

The Energy of the Sun for Brewing Beer

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Since June 2006 the Austrian brewery „Neuwith“ offers solar brewed beer to their customers. The solar brewery is a demonstration project within the Solar Heating and Cooling Programme of the International Energy Agency. Breweries were identified by the experts working in this international project to be most suitable for the integration of solar heat. The temperatures needed in the brewing processes are in the range between 50 and 95°C. This is a temperature range, which can be produced by advanced flat-plate collectors or evacuated tube collectors.

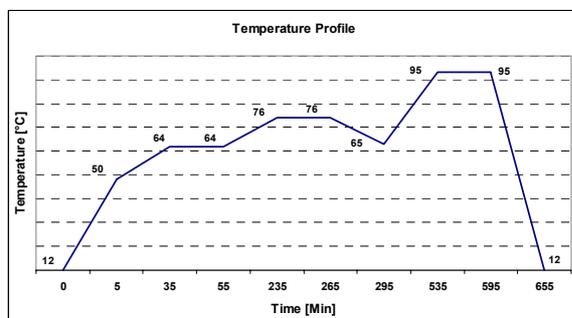


Fig. 1: Temperature profile for a typical brewing process

Whereas large-scale breweries have usually huge heat recovery potentials to

provide heat for the low temperature processes due to several parallel production lines, this is not the case for small-scale breweries. They are operated usually in a batch process. Therefore small-scale breweries show a bigger potential for solar heat integration.

AEE – Institute for Sustainable Technologies (AEE INTEC) developed in co-operation with the brew master an overall concept, which allows the integration of solar heat into the brewing process. Based on this, a brewing vessel with a special heat exchanger was constructed and built.

The solar collectors of this demonstration plant have a capacity of 14 kW_{th} (20 m²). The heat produced by special double-glazed, anti-reflective coated solar collectors is delivered to a hot water storage tank with a capacity of 1 m³. The brewing vessel has a volume of 400 litres. With this system about 40,000 litres of beer will be brewed annually.

In order to prove the efficiency of the overall concept, the plant is going to be monitored for two years. The monitoring data will be the basis for further optimisations of this kind of plants and also for upscaling of the system for larger breweries.

The monitoring results obtained during the first months of operation show promising results. As can be seen in figure 2, the working temperatures of the medium temperature collector with double-glazing and gas filling between the two glasses, are in the range between 80 and 115°C. In the week documented in this figure, it was possible to cover between 63 and 89% of the overall heat demand by solar energy. The back-up heat is provided either by an electrical back-up heater or by a biomass boiler.

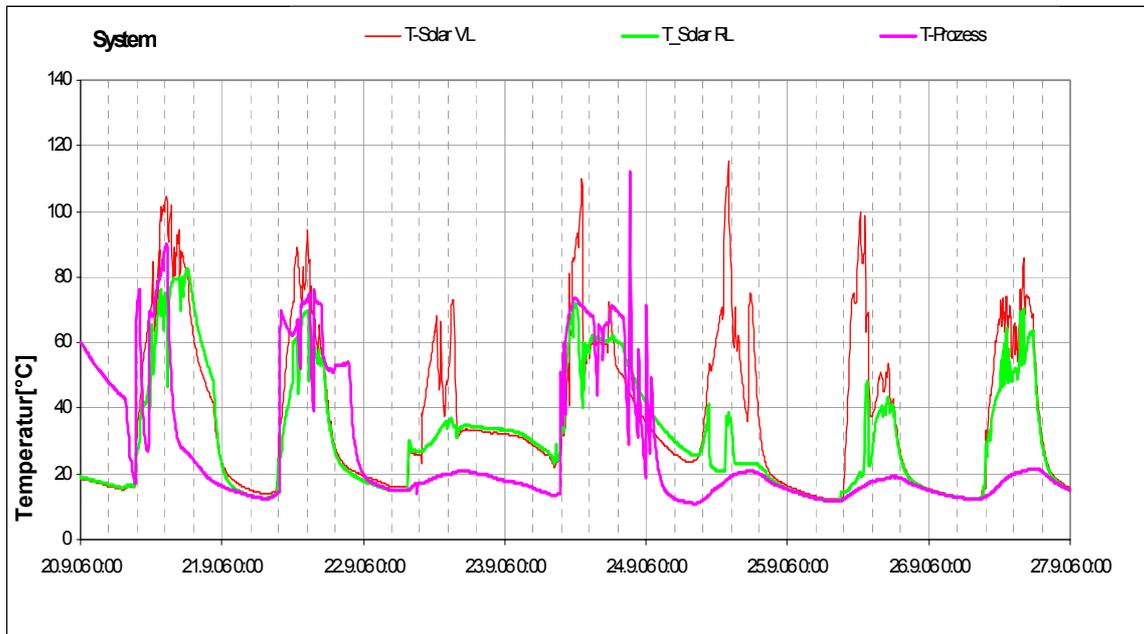


Fig. 2: Temperatures during one week in June 2006
 (Collector flow temperature – red, collector return temperature – green
 temperature in the brewing process – pink)

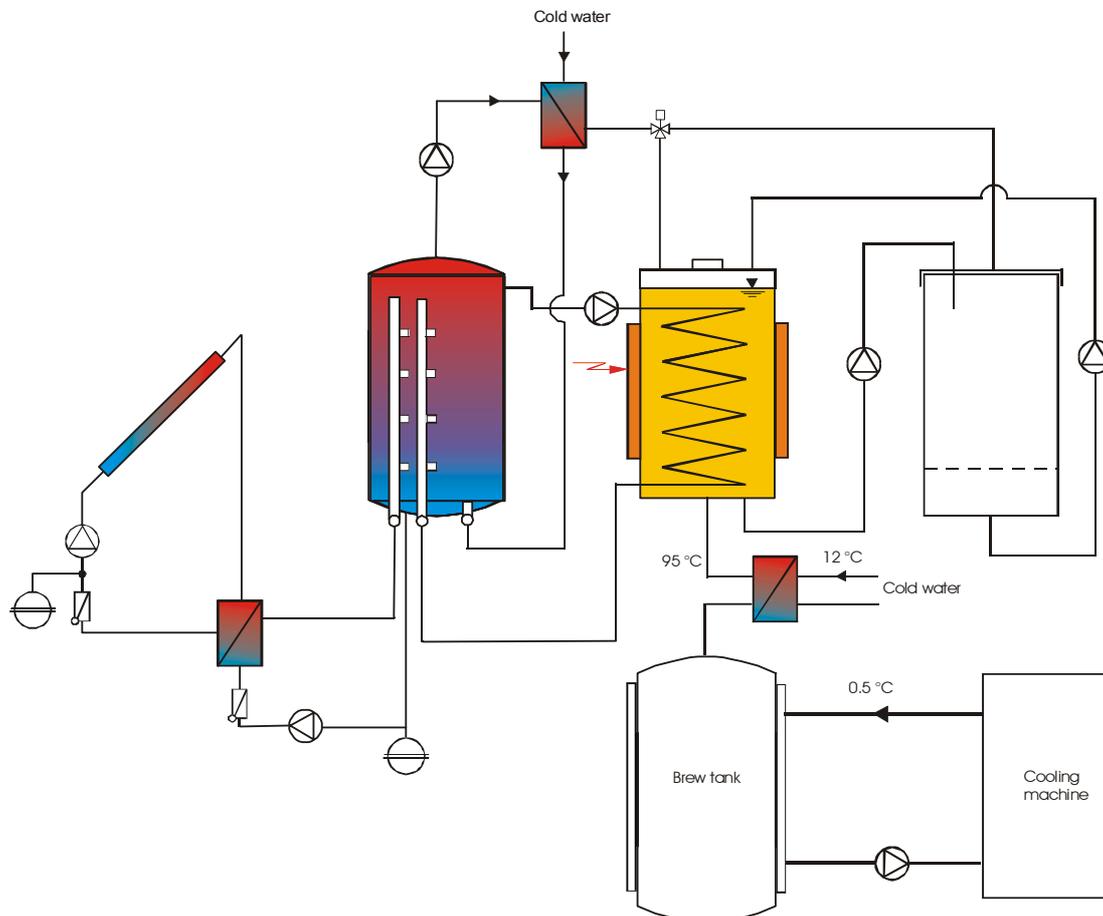


Fig. 3: Hydraulic concept of the SUNBREW plant