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Newsletter of the International Energy Agency Solar Heating and Cooling Programme

SHC Solar Award

The 2010 winner of the SHC SOLAR AWARD is Helmut Jäger, founder and general manager of Solvis Energyiesysteme GmbH. Mr. Jäger received the award at EuroSun 2010: International Conference on Solar Heating, Cooling and Buildings in Graz, Austria.

The SHC SOLAR AWARD is given to an individual, company, or private/public institution that has shown outstanding leadership or achievements in the field of solar heating and cooling, and that supports the work of the IEA Solar Heating and Cooling Programme.

▲ **SHC Solar Award recipient Helmut Jäger and SHC Chairman Werner Weiss.**

Mr. Helmut Jäger is the sixth recipient of the SHC SOLAR AWARD. He was selected for his extensive work in the development of innovative solar thermal technologies. In 1988, Mr. Jäger founded Solvis, a thermal solar systems manufacturer. Over the next twenty plus years, Solvis has produced products ranging from stratified solar storage tanks and solar condensing boilers to solar collectors. In 2007, Solvis became a leading producer of absorbers in Europe. Solvis has maintained a commitment to environmental stewardship, and in 2002 opened Europe's largest zero-emission factory.

Today, Mr. Jäger is active in many organizations to promote solar energy. Since 1997 he has been a board member of Bundesverband Solarwirtschaft, the German National Solar Energy Association, and in 2008 was nominated to the advisory committee of the German Federal Environmental Foundation. He is also a member of the advisory board of the Fraunhofer Institute for Solar Energy Systems ISE.

Mr. Jäger joins Manuel Collares Pereira, Volker Wittwer, Jan-Olof Dalenbäck, William Beckman, and Torben Esbensen as a recipient of this award. The SHC Programme is recognizing such leaders in the field of solar energy not only for their contributions, but also to promote solar energy as a viable energy source for heating and cooling.

Mr. Helmut Jäger is a pioneer in the market development of solar thermal collectors and systems in Germany and throughout Europe. Helmut's work does not solely focus on the financial growth of his company, Solvis. He follows a sustainable and holistic business model and tries to implement innovative technologies through demonstration as at the Solvis Zero-Emission Factory. Helmut Jäger is a networker for a 'solar energy future' as vice chair of Bundesverband Solarwirtschaft, and an active participant in the German Solar Thermal Technology Platform.

MARKUS KRATZ, *German SHC Executive Committee Member*

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Finland
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South Africa
Spain
Sweden
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United States

The SHC Programme welcomes its newest Members – **South Africa** and **Singapore**. Each of these countries adds a new dimension to the Programme's work. The Executive Committee and the Task experts look forward to working together.

Don't miss this issue's article on solar thermal in South Africa.

In This Issue

Solar Air-Conditioning and Refrigeration

task 38

The solar cooling system installed at at this Tunisian winery was monitored by Task 38 experts and received the Energy Globe Award Tunisia 2009.

TASK 38 PARTICIPANTS
64 Experts from 12 Countries

Australia	Italy
Austria	Mexico
Canada	Portugal
Denmark	Spain
France	Sweden
Germany	Switzerland

As 2010 drew to an end so did SHC Task 38, Solar Air-Conditioning & Refrigeration. This Task was one of the largest single activities of the SHC Programme in terms of participation. Forty-nine organizations from 12 countries participated – 16 research institutes, 20 universities and 13 private companies (planning and engineering offices, manufacturers, and installation companies). The high level of interest in this topic is evident by the number of participants (on average 64) attending the twice-yearly Task meetings. And the results documented in high quality reports and presented at conferences have certainly contributed to the technical progress of this technology and supported its market deployment. The high quality of the reports and results combined with presentations at various conferences and other events certainly contributed to the technical progress of this technology and supported its market deployment.

A main activity of SHC Task 38 was the detailed monitoring of 24 installations – 13 installations in the small capacity range and aimed at supporting the development of small capacity, pre-engineered systems for application in the residential and small commercial sectors; 11 systems in large commercial buildings and buildings requiring cold for industrial processes. These last systems represent a category of custom-made systems that are designed for the special conditions of the given site and application.

A main result from this monitoring work is that it showed systems are able to achieve significant primary energy savings in comparison to standard solutions using conventional electrically driven vapor compression systems. However, it also clearly demonstrated that a high quality on all project levels is needed in order to achieve savings. A careful design, a high quality installation, a thorough commissioning and an ongoing monitoring ("continued commissioning") are necessary to guarantee a long-term stable operation and the benefits of lower energy consumption and operation costs compared to standard solutions.

To help ensure the success of projects, various tools and concepts were developed by the Task participants. In addition, many cross-cutting research activities were carried out, such as an exergy analysis of solar cooling systems to help optimize system design, a simulation study comparing the reliability and user friendliness of different simulation tools, and – for the first time – an extensive life cycle analysis of solar cooling systems.

The following three results are a selection of the Task's practical outcomes for use in future R&D projects and commercial projects.

Online Tool

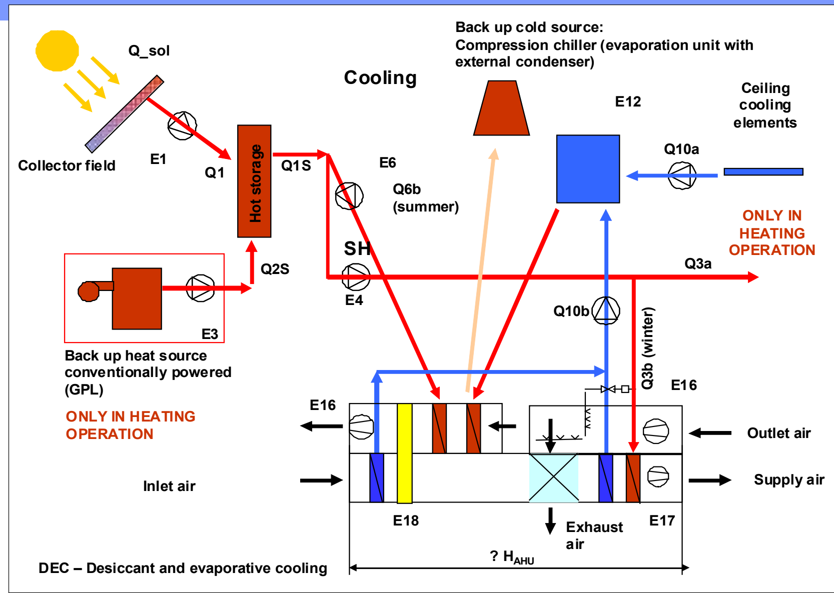
The "Check-list method for the selection and the success in the integration of a solar cooling system in buildings" is available on the website of the company TECSOL SA (http://www.tecsol.fr/checklist/). It is based on the feedback of European solar cooling experiences in the framework of SHC Task 38. The method and tool have been developed to support the evaluation of the potential of using solar cooling technology in the early phase of a project. The tool takes into consideration all the important aspects – technical boundary conditions, financial aspects, questions related to building space and areas for installation of solar collector systems, and issues of knowledge and interest of involved stakeholders. At the end the check-list method gives a hint about the feasibility of the particular project under consideration.

continued on page 3

Air-Conditioning *from page 2*

Monitoring Procedure

A unified monitoring procedure applicable for Solar Heat Driven Chiller (SDHC) as well as Desiccant Evaporative Cooling (DEC) systems has been developed. It enables a structured collection of monitoring data and defines a common evaluation methodology of the energy performance of solar assisted solar heating and cooling plants. The procedure has been applied to 13 small-scale (< 20 kW cooling capacity) and 11 large-scale systems. The procedure includes performance evaluation, comparison of the energy performance of solar driven systems with conventional systems, and comparison between different solar driven systems. Therefore the procedure supports the identification of best practice systems and also defines the minimum monitoring equipment required for a reliable performance evaluation.



▲ **Figure 1. Application of the monitoring procedure on a DEC-System** (Source: DREAM)

Policy Position Paper

A Solar Cooling Position Paper with a description of the state of the art and a roadmap is available. The paper consists of three main parts 1) the current status (technical maturity, energy performance, economic viability and market status), 2) technical potentials, costs and economics, market opportunities, 3) and actions needed (technology development, quality procedures, and market and policy issues). This Position Paper incorporated feedback from many experts in R&D and manufacturer CEOs.

This article was contributed by the Task 38: Solar Air-Conditioning and Refrigeration Operating Agent, Hans-Martin Henning of Fraunhofer Institute for Solar Energy Systems, Germany, Hans-Martin.Henning@ise.fraunhofer.de.
For more information on this Task visit http://iea-shc.org/task38.

▲ **Figure 2. Solar heating and cooling installation at the Town Hall Gleisdorf, Austria (304 m² flat plate collectors connected to 35 kW Yazaki chiller WFC 10 and a desiccant evaporative cooling system).** (Source: AEE INTEC)

◂ **Figure 3. Indoor components of the solar cooling installation at the office building of the Company SOLID in Graz, Austria (17.5 kW Yazaki chiller WFC 5).** (Source: SOLID)

Advanced Housing Renovation with Solar and Conservation

task 37

The SHC Programme completed its work on *Housing Renovation Using Solar and Conservation* in 2010 and will begin a new Task on *Renovation of Non-residential Buildings towards Sustainable Standards* in 2011. Building renovation is a critical component of sustainable development – buildings alone consume 35% of the energy in most IEA countries and housing accounts for the largest part of this energy use. The energy saving potential for renovating houses is enormous and the job is not as onerous as one might think and exemplary renovated buildings do exist.

There are five basic steps:

1. Reduce the heat loss as much as possible by insulating walls, floor and ceiling, passive house windows, introducing a continuous air tight layer to achieve an air tight building envelope and installing balanced ventilation with high heat recovery efficiency (□>75 %).
2. Minimize the electricity demand, by using very efficient fans, pumps, appliances and lighting systems.
3. Use passive and active solar technologies.
4. Control energy use and energy behaviour.
5. Choose the energy source to cover the rest of the demand.

The SHC Programme's work conducted by 49 experts from 12 countires focused on two areas of work:

- Development of a solid knowledge base on how to renovate housing to a very high energy standard while providing superior comfort and sustainability.
- Development of strategies that support the market penetration of such renovations, particularly directed towards market segments with high renovation potentials.

TASK 37 PARTICIPANTS

49 Experts from 12 Countries

Austria	Italy
Belgium	Netherlands
Canada	New Zealand
Denmark	Norway
Finland	Sweden
Germany	Switzerland

Marketing Aspects

The Task focused on how to get from demonstration projects to a volume market for very low energy demand in advanced housing renovation. Building stock analyses show that many countries have a huge theoretical potential for reducing the energy consumed in the existing building stock, but that the marketing aspects are missing.

For successful market development, it is necessary that the right private and public actors cooperate, coordinate their measures, and perform them at the right time. For those that say the market is not ready for this are only right if they mean the majority of the market. Any new product or service has first to be adopted by the innovators in the introduction phase and then the early adopters in the growth phase before it can reach the early majority in the volume market. This applies for both the supply and demand side. The technical report, *"From Demonstration Projects to Volume Markets"* investigates these three phases through four marketing perspectives: attractiveness, competitiveness, affordability and availability.

Exemplary Projects

Sixty exemplary housing renovations achieving dramatic energy savings have been documented in brochures. The results from these projects are impressive – the primary energy consumption for space heating and domestic hot water was reduced by up to 90%. This is all the more impressive because it is measured in primary energy, that is, the source energy needed to produce the heat. Many of these projects include a solar heating system for domestic hot water and/or space heating. And, some achieve nearly a net zero energy balance.

The successes of the renovations are the result of a combination of strategies, including:

- extreme conservation measures
- installing efficient systems for ventilation and heat production
- adding a solar thermal system and/or PV system
- minimizing the ecological impact
- redesigning the housing to enhance the living quality

The first step in each of these renovation projects was to add insulation and eliminate air leakage and to replace old windows with high efficiency windows. The next step was to compliment these conservation measures with a solar thermal system. In locations with high kWh buy-back prices, a roof mounted PV system was added and in locations with other types of public incentive systems solar thermal systems for hot water heating and/or space heating were added.

These examples include specific information on the renovation measures to encourage housing owners to be ambitious when planning a renovation. A mediocre renovation blocks a deeper, more effective renovation for decades. Whereas the marginal costs of energy saving measures during a modernization will pay back nicely if the inflation of energy costs is considered.

Technical Aspects

In some renovation projects it is impossible to achieve the "passive house" level without extensive economic investments due to limitations, such as:

- façade restrictions limit the insulation that can be added to the external wall
- building design prevents reaching the passive house air tightness requirement,
- windows design restrictions prevent the use of passive house windows,
- roof construction limits the thickness of the insulation that can be added

In these cases, the technical and economical analysis has shown that a "low energy" renovation to obtain a space heating demand of 45 kWh/m^2 is a more realistic goal.

Proposed ambition level for ambitious energy renovation.

Ambition level for renovation	Space heating demand
Level I: Low energy renovation	45 kWh/m^{2}a
Level II: Passive house renovation	25 kWh/m^{2}a

By lowering the space heating demand to this level, the relative share of DHW in these buildings is increasing and the DHW supplied by solar thermal systems becomes more important. Other technical conclusions included:

- Heat pumps should only be used if there is already an existing floor heating system or if a new low temperature distribution system is installed.
- Combined heat and power plants as the supply system are effective in multi-family homes.
- Balanced ventilation systems with heat recovery are effective even though a very high efficiency is crucial to energy savings as well as good indoor air quality.

Environmental Considerations

As there is no standard way to achieve sustainable renovation, it is necessary to take into consideration many parameters — typology of the dwelling, quality of the existing building, type of renovation proposed, budget for the renovation, quality of the context, etc. It must also be stressed that energy efficient, sustainable renovation is affordable. The idea is to reach a certain level of performance that is entirely accessible in renovation that will allow for better comfort – both indoors and outdoors – energy savings and reduced environmental impact.

To Learn More

Visit the SHC Task 37 web page at http://iea-shc.org/task37. In addition to more details on the work, you will find the following publications. It is the hope of that you and others will use and adapt this information for your specific country or renovation.

Brochures. 60 brochures of exemplary renovation projects from the 12 countries participating in Task 37 plus a summary report *"Lessons Learned from Exemplary Housing Renovations"*

Films. Solar renovation films describing housing renovations and based on SHC Task 37 work and demonstration projects. The films are available in English and German.

- Why low energy? (4 minutes)
- Low-rise flats, Germany (17 minutes)
- Housing cooperatives for passive housing, Sweden (16 minutes)
- Municipal assistance, Norway (12 minutes)

Technical reports.

- "Advanced and Sustainable Housing Renovation, A Guide for Designers and Planners"
- "From Demonstration Projects to Volume Markets"
- "Advances in Housing Renovation – processes, Concepts and Technologies". To be available in early 2011
- "Housing Renovation in Cold Climates - Whole Building Concepts". To be available in early 2011.

For more information on SHC Task 37 or the new work Task 47, Advanced Renovation of Non-Residential Buildings*, contact the SHC Task Operating Agent, Fritjof Salvesen of Asplan Viak AS, Norway, fritjof.salvesen@asplanviak.no.*

Compact Thermal Energy Storage: Materials Research and Development

task 42

In January 2009, an international team of experts in the fields of material development and system integration began working together to develop better materials for the compact storage of heat in a joint project of the IEA Solar Heating and Cooling (SHC) Programme and IEA Energy Conservation through Energy Storage (ECES) Programme. The project's objective is to find ways to store heat more compactly than in the conventional water heat storage devices.

Three classes of materials have the potential to serve as a compact storage material: 1) latent or phase change materials, 2) sorption materials, and 3) thermo-chemical materials. Latent/phase change materials are primarily used to store heat at relatively low temperatures in buildings and cooling systems. The May 2010 issue of the SHC Solar Update highlighted the Oak Ridge National Laboratory's work on the integration of phase change materials in building elements as part of their contribution to SHC Task 42/ ECES Annex 24.

▲ **Figure 1. Different composites investigated at ITW: salt/zeolite composites (bottom left), compacted salt granules (bottom right), salt in honeycomb structure with different channel geometries (top left), aluminium foam impregnated with salt (top right).**

In this article, you will learn about the work of four other institutes. These institutes are working on sorption and thermochemical materials for compact heat storage at intermediate temperatures, between 20 and 100 degrees Centigrade.

ITW - Germany

ITW is investigating novel materials for seasonal compact thermochemical energy stores (CTES) for low temperature applications. The work is focusing on composite materials based on a porous carrier matrix and a salt that stores/releases energy through a dehydration/hydration reaction of the salt. This carrier matrix fulfils several different functions. It defines the stability, the shape and the size of the material, which can be specially adapted for the application. It provides a high inner surface allowing a fine dispersion and uniform distribution of the salt within the carrier matrix. And, in the case of a carrier matrix being a storage material itself, for example zeolite, it supports the reaction by enhancing the reaction kinetics.

Salts on active and passive carrier matrices, compacted salt granules as well as salts on honeycomb matrices have been produced. The honeycomb structures offer improved flow distribution, low-pressure drop and fast reaction kinetics. In addition, the salinity can be fine tuned during the extrusion process (samples with different salt concentrations inside the thin walls have been produced). Experts are conducting experimental investigations to determine the reaction equilibrium, reaction enthalpy and reaction kinetics of these novel composites. And, they are using numerical tools to investigate the heat and mass transfer of the composite in a technical reactor. The proper description of the reaction kinetic and the heat of reaction are two important areas of work. A global approach to materials research (including material development) combined with work on process development allows a comprehensive assessment of the composite material in terms of its suitability for CTES application.

ECN (Energy research Centre of the Netherlands) - Netherlands

At ECN, work on seasonal thermal energy storage using magnesium chloride hydrate as the active thermochemical material is underway. Based on a techno-economic study, the focus of this work is to develop a fixed-bed open sorption system. In order to improve the stability of the active material, composite materials are under investigation in which the active material is combined with a carrier material. The magnesium chloride and the carrier material have

been chosen to create a system that is feasible for use in the built environment based not only on their thermochemical characteristics, but also on their low cost and safety. Presently, composite optimization and reactor testing is underway, and the intention is to do the first field test in 2012.

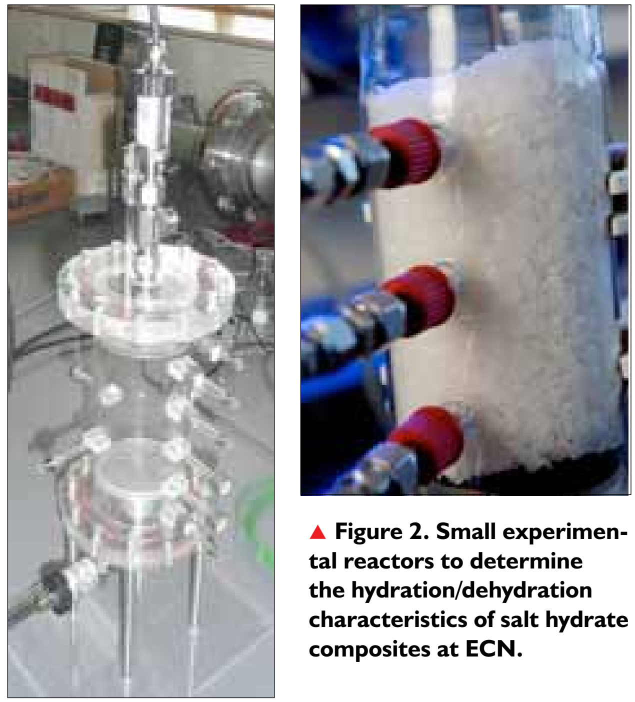
Technical University of Applied Sciences Wildau in cooperation with CWK, Chemiewerk Bad Köstritz GmbH - Germany

Novel nonbinding molecular sieves of type A and X have been developed at CWK following a new strategy of manufacturing zeolite pellets. These new products (13XBF and 4ABF, see Figures 3a and 3b) have been investigated by different physic-chemical methods to evaluate their water adsorption properties, hydrothermal stability and storage capability. The results prove that the nonbinding molecular sieves, compared to ordinary materials, are well suited for thermochemical storage and heat transformation due to their faster kinetics, higher water adsorption capacities, good hydrothermal stability and improved storage capacities.

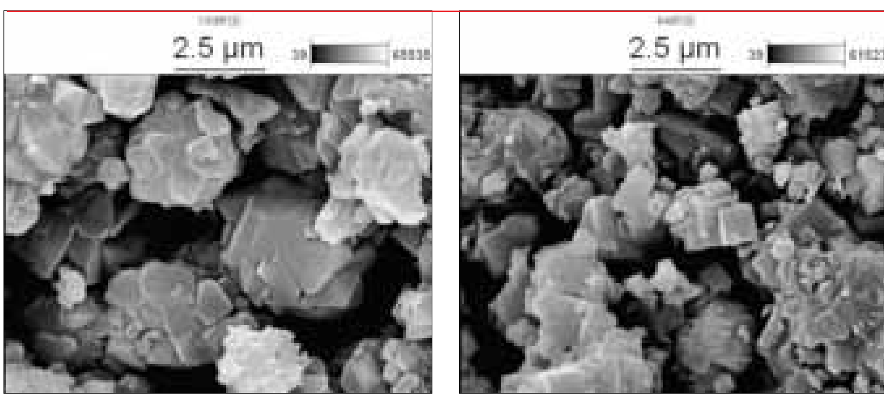
EDF (Electricité de France) - France

The R&D division of EDF is developing a thermal energy storage system using a novel thermochemical material patented by EDF. The initial aim of the storage system is to reduce the peak load demand on the electrical grid resulting from residential heating requirements.

The composite material combines the very high energy densities of a cheap, non-toxic and abundant material, magnesium sulphate, with the high power densities of another thermochemical storage material, zeolites. This material is still under development and has demonstrated record power densities. It has been tested in small 200g reactors and is currently going through a series of tests in a larger 5 kg reactor.



▲ Figure 2. Small experimental reactors to determine the hydration/dehydration characteristics of salt hydrate composites at ECN.



◀ Figure 3. The SEM images show a tiny detail of the surface of molecular sieve beads (diameter 1.6-2.5 mm) of 13XBF (Figure 3a) and 4ABF exhibiting an overall zeolitic morphology without any binder (Figure 3b).

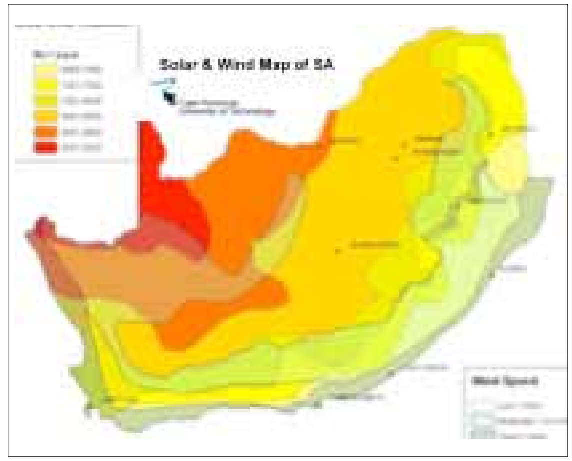
This article was contributed by Henner Kerskes and Barbara Mette of ITW, Stuttgart, Germany; Herbert Zondag of ECN, Netherlands; Jochen Jänchen of TU Wildau, Germany; Philip Stevens of EDF, Les Rénardières, France; and Wim van Helden of ECN and the Task 42 Operating Agent. For more information, you can contact one of the authors or check the Task website, www.iea-shc.org/task42.

▲ Figure 4. A 5 kg test stand for thermochemical storage at EDF.

South Africa: Leap-frogging into Solar Technologies

South Africa is a country blessed with many natural resources ranging from gold and diamonds to coal and uranium - not to mention very high levels of solar irradiation and adequate wind mainly along the coastal and inland mountain regions, as shown in Figure 1.

At the face of it the country has so many choices that it is difficult to understand why better use has not been made of renewable energy sources, especially in the north-western region of the country. There are, however, also notable limitations since rivers often dry up making hydropower unreliable and the country's limited supplies of natural gas are being used almost entirely for the commercially-viable SASOL oil-from-coal refineries. During the 1950s, the single national electricity utility company, Eskom, linked the municipal business hubs of the country with a single national grid. At that time, these monopolistic developments made good business and energy security sense. This has enabled the present government to offer 86% of the entire population access to the electricity grid, compared with less than 10% in other southern African states.



▲ **Figure 1. Solar and wind map of South Africa showing high solar irradiation in the north west.**

Environmental Issues

Like most developing countries, South Africa is locked into a socio-techno-economic development mode, in which the environment will have to take second place for the next decade or two. As much as many scientists would like to prioritize the reduction of greenhouse gas emissions and all forms of pollution, government policy openly dictates that certain national goals will have to be met first. These include supplying the poor with proper homes, electrifying them, extending the domestic clean water supply, improving sanitation and other health-care objectives, like combating AIDS, TB, etc. Only after these objectives have been achieved, will costly environmental reforms be implemented. An obvious target is the reduction of generating electricity from coal. Eskom generates approximately 92% of its power from coal and the rest is largely nuclear and very little hydro, solar and wind-power. Scientists have unsuccessfully been promoting the wider use of the latter two options for the past decade. It is precisely here where the IEA Solar Heating and Cooling Programme can assist this country. International know-how and experiences can help convince local decision-makers that SHC is actually working on a large scale in other countries with far less sunshine than South Africa.

South Africa joined the IEA Solar Heating and Cooling Programme in 2010 and will now be able to leapfrog various technologies to be catapulted into the cutting-edge arena of solar heating and cooling.

Power Shortages Promote SHC

Due to imminent power shortages, the power generation scene is about to change drastically in South Africa. The Government's new energy efficiency and demand side management rules (EEDSM), have prioritized solar thermal water heating, efficient lighting and ceiling insulation. Space heating is not as important here as in colder climates, but solar water heating for domestic use can play a major role at the national level. Although the residential sector is normally a low power consumer, it nevertheless dominates the peak demand periods, and in turn determines the need for additional power generating plants. If successfully applied, SHC will assist in delaying the need for additional new power stations.

Solar Water Heating

The authorities hope to have 1 million domestic solar water heaters (SWHs) installed within 3 years. Eskom offers a rebate on approved installations of domestic SWHs of about 30%, reducing the pay-back period to between 5 and 10 years. By June 2010, some 4,850 claims for rebates for locally-manufactured flat panels and imported evacuated tubes had been recorded. Households with lower incomes resort to 50-litre solar thermal, stand alone systems, shown in Figure 2.

In larger homes, solar water heaters with electric back-up systems are being installed. In Figure 3, the combination with swimming pool heating is shown.

▲ **Figure 2. Mass rollout, stand alone solar thermal water heaters.**

▲ **Figure 3. Stand alone, solar thermal flat panel swimming pool heaters plus evacuated tube, power back-up, solar water heater.**

New SHC Technologies

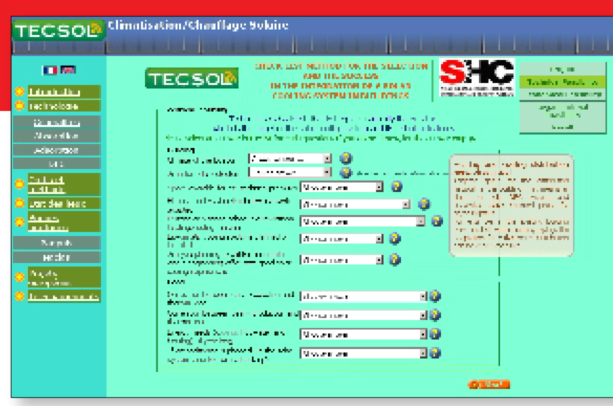
Although South Africa is not a leader in solar applications, it does have an appreciation of the developments in the rest of the world. And is making strides of its own, a revised Renewable Energy Feed-in Tariff (REFIT) was promulgated during the past year, but is being delayed by Power Purchase Agreements. The authorities are in the process of building a Concentrated Solar Power (CSP) plant at Upington in the Northern Cape Province. And, research at various local research institutions is aimed at developing more affordable, small, solar-driven heat pumps and cooling systems.

Eskom also has been instrumental in training and commissioning Energy Services Companies (ESCOs) as well as Measurement and Verification (M&V) teams at selected universities to objectively verify claimed energy savings and reductions in greenhouse gas emissions. To speed up future DSM interventions, Eskom has resorted to Standard Offer bids. The M&V base is also to be expanded, since treasury rebates will only be paid out to clients whose interventions have been independently verified.

This article was contributed by the South African Executive Committee member, Ms. Thembakazi Mali of SANERI, and alternate Executive Committee member, Prof. Ernst Uken of Cape Peninsula University of Technology.

MarketPlace

The Solar Heating and Cooling Programme is not only making strides in R&D, but also impacting the building sector. This section of the newsletter highlights solar technologies that have been developed or conceptualized in a SHC Task and are now being commercially manufactured, marketed or used.



SOLAR AIR-CONDITIONING & REFRIGERATION

A free online tool, "Check-List Method for the Selection and the Success in the Integration of a Solar Cooling System In Buildings," is available on the website of the company TECSOL SA (http://www.tecsol.fr/checklist/). The tool is based on feedback from the European solar cooling experiences in SHC Task 38, Solar Air-Conditioning and Refrigeration.

The method and tool were developed to support the evaluation of using solar cooling technology in the early phase of a project. The tool takes into consideration all the important aspects – technical boundary conditions, financial aspects, questions related to building space and areas for installation of solar collector systems, and issues of knowledge and interest of involved stakeholders. At the end, the tool provides information on the feasibility of the particular project under consideration.

With this tool a pre-selection of the technical and the hydraulic scheme according to the building and the meteorological boundary conditions is possible as well as draft sizing of the main components of the system. The target audiences for the tool are building owners, planners, installers and others interested in the application of the technology.

SHC new publications

SOLAR REFRIGERATION AND COOLING

A series of technical reports are available for downloading at http://iea-shc.org/publications/category.aspx?CategoryID=79.

Benchmarks for Comparison of System Simulation Tools – Absorption Chiller Simulation Comparison

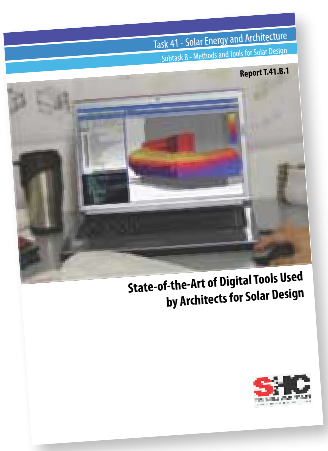
Description of Simulation Tools Used in Solar Cooling

State of the Art on Existing Solar Heating and Cooling Systems

Collection of Selected Systems Schemes "Generic Systems"

Market Available Components for Systems for Solar Heating and Cooling with a Cooling Capacity < 20 kW

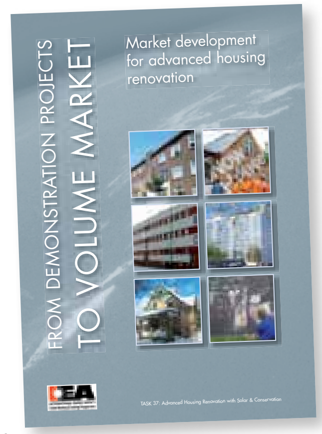
SOLAR ENERGY & ARCHITECTURE



State-of-the-Art of Digital Tools Used by Architects for Solar Design

This report is a review of 56 existing digital tools widely used today. The computer programs reviewed are classified according to three categories: 1) CAAD (computer-aided architectural design), 2) visualization, and 3) simulation tools. The aim of this review is to analyze the current software landscape for building projects with a focus on the early design phase.

SOLAR RENOVATION



From Demonstration Projects to Volume Markets

How do we get from demonstration projects to a volume market for very low energy demand in advanced housing renovation? This report looks at both traditional market development perspectives and interventions by public actors to provide a better understanding of what drives advanced housing renovation. The report also includes a reference document designed to inform and to recommend directions for policy makers and central decision makers.

Advanced and Sustainable Housing Renovation Handbook

This handbook is produced from material developed in the course of IEA SHC Task 37 Advanced Housing Renovation by Solar and Conservation. Operating agent was Fritjof Salvesen from Norway. This venture brought together some 50 experts from 12 countries. The objective of this task was to develop a solid knowledge base how to renovate housing to a very high energy standard while providing superior comfort and sustainability and to develop strategies which support market penetration of such renovations explicitly directed towards market segments with high renovation and multipliable potentials.

New Work

ringing in 2011 with three new tasks

NEW TASKS

Large Systems: Large Solar Heating/Cooling Systems, Seasonal Storage, Heat Pumps – Task 45

The participants in this new Task will collaborate to develop a stronger and more sustainable market for large solar heating and cooling systems. Their work will address the cost effectiveness, high performance and reliability of systems and focus on how to match system configurations to local needs and conditions. To organize the work, the Task will be divided into four work areas: Collectors and collector loop, Storages, Heat pumps/chillers, and Systems.

The Task will run from January 2011 to December 2013. The first Task meeting is planned for April 4-6, 2011 in Barcelona, Spain.
For more information contact the Operating Agent, Jan Erik Nielsen of PlanEnergi, Denmark, jen@solarkey.dk

Solar Resource Assessment and Forecasting – Task 46

This new Task will address four basic objectives to increase the understanding of our solar resources: 1) evaluation of solar resource variability that impacts large penetrations of solar technologies; 2) standardization and integration procedures for data bankability; 3) improved procedures for short-term solar resource forecasting, and 4) advanced solar resource modeling procedures based on physical principles. Participants will provide the solar energy industry, electricity sector, governments, and renewable energy organizations and institutions with the means to understand the "bankability" of data sets provided by public and private sectors. Building on the work of SHC Task 36, Solar Resource Knowledge Management, participants will work in four areas: Solar resource applications for high penetration of solar technologies, Standardization and integration procedures for data bankability, Solar irradiance forecasting, and Advanced resource modeling.

The Task will run from July 2011 to June 2015.
For more information contact the Operating Agent, Dave Renné of NREL, United States, david.renne@nrel.gov

Solar Renovation of Non-Residential Buildings – Task 47

This new Task will develop a solid knowledge base on how to renovate non-residential buildings towards the NZEB (Near-Zero Energy Buildings) standards in a sustainable and cost efficient way and to identify the most important market and policy issues as well as marketing strategies for such renovations. Building on the work of SHC Task 37, Advanced Housing Renovation with Solar & Conservation, participants will work in four areas: Advanced exemplary projects, Market and policy issues and marketing strategies, Design and analysis of technical solutions, and environmental and health impact analysis.

The Task will run from January 2011 to June 2014. The first Task meeting is planned for March 2011.
For more information contact the Operating Agent, Fritjof Salvesen of KanEnergi, Norway, fs@kanenergi.no

PROPOSED WORK

Solar Cooling - Quality Assurance Measures for Solar Thermally Driven Heating and Cooling Systems

The SHC Programme plans to continue its work in solar cooling R&D. As a follow-on to SHC Task 25, Solar Assisted Air-Conditioning of Buildings and SHC Task 38, Solar Air-Conditioning and Refrigeration, this new work also will look for solutions to make solar thermally driven heating and cooling systems (STDHC) more reliable and cost competitive. The main objectives of this proposed work are to identify and optimize a set of "best" STDHC applications, to develop and provide measures for cost reductions and quality improvements, and to create criteria for a quality label for systems.

The proposed Task dates are October 2011 – September 2014. A meeting to further define the work is planned for March 28-29, 2011 in Paris.
For more information contact Daniel Mugnier of TECSOL SA, France, daniel.mugnier@tecsol.fr

Solar Heat Integration in Industrial Processes

This proposed work will build on the results of SHC Task 33, Solar Heat for Industrial Processes. The main objectives will be to further develop solar process heat collectors, to optimize processes for a more efficient solar integration, to identify new applications (e.g. SunChem and water treatment), to develop planning tools, calculation tools and design guidelines, and to install and monitor large-scale demonstration systems.

For more information contact Christoph Brunner of AEE INTEC, Austria, c.brunner@aee.at

Utility Solar Heating and Cooling Programmes: Information Sharing and Development

This proposed Task will focus on the implementation of solar heating and cooling (SHC) programs by utility companies. A primary goal of this work will be to create opportunities for utilities to learn and share successful SHC business models. Participants will investigate program design, obstacles, successes and continuing challenges to involve natural gas and electric utilities in solar heating and cooling technology development and deployment.

For more information contact Chip Bircher, USH2O Coordinator, United States, ush2o.mail@gmail.com

IEA programme SHC

The International Energy Agency was formed in 1974 within the framework of the Organization for Economic Cooperation and Development (OECD) to implement a program of international energy cooperation among its member countries, including collaborative research, development and demonstration projects in new energy technologies. The members of the IEA Solar Heating and Cooling Agreement have initiated a total of 47 R&D projects (known as Tasks) to advance solar technologies for buildings. The overall Programme is managed by an Executive Committee while the individual Tasks are led by Operating Agents.

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