



IND

2014

CLIMATE SOLVER 2013 AWARDEE

GHG Reduction: Decentralized Solar Thermal System for Industries

Developed by: Aspiration Energy Pvt. Ltd

Innovation

Process heat is vital to nearly all manufacturing industry processes. According to statistics, the global demand for industrial process heat below 120° C is 7 per cent of the global energy demand. That's almost 30 per cent of the total industrial process heat demand.

Traditionally industries use electricity, high speed diesel or furnace oil to achieve process heat temperatures ranging from 70° to 120° C. Besides being expensive, reliance on fossil fuels leads to emissions of pollutants and greenhouse gases. Aspiration Energy, a Solar Energy Services Company, has developed a way to meet low temperature process heat demand through decentralized energy generation based on solar thermal system.

The decentralized solar energy generation system uses solar collectors - Evacuated Tube Collectors (ETCs) - that normally heat up to about 70° or so. But through technology innovations in fluid pressure, system design and module design, Aspiration Energy has been able to achieve temperatures of more than 100 degrees.

Unlike other solar thermal systems that need concrete roofs or ground space, these solar collectors can be installed on otherwise unused trussed factory rooftops. Moreover, these systems can also be retrofitted with existing heaters or boilers. In this case, they work in a hybrid mode delivering thermal energy whenever solar radiation is available, reducing fossil fuel consumption.

Another unique feature of Aspiration's system is the innovation in their business model. They offer a 'pay as you save (PAYS)' price model where customers only pay a monthly fee of 50 - 75 per cent of their monthly savings created by the use of solar system. Thus, per unit energy cost comes down to Rs 3 to 5 in



Solar thermal system installed on an industry rooftop

this financial model, resulting in significant savings for the customers. These features make it easier for industries with space and financial limitations to switch to a green solution.

Benefits

Global potential for Aspiration's decentralized energy generation system is significant as it is a cheaper and greener alternative to fossil fuels. The estimated global GHG emission reduction through wide scale utilization of this system in industrial sector is likely to be 26 million tons by 2023.

About the Company

Aspiration Energy Pvt. Ltd is a Solar Energy Services company based in Chennai, providing decentralized solar energy solutions for industrial process heating and solar powering of telecom towers on a unique monthly performance based energy charges model - PAYS (ESCO) model. So far, Aspiration Energy has executed eight commercial scale solar thermal installations for industrial process heat projects equivalent to 1 MW_{th}.

CLIMATE SOLVER 2013 AWARDEE

GHG Reduction: ARUN[®] Dish - Fresnel Paraboloid Solar Concentrator System

Developed by: Clique Developments Ltd

Innovation

According to International Energy Agency (IEA) estimates, total energy consumed by industrial sector worldwide was 2556 Mtoe (million tonnes of oil equivalent) in 2011 which is nearly 30 per cent of the global total energy consumed. Process heating application is one of the major energy consuming activities in industries. These applications include combustion processes that generate GHG emissions. Therefore, there is a need to identify, develop and utilize clean energy options.

The heat requirement for many industrial processes ranges below 400° C. Such processes account for a significant share (nearly 57 per cent) of the total industrial process heat demand, also indicating significant potential for the application of solar thermal applications at medium and medium-to-high temperature ranges.

ARUN[®] dish is a Fresnel Paraboloid Solar Concentrator System with a point focus based on assembly of solar grade mirrors as reflectors. The receiver of ARUN[®] is designed to operate at temperatures up to 300° C and pressure up to 20 bar steam. Thus, it works as a solar boiler, substituting the consumption of conventional fuels such as Furnace Oil, High Speed Diesel (HSD), Piped Natural Gas (PNG), coal, etc.

The system automatically tracks the sun from morning to evening using a proprietary electronic tracking system. The receiver is placed at the focus of the paraboloid concentrator. It is an inverted cavity type receiver with mild steel tubing as per the required pressure. ARUN[®] design integrates the technologies for complete automated operations, built in safety provisions as well as two axes tracking of the sun.

The ARUN[®] dish system can be used in hybrid mode i.e. it can be retrofitted to the existing boiler or heater system. Thus, in this mode, it delivers thermal energy whenever solar radiation is available and saves fossil fuel consumption. Also, ARUN[®] dish is mounted on a single column, thus occupying ground area of less than 3m x 3m. This makes it suitable to be installed in areas with space constraints as well as on rooftops. In India, ARUN[®] is the first IBR approved Solar Boiler. Also,



MNRE provides support by way of capital subsidy or soft loans for ARUN[®] installations. Depending upon the fuel being substituted, the ARUN system payback ranges between two and four years in India at current prices of liquid fuels.

Thus, with its indigenous solar concentrating design, ARUN[®] dish provides economical process heat for heating, cooling and cooking requirements in industries, hotels, residential and commercial complexes.

Benefits

ARUN[®] dish with its innovative solar concentrating technology can significantly reduce dependence of industrial and commercial sector on traditional fossil fuels for thermal energy needs. Assuming wider global deployment, this technology has a potential to mitigate 28 million tons of GHG emissions by 2023.

About the Company

Clique Developments Ltd with its pioneering and indigenous Concentrated Solar Thermal Technology (ARUN[®] dish), provides economical process heat for industries, hotels, residential and commercial complexes. Clique solar has installed the ARUN[®] system for different applications in various organizations including industries such as dairy, automobile and chemicals.



CLIMATE SOLVER 2013 AWARDEE

GHG Reduction: E Grid - A Low-Cost, Scalable Platform and Analytics for Demand Side Management

Developed by: Ecolibrium Energy Pvt. Ltd

Innovation

The industrial sector uses almost 43 per cent of the world's total power consumption. With fluctuating availability and rising power prices, the need of the hour is to monitor power consumption and analyze this data to optimize usage and savings.

For power management, industries either use manual readings of on-site meters or wired inflexible energy management systems. But these solutions prove expensive for small and medium scale industries especially in developing countries like India. Moreover these developing nations are struggling to meet their growing energy needs, and therefore management of available energy becomes critically important.

To fill this gap, Ecolibrium Energy in Ahmedabad has developed a platform called E Grid. The E Grid infrastructure is a virtual platform which hosts different applications that monitor, control and optimize energy consumption at the user's end.

E Grid infrastructure comprises of a wireless enabled sensor that can be retrofitted on an existing electric meter. A basic sensor can connect up to eight electric meters and provide minute by minute power usage readings for each one. It then transfers this data using wireless technology like GPRS or Zigbee to a cloud server. Ecolibrium's indigenous E Grid application called Smartsense tracks and evaluates consumption data according to preset parameters. Because the data is stored on a cloud server, the consumer too can access and monitor this information. Smartsense identifies supply strength and quality, manages



E Grid installed in an industry

demand in peak load periods and can even switch off the devices to prevent wastage. It also sends automated usage and critical situation alerts to management systems.

Ecolibrium Energy provides customized reports on usage patterns and offers action-oriented solutions to minimize wastage and optimize consumption of available power. Smartsense offers a suite of different products catering to varying industry needs across sectors ranging from food processing, FMCG, textiles and pharmaceuticals. The E Grid can also monitor various other physical parameters including temperature, water flow and gas pressure. Because it uses a virtual platform, it saves the consumer wiring, operational and maintenance costs, creating savings ranging from 5 to 25 per cent for commercial and industrial users.

Benefits

Global energy saving and resulting GHG mitigation through large scale utilization of E Grid solution in industrial sector can result in reduction of estimated 21 million tons of GHG emission by 2023.

About the Company

Ecolibrium Energy Pvt. Ltd is a Smart Grid service provider in India. It was incubated at Centre of Incubation Innovation and Entrepreneurship (CIIE) under the Renewable Energy Search Program in partnership with Ministry of New and Renewable Energy (MNRE). Ecolibrium has more than 200 customers including large industries, governments and power utilities.

