SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

# 2016 HIGHLIGHTS

## Task 54 – Price Reduction of Solar Thermal Systems

## THE ISSUE

One of the greatest challenges of the 21st century is to secure a sustainable energy supply and to considerably reduce $CO_2$ emissions and the serious consequence of climate change. The challenging goals with regard to the contributions of renewable energy cannot be reached without considerable growth of solar thermal markets worldwide. Therefore, cost-competitive, efficient and reliable solar thermal systems are required. Cost-competitiveness is particularly hard to achieve as the price of solar thermal systems is still not equaled by the price end-users have to pay for conventional heat supply. A great number of complex, costly and oftentimes non-transparent steps are needed to bring solar thermal from the factory to the actual users. SHC Task 54 is looking for ways to optimize each of these steps as well as looking into the social-political context in which solar thermal installations are embedded. The ultimate goal is to strengthen the solar thermal industry by finding solutions for more cost-efficient production and installation of solar thermal systems and for marketing them at an even more competitive price.

## OUR WORK

SHC Task 54 aims to reduce the purchase price for end-users of installed solar thermal systems by evaluating and developing sustainable means to reduce the production and/or installation costs of materials, sub-components and system components.

Special emphasis is being placed on the identification and reduction of post-production cost drivers (e.g., channels of distribution). An extensive market research, the definition of reference systems, cost analyses and the study of socio-political boundary conditions for solar thermal prices in selected regions will provide the basis for the evaluation of cost structures and cost reduction potential. Additionally, ways to make solar thermal more attractive by improving marketing and consumer-oriented designs are being explored.

**Participating Countries**

*Australia*
*Austria*
*China*
*Denmark*
*France*
*Germany*
*Italy*
*Netherlands*
*Norway*
*Switzerland*


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TASK 54

# KEY RESULTS IN 2016

## Task 54 Workshop In Cooperation With European Solar Thermal Industry Federation

The first SHC Task 54 workshop was held in the framework of the ESTTP workshop "Solar Thermal Energy for Europe" (24-25 May 2016) in Brussels, Belgium. Jointly organized with the European Solar Thermal Industry Federation, ESTIF, the event attracted solar thermal specialists from industry, research and politics who joined in lively discussions on the challenging goal of Task 54. The workshop included a presentation and discussion of the reference systems to be defined in Task 54 and the Task's installation questionnaire. Input was gathered, consolidated and published in summer 2016. The workshop received broad media coverage on solarthermalworld.org, in the ESTIF newsletter, the *SHC Solar Update*, and on the Task 54 homepage, all of which laid the groundwork for further cooperation with ESTIF and the FROnT project.

## Cost Drivers And Saving Potentials – First Task 54 Info Sheets Published Online

Due to the specific characteristics of polymeric materials (e.g., variety of property profiles, ease of processing, mass production capability, freedom of design) this material class has been used to replace metal parts and components in various industrial sectors. SHC Task 54's first *Info Sheet (C 1.1)* gives insight to a case study that describes cost reduction achieved by material substitution, particularly for industrial pumps.

The second *Info Sheet (C 1.2)* focuses on additional ways to reduce costs of solar thermal systems sustainably, for example by reducing the number of different product types to reach a simplification of the components and products on the shelf and leading to less administrational effort, the concentration of component production to OEM producer, an efficient co-operation of market actors for using the same base components and by limiting operation conditions (temperature, pressure) with the help of smart system/control design allowing new materials and novel mass production possibilities. The Task 54 Info Sheets are available for download at http://task54.iea-shc.org/info-sheets.

## Task 54 Approach To Levelized Cost Of Heat (LCoH)

The levelized cost of heat (LCoH), a measure based on the concept of levelized cost of energy widespread in the electric power sector, was chosen for assessing the impact of different measures on the costs of the heat produced by solar thermal systems over their life time. This method is based on the work of the FRoNT project, which laid the foundations for the application of the method to any heating technology, and aims to detail the methodology for calculating the levelized cost of the heat substituted by solar thermal energy. In addition, an extension of the concept is suggested to estimate the cost of the heat generated by the entire solar assisted heating system.

The LCoH for solar thermal applications can be derived from the following formula:

$$LCOH = \frac{I_0 - S_0 + \sum_{t=1}^{T} \frac{C_t(1-TR) - DEP_t \cdot TR}{(1+r)^t} - \frac{RV}{(1+r)^T}}{\sum_{t=1}^{T} \frac{E_t}{(1+r)^t}}$$

Where:

$LCOH$: levelized cost of heat in €/kWh
$I_0$: initial investment in €
$S_0$: subsidies and incentives in €
$C_t$: operation and maintenance costs (yr t) in €
$TR$: corporate tax rate in %
$DEP_t$: asset depreciation (year t) in €
$RV$: residual value in €
$E_t$: saved final energy (year t) in kWh
$r$: discount rate in %
$T$: period of analysis in year