
Research Priorities for Solar Thermal Energy

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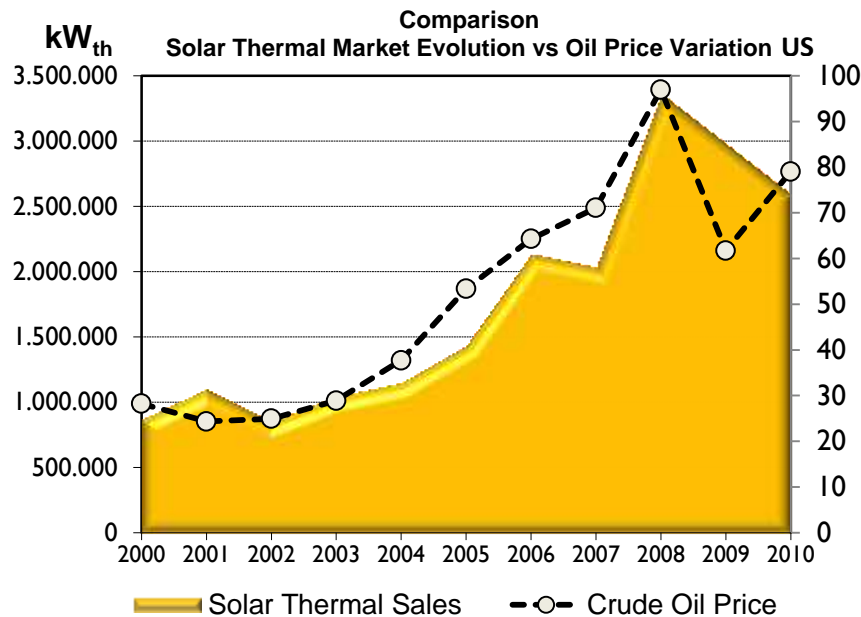
From Vision to Research Priorities

As a sector, heating and cooling remains the largest contributor to final energy demand in 2050

Solar thermal energy can become the major source of renewable heating and cooling in Europe



How to Accelerate Market Development



Challenges: to reduce investment costs, to further increase solar fraction as well as to further develop solar thermal technology



R&D Priorities subdivided in 3 cross-sections

Components

- *Solar Collector*
- *Thermal Storage*
- *Control and Performance Assessment*

Applications

- *Solar DHW and Space Heating*
- *Solar Cooling*
- *Large Scale Systems*

Non-Technological

- *Standards and Quality Assurance*
- *Non-technological Research, Support and Infrastructure Measures*



Priorities per cross-section field:

Summarised Development Potential

*Additional in SRP document:
Table with R&D topics
(<2020 and 2020 – 2030)*

- **theme 1 R&D Priority**
- **theme 2 R&D Priority**
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Solar Thermal Collectors

Developing higher performing collector materials, designs and production processes is essential to future growth for solar thermal markets



- increased performance at decreased cost
- simplified installation and decreased maintenance cost
- increased stability and more reliable long-term performance



Thermal Storage

A significant improvement in storage performance can be achieved via heat loss reduction, compactness of the storage material and efficiency in the charging and discharging process



- increased storage density using thermochemical materials
- increased storage density using phase change materials
- more efficient storage through improved heat transfer and heat transport
- reliable and efficient system performance of thermal storage



Control and Performance Assessment

Improved control will lead to better monitoring of performance, optimised maintenance and even preventive maintenance



- novel sensors
- integration and communication
- advanced algorithms



Solar Domestic Hot Water and Space Heating

The potential is on the improvement of the cost-performance ratio, on the building integration and on improvements relevant to the 'Solar Active House' concept



- **high fraction solar thermal systems as a standard element of buildings**
- **solar thermal components as integral elements of the building**



Solar Cooling

It has strong development potential in cost reduction, quality improvement, energy performance enhancement and system integration.

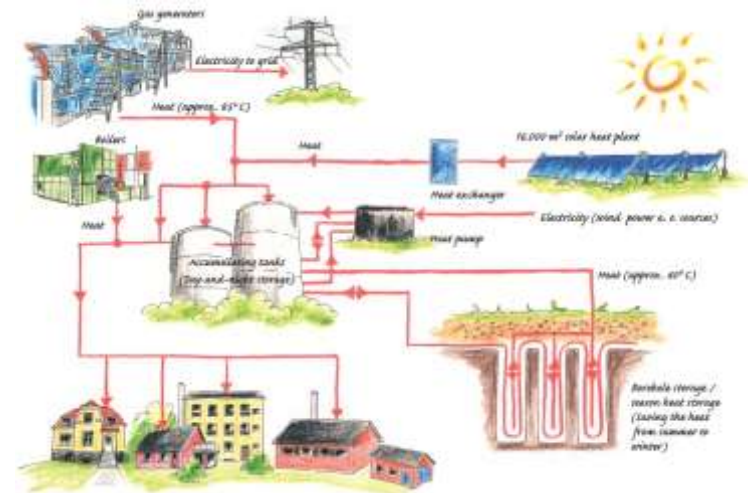


- **improvement of thermally driven cooling components**
- **improved system performance, integration and costs**



Large Scale Systems

Large applications have a great potential up to 2030: 58 TWh for solar district heating low and 72 TWh for medium temperature process heat



- dedicated medium temperature collectors
- solar as a reliable, preferred solution for process heat
- optimized large-scale systems for district heating



Standards and Measures for Quality Assurance

They will lead to a high product quality and thus a high consumer's confidence, and sustain the European leadership



- standards for sustainable market development
- systems with a high consumer trust



Non-technological Research and Supporting Measures

Transforming public perception and identifying the optimum procedures for introducing newly developed solar heating and cooling technology are essential to increase the uptake of this technology



- **towards a broad professional training and education system**
- **strengthening research infrastructure**
- **socio-economic aspects**



Solar Thermal Technology

Through the Research, Development, Demonstration and Deployment of the Strategic Priorities , Solar Thermal Energy will become a major source of ~~Renewable~~ Heating and Cooling in Europe.

