

## 2013 HIGHLIGHTS

### SHC Task 49 Solar Heat Integration in Industrial Processes

#### THE ISSUE

Solar Heat for Industrial Processes (SHIP) is currently at the early stages of development, but is considered to have huge potential for solar thermal applications. Currently, 120 operating solar thermal systems for process heat are reported worldwide, with a total capacity of about 88 MWth (125,000 m<sup>2</sup>). The first applications have been experimental and relatively small scale. In recent years, significantly bigger solar thermal fields have been applied and are currently in the project pipeline. There is great potential for this market and technological developments, as 28% of the overall energy demand in the EU27 countries originates in the industrial sector, and the majority of this is heat of below 250°C.

In several specific industry sectors, such as food, wine and beverages, transport equipment, machinery, textiles, pulp and paper, the share of heat demand at low and medium temperatures (below 250°C) is around 60%. Tapping into this potential would provide a significant solar contribution to industrial energy requirements.

#### OUR WORK

The work of Task 49/IV is dedicated to three main areas: process heat collectors, process integration and process intensification and design guidelines. Improved solar thermal collectors and solar thermal system integration for production processes will be reached through advanced heat integration and storage management and advanced methodology for decisions on integration place and integration types.

Within the Task new developments of the advanced pinch analysis for heat exchanger and storage design will be reached as well as the identification of the increasing potentials of process intensification and new applications, such as solar water detoxification, solar water disinfection and solar driven reactions. The Task will prepare a worldwide overview of SHIP results and experiences (including completed and ongoing demonstration system installations using monitoring data, as well as carrying out economic analyses) in order to lower the barriers for market deployment and to disseminate the knowledge to the main target groups.

This is a 4-year collaborative project with the IEA SolarPACES Programme's Task IV.

**Task Date** 2012-2016  
**Task Leader** Christoph Brunner  
AEE INTEC, Austria  
**Email** [c.brunner@aee.at](mailto:c.brunner@aee.at)  
**Website** <http://www.iea-shc.org/task49>

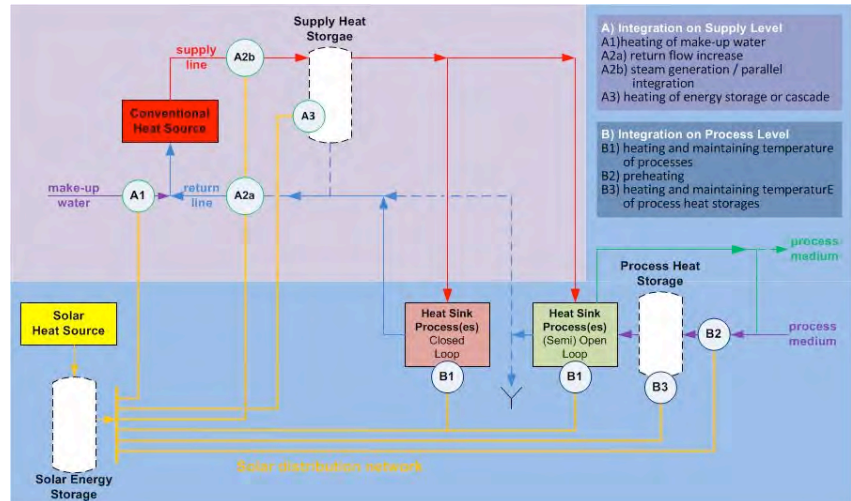
#### PARTICIPATING COUNTRIES

Australia  
Austria  
China  
Denmark  
France  
Germany  
Hungary  
India  
Japan  
Italy  
Mexico  
Netherlands  
New Zealand  
Poland  
Portugal  
Slovenia  
Spain  
South Africa:  
Sweden  
Switzerland  
Tunis  
United Kingdom  
United States

## KEY RESULTS OF 2012

### Integration Guidelines for the Integration of Solar Heat in Industrial Processes

When integrating solar heat in industrial processes, the aim is to identify the technical and economical most suitable integration point and the most suitable integration concept. Due to the complexity of heat supply and distribution in industry where a large number of processes might require thermal energy, this task is not always trivial. The “Integration Guidelines” shall give a guideline to solar planners, energy consultants and process engineers showing the general procedure for a solar thermal integration, which basis steps are necessary for identifying suitable integration points for a solar thermal system in industry and which integration concepts are available. The document can be used as supporting material in solar process heat trainings of planners and energy managers and consultants or as additional help for energy experts besides their own practical experiences. The scope of this document does not include a description of detailed planning steps of the solar system itself.



Possible integration points for solar heat in industry.  
(Source: Task 49/IV AEE INTEC)

### First Large-Scale Solar Thermal System in the Brewing Industry

Within the EU-funded project “SolarBrew,” the first of three plants, which will have in total a capacity of 5.08 MWth, corresponding to 7,270 m<sup>2</sup> of collector area, started its operation in June 2013. At the Brewery Göss in Austria, 1.375 m<sup>2</sup> of collectors started producing energy for one of the key processes in the brewing industry. The project partners are HEINEKEN, the number one brewer in Europe and the number three brewer by volume in the world, Austrian research centre AEE INTEC, collector producer and full-service company SUNMARK from Denmark, and the international brewery equipment provider GEA Brewery Systems from Germany.

The mashing process in the Austrian brewery Göss is heated with steam running through a heat exchanger on the outside of the mashing tun. For the integration of the solar thermal heat, a new heat exchanger plate was added on the inside of the mashing tun. The new heat exchanger allows for a hybrid energy supply for the mash tun, which includes solar thermal energy and the waste heat from a wood chip fired combined heat and power plant. At the moment the whole system is being monitored and optimized.



(Photo credit: AEE INTEC)