SOLAR UPDATE

NEWSLETTER OF THE INTERNATIONAL ENERGY AGENCY SOLAR HEATING AND COOLING PROGRAMME • NO. 39 FEBRUARY 2003

An International Committment to Solar

25 Years of Solar R,D&D

The IEA Solar Heating and Cooling (SHC) Programme, which began when solar technology was in its infancy, continues to tackle the challenges that face the development of solar technology and its impact in the marketplace. As a result of this international collaborative work, the contributions of the SHC Programme can be found in all parts of the world.

Recognizing the importance of solar energy in today's energy mix, whether locally, nationally or internationally, the 20 Member countries and the European Union have agreed to collaboratively research, develop and demonstrate solar heating, cooling and daylighting technologies.

The need for a higher reliance on solar energy and other renewable energy sources is evident by the following facts:

- 30-40% of total energy demand in OECD countries is from buildings.
- Demand for energy is growing.
- Concern over climate change is growing.
- Countries' are committed to meeting their Kyoto targets.
- Solar and other renewables are large, inexhaustible energy sources.

The SHC Programme is currently working in the following areas:

- Building energy analysis tools
- Procurement of solar water heaters
- Solar combisystems
- Solar assisted cooling
- Solar sustainable buildings
- Performance of solar façade components
- Solar crop drying
- Daylighting
- Storage for solar thermal systems
- Solar heat for industrial processes

Each project (Task) listed above is managed by an Operating Agent from one of the Member countries while the overall control of the Programme rests with the Executive Committee comprised of one representative from each of the Member countries.

Advancing Solar Designs and Technologies

The SHC Programme is committed to expanding the market share of solar energy. To increase the world's attention given to solar energy, the SHC Programme has established the SHC SOLAR AWARD. This award recognizes the outstanding contributions made in the solar field with connections to work of the Solar Heating & Cooling Implementing Agreement.

The first SHC SOLAR AWARD will be presented at a special ceremony at the June 2003 ISES World Congress in Göteborg, Sweden. The recipient (individual, company, private institution or public institution) will have shown outstanding leadership or achievements, with links to the IEA Solar Heating and Cooling Programme, in the field of solar energy at the international level within one or more of the following sectors:

- Technical developments
- Successful market activities
- Information

The results from 25 years of SHC Programme work can be found on the web site, www.iea-shc.org.

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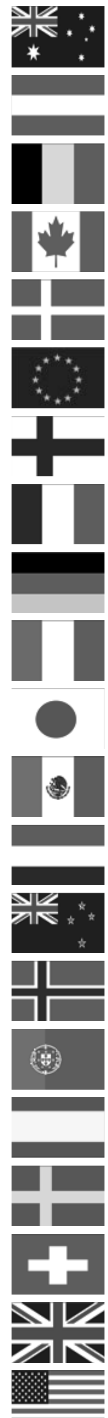

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Solar Activities in IEA Countries

The Executive Committee held its 8th National Programme Review workshop on national activities in solar energy for buildings in IEA Member countries. A report was compiled of the country papers, and this article is an excerpt from the overview chapter by Dr. Charles Bankston of the report, Solar Energy Activities in IEA Countries - 2002.

Climate Change and Other Environmental Issues

Environmental issues continue to be the driving force for the development of alternative energy technologies in SHC Member countries. Global climate change due to the increase of greenhouse gases in the atmosphere is seen as the greatest danger. Most of the European countries have ratified the Kyoto Agreement and established voluntary goals for the reduction of green house gas emissions. Some of the countries report remarkable progress toward meeting these goals. Germany, for example, has a goal of reducing 1990 emissions by 25% by the year 2005, and has already accomplished a 19% reduction. While most of the reduction in greenhouse gas emissions will be achieved through improvements in energy efficiency, many countries are also setting aggressive goals for the use of renewable energy technologies. Portugal, for example, is committed to achieving 39% of its electricity production from renewable energy sources by 2010. (Of course, Norway already produces 99% from hydro, and Finland produces 21% from biomass).

Renewable Energy Budgets

The overall Renewable Energy budget total for the countries reporting shows a 10% increase over 2000.

Despite the generally strong interest in solar technologies as a means of tapping into an environmentally clean and renewable energy source, funding levels for solar energy activities continue to vary across SHC Member countries.

Although the trend of government funding for solar energy technologies from 1998/1999 to 2000/2001 is negative or flat, there are upturns in funding in several countries for the 2001 budgets. Belgium and Norway show increases in Active Solar budgets, Austria, Germany, Norway, and Switzerland show modest increases in their Passive Solar budgets, and Austria, Italy, and Norway show larger PV programs.

Countries that have experienced substantial budget reductions from 2000 to 2001 include: Austria, Germany, Netherlands, and Switzerland in Active Solar; and Germany in PV programs.

Although few of the national budgets show large increases in RD&D budgets for solar technologies, a number of countries have energy plans or policies that anticipate substantial growth of the contributions from renewable energy resource over the next 5 to 10 years. These plans may imply increases in funding in the out years, but also reflect a growing trend toward measures such as:

- requiring utilities to produce an increasing fraction of power from renewable resources,
- building codes that encourage solar and energy conservation measures,
- tax incentives for businesses and consumers to promote alternative energy sources, and
- some anticipation of improving economics for renewable energy technologies.

Passive Solar Energy

Although many countries report continuing research on materials and processes that can improve performance of buildings including: electrochromic and thermochromic materials for controllable windows, transparent insulation, phase change energy storage materials and dynamic shading devices, there seems to be greater reporting of projects that attempt to integrate and optimize a number of existing solar and building components in to more energy-efficient buildings.

Finland reports a new project in Ekoviikki, a community of 1,500 inhabitants and some 64,000 m_ of building area, which was designed from the beginning to include fully integrated passive solar, energy efficiency, and active solar technologies for about 800 residents. The extra investment due to the solar features was less than 1%, and the total energy demand will be about half the average for new construction. Germany, Italy, and the United States also report the development of highly integrated, low-energy buildings using passive solar techniques. Some of these projects employ other solar technologies, active controls, and microprocessors to achieve zero energy demand and/or autonomous "intelligent" operation.

Active Solar Systems

Many countries report growing consumer interest in Solar Domestic Hot Water (SDHW) systems, as well as significant ongoing efforts to control quality of products and installation, and to reduce costs.

In Austria, the cost of large-scale solar heating systems for district heating plants and other large commercial projects is being reduced through the development of larger collector modules. Collector modules up to 15 m_ in area increase efficiency, reduce connection costs and heat losses, and lower installation costs for an overall cost reduction of 30 %. In Norway a new plastic collector using a novel packed bed absorber design in a drain back configuration is expected to reduce costs and spur the growth of a new company. The United States also

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reports proof in principle testing of new plastic collectors suitable for SDHW systems.

Building-Integrated Photovoltaics

Photovoltaic technologies continue to receive the largest R&D budget in most countries and to achieve significant technical advances. Most countries are improving their facilities for processing silicon and other cell materials, and report both improved efficiency and decreasing costs. While the cost of PV-generated electricity is still far higher that grid power, there are encouraging developments both in basic technology and in the application of specific adaptations of the technology for building integration. This report only touches on PV with an emphasis on building-integrated PV. More focused IEA work on PV is undertaken by the IEA PV Power Systems Implementing Agreement.

Government Incentives

Although some renewable energy technologies have reached economic competitiveness in select locations, most solar technologies still require some type of financial incentive from governments to be attractive to consumers and inventors. Therefore, most of the reporting countries have some type of incentive programs in place. Direct subsidies for the installation of new solar equipment is probably the most common incentive, but many countries use other financial instruments, in place of, or in addition to the use of direct subsidies. Low cost loans also are common – particularly for commercial investments, and tax policies are frequently employed. Tax measures may take the form of direct tax credits for certain solar related investments, the removal or reduction of property or value added taxes for purchases or investments, or special tax rules (e.g., a reduction of the depreciation period on solar capital investments).

Most countries have based subsidies on the cost of the installation or investment involved, and frequently provide differing percentages for different technologies. However, a few countries or regional jurisdictions do employ performance-based subsidies. The most common are the premiums paid for PV or wind generated electricity, but there also are some performance-based incentives for thermal energy from renewable sources.

Even the most generous incentives will not succeed if the consumers or investors do not perceive the supported technologies as safe, effective, and reliable. Therefore, most countries have government-supported programs for testing and certifying solar and energy efficiency products and for making that information available to the target audiences.

> IN 1999-2000, AN AVERAGE OF 2 MILLION M² OF SOLAR COLLECTORS (EXCLUDING AIR COLLECTORS) WERE INSTALLED IN 19 OF THE 20 SHC MEMBER COUNTRIES. THE COLLECTORS INSTALLED IN AUSTRIA, GERMANY, JAPAN, AND THE UNITED STATES REPRESENTS APPROXIMATELY 87% OF THIS TOTAL FOR 1999-2000.

A few countries or regions have mandated the use of solar and energy efficient equipment in new buildings, and many countries encourage the use of such technologies through their building codes and standards.

Solar Market Activity

As the total market for all types of solar technologies grows, the opportunities for private companies to expand and compete in new markets increase. This is evident in the solar thermal markets as well as the PV markets. Countries such as Austria, Germany, and Sweden are exporting a significant part of the products from their solar thermal industries. Expansion into foreign markets allows companies to invest in more efficient production facilities with greater automation, and thus cut production costs and achieve better quality control. On the other hand, some countries' industries are facing increasing outside competition and will likely experience some consolidation.

In 1999-2000, an average of 2 million m² of solar collectors (excluding air collectors) were installed in 19 of the 20 SHC Member countries. The collectors installed in Austria, Germany, Japan, and the United States represents approximately 87% of this total for 1999-2000. For more detailed information and data on solar thermal collectors in SHC Member countries, please refer to the SHC report, Solar Thermal Collector Market in IEA Member Countries, which can be found on the SHC web site (www.iea-shc.org).

Another continuing trend in the Member countries is that testing, certification and standardization of solar equipment is becoming more common, with the aim of making the systems more reliable and cost-effective. For new technologies, it is very important that the quality is high. In most cases, the programs are conducted by or with funding from the government, but increasingly, industry associations, utilities, and end-user groups are involved.

New approaches to marketing are also being employed to overcome some of the barriers associated with the high investment cost of solar equipment. Energy service companies have been formed in Portugal and the United States, among others, that sell solar heated water to commercial and residential customers. Unlike district heating companies, the solar water heaters are located on the customer's property but owned and maintained by the energy service company.

This report, "Solar Energy Activities in IEA Countries – 2002," will be available in March 2003. Hard copies can be ordered for $ 25 from the SHC Executive Secretary, see back page for address. An Adobe Acrobat (pdf) version can be downloaded from the SHC web site, www.iea-shc.org. ✷

New Integrated Design Process Developed, Tested & Demonstrated

The Integrated Design Process contains no elements that are radically new, but rather integrates well-proven approaches into a systematic total process. When carried out in a spirit of cooperation amongst key actors, the result is a design that is highly efficient with minimal, and sometimes zero incremental capital costs, along with reduced long-term operating and maintenance costs. The benefits of the Integrated Design Process are not limited to improved environmental performance, though. This approach often leads to improvements in the function, structure, and architecture of the building.

To significantly reduce the total energy use in large buildings, it is necessary to combine several systems and technologies, such as energy conservation, daylighting, passive solar, active solar and PV. Building designers are therefore confronted with the dilemma of finding the optimum combinations of technologies for the whole building they are designing. In order to consider the whole building instead of its parts, an integrated approach to the building design is needed, but this has been missing from the traditional designer's standard box of tools.

To develop a new integrated design process, 25 experts from 12 countries worked together for five years in SHC Task 23, Optimatization of Solar Energy Use in Large Buildings. The results of this work are—a new integrated design process, guidelines on how to carry out the new design process, methods and tools for trade-off analysis, and buildings that demonstrate that the process works. And, proof that about a 20% energy reduction is possible without any additional costs.

The Conventional Design Process

Although there are many exceptions, and this has been oversimplified, the "traditional" design process typically consists of the following:

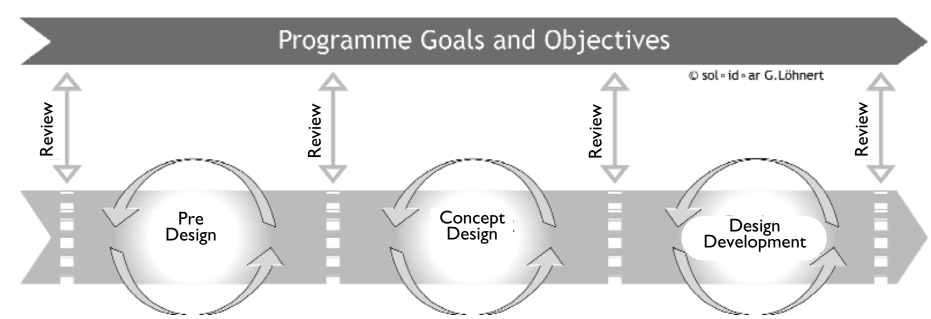
- The architect and the client agree on a design concept, consisting of a general massing scheme, orientation, and fenestration. The general exterior appearance is usually determined by these characteristics as well as basic materials; and
- The mechanical and electrical engineers are then asked to suggest appropriate systems.

The traditional design process has mainly a linear structure due to the successive contributions of the members of the design team, and there is little opportunity for optimization until later in the process when it is difficult or impossible to do. If the engineers involved in such a process are clever, they may suggest some very advanced and high-performance heating, cooling, and lighting systems, but these may result in only marginal performance increases, combined with considerable capital cost increases. The underlying cause is that the introduction of high-performance systems late in the design process cannot overcome the handicaps caused by the initial poor design decisions.

The Integrated Design Process

The Integrated Design Process involves a different approach starting from the very early stages of design, and can result in a very different result. It is based on the well-proven observation that changes and improvements in the design process are relatively easy to make at the beginning of the process, but become increasingly difficult and disruptive as the process unfolds. Changes or improvements to a building design when foundations are being poured, or even contract documents are in the process of being prepared, are likely to be very costly, extremely disruptive to the process, and result in only modest gains in performance.

The Integrated Design Process includes the following elements:



Source: Solidar, Berlin Germany

- Inter-disciplinary work between architects, engineers, costing specialists, operations people, and other relevant actors right from the beginning of the design process.

Integrated Design Process Tools Available on the Web

- Introductory Booklet on the Integrated Design Process
- Integrated Design Process Guideline
- IDP Navigator Software
- Examples of Integrated Design
- Blueprint for a Kick-off Workshop
- MCDM-23 (Multi Criteria Decision Making) Method and Software

These and other Task products can be downloaded from www.iea-shc.org/Task 23.

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Requirements for Successful Solar Building Design

- Start with a client and design team committed to high performance and willing to alter the normal design process
- Select a design team with a wide range of technical skills
- Add an energy engineer and the relevant specialists to the team
- Commence with teamwork from the very start of the pre-design stage
- Define performance goals at the outset and refer to them throughout

- Discussion of the relative importance of various performance issues and the establishment of a consensus on this matter between client and designers.
- Budget restrictions applied at the whole-building level, with no strict separation of budgets for individual building systems, such as HVAC or the building structure. (This reflects the experience that extra expenditures for one system, such as solar shading devices, may reduce costs in other systems, such as capital and operating costs for a cooling system).
- The addition of a specialist in the field of energy, comfort, or sustainability;
- The testing of various design assumptions through the use of energy simulations throughout the process, to provide relatively objective information on this key aspect of performance.
- The addition of specialists (e.g., for daylighting, thermal storage, etc.) for short consultations with the design team;
- A clear articulation of performance targets and strategies, to be updated throughout the process by the design team; and
- In some cases, a Design Facilitator may be added to the team, to raise performance issues throughout the process and to bring specialized knowledge to the table.

Based on experiences in Europe and North America, the overall characteristic of an Integrated Design Process is the fact that it consists of a series of design loops for each stage of the design process, separated by transitions with decisions about milestones. In each of the design loops, the design team members relevant for that stage participate in the process.

The design process itself emphasizes the following sequence:

1. First establish performance targets for a broad range of parameters, and develop preliminary strategies to achieve these targets. This sounds obvious, but in the context of an integrated design team approach it can bring engineering skills and perspectives to bear at the concept design stage, thereby helping the owner and architect to avoid becoming committed to a sub-optimal design solution;

2. Then minimize heating and cooling loads and maximize daylighting potential through orientation, building configuration, an efficient building envelope, and careful consideration of amount, type, and location of fenestration;

3. Meet these loads through the maximum use of solar and other renewable technologies and the use of efficient HVAC systems, while maintaining performance targets for indoor air quality, thermal comfort, illumination levels and quality, and noise control; and

4. Iterate the process to produce at least two, and preferably three, concept design alternatives, using energy simulations as a test of progress, and then select the most promising of these for further development.

The Integrated Design Process has impacts on the design team that differentiates it from a conventional design process in several respects. The client takes a more active role than usual, the architect becomes a team leader rather than the sole form-giver, and the mechanical and electrical engineers take on active roles at early design stages. The team should always include an energy specialist, and in some cases, an independent Design Facilitator.

Community Centre in Kolding, Denmark

(Photograph by Municipality of Kolding)

School in Mayo, Yukon, Canada

(Photograph by Kobayashi + Zedda Design Group – Whitehorse)

Putting the Integrated Design Process to Practice

Five buildings were constructed using some of the guidelines, methods, and tools developed in SHC Task 23. Aside from testing the Task's guidelines and tools, the buildings demonstrate the successful integration of technologies in real buildings and promote sustainable solar buildings. The Task's demonstration buildings were a community center in Denmark, a school in Canada, the German Postal Service Headquarters, and two office buildings in the Netherlands.

Danish Community Centre

The first demonstration project completed was a Community Centre for the Municipality of Kolding in Denmark. A goal of this project was to optimize the building in terms of resource use, functionality, and ecology. During the design process, the SHC Task 23 multi criteria decision making method was used to help identify the objectives, to sort out poor solutions, and to document the design. And, passive and active solar energy technologies were used in the building, together with other sustainable features.

The efficiency of this process was a positive outcome of the Integrated Design Process. And, the client considered that the resulting good indoor climate and reduced energy operating cost were a direct result of using the Integrated Design Process. Overall, the client is very satisfied, and the team members intend to use the Integrated Design Pro-

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cess in future projects.

Canadian School

A school in Mayo, Yukon, Canada was built with the goal to create a building that could be used by the entire community (e.g., school, community gatherings, adult education, etc.) and meet the energy and environmental performance standards for the Canadian C-2000 Program for Advanced Buildings, all on a fixed budget. Passive solar and daylighting technologies were used in the building.

Without using the Integrated Design Process, the Department of Education would probably have implemented a "stock" building plan. After initial resistance to the high-performance approach, all the actors are satisfied with the process and there has been a groundswell of sustainability initiatives within the Yukon Territorial Government.

See the report, "The Integrated Design Process in Practice: Demonstration Projects Evaluated" for detailed information on all five of the demonstration projects.

The Impact of Integrated Design Processes on Design

The overall conclusion is that the use of the Integrated Design Process means high building performance levels, superior indoor environments, and greatly reduced operating costs, at little extra capital cost. To achieve an integrated building in terms of performance and cost, a traditional design process is in many cases ineffective. And, as the SHC Task 23 Operating Agent, Prof. Hestnes states, "Although there will always be individual designers who are able to design brilliant buildings in an individualistic way, the Integrated Design Pro cess approach will be of significant benefit to most designers and clients who are attempting to achieve excellence in building design."

This article is based on the booklet, "Solar Low Energy Buildings and the Integrated Design Process: An Introduction." This report and others can be found under Task 23 of the SHC web site.✷

The Solar Heating and Cooling (SHC) 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.

57 Million Square Meters of Solar Thermal Collectors Installed

By the end of 2000, the collectors installed in 22 IEA countries represented:

- 31 million square meters of flat plate and evacuated tube collectors for hot water and space heating
- 24 million square meters of unglazed collectors for swimming pool heating, primarily, and
- 1.7 million square meters of air collectors for agriculture products drying and some space heating.

The data collected by the SHC Programme shows an 8% market growth for flat plate and evacuated tube collectors between 1999 and 2000. The markets that showed the largest growth were Mexico (226%), Sweden (99%), Spain (65%), Germany (47%) and France (42%).

The calculated annual collector yield of the recorded systems, excluding air collectors, is approximately 21,300 GWh (76,900 TJ). This corresponds to an oil equivalent of 3.4 billion liters and a CO2 avoidance of 9.3 million tons.

The complete report, *Solar Thermal Collector Market in IEA-Member Countries*, will soon be available on the SHC web site at www.iea-shc.org.

Uponor Wins SHC Solar Procurement Competition

Fourteen systems from Sweden, Germany, Denmark and Austria entered SHC Task 24's solar procurement competition for Solar Domestic Hot Water (SDHW) systems. The winner was Uposun HW 300, a new system with a plastic collector from Uponor AB. In addition, six other systems were given honourable mention.

The goal of this competition was to develop a solar domestic hot water system that could replace the electric hot water systems that are used in many detached houses with electric heating in Sweden. The system requirements were developed by an independent expert group and included obligatory, as well as desirable requirements. For example, the total price (including VAT, but excluding mounting) should not exceed 16,000 SKr (about 1,700 _) for an order of 1,000 systems. An independent jury evaluated the qualifying systems -- installation (including mounting time, etc.) represented 40%; price and performance 30%; environmental aspects (life cycle analysis) 10%; documentation 10%; and maintenance/length of life 10%. The system evaluations were based on prototype testing carried out by the National Swedish Testing and Research Institute (SP). In addition, the offering company had to pass an evaluation on its ability to carry out delivery and guarantees, and the winner would need to carry out an approved "real" installation of 5 systems on houses.

As a result of the competition, the average performance of marketable SDHW systems in Sweden has improved. And, to support the development of improved systems, the competition's performance test results were sent to the system designers together with detailed advice on how to improve the design, as well as performance. The majority of manufacturers have adopted the proposed improvements, and in some cases, introduced further improvements. In addition, the competition has resulted in a decreased price in the order of 20% for SDHW systems sold in the Swedish market, and lead to the establishment of SDHW system testing at SP.

The competition was initiated and financed by the Swedish Council for Building Research, which is now part of FORMAS, and LIP Stockholm (Council for the Local Investment Program in Stockholm).✷

IN BRIEF

NEW SHC WORK FOR 2003

Task 32: Storage Concepts for Solar Buildings

The objectives of this new work are to contribute to the development of advanced storage solutions in thermal solar systems for buildings and to propose advanced storage solutions for other heating or cooling technologies than solar. The goal of the Task is not to develop new storage systems independent of a system application, but to focus on the integration of advanced storage concepts in a thermal system for low energy housing. The work will be organized into four subtasks: Subtask A: State of the Art, Common Specifications, Evaluation and Knowledge Dissemination, Subtask B: Storage Concepts Based on Chemical Reactions and on the Sorption Principle, Subtask C: Storage Concepts Based on Phase Change Materials, Subtask D: Storage Concepts Based on Advanced Water Tanks and Special Devices. The proposed start date is July 2003.

For more information contact the Operating Agent, Jean-Christophe Hadorn, e-mail: jean-christophe.hadorn@bluewin.ch or fax: +41-21-732-13-20.

Task 33: Solar Heat for Industrial Processes

The objective for this new work is to focus on the integration of solar thermal systems into industrial processes with temperatures up to 250° C. The goals of the Task include collecting and sharing knowledge and experiences; providing methods and tools to analyze a wide range of solar applications for the industry; helping to coordinate research and development of solar thermal systems for industrial applications leading to improvements in both performance and costs; ensuring the reliability of new materials and components; and demonstrating that systems providing solar heat for industrial applications are reliable and economical, as well as environmentally useful. It is proposed that the work be organized into four subtasks Subtask A: Solar Process Heat Survey and Dissemination of Task Results, Subtask B: Investigation of Industrial Processes, Subtask C: System Integration and Demonstration, and Subtask D: Collectors and Components.

At the request of the IEA SolarPaces Implementing Agreement, the Executive Committee has agreed that this activity should be a joint Task. The proposed start date is September 2003.

For more information contact the Task Organizer, Werner Weiss, e-mail: w.weiss@aee.at or fax: +43-3112-5886-18.

Follow-up Task on Building Energy Analysis Tools Test Methods

This proposed Task builds upon the work of SHC Tasks 8, 12 and 22. The goal of this new work is to conduct pre-normative research to develop a comprehensive and integrated suite of building energy analysis tool tests involving analytical, comparative and empirical methods for purposes of quality assurance during tool development and certification of tools for energy standard or code compliance. The work would involve research to develop and test a number of building energy analysis tool evaluation tests. A workshop to define this new work will be held in 2003.

For more information contact Mr. Drury Crawley, e-mail: Drury.Crawley@EE.DOE.GOV, fax: +1-202-586-4617.

SHC PUBLICATIONS

Programme and Task publications can be found, and many downloaded, from the SHC web site, www.iea-shc.org.✷

Thanks To...

Georges Deschamps, the representative for the European Commission, who served on the Executive Committee for six years.

Anne Grete Hestnes, the Operating Agent for Task 23, who has given her final farewell after 14 years with the Programme. She began by designing a house for Task 8, Passive and Hybrid Solar Low Energy Buildings, serving as a Task Expert in Task 11, Passive and Hybrid Solar Commercial Buildings, and then acting as the Operating Agent for Task 13, Advanced Solar Low Energy Buildings.

Welcome To...

Jerri Laine, of TEKES, who is the new alternate Executive Committee member for Finland.

Jean-Christophe Hadorn, of BASE consultants on behalf of the Swiss Federal Office of Energy, who is the Operating Agent for Task 32, Solar Concepts for Solar Buildings.

New Executive Committee Chairs...

The new Chairman is **Michael Rantil**, of Sweden. The new Vice-Chairs are **Maria Luisa Delgado-Medina** of Spain and **Drury Crawley** of the United States

IEA Solar Heating and Cooling Programme

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 21 members of the IEA Solar Heating and Cooling Agreement have initiated a total of 29 R&D projects (known as Tasks) to advance solar technologies for buildings. The overall program is managed by an Executive Committee while the individual Tasks are led by Operating Agents.

Current Tasks and Operating Agents

Task 22: Building Energy Analysis Tools
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Task 25: SolarAssisted Air Conditioning of Buildings
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Task 26: Solar Combisystems
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Task 27: Performance of Solar Facade Components
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Task 28: Solar Sustainable Housing
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Task 29: Solar Crop Drying
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Task 31: Daylighting Buildings in the 21st Century
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The Newsletter of the IEA Solar Heating and Cooling Programme

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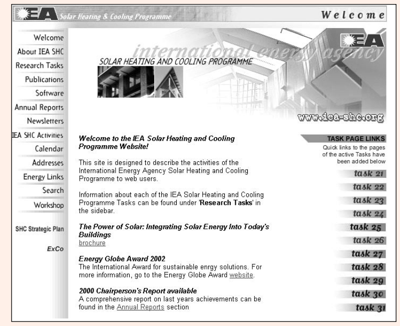

SHC Web Site

Visit the SHC web site next time you're on the Internet. You will find Programme information, details on Task activities, publications, names of Programme contacts, calendar of upcoming SHC meetings and workshops and other useful information.

http://www.iea-shc.org

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