

2014 HIGHLIGHTS

SHC Task 52 Solar Heat and Energy Economy in Urban Environments

THE ISSUE

Many cities in the world aim to achieve ambitious de-carbonization goals within the next decades. A major expected contribution to the achievement of these goals is linked to the building sector. However, due to the complexity of the energy sector within cities on the one hand and a dynamic change of boundary conditions (e.g., composition of the electricity mix with increasing share of fluctuating renewables) on the other hand, it is difficult to develop robust concepts for future energy infrastructures in cities and districts. This is even more important since decisions on the energy infrastructure as well as in the building sector generally imply long-term investments. Solar thermal energy is one of the promising options to replace the use of fossil fuels for heat loads (heating of buildings, domestic hot water, industrial processes).

With fast changing economic boundaries in the energy economic markets and the growing of renewables in the electricity sector a review of the strategic role of solar thermal energy systems for low temperature heating and cooling demand is needed.

OUR WORK

This Task focuses on the analysis of the future role of solar thermal in energy supply systems in urban environments. Based on an energy economic analysis—reflecting future changes in the whole energy system—strategies and technical solutions as well as associated chains for energy system analysis will be developed. Further on, technically and economically feasible examples of the integration of solar thermal systems in urban energy systems will be identified, assessed and documented.

Participating Countries

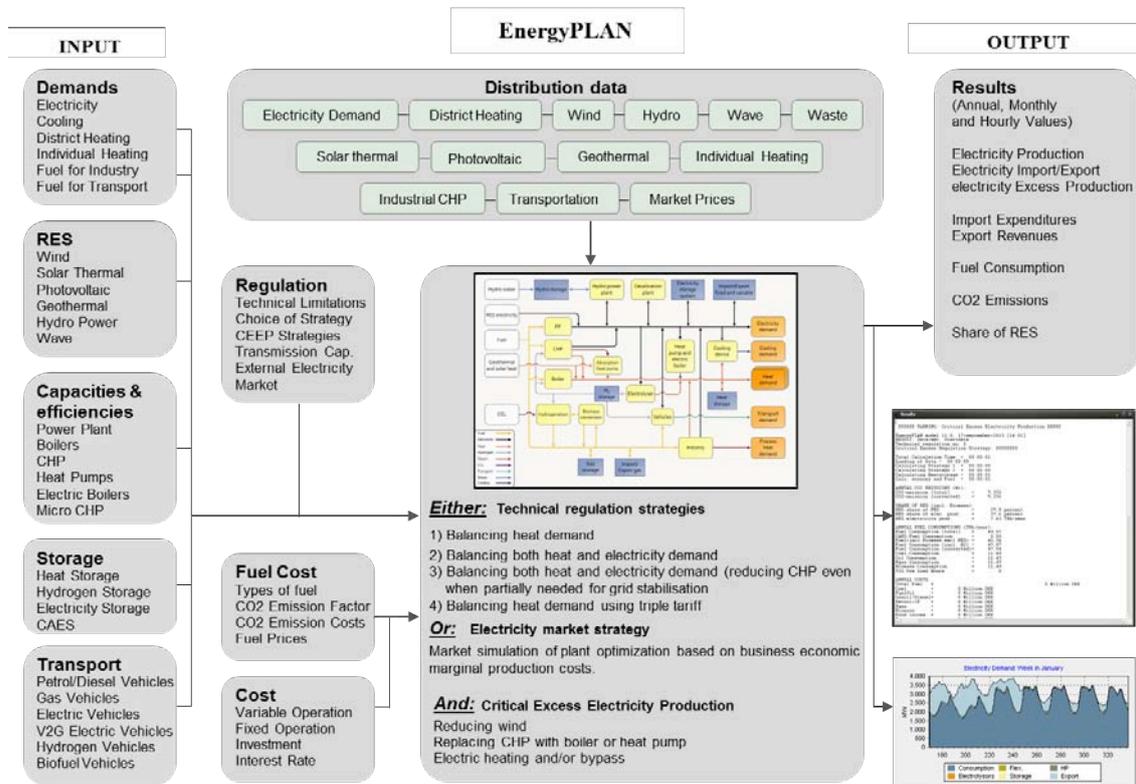
Austria
Denmark
Germany
Portugal
Switzerland

Task Date 2014-2017
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KEY RESULTS OF 2014

Set Up of Energy Analysis Framework

A framework for energy system analysis was set up using different modeling approaches. And, the EnergyPLAN by Aalborg University in Denmark will be used as the Reference Model.



Classification of Solar Heat integrated in Urban Energy System

Different criteria define how solar thermal is integrated into the urban energy system, which includes the location of the solar system generation (top roof or centralized), the integration into a district heating grid and the kind of storage system. In addition, the interaction of the solar thermal system with other supply systems while operating characterizes the system, for example, a combined heating and power plant or a heat pump operating in a grid friendly way.

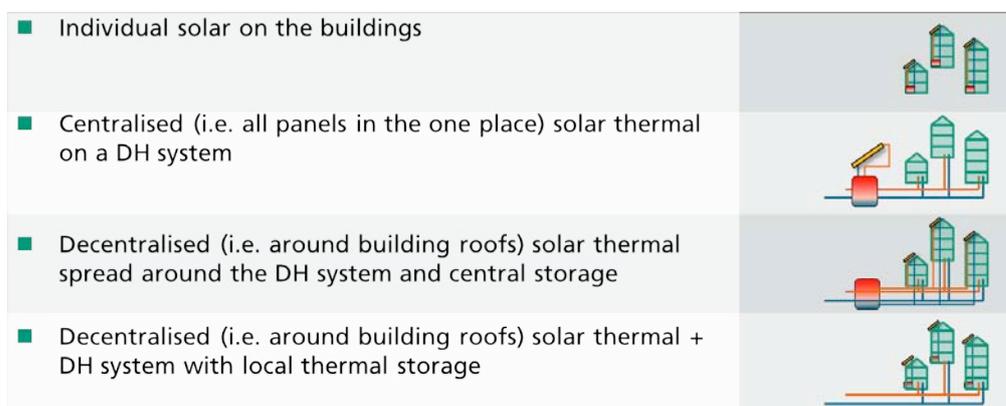


Figure 2. Classification of solar thermal systems (Source: AEE Intec / Fraunhofer ISE)

Cost Analysis of Solar District Heating Plants

Based on a database for SDH plants today, the costs for large systems were collected and analyzed. Significant differences can be seen in the different countries evaluated: in Denmark installation costs are the lowest showing a mature market while in Austria and Germany costs are higher and the size of the installed systems analyzed are smaller.

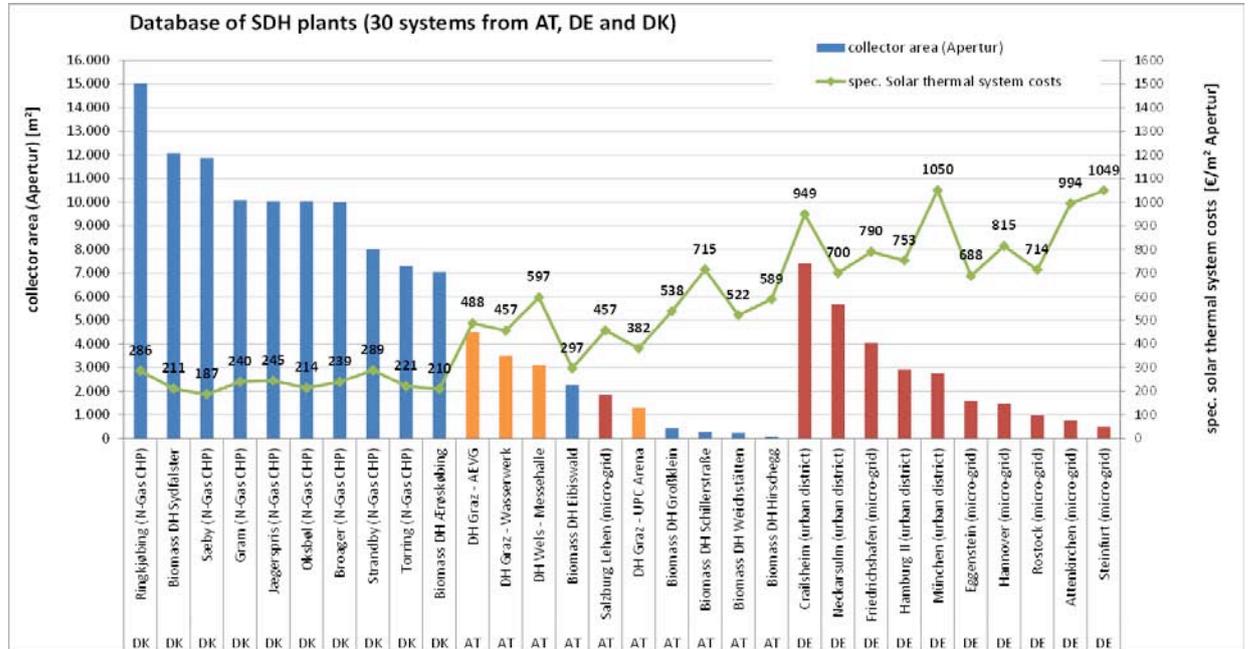


Figure 3. Solar District Heating database will be used for cost estimations (Source: F. Mauthner, AEE Intec)

SHC Task 52 is a 4-year collaborative project that will be completed in December 2017.