Synthokem Labs - Sanath Nagar, Pashamylaram

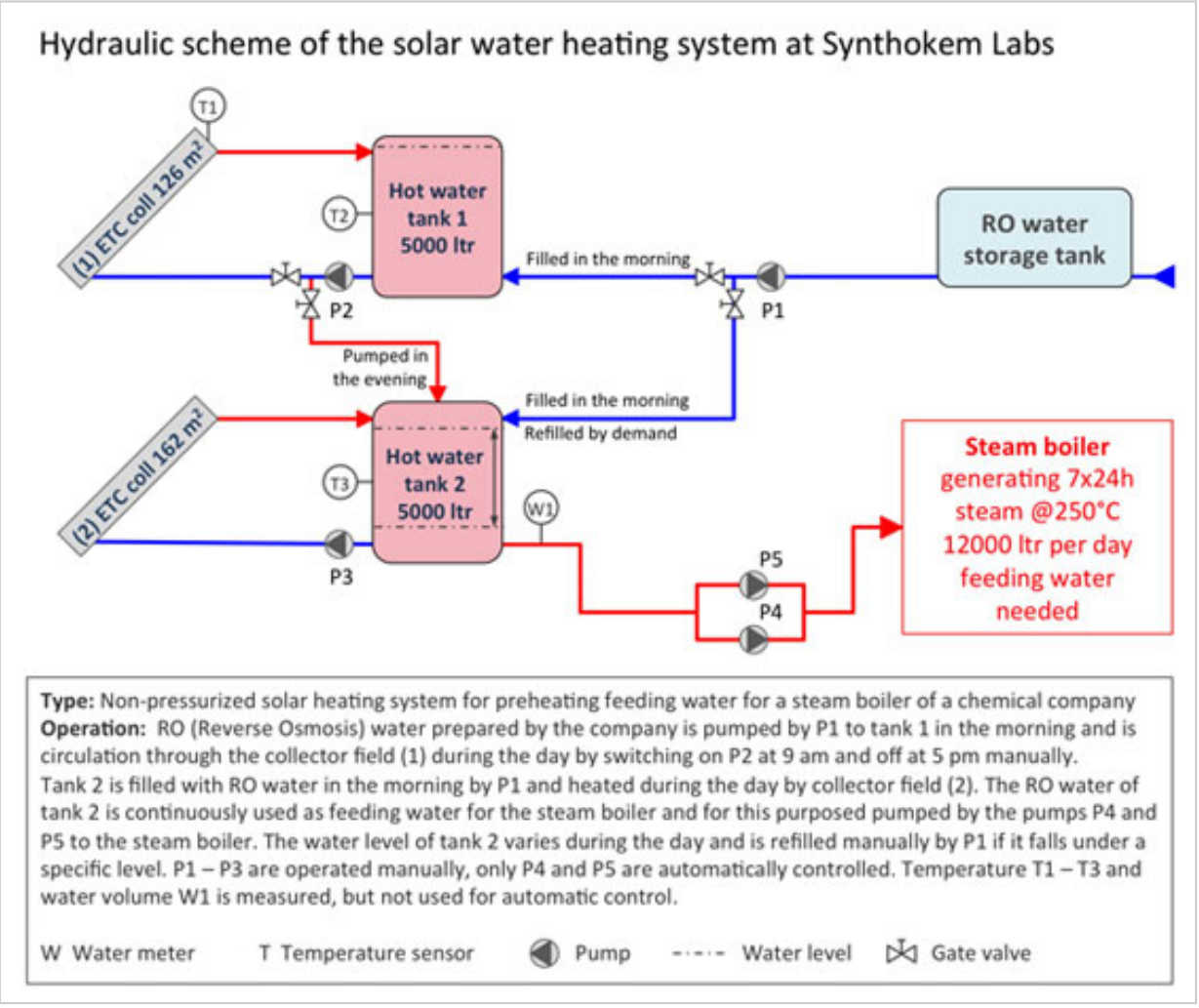
General Information

Description of the company	:	Synthokem Labs Pvt Ltd was founded in 1978 and has today around 250 employees. The company is manufacturing pharmaceutical ingredients and drug intermediate in bulk drugs catering to the pharmaceutical sector.
Type of Industry	:	Chemical / Pharmaceutical industry
Location of the company and the solar plant	:	The SWHS is installed on the roofs of the factory which is located in Hyderabad, Andhra Pradesh at: Synthokem Labs Private Limited P.B.No. 1911, B-5, Industrial Estate, Sanathnagar, Hyderabad – 500 018 www.synthokemlabs.com
Heat demanding processes	:	The plant is using steam to heat the solvents and liquids, to remove the moisture content from the materials and to create vacuum in the steam jackets. The solar heat is used to preheat the feeding water for the steam boiler.
Conventional heat supply	:	A furnace oil boiler with 1.5 TPH is used to generate steam at 110°C temperature and pressure of 6 to 7 kg/cm2. (TPH = tons per hour steam generation)
Conventional fuel used	:	Furnace oil is used, which costs about INR 55 per litre.
Motivation to use solar thermal energy	:	From 2006 to 2007 the furnace oil prices increased from INR 22 (EUR 0.28) to INR 33 (EUR 0.41) per litre. This motivated Synthokem Labs to substitute furnace oil by solar energy in two manufacturing units of the company.

Description of the solar thermal system

Type of solar plant	:	ETC solar water heating system for pre-heating steam boiler feeding water for industrial processes.
Year of installation	:	The solar system was commissioned in March 2009.
Solar collector field	:	 The solar thermal system has two distinct collector arrays of 10 ETC collectors each installed on the roofs of two factory buildings.
Water storage	:	Each of the two collector circuits are connected to a non-pressurized water storage tank with a volume of 5000 litre each and a total storage volume of 10,000 litre.
Hydraulics and Operation of the system	:	The system is designed for soft water application and it operates on force flow concept. Pumps are provided for primary circulation between solar tank and heat exchanger and another set of pumps are provided for secondary circulation between heat exchanger and boiler.

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 : The plant operator records the temperature of the hot water tank 1, the collector field 1 and the furnace oil consumption manually.

Energy balance

Heat demand	:	The demand on furnace oil is in the average 800 litre/day or 290 tons/year. This corresponds to an energy demand of 7.6 Mio kcal/day or 2700 Mio kcal/year and 8.8 MWh/day or 3180 MWh/year. (assumed furnace oil density of 0.95 kg/litre and caloric value of 10,000 kcal/kg)
Solar radiation-on site	:	The site receives an average annual solar irradiation of 5.17 kWh/m2 per day on a horizontal plane, which corresponds to 1890 kWh/m2 per year (17.45oN Lat., 78.4oE Long.) The minimum monthly average irradiation is 4.18 kWh/m2 per day during August and maximum monthly average is 6.51 kWh/m2 day during April. (Source: NASA RET SCREEN)
Useful solar energy delivery	:	Will be calculated based on the monitoring results
Fuel saved by solar energy	:	Will be calculated based on the monitoring results
Solar fraction	:	Will be calculated based on the monitoring results
Emissions saved	:	Will be calculated based on the monitoring results

Economy

Investment costs	:	Total investment costs: INR 8.65 lakhs (INR 865,000 = EUR 11,000).
Subsidies	:	The Ministry of New and Renewable Energy provided a subsidy of INR 192,000 (EUR 2400), which corresponds to 22% of the investment costs. The remaining investment costs for the owner results to INR 6.73 lakh (INR 673,000 = EUR 8400).
Economics of the solar system	:	Will be calculated based on the monitoring results

Experiences

Operation experience	:	The system has been functioning for five years now. In between, the system requires replacement of a couple of ETC tubes. So far no other problems have been encountered in the system operation.
Statement of the owner	:	The owner is very satisfied with the operation of the solar water heating system and the achieved results. He uses the collector and storage temperature as indicators for the proper function of the system. Based on this good experience the company set up another SWHS at their second manufacturing plant.
Statement of the supplier/manufacturer	:	The manufacturer states that the plant has been functioning to their satisfaction.