Aspiration Energy, that specialises as an ESCO company said industrial consumers are more quality conscious as they desire performance hence any inferior component will never find place in their business irrespective of the mandatory BIS.

There was a divided opinion on the impact of business by way of proposed Goods and Services Tax (GST). Patel told that selling price will certainly rise as these systems have up to 5.5% Value Added Tax (VAT) against the proposed GST of 18%. The cost price may although not see any change as there will be set-off available against raw materials purchased. In the event the industry’s demand for removal of GST is not accepted the manufacturers are getting geared up to face this quandary and keep the prices affordable.

Patel called on Municipal Corporations to amend bye-laws on priority making mandatory implementation of solar water heaters for all future residential buildings. He cited the success story of Rajkot Municipal Corporation. Kaushal also echoed similar opinion of the market success with the mandatory clause in by Haryana state government.

Due to fierce competition in certain regions of India the manufacturers need to offer innovative solutions to fulfil the needs of every residential house but in a cost effective manner. Bhandari enlightened that SolarMaxx will soon offer systems that can cater to hot water needs of every family in high rise buildings. Shah hinted at development of cost-effective storage tanks developments that will take care of hardness of water.

Though solar thermal business continues to get stumbling blocks but the positive body language of industrials will make it a smooth ride.

<http://www.renewableenergyindiaexpo.com>

<http://www.stfi.org.in>

Kasturba Medical College commissions concentrated solar thermal system



Photo courtesy: Quadsun Solar

KMC Manipal Hospital – Mangalore in Karnataka state has commissioned solar concentrators with a combined 44 m² area comprising of 10 dishes supplied by QuadSun Solar through their Channel Partner Apollo Power Systems Pvt Ltd. The systems rest on an elevated platform over 90 m² area. The multi-speciality KMC hospital has hot water requirement of close to 8,000 litres per day at temperatures up to 70 °C. With the aim of reducing electricity consumption and as a part of the Green Energy Initiative the management in August 2015 decided to consider a high efficient concentrated solar thermal system and shortlisted QuadSun Solar Model :- CST-3500 which was successfully installed commissioned and handed over in April 2016.

Water circulates through the receiver which is placed at the focus of concentrated solar dish transferring the thermal energy from the sun to the circulating water and this heat transferred to process line using highly efficient plate heat exchangers. Each of the dishes deliver 50 litres/hour up to 70°C under at 1,000 watt/m² of Direct Normal Incidence (DNI), claims the supplier. A robust tracking system reduces the Operation & Maintenance (O&M) expenses significantly and is regularly monitored with the help of a SCADA. : System is monitored continuously for performance analysis. Solar loop temperature and process line temperatures are logged automatically into SCADA Data files after 5 minutes interval. Problems can be remotely monitored for quick action. The hospital maintenance staff have undergone extensive training by the suppliers to ensure Zero downtime This project showcases the technical and commercial viability of solar thermal systems for satisfying institutional hot water needs efficiently with minimum usage of space.

<http://www.kmhospitalsmangalore.com/>

Solar Thermal focus of R&D at Oorja Energy



Photo courtesy: Oorja Energy Engineering Pvt. Ltd

Oorja Energy Engineering Pvt. Ltd (OEEPL) is focus their Research & Development efforts on thermal storage systems and have successfully developed a prototype high efficiency Parabolic Trough Concentrator using CSP-grade components for Industrial Heating market. The company sees inherent disconnect between the solar heat generation and process heat requirement and will be an advantage to the industries.

Any typical industrial heating systems allows for control on the feed-rate of fuel delivery depending on the load demand. Diesel, electricity, natural gas etc. can be fed to the heating system at desired rate based on the demand. However, the feed-rate of heat input cannot be controlled by a solar thermal system, thus calls for the need of thermal storage in many cases.

Based on this experience, the company is working with a couple of prestigious technical institutes in the area of thermal storage for industrial process heat. OEEPL believes in collaborative research by engaging with top technical institutes in India (and some abroad too) and already has success with such engagements for research & development in building energy efficiency.

The company plans to evaluate both sensible and latent thermal storage systems under this R&D effort. The materials being considered by the company in this effort are $\text{KNO}_3 + \text{NaNO}_3$, Cast Iron, Graphite and Synthetic Pebble Bed.

This collaborative R&D effort will help the company in identifying and deploying optimal solution for thermal storage for industrial process heat applications. OEEPL plans to start rolling out the solution by the end of 2017.

In the past OEEPL has already successfully implemented thermal storage system using a double jacketed steam storage system for Devnar School for Blind.

OEEPL was recently conferred with WWF-India's Climate Solver award under the GHG Reduction and Energy Access category.

<http://www.oorja.in/>

DIHAR successfully tests evacuated tube shelter heating



Photo courtesy: Solar Thermal heating of shelter by DIHAR (inset Sarfaraz Nazir),

The Defence Institute of High Altitude Research (DIHAR), a Defence Research Development Organisation (DRDO) laboratory based at Leh, has made a breakthrough by developing and successfully testing a shelter for troops by utilising solar heat harnessed during the day for heating rooms during the night at extreme altitude. It is the world's highest research station set up in 2015.

The collector has 30 tubes each of 1800 mm long and is able to save anywhere between 6-10 litres of kerosene in a day up to temperatures of -30°C .

Conventionally, the Army uses "bhukaris" (a wood burning stove heater) and generator-run electrical appliance to heat spaces like barracks and bunkers in Ladakh as well as the North-East, consuming lakhs of litres of kerosene and diesel every year.

The pilot installation was tested at a shelter built at Chang La, in Ladakh located at 17,600 feet above sea level, with temperatures as low as minus 40°C . The shelter size is about 90m^2 . The shelter maintains a temperature of $7-10^{\circ}\text{C}$ when the ambient temperature is -30°C . However, there is a need to operate a diesel generator for six hours during the peak winter months (January and February) when the temperature falls below -30°C .

Sarfaraz Nazir the Scientist at DIHAR said "The idea struck my mind in early 2014 when I collected the Solar radiation data of this area and found that both the intensity and sunshine duration of solar energy are on higher side and this can be used very efficiently in warming the closed space if suitable solar thermal system were selected in place of fossil fuel based heating systems. I started working on designing a prototype and finally after 18 months of research succeeded in setting up a prototype."

The scientists at DIHAR have used HS 29 (mixture of CaCl_2 and other salts) type phase change materials (converting solid to liquid and liquid to solid on change of temperature, thereby releasing heat) to store thermal energy collected from evacuated tube solar collectors. It has a greenhouse based thermal trap area over the roof and utilises greenhouse concept for creating a tunnelling effect to trap solar heat in the shelter.

This new environmentally benign development is seen as a major breakthrough that will benefit in such ecologically sensitive areas, besides reducing greenhouse gases. With this successful pilot shelter DIHAR is now planning to magnify these installations at several hundreds of other installations.

<http://www.drdo.gov.in/drdo/labs/DIHAR/English/index.jsp?pg=homebody.jsp>