



SOLARTHERMAL ENERGY FOR HEATING, HOT WATER AND COOLING

Infoportals, Initiatives, Associations

BINE Informationsdienst (in German)

www.bine.info

BINE information service promotes the information and knowledge transfer from the energy research to practice in the fields renewable energies and efficient energy technologies. BINE is funded by the Federal Ministry for economics and technology (BMWi) and works with numerous companies, research centres and politics. BINE distributes a large number of publications (mostly in German) (Projektinfo, Themeninfo, BasisEnergie). BINE Experts hotline offers project-related and practice-relevant additional information. Furthermore is the book series of BINE to mention, published by Solarpraxis.

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BSW – Bundesverband Solarwirtschaft e.V.

www.solarwirtschaft.de

With over 600 member companies, the BSW e.V. is the lobby group of the German solar energy industry. Forming a strong community of companies, the BSW-Solar acts as an informant and intermediary between the business, political and public sectors. It represents the common commercial interests of businesses across the solar energy value chain. The BSW-Solar exerts decisive influence on creating and securing a suitable policy framework for stable growth, and thus on ensuring investment security throughout the entire industry. The objective is to establish solar energy as a firm pillar of the energy industry.

On the website there is a list of important links to European and international solar energy associations and research centres (<http://www.solarwirtschaft.de/typo3/index.php?id=75>)

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DGS – Deutsche Gesellschaft für Sonnenenergie e.V. (in German)

www.dgs.de

The German society for solar power e.V. was created 1975 in Munich. Since 1989 it is at the same time the German section of the International Solar Energy Society (ISES). DGS is a non-profit association with 3000 persons and enterprises as members and represents the interests of consumers and users in the field renewable energy and the rational use of energy. DGS has 7 technical committees and is a partner for politics and public. DGS aims additionally at an improvement of the social, legal and political conditions for renewable energies and efficient use of energy. DGS regards the promotion of the research in renewable energies and the conversion of research results to the practice as important content of its activity.

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ESTIF - European Solar Thermal Industry

<http://www.estif.org/>

ESTIF engages in many different issues relevant to the solar thermal industry - from lobbying for favourable legislative framework conditions to work on standards & certification. ESTIF stands for:

- The Promotion for a European Directive for renewable heating and cooling.
- Full recognition of solar thermal in the implementation of the EU Directive on the Energy Performance of Buildings
- Binding regulations making the use of solar thermal obligatory in new buildings and in buildings undergoing major renovation, retrofitting or in any other situation as appropriate
- Financial incentives to investment or fiscal reductions
- Support specific training for solar thermal technologies, focused on key professional actors: architects, heating installers and roofers
- Strengthening solar thermal R&D, because solar thermal has been often neglected by national and European R&D programmes: Focussed R&D approach for promising areas like solar process heat, solar desalination, long term heat storage, building integration
- Energy statistics at national, European and international level that fully consider solar thermal, using MW as unit of measure
- Abolition of all technical and trade barrier
- Full internalisation of the external costs linked to the use of oil, gas, coal and nuclear for heating and cooling purpose

Publications:

a) Market data:

http://www.estif.org/fileadmin/downloads/Solar_Thermal_markets_in_Europe_2005.pdf

b) Solar Thermal Action Plan for Europe (STAP)

<http://www.estif.org/281.0.html>

c) European Directive to promote Renewable Heating and Cooling

<http://www.estif.org/140.0.html>

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ESTTP - European Solar Thermal Technology Platform

http://esttp.org/cms/front_content.php

Technology Platforms (TPs) are instruments created by the European Commission to bring together stakeholders in technology to strengthen Europe's leading position in certain technological fields. TPs are expected to have a decisive influence on European R&D politics. ESTTP was launched in June 2005 initiated by ITW, Stuttgart, BSW, Berlin, AAE-Intec and Fraunhofer ISE. ESTTP aims to accelerate the development of solar thermal technology, secure the technological leadership of Europe's solar thermal industry, increase the use of solar thermal energy.

Objectives of the ESTTP are to:

- • Develop a vision for solar thermal technology in 2030
- • Work out a strategic research agenda to achieve this vision
- • Support of the implementation of the strategic research agenda
- • Identify non-technological framework conditions to facilitate a broad market deployment for solar thermal technologies

Publication:

Solar thermal vision 2030

http://esttp.org/cms/upload/pdf/Solar_Thermal_Vision_2030_060530.pdf

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ISES – International Solar Energy Society

www.ises.org

ISES has been serving the needs of the renewable energy community since its founding in 1954. ISES is a UN-accredited NGO present in more than 50 countries (see <http://www.ises.org/ises.nsf!Open>),

the Society supports its members in the advancement of renewable energy technology, implementation and education all over the world. Its goals include:

- To encourage the use and acceptance of Renewable Energy technologies.
- To realise a global community of industry, individuals and institutions in support of Renewable Energy.
- To create international structures to facilitate cooperation and exchange.
- To create and distribute publications for various target groups to support the dissemination of renewable energy technologies.
- To bring together industry, science and politics in workshops, conferences and summits on Renewable Energy.
- To advise governments and organisations in policy, implementation and sustainability of Renewable Energy activities world-wide.

Contact:

The International Solar Energy Society (ISES),

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Industry (Manufacturers and Utilities)

Regarding German companies involved in solar business as producers, planers, services is following website recommended:

<http://www.solarbusiness.de/index.php?id=9>

CONERGY AG

<http://www.conergy.de/en/desktopdefault.aspx>

Conergy develops flat plate solar collectors and systems that are suitable for heating support, hot water production and space cooling. In Central-Europe standard solar system provides enough energy to cover the full energy requirements for hot water production in the months May to September. Conergy offers also complete solar heating support accompanied with a high-capacity combi storage tanks. The reduced heat requirements of low-energy buildings in conjunction with ever more efficient solar systems can result in savings of up to 50 %. These are a tank-in-tank solution where the domestic hot water and the heating water are stored separately in a single tank. Conergy offers flat collectors and solar energy systems for solar-powered cooling.

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WAGNER & Co Solartechnik

<http://www.wagner-solartechnik.de/GB/start.html?navid=210&ref=/wagnerDE/SW/index.php>

Wagner & Co Solartechnik GmbH offers a complete solar systems for hot water and supplementary central heating, for example:

A) Hot water package deals with

- Solar systems with EURO-collectors
- Solar systems with vacuum tube collectors

B) Packages combining hot water and central heating deal with:

- Solar systems with TERMO combination storage tank and EURO collectors
- Solar systems with fresh water station RATIOfresh and EURO collectors
- Solar systems with TERMO combination storage tank and vacuum tube collectors

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www.wagner-solartechnik.de

Ritter Solar GmbH & Co. KG

http://www.rittersolar.de/english/index_e.htm

The company Ritter Solar founded in 2000 is a manufacturer of highly efficient evacuated tube collectors with or without CPC reflectors. The evacuated tube collector CPC OEM was developed especially for solar domestic water heating and for solar backup space heating. The low pressure loss allows several modules to be connected in series. The aperture area amounts 1.0, 2.0 and 3.0 m². The evacuated tube collector CPC XL OEM may also be used for both solar domestic water heating

and for solar backup heating. The difference between this model and the CPC OEM is the 400 mm longer evacuated tube. There can be distinguished between an aperture area of 1.28 or 2.56 m². The evacuated tube collector CPC w OEM is a specialist system for efficient domestic water heating. It was developed especially for hot water production in one-family-houses. It can be used as a stand-alone collector which cannot be linked with additional modules. They are available at 3.2 and 4.0 m² aperture area.

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www.rittersolar.de

SCHOTT ETC16 Evacuated Tube Collector

<http://www.schott.com/solarthermal/english/>

The SCHOTT ETC16 evacuated tube collector is suitable for domestic hot water heating, auxiliary heating, for generating process heat and as a component for solar cooling. They can be used in private households, multi-family dwellings, office buildings as well as public buildings and for industrial purposes. Solar heat for water, heating and cooling. SCHOTT although the manufacturer of the ETC16 evacuated tube collector does not sell directly to the end customer. Technical data of ETC 16: Dimension 1684x765x100 mm, aperture area 0.808 m², cross area 1,29 m², weight 20 kg, yearly yield for 4 collectors-system for hot water production (location Wuerzburg) 730 kWh/m²

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Research Centres

AEE – Institute for Sustainable Technologies

<http://www.aee-intec.at/index.php?seitenId=2>

The “Arbeitsgemeinschaft Erneuerbare Energie“ (AEE) was founded in 1988 in Gleisdorf, Austria as a non-profit association and is active in the development of scientific and technical basics for solar thermal applications, with the development of efficient energy supply systems for buildings as well as the development of sustainable technologies for water supply and sewage disposal. Regarding solar thermal use and ecoefficient buildings following two departments have to be mentioned:

- Department for solar components and systems: Significant focuses in component development to date have been the improvement of flat-plate collectors, facade collectors, parabolic trough collectors for the medium temperature range and the development of optimised storage tanks. The development of plants for industrial heat requirements is a new focal area.
- Department for sustainable buildings: The two main focuses of the research work are product and system development and the planning of holistic energy concepts for new buildings and renovation projects. The development of low-energy and passive house technologies for residential (houses and multi-storey buildings) and other (office and administration buildings, schools etc.) buildings is a priority. Further key areas at AEE INTEC are the "passive cooling" of office and administrative buildings, and building monitoring.

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Arsenal Research

http://www.arsenal.ac.at/home_en.html

In the area of efficient and sustainable thermal energy systems arsenal research has a numerous of R&D activities which range from heat pumps to solar cooling and up to seamless integration of this technology into building technology. State-of-the-art methods of the numerical flow simulation (CFD) are applied in order to optimally coordinate the individual components of the heating, ventilation and air-conditioning engineering.

Particularly in solar thermal technology and ecoefficient buildings the research areas are:

- Development of experimental methods for solar technology (developing testing methods for thermal solar collectors and photovoltaic modules in the laboratory and practical operation, detailed analyses of innovative small and large plants with the objective of optimising and standardising components and plants).
- Advanced Cooling Systems: (absorption refrigerating machines and heating pumps, which at the same time are suitable for heating and cooling of buildings, are strategic research topics. Furthermore, arsenal research develops new concepts with state-of-the-art simulation tools in the area of innovative air conditioning in buildings)
- Sustainable energy systems in building technology: (The ideal integration of energy efficiency technologies and renewable energy technologies into an innovative building technology is developed by means of simulation, test and measuring technology).

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Regarding German research institutes following website is recommended:
<http://www.solarbusiness.de/index.php?id=129>

FVS – Forschungsverbund Sonnenenergie (in German)

www.fv-sonnenenergie.de

FVS (The Research Association Solar Energy) is a co-operation of non-university research institutes in Germany to all topics of renewable energies. Nine German research institutes are members in FVS, with their 1500 employees they represent 80% of the research capacity of solar energy in Germany. The FVS members coordinate their research activities among themselves, long-term goals and tasks are defined in strategic partnerships, activities and know how are interfaced and experience exchanged. Together with the industry FVS defines new research tasks. For the public organizes FVS conferences and Workshops about research projects and results on solar and renewable energies.

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Fraunhofer ISE - Institut für solare Energiesysteme

<http://www.ise.fraunhofer.de/>

Fraunhofer Institute for Solar Energy Systems develops components, materials and processes in the areas of the thermal use of solar energy, solar building, solar cells, electrical power supplies, chemical energy conversion, energy storage and the rational use of energy.

With a staff of approximately 500, Fraunhofer ISE is the largest solar energy research institute in Europe. The work at the Institute ranges from the investigation of scientific and technological fundamentals for solar energy applications, through the development of production technology and prototypes, to the construction of demonstration systems. The Institute plans, advises and provides know-how and technical facilities and services.

Solar collectors for water heating is for long time now an industrial product of high quality. Fraunhofer ISE supports the industry by improvements of collectors and plant components. ISE operates a testing laboratory (PZTS), recognized by DIN CERTCO, and carry out collector tests according to German, European and international standards. ISE opens new markets by new materials and production techniques: Non-corrosive collectors for seawater desalination, extremely interruption-resistant systems, pollution free coating processes, facade-integrated collectors.

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ISFH - Institut für Solarenergieforschung Hameln/Emmerthal

www.isfh.de

The purpose of the Institute for Solar Energy Research Hameln/Emmerthal (ISFH) is the promotion and execution of research and development in the field of solar energy utilization. The activities of the ISFH focus on applied research in photovoltaics and solar thermal energy conversion. ISFH puts

much emphasis on higher education in applied solar energy research. Many students are currently working on their master thesis or their doctoral thesis.

The institute is offering scientific services to the industry and other research institutions in the fields of solar thermal and photovoltaics. ISFH has the official relationship of an 'associated institute' of the Leibniz University of Hanover, is a non-profit organization funded by the State Government of Lower Saxony.

The research and development activities of the ISFH in the field of solar thermal systems are conducted by three research teams: Thermal materials, Thermal components, and Thermal systems. The ISFH has two research teams in the field of scientific services: Solar thermal test center and Photovoltaic characterization.

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ITW - Institut für Thermodynamik und Wärmetechnik, Stuttgart

<http://www.itw.uni-stuttgart.de>

The main points of research of the institute are in the areas heat transfer, the determination of material properties and the development of integral energy concepts with the special emphasis of the solar heat supply. With the research and testing center (TZS) the Institute has additionally at its disposal an accredited and world-wide recognized testing station for thermal solar plants and their components.

ITW has three departments with following main research areas:

- Department of heating and cooling technologies: Heat transfer, Evaporation, Fouling, Solar cooling.
- Department of rational energy use: Numeric computations, passive solar systems, Solar supported district heating.
- Department of research and Testing Center for solar plants (TZS): ITW offers services particularly in the area of the solar heat supply and deals with plants for the supply of individual houses (TZS) as well as the supply of whole house settlements (SuN).

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Solar Heating and Cooling Programme of the International Energy Agency

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

The Solar Heating and Cooling Programme was established in 1977, one of the first programmes of the International Energy Agency. The Programme's work is unique in that it is accomplished through the international collaborative effort of experts from Member countries and the European Commission. On this website you can find a lot of publications about solar energy use world wide and in different countries. A total of 39 Tasks have been initiated, 30 of which have been completed.

Examples of tasks in solar heating and cooling:

- Task 1 - Investigation of the Performance of Solar Heating and Cooling Systems
- Task 2 - Coordination of Solar Heating and Cooling R&D
- Task 3 - Performance Testing of Solar Collectors
- Task 25 - Solar Assisted Air Conditioning of Buildings
- Task 13 - Advance Solar Low Energy Buildings
- Task 14 - Advance Active Solar Energy Systems
- Task 23 - Optimization of Solar Energy Use in Large Buildings
- Task 38 - Solar Air-Conditioning and Refrigeration

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SPF Institut für Solartechnik (Solartechnik, Prüfung, Forschung)

<http://www.solarenergy.ch/spf.php?lang=en&fam=41&tab=1>

The Institute for solar technology SPF is part of the Hochschule für Technik Rapperswil HSR. SPF has been engaged in applied research and development on thermal solar technology since 1981. Around 20 members of staff (engineers, physicists and technicians) are occupied in the following areas:

- Materials and components (absorber coatings, substrates, covers, pumps, compensators)
- Collectors (flat-plate and tubular collectors, liquid and gaseous heat transfer media, concentrating configurations)
- Systems (solar domestic hot water systems, combined systems for space heating and hot water, solar cooling)
- Information technology (Software "Polysun" to calculate and optimize collector systems)

Regarding testing SPF is active in:

- a) Performance test of collectors (Measurement of the efficiency curves with and without wind, Measurement of the incidence angle modifier, Calculation of the thermal capacity)
- b) The standard of SPF system testing (**performance tests of solar hot water systems for free-standing houses since 1995. To date, we have tested about 80 systems. SPF is an accredited testing laboratory (STS 301) for system tests according to EN12976.**)
- c) Optical Measurements (testing of various optical properties that are important in the thermal use of solar energy).

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ZAE Bayern - Bayerisches Zentrum für Angewandte Energieforschung e.V.

www.zae-bayern.de

The department of technology for energy systems and renewable energies operates pursues research among others in the areas thermal use of solar energy, thermodynamical and electro-chemical systems, thus heat pumps of each kind, heat and cold storage. ZAE is developing innovative components and systems, plans reference systems and cares for the measuring techniques. Complex

energy supply systems are optimized in energy-technical and economic regard. Manufacturers and operators of the plants are supported by dynamic simulation of the systems during design and planning of the system. On the field of the Solar thermal use ZAE works on the development of innovative components e.g. high efficient collectors and operates for this a free air test stand. Concepts for solar district heating supply with seasonal heat storage in the ground are developed, reference systems are planned and their instrumentation supported.

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REGULATIONS, STANDARDS AND GUIDELINES

Beuth Verlag

<http://www.beuth.de>

DIN 4757: Solar heating plants operating on organic heat transfer media; Requirements relating to safe design and construction 1980-11

DIN EN 12975-1:2006-06: Thermal solar systems and components - Solar collectors - Part 1: General requirements; German version EN 12975-1:2006

DIN EN 12975-2:2006-06: Thermal solar systems and components - Solar collectors - Part 2: Test methods; German version EN 12975-2:2006

VDI 3805 Blatt 19:2006-02: Product data exchange in the Building Services - Solar collectors

EN 12976-1:2006-04 Thermal solar systems and components - Factory made systems - Part 1: General requirements; German version EN 12976-1:2006

EN 12976-2:2006-04 Thermal solar systems and components - Factory made systems - Part 2: Test methods; German version EN 12976-2:2006

ENV 12977-1:2001-10 Thermal solar systems and components - Custom built systems - Part 1: General requirements; German version ENV 12977-1:2001

ENV 12977-2:2001-10 Thermal solar systems and components - Custom built systems - Part 2: Test methods; German version ENV 12977-2:2001

ENV 12977-3:2001-10 Thermal solar systems and components - Custom built systems - Part 3: Performance characterisation of stores for solar heating systems; German version ENV 12977-3:2001

06/30156096 DC:2006-09-20 ISO CEN TS 12977-3 - Performance test methods - Thermal solar systems and components - Custom built systems - Part 3: Performance test methods for solar water heater stores