A.T.E. Solar Thermal Concentrator for Bottle Washing

Solar Concentrator Technology

Solar energy is one of the main renewable energy resources that can reduce India's carbon intensity, as well as meet the rising energy demand and simultaneously save fossil fuel resources and money. Solar concentrators are mainly used to concentrate solar energy for medium- and high-temperature thermal applications or power generation. Dish concentrator technology is best suited for direct steam generation in land-constrained process applications.

A.T.E.

A.T.E. is a seven decades-old, diversified engineering group with an excellent reputation for value-based operations and customer service. Established as a small trading company in 1939, A.T.E. is well-known in all areas of textile engineering, print and packaging, effluent water treatment and flow technology, and machine-to-machine solutions. 9 regional offices in India, and one in Bangladesh, support the sales, service and manufacturing operations.

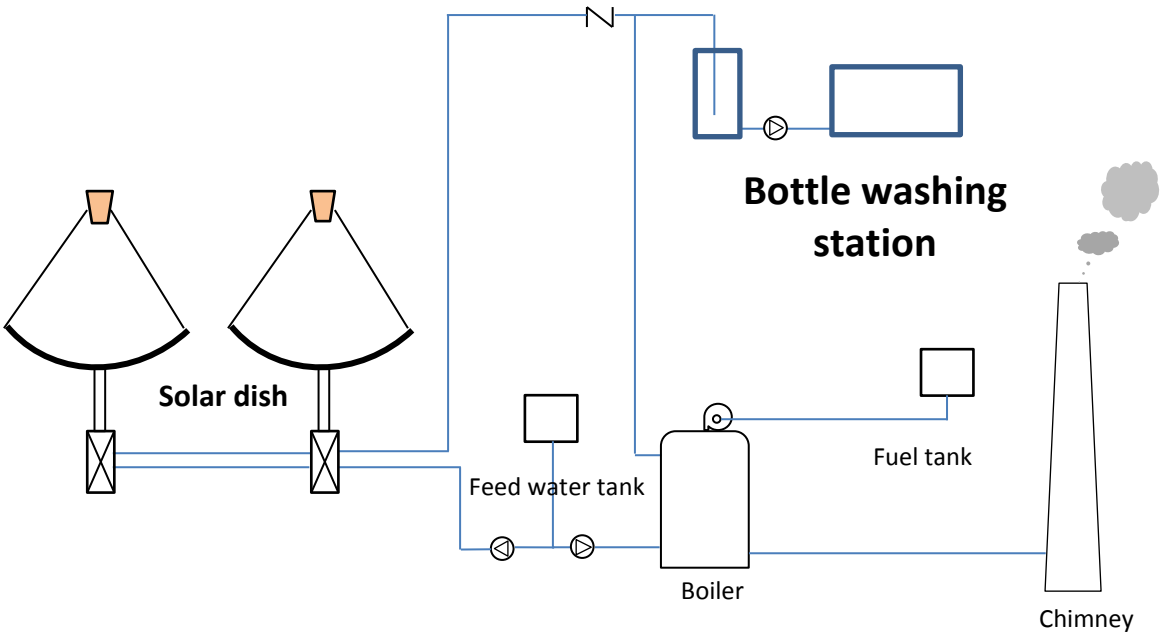
A.T.E.'s paraboloid concentrator dishes reflect and concentrate solar energy on a receiver at the focal point to generate steam directly. Three years into development, the in-house pilot at A.T.E.'s solar test facility at Pirangut, near Pune, has already clocked more than 2000 hours of operation and 17000 hours of installation. The performance of the A.T.E. solar dish concentrator has been certified by MNRE's Regional Test Facility at University of Pune. A.T.E. is ready to commercially launch this product.

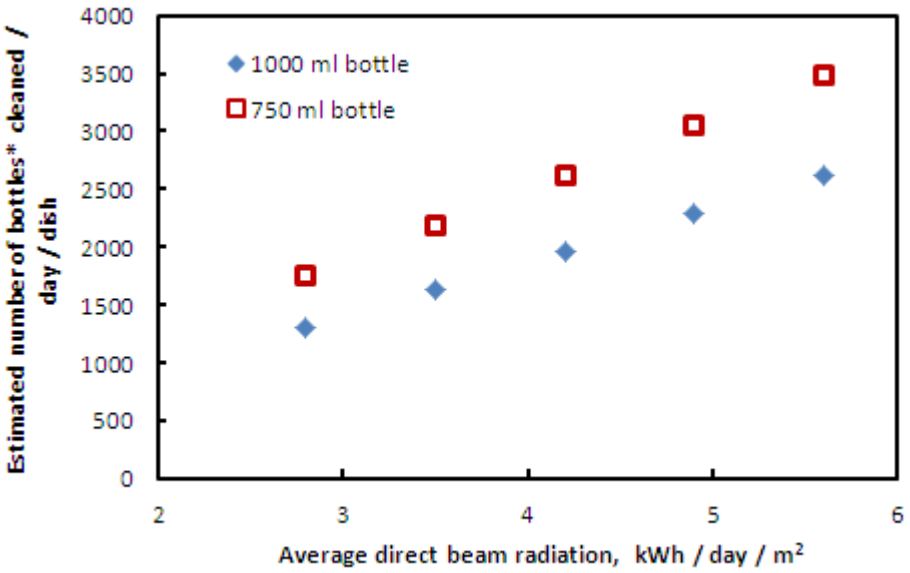
Salient Features of the Technology

- Point focus concentrator results in smallest footprint plus flexibility in siting
- Direct steam generation avoids extra secondary heat exchange process
- Two-axis system drives the dish to accurately track the Sun position and utilizes available solar energy to the maximum
- Automated control system with several in-built safety measures ensures easy and safe operation
- Proprietary modular construction makes installation simple
- Robust structural design to withstand extreme winds
- Simple system to clean the reflector surface
- Proprietary technology with 3 patent applications filed
- 100% indigenous content in components
- Continuous monitoring: proprietary remote monitoring available on request
- Solar-grade mirrors: imported mirrors available on request

Application to Bottle Washing

Bottle washing in the beverage industry requires hot water in the range of 80–90°C. A.T.E.'s solar augmented system, the basic hot water generation where generally the heat source is electricity / fossil fuel remains unaltered. The heat supplied by electricity / fossil fuel is substituted / augmented by heat in the form of steam from the solar concentrators. Solar-based hot water generation is viable between 8 a.m. and 4 p.m. on sunny days. Based on number and size of bottles washed, typically 10–80% fuel substitution is possible with solar steam.





* H. Tokos and P. Glavič. "Minimisation of freshwater consumption in brewery." CHEMICAL ENGINEERING 12 (2007)

India solar map

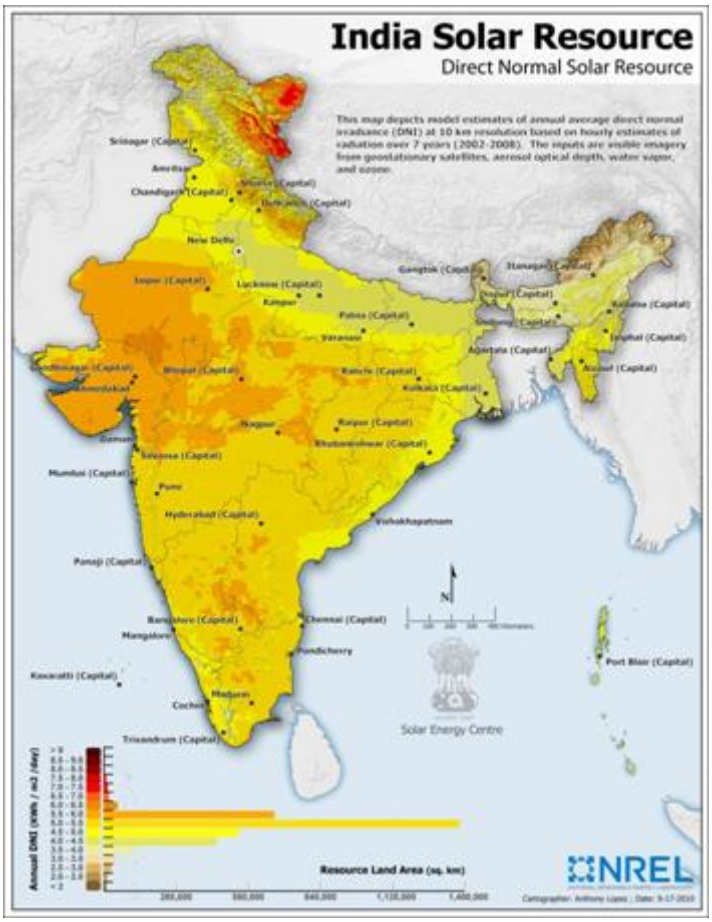


Photo dishes

Product specifications

Parameter	Value
Aperture area	25 m^2
Concentration ratio (ratio of size of image to dish aperture)	250-300
Rate of steam generation	100 kg/day
Operating temperature range	100-180 ºC
Rated thermal power	11 kW
Annual steam generation	24000-30000 kg/h
Environmental impact	20-25 ton CO_2 / year