



2016 Solar Thermal Trends

With 2016 underway, it's important to stop for a moment and think about where solar thermal is headed in the short-term and how current work can support or be adjusted to keep pace with technological advances. Several SHC Task Operating Agents have weighed in on trends in their areas of expertise.

Compact Thermal Energy Storage

- Continued improvement of compact thermal energy storage materials and better methods for characterizing the materials properties.
- Targeted development of critical components for compact thermal energy storage, e.g. heat exchangers and thermal reactors.
- Industry and automotive industries will get more attention from developers of compact thermal storage technologies.

Rating & Certification Procedures

- New revision of ISO 9806 standard for solar collector testing is expected to be approved and published before the end of 2016. This version takes into account issues raised by countries not adopting the present version thus the new version is expected to be more widely accepted.
- The "Global Solar Certification Network" is expected to start operating during 2016. New website: www.gscn.solar.

Large Scale Solar Heating and Cooling Systems

- Large scale applications feeding into the district heating systems of cities or provinces continue to experience steady growth, with Denmark leading the way.
- Increase in the number of systems that combine renewable heat and renewable electricity and seasonal heat storage to manage the mismatch between production and load.

Advanced Lighting Solutions for Retrofitting Buildings

- Lighting Systems and SSL (Solid State Lighting):
 - LED systems represent more than 30% of light sources sold worldwide, in central Europe more than 50%.
 - "More for less" – still increasing efficiency and added functionality (e.g., "tunable white", "tunable candle power distributions") which means falling prices.
 - "More than light" – luminaires becoming network points in ceilings (i.e., adding functionality to spaces like indoor locating /positioning, bulbs with loudspeakers, optical data transmission).
 - Context sensitive lighting controls – the user interacts with light and space.
 - Integrated "hybrid components" bringing daylight and electric light out of the façade into indoor spaces.
- Standards, Regulation and Certification:
 - New and enhanced methods and approaches. Adapting to rapidly changing technologies (SSL, lighting controls).
 - Increasing relevance of certification systems. In parts updates required.
- Retrofit of lighting installations:
 - Replacing existing solutions by SSL becomes more and more economical.
 - Increased focus in countries with rising electricity costs
 - Increasing interest due to the above mentioned aspects

Solar Resource Assessment and Forecasting

- High quality, reliable, and long-term solar resource data products, derived either from satellite imagery or numerical weather prediction models, are now available primarily through private data providers.

- Public/private relationships among data providers continues to evolve. National research institutes continue to offer publicly available data sets, and organizations, such as the World Bank, are contracting private data providers to offer free country or region-specific data sets to the public. In addition, on occasion small, independent companies are being acquired by larger, more mature companies interested in adding to their renewable energy services portfolio.
- Governments continue to support R&D activities to improve the solar resource models, but overall government funding support in resource assessment R&D is going down. Governments have recently focused on the data requirements for effective integration of large amounts of solar technologies into grid systems, including research on improving the accuracy of solar forecasts to support solar electric "fleet" management strategies.
- Collection of low-cost yet very high quality bankable data from ground measurement stations is a priority of the industry in order to gain financing for specific projects. Significant efforts are underway to design improved and cost-effective instrumentation and data collection and processing procedures, following agreed upon international best practices. Through support of national programs and international funding organizations like the World Bank, several new country-wide solar monitoring networks are being installed.
- IRENA's Global Atlas will continue to serve as a "one stop shop" for allowing practitioners, planners, and researchers to have ready access to quality and reliable resource data, even if the atlas leads the users to private-sector data providers. Other multilateral activities such as the World Bank's ESMAP

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solar and wind resource mapping program have also gained prominence in providing country-specific resource atlases, especially in developing countries.

- Overall, the relationship between public research institutes and private-sector data providers is an evolving process, where governments now mainly support high risk R&D and provide data for public good, while the private sector provides the value added services required for effective solar energy deployments.

Solar Thermal Cooling

- Broadening reach to new markets in the Middle East and China where there is large market potential while the European solar cooling market remains very small.
- PV cooling, especially in the small power range, is pushing solar thermal cooling to adapt to the competition – new cost competitive sorption chillers are entering the market and solar thermal cooling costs are going down significantly.
- More than ever, peak load shaving is driving solar cooling (and heating), which means the link between grid operators and the future development and growth of the solar cooling sector is critical.