News for the month of September 2015

India amongst top 5 attractive process heat markets

SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

Aggressive policy mechanisms, UNDP-GEF program and uncertainty of fuel oil prices has made solar thermal process heat an attractive market in India according to Task 49 *Solar Process Heat for Production and Advanced Applications* of the International Energy Agency Solar Heating and Cooling Programme. The most comprehensive online database of solar process heat projects available at www.ship-plants.info includes 155 solar process heat projects (as of May 2015) with a total solar thermal capacity of 101 MW_{th}.

Chile, China, the USA, India and Austria are the leading the ranking of the volume of installed solar process heat collector area as given in Table 1 below.

Country	Total collector area of solar process heat projects [m²]	No. of solar process heat projects	Average project size [m²]
Chile	39,740	2	19,870
China	29,051	9	3,228
USA	23,993	18	1,333
India	**9,140**	**15**	**609**
Austria	7,840	23	341
Greece	5,553	10	555
Germany	4,774	21	227
Spain	4,089	14	292

Table 1: Database ranking of the countries with the largest solar process heat collector area, Source: Task 49

The food industry is the most frequent industry sector for solar process heat according to the online list. The solar plants in the textile industry are mostly based in Asia, at leather producers or printing and dyeing workshops. Breweries using solar can be found all around the world, with projects in Austria, China, the Czech Republic, France, Germany, Greece, Saudi Arabia, Tunisia and the United States.

Flat plate collectors are dominating SHIP installations: 65 % of the registered plants are equipped with this collector type, 21 % with vacuum tube collectors, 7 % with parabolic trough concentrators, 5 % with air collectors and 2 % with unglazed collectors. The statistics are based on May 2015 figures of 155 projects with a total collector area of 144,406 m².

The SHIP database is one of the major outcomes of the four-year research programme Task 49 / IV Solar Process Heat for Production and Advanced Applications. It is a joint task between the two IEA Implementing Agreements Solar Heating and Cooling and SolarPaces. 57 participants from 16 countries worked together on different subjects, of whom 33 % have an industrial background and 67 % are researchers. Additional results include a report on Overheating prevention and stagnation handling in solar process heat applications published in January 2015 and the Integration Guidelines posted on the Task 49 subpage in February 2015 (find both studies attached). The task will end in January 2016.

http://www.TAKS49.iea-shc.org
http://www.solarthermalworld.org

Solar Desalination project exported in Oman

Photo courtesy: Essential Equipments, Dhule

Caledonian College of Engineering, Oman has commissioned a concentrated solar thermal desalination part as a part of their Research & Development. The project funded by Government of Oman got inspired by Prof. Ajay Chandak's Ph.D. in solar desalination. The entire turnkey job was executed by Essential Equipments, Dhule from Maharashtra.

There are 2 dishes each 16 m2. It is a multi-effect evaporation system coupled with solar steam generation at 10 bar in the first stage. There are three effects added to increase the net gain making it 4 stage system. Sensors are cconnected to data loggers for getting all data in real time.

Professors of the Engineering College came to Dhule to meet and discuss how they can proceed on developing the test setup. That time they had no intention of placing the order, rather decided procuring only Schefflers and then do the rest of work on their own. Informs Prof. Chandak "After our meeting and discussions and later visiting Essential Equipments they thought it's better to develop the setup here."

Field trials in presence of Oman representatives were conducted at the R& D centre Dhule in May 2015 as part of pre-dispatch inspection. Commercial viability of such projects is difficult as evaporation is energy intensive process while other water treatment options like RO are much cheaper. However if laboratory grade distilled or DM water is required then this may workout.

According to authorities at Essential Equipments, packing and transportation required special care as getting installation assistance in Oman is difficult and labour is expensive. The entire installation was completed in record 7 day's time. All the raw materials used were shipped.

http://www.cce.edu.om/

Delegation profits from European knowledge

Photo: The Indian delegation that toured Europe, courtesy: UNIDO India CST project

A group study tour to learn the European experiences of the thermal applications in the industrial sector using concentrating solar technologies (CSTs) was organised by United Nations Industrial Development Organisation (UNIDO). It comprised officials of central and state governments, besides representatives of financial institutions, academicians and industries. The delegates visited Austria, Switzerland and Germany to learn and recognise the points of intervention and innovation from both the consumer and manufacturer side.

The delegates visited the food processing units that included a meat processing unit, brewery unit and a cheese producing dairy industry using different solar thermal technologies. Visits to four manufacturers of solar thermal technologies which include flap plate collectors, parabolic trough collectors and Fresnel systems were also made.

The technologies covered were flat plate collectors and parabolic trough collectors. It is important to note that all the three industries visited are part of the food processing sector. This careful selection was made as the technology integration process in such industries is very specifically designed such that the stringent food norms of the country are maintained. The efficiency of the heat exchanger systems, the storage process and the closed loop processing systems are the several points of interventions such that hot water from the CST system does not come in direct contact with the industrial food product.

The study tour apprehend European companies are investing heavily in research to understand which technology works best for given conditions such that more customised solutions for different conditions can be created. German Aerospace Centre (Deutsches Zentrum für Luft- und Raumfahrt; DLR) are also working on system improvement in more controlled settings, also through effective public-private partnerships. Overall the tour was a great experience to understand the industrial integration for CST technologies and also to understand the motivations behind industries adopting such technologies.

One point that all the delegates agreed on is that although India is often referred to as sun-shine country, the hours of receiving a strong DNI are very few to allow for efficient running of the system. The focus should be how more diffused radiations can also be collected in the process improving efficiency of heat exchangers. The tour displaced the previously held belief that for India the primary focus is the efficiency of CST technologies. It was well recognised that improvement in technology would not add to efficiency as much as modification and designing of the industrial process with specific addition of flow valves, pumps and heat exchangers can.

http://www.unido.org

Easy financing to be emphasis under UNDP-GEF programme

Preview meeting of the consultants and stakeholders under the UNDP-GEF-MNRE concentrated solar thermal heating (CSH) program was held in New Delhi to share their developments.

Representatives from PricewaterhouseCoopers, IT Power, The Energy Resources Institute, World Renewable Energy Spiritual Trust, Eco Axis, Andhra Pradesh Industrial and Technical Consultancy, School of Energy Studies - University of Pune and Solar Thermal Federation of India presented their updated developments in presence of MNRE and UNDP officials.

PricewaterhouseCoopers have conducted six workshops involving banks and are getting between 40-45 participants, which speak of the interest shown for financing CSH systems. In fact Syndicate Bank is shortly planning to float a financing scheme for CSH systems with attractive interest rates.

Dr. Indu Keoti of EcoAxis gave a comprehensive overview of the results of the tests undertaken on 15 systems and is very vital to understand for future projects so as to optimise the output.

The impact of couple of hands on training and seminars undertaken by World Renewable Spiritual Trust (WRST) was shared B.K. Jaisimha. Targeted largely to develop technicians as installers Jaisimha shared the success of some of the participants and should be helpful for manufacturers in future to source human resources. He also shared an innovative 28 m2 moving focused parabolic dish. WRST would be conducting six training programmes and nine seminars for awareness of CSH systems in future.

IT Power displayed the drafts of booklets for various CSH technologies that provide with significant information in a comprehensive format and will be helpful to apprehend for potential customers.

Since initial financing is still an issue that is preventing the end users from considering CSH systems it was agreed to address this concern with events involving bankers and financial institutions. The Syndicate Bank model will be studied and will be treated as pilot for other banks to consider.

http://www.cshindia.in

Mixed reaction to currency turmoil

Chinese currency Yuan hit a four-year low by September 2015 and simultaneously Indian Rupee weakened against US dollar. The devaluation is aimed at boosting China's exports; it is expected to have a direct impact on economies competing with China on that front. The move is likely to witness Chinese import surge. A reduction in the cost of Chinese goods can also exacerbate the problem of dumping into India from China.

While majority of the components are domestically produced hence the impact will be less felt. Components like quality steel and mirrors that are largely imported seldom come from China. The resultant situation may pressurize manufacturers to increase their cost and it will be a further challenge considering Oil prices are also on the decline. Concentrated solar thermal industries in India have share mixed reactions to this turmoil.

Dharmendra Gor gratifyingly puts it "since we use all indigenous components hence we were not impacted by the current financial fluctuations. However one should give thought to explore exports but it will require extensive marketing exertion."

Geetanjali Choori of Leveragenet Solutions Pvt. Ltd. Informs that nearly 25 per cent of their raw material is imported from USA. She adds" Instead of levying import duties on Chinese products, India should consider how to empower Indian Suppliers similar to what China has done, by supplying them with working capital and financing them."

An official at Clique Solar puts it that the US dollar has also simultaneously risen and since the mirrors are imported from Europe hence the prices will rise on the contrary. Its time India manufacturers shop their products outside India and invite industries from other potential countries with process heat requirement and also dependent on import of oil.

Sanjay Jinturkar of Sudarshan Saur Shakti one of the largest manufacturers of solar water heaters and importing evacuated tubes also feels that the situation has become ripe for Chinese evacuated tube manufacturers to dump their products in India considering our huge market of nearly 1million m2. However the simultaneous weakening of Indian Rupee may negate the effect to some extent. It may be noted that India imports all the evacuated tubes almost from China for the use of solar water heaters

Given the circumstances government should give support to solar thermal manufacturers in terms of low interest working capital financing in order to enable it realise its goals set under various programmes.

“Make in India” high temperature glass mirror

Photo courtesy: ARS Glasstech, Vadodara

Delivering promise on “Make in India” crusade set by the government of India, the country finally has a domestic high temperature glass mirror manufacturer. Concentrated solar thermal systems in India relied on imports of mirrors. Taking note of this hitch Vadodara based ARS Glass Tech Pvt. Ltd., a vibrant engineering solutions company developed mirrors required for concentrated solar thermal projects requiring heat up to 250 ^{O}C.

Deepak Gadhia, developer and promoter of Scheffler dishes in India was the inspiration. Following his guidance and gathering his learning experience ARS started the Research for the failure of mirror supplied in India. To make a beginning he placed order for 1,400 m2 mirror for the Solar Air Conditioning Plant of Muni Seva Ashram of 100 TR for which they had to replace the existing mirrors.

Rajesh Verma, explains “Our highly trained and researched team, engineering facility and technical expertise, enables us to offer products to satisfy the needs of the target industries.”

There are a handful of global mirror manufacturers supplying for concentrated solar thermal as they have to be of special type i.e. low iron and sustaining the high temperatures. These manufacturers make specific size of mirrors largely used for solar thermal power generation and are large in sizes. Considering the low volume demand in India they are reluctant to make in smaller sizes due to economies of scale. Transporting such large sizes of mirrors often becomes expensive.

ARS caters to client’s requirement by providing desired sizes of mirrors. Glass is cut using special CNC glass cutting machines and sealed from the sides. The back coating is done using special coat. The company claims its mirrors are 50% cheaper than imported mirrors. The mirrors carry a warranty of 5 years and have certification from by SGS lab, Switzerland, Solar Energy Centre, Gurgaon and SISECAM, Turkey

Their mirrors used are successfully put to use by developers like Muni Seva Ashram, Vadodara; Jimmy McGilligan Centre for Sustainable Development, Indore; MegaWatt Solution Pvt .Ltd- Delhi; Enersun Power Tech Pvt Ltd- Mumbai and Taylormade Solutions Pvt Ltd. Ahmedabad.

To keep its momentum going ARS is looking forward to government support for providing platform to present about their product and also display in prominent events.

http://www.arsglasstech.com/