

The status of solar thermal and solar buildings in IEA SHC member countries

Status: November 2013

This report of the IEA Solar Heating and Cooling Programme (IEA SHC) summarises the findings of the country status reports published on www.iea-shc.org/country-status-reports

Status of the Market for Solar Thermal Systems

ST market development in IEA SHC countries

The solar thermal market in the member countries of the IEA SHC has developed dynamically between 2001 and 2011 (the last year for which IEA SHC has data, as published in Solar Heat Worldwide), from 6.7 GW_{th} to 42.9 GW_{th} or 20% p.a.. The strongest growth was seen in Portugal (36% p.a.) and Canada (31% p.a.), while Sweden was the only country, whose 2011 market was smaller than in 2001 (-1% p.a.).

By far the largest national market in absolute numbers is China, which reached 40.3 million MW_{th} in 2011 and an average annual growth of 21.5% between 2001 and 2011. In the same time its share of the total newly installed solar thermal capacity in IEA SHC countries increased from 85% to 94%.

Typical applications

In most IEA SHC countries, domestic hot water (DHW) is the primary application of solar thermal technology. In most of them, the solar DHW systems are small-sized (2-4 square meters of collector area and 50-100l storage tank), supplying one- or two-family houses or individual apartments in a larger residential building. Exceptions are the Scandinavian countries and Austria, where combisystems (DHW + space heating) and solar district heating are the most common solar thermal applications; and the USA, where residential swimming pool heating dominates the solar thermal market.

Other applications, such as solar process heat and solar assisted cooling are growing in several countries and are often seen as major applications in the future. But so far, their market share is limited.

Flat-plates are the dominant collector type in the majority of IEA SHC countries, but China with its large market is clearly dominated by vacuum tubes, thus making tube collectors the most common collector type over all countries. The USA are a special case: Due to their predominant use of solar thermal for pool heating, unglazed absorbers are the leading collector type.

Main market drivers

In IEA SHC countries, building regulations are amongst the key market drivers for solar thermal. The regulations usually cover only new buildings but range from general energy efficiency requirements for new buildings (a significant driver e.g. in the Netherlands) to binding requirements to use solar or other renewable energy for water heating (e.g. in Spain, urban regions of China, South Africa).

Financial support schemes continue to play an important role in many countries (or parts thereof). The support is given in a wide number of variants – from direct grants, to tax rebates to low-interest loans. Examples of countries where financial incentives remain important: Australia, Austria, rural parts of China, Norway, USA, South Africa.

Environmental considerations of house owners still plays a major role in Central Europe (Austria, Switzerland, the Netherlands), especially in those market segments not covered by regulations, i.e. existing buildings.

In some regions, certain solar thermal applications have already reached cost competitiveness with conventional heating solutions – this is true e.g. in rural parts of China and very strongly so for large-scale (often district-heating connected) solar thermal systems in Denmark. In Portugal, solar thermal is not yet cost competitive, but the expectation of ever increasing prices for conventional fuels serves as an increasingly important incentive for home owners to invest into a solar thermal system.

Industry

While many smaller solar thermal markets have significant shares of (net) imports (e.g. France, Netherlands, Norway), the larger markets typically have a relatively strong local manufacturing base. This is also due to solar thermal having a low barrier to market entry: Especially, companies from “neighbouring” industries such as glass, metals, construction have frequently extended their manufacturing portfolio to include also solar thermal. And furthermore, imports from far away countries are often not too attractive, as material costs rather than labour have a high share of the total hardware costs. The advantages of mass production are to certain extents offset by transportation costs.

Especially for small systems, there exists a high share of soft costs (marketing, sales, planning, installation, maintenance). Therefore, even where products are imported, solar thermal offers a lot of value creation at local level. Many small and medium sized enterprises (SMEs) are active in solar thermal, securing jobs locally. But, of course, this contributes to the relatively high costs of solar thermal in some countries, especially in Europe.

Solar Buildings

Solar buildings market development in IEA SHC countries

Solar buildings are not (yet) a market segment of their own in the IEA SHC member countries. Instead, other low-energy concepts, such as “passive houses”, “energy-neutral” or “net zero energy” buildings are gaining market shares – partly because of environmental concerns, partly because of the cost of conventional energy supply. In most countries, there exist rating or certification schemes, which assess the energy performance of buildings. Some of them are mostly local, such as the Swiss Minergie system, whereas others are internationally used, such as LEED or BREEAM. Within these concepts, active as well as passive solar technologies are usually considered, i.e. the installation of a solar thermal water/space heating system improves the overall energy efficiency of the building and thus helps achieve a higher rating.

In commercial buildings, daylighting is more and more used to replace electrical lighting and to contribute to higher comfort.

Main market drivers

In several countries, economic advantages (including reducing the risk from increasing fossil energy prices) have become the main driver for solar and energy efficient buildings. Conventional energy prices are often already so high and are expected to increase further, that the higher investment for better energy performance are attractive already today.

In other countries, public support policies continue to play a major role for the adoption of energy efficient buildings. In some countries it is the building regulation which drives many builders to opt for the more energy efficient buildings (e.g. in Germany, Spain, Singapore), whereas in others it is financial incentives which are offered for better energy performing buildings (e.g. in Austria, Switzerland).

Only in very few countries, remains environmental awareness a key market driver. This is the case in Austria and in Norway.

R&D Activities

In most IEA SHC countries, R&D on solar thermal and on solar buildings can receive money from public research programmes. While there are no SHC specific programmes, the different topics are usually eligible for funding within larger programmes for research on (renewable) energy, energy-efficient buildings and even basic research (e.g. thermo-chemical energy storage).

While some members have specific solar research institutes, e.g. France, Germany, Singapore, others have solar research taking place at different universities and research labs. The most important of them are listed in the respective national status reports.

Support framework

Energy policy is a major concern for national governments and most of them have enacted broad plans for how to reduce energy consumption. The goals are to reduce greenhouse gas emissions (GHG), to decrease the import dependence of the national economy, to improve the local environment (e.g. air quality) and to create local wealth. These longer-term plans typically serve as a basis for more concrete measures, which typically push also for solar thermal and solar buildings. Most of the countries have implemented a mix of measures addressing different barriers to growth and different market segments:

- (building) regulation to improve the energy performance of (new) buildings
- direct financial incentives (ranging from tax rebates to direct investment grants)
- indirect financial measures (e.g. CO₂ taxes, which create a more level playing field for renewable energies)
- awareness raising campaigns
- support of quality schemes on hardware and/or planning and installation
- support for RD&D to develop solar technologies not yet available today

Unfortunately, many of these measures tend to be short-lived leading to a stop-and-go dynamic in the market, which does not help create a healthy industry. This is especially true

for financial incentives schemes which are usually dependent on regular (e.g. annual) approval and which have a tendency to suddenly change whenever a new government comes into office.

Therefore, longer-term stable framework conditions are needed to achieve the significant benefits from deploying solar thermal and implementing solar building strategies.

For further information, please visit www.iea-shc.org and especially the detailed country status reports at www.iea-shc.org/country-status-reports