

2016 HIGHLIGHTS

Task 52 – Solar Heat and Energy Economics in Urban Environments

THE ISSUE

This Task focuses on the analysis of the future role of solar thermal in energy supply systems in urban environments. With fast changing economic boundaries in the energy economic markets and the growth 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

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 integration of solar thermal systems in urban energy systems will be identified, assessed and documented.

Energy Scenarios

The role of solar thermal in the energy system of urban environments will be identified with a horizon of 2050 and a 100% Renewable energy goal. The focus lies on a national or international level, but not necessarily 100% on a city or regional level solely.

Integrating Design Tools for Urban Energy Supply Systems

Existing tools for estimating the solar potential based on geographical information systems GIS are not yet linked to existing design tools for optimizing the structure of urban energy systems and do not consider the spatial and time resolution and variability of energy production and energy consumption induced by local renewable resources. Tools and techniques for the transition process of the energy system towards a renewable one will be addressed and case studies documented.

Demonstration and Operation

The implementation of solar thermal in existing or new urban districts as part of an integrated energy supply system will be demonstrated and analyzed. A focus will be on the integration of solar systems in district heating systems. Tools for operation will be analyzed and existing sites included to identify bottlenecks and best practices.

Participating Countries

Austria

Denmark

Germany

Portugal

Switzerland

Sweden

Task Period

2014 - 2017

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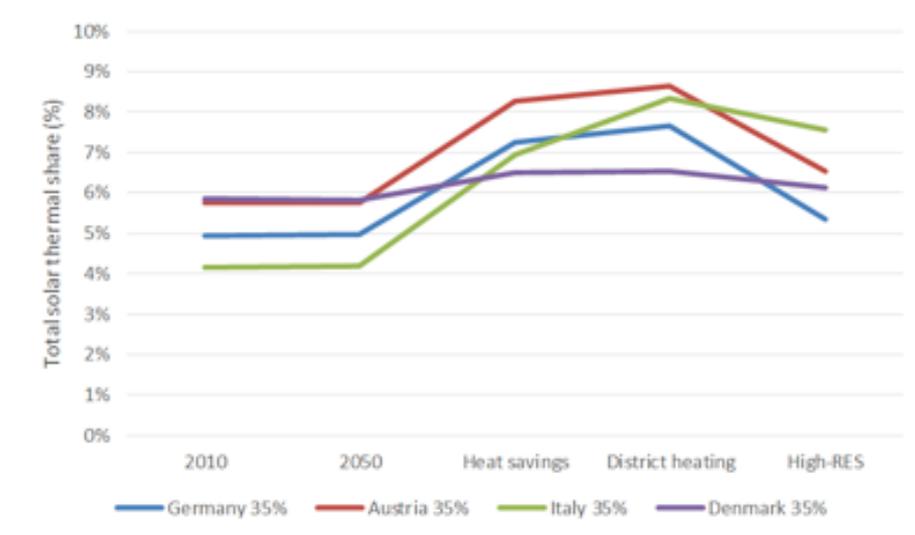
<http://task52.iea-shc.org>



KEY RESULTS IN 2016

Scenario Analysis Of Solar Heat Share In Four European Countries

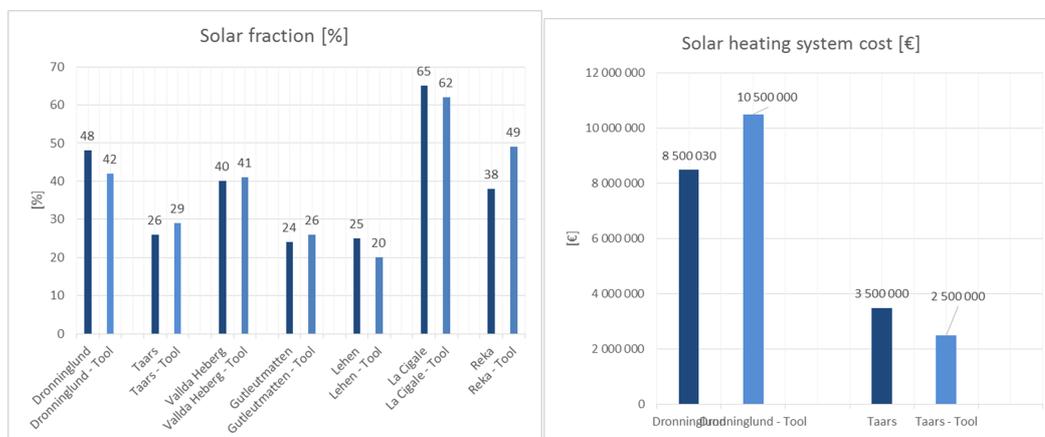
A detailed analysis for the Austrian, Danish, German and Italian situation was done looking for different scenarios for the year 2050. For different shares of district heating and installed photovoltaic capacity potentials for solar heat were calculated using the techno-economic model EnergyPLAN. The results show that the overall share has a potential of 5-8% of the total heat demand.



Total solar thermal share potentials in the four countries with a solar penetration rate of 35%.
Source K. Hansen, AAU

Fast Predesign Tool For Solar Districts

An Excel-tool was elaborated on to calculate solar indicators. Based on heated floor area and available area for solar panel, some relevant indicators can be calculated at a very early stage in a project. The tool can provide valuable estimations on the solar fraction, cost evaluation of the solar system or gains in the CO2 emissions. Moreover, in order to help the stakeholder in his choices, adapted commercial tools are proposed to address some specific questions.



Comparison of Task 52 predesign tool results and detailed data from different case studies. Source: M. Joly Sorane.

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Solar Heat and Energy Economics in Urban Environments

Best Practice Solutions

The detailed documentation of seven different larger solar Case Studies from Denmark, Sweden, Germany, Austria and Switzerland are described and both technical and socio-economical aspects documented.



Hybrid solar district heating in the city of Taars, DK (left)



Solar district heating with seasonal storage in the city of Dronninglund, DK (right)



Solar assisted residential area Vallda Heberg in Kungsbacka, SE (left)



Solar assisted urban quarter Lehen in Salzburg, AT (right)



Solar assisted urban quarter Gutleut-matten in Freiburg, DE (left)



Solar assisted apartment blocks La Cigale in Geneva, CH (right)



Solar assisted mountain holiday resort "Reka Feriendorf" in Naters, CH