

OCV Glass Fibre Products, Hyderabad

General Information

Technical Description

Energy balance

Economy

Experiences

General Information

Description of the company : OCV Reinforcements Manufacturing Limited is a daughter company of the US company Owens Corning Inc. In India OCV Reinforcements is a market leader of glass fibre products. The total annual production capacity is 18,500 Tonnes. The annual sales turnover during the year 2012-2013 was around INR 1.20 Billion.

Type of Industry : Glass fibre products manufacturing

Location of the company and the solar plant : M/s Owens Corning Industries (INDIA) Pvt Ltd.,
Timmapur Highway,
Hyderabad- 509 325.
www.ocvreinforcements.com

Heat demanding processes : Hot water is required for mixing of chemicals. The required hot water temperature is about 85°C. The factory is operating continuously in three shifts a day.

Conventional heat supply : The back-up heater to the SWHS is an electrical heater of 4.5 kW capacity.

Conventional fuel used : Beside solar thermal energy, only electricity is used for water heating.

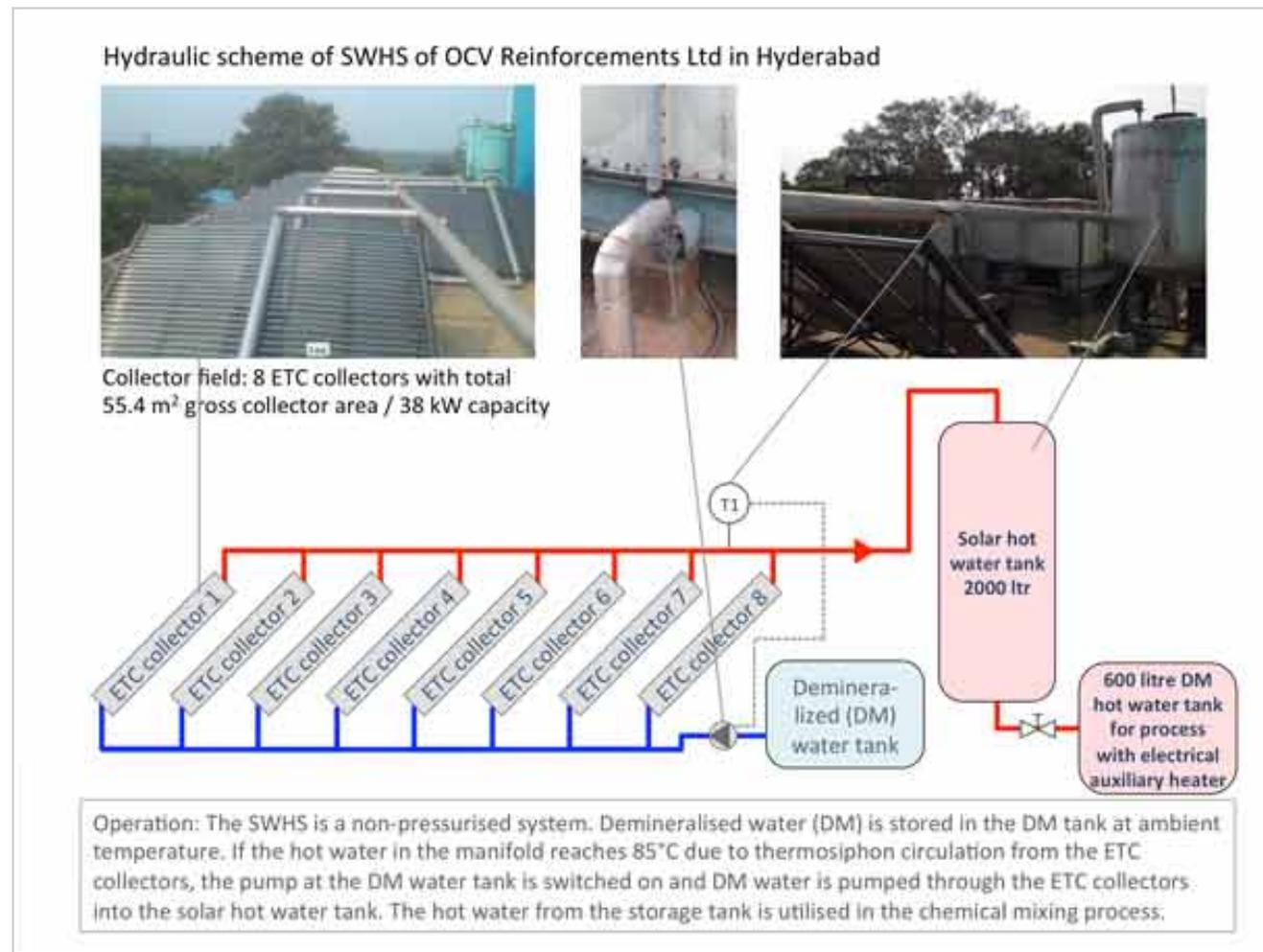
Motivation to use solar thermal energy : The company aims to increase energy efficiency and reduce electricity consumption by using solar water heater.

Description of the solar thermal system

Type of solar plant : Non-pressurized solar water heater system with ETC collectors with a solar water storage tank of 2000 litres.

Year of installation	:	The SWHS system was commissioned in 2010.
Solar collector field	:	8 evacuated tube collectors (ETC) are installed in parallel with 6.93 m ² total gross collector area per collector and 55.4 m ² in total. The panels are installed on the flat roof of the factory building.
Water storage	:	Solar hot water storage tank of 2000 litres.

Hydraulic scheme and operation of the system



The SWHS is a non-pressurised system. Demineralised water (DM) is stored in the DM tank at ambient temperature. If the hot water in the manifold reaches 85°C due to thermosiphon circulation from the ETC collectors, the pump at the DM water tank is switched on and DM water is pumped through the ETC collectors into the solar hot water tank installed at the rooftop of the unit building. The hot water is flowing to the process by gravity, since the hot water requirement is on the ground floor. There is a control valve for ON/OFF purpose. The hot water from the storage tank is utilised in the chemical mixing process.

Supplier/ manufacturer of the solar system : The solar system was designed, delivered and commissioned by:

M/s Photon Energy Systems Limited
Unit 19, Mount View Enclave
Road No. 12, Banjara Hills
Hyderabad 500034
www.photonsolar.in

Data recorded : There are no data logged.

Energy balance

Heat demand : It is assumed, that the factory requires 2000 litre per day of 85°C hot water and the cold water temperature is about 30°C.

Then the energy demand per day for hot water heating is:

$$Q_{\text{daily}} = 2 \text{ m}^3/\text{day} * (85^\circ\text{C} - 30^\circ\text{C}) * 1.16 \text{ kWh}/(\text{m}^3*\text{K}) = 128 \text{ kWh}/\text{day}$$

The energy demand per year is:

$$Q_{\text{annually}} = 350 \text{ days} * 128 \text{ kWh}/\text{day} = 44,800 \text{ kWh}/\text{year}$$

(The temperature difference in °C is measured in K (=Kelvin), it is assumed, that the factory is operating 350 days a year)

Solar radiation-on site : The site receives an average annual solar irradiation of 5.18 kWh/(m²*day), this means 1,891 kWh/(m²*year) on horizontal surface. On collectors with an inclination of 30° the irradiation is 1.05 * 1,891 kWh/(m²*year) = 1,986 kWh/(m²*year).

The site is located at 17.17° N Lat. and 78.29° E long.

Source: NASA RET SCREEN.

Useful solar energy delivery : The solar radiation on the collector surface is $55.4 \text{ m}^2 * 1,986 \text{ kWh}/(\text{m}^2*\text{year}) = 110,000 \text{ kWh}/\text{year}$.
If a system efficiency of about 30% is assumed, the useful solar energy is about $110,000 \text{ kWh}/\text{year} * 0.3 = 33,000 \text{ kWh}/\text{year}$.

SWHS system efficiency	:	A SWHS system efficiency of 30% is assumed
Energy saved by solar energy	:	Since each kWh provided by solar energy is replacing a kWh of electricity, about 33,000 kWh electricity per year are saved.
Emissions saved	:	Emissions saved from saving of 33,000 kWh electricity is about 28 t CO ₂ per year (Assumption: emission factor 0.85 t CO ₂ /MWh for southern grid)

Economy

Investment costs	:	Investment costs: INR 5 lakhs = INR 5,00,000 (€ 7,080) This corresponds to INR 9,000 per m ² collector area (€ 127 per m ²)
Subsidies	:	No Subsidy is availed.
Economics of the solar system	:	Based on an electricity price of INR 4.5 per kWh, INR 1,48,500 are saved per year. Payback period without considering interest on debt is 3.4 years.

Experiences

Operation experience	:	No malfunction known.
Statement of the owner	:	Owner is satisfied about the operation and savings due to implementation of SWHS System.
Statement of the supplier/manufacturer	:	—