SOLAR UPDATE

NEWSLETTER OF THE INTERNATIONAL ENERGY AGENCY SOLAR HEATING AND COOLING PROGRAMME • NO. 32 MARCH 1999

IEA Workshop Focuses on Sustainable Buildings

Recognizing the important role that sustainable (resource-efficient) buildings are having and will continue to have in the marketplace, the IEA has held two workshops on this topic. The first workshop was in May 1997, and its objective was to explore if the IEA should initiate collaborative work related to sustainable buildings and, if so, how to implement and coordinate that work. The workshop participants, representing several of the IEA building-related programs, unanimously endorsed a proposal to expand the focus of the IEA's current building-related collaborative R&D and related activities beyond energy to also include sustainable building issues.

In August 1998, the IEA convened a second workshop, Towards Sustainable Buildings—A Workshop on Defining Collaborative R&D Needs, to identify work that would facilitate the transformation of the building-sector market in IEA Member countries. Representatives from the IEA's seven building-related programs attended this meeting as well as experts from building-sector businesses, technology and design professions, and government building/construction programs. The richness of the participants' qualifications, 62 people from 18 countries as well as representatives from the European Commission and the International Council for Research and Innovation in Building and Construction (CIB), led to an intensive and productive 3 1/2 day workshop.

Towards Sustainable Buildings

The Towards Sustainable Buildings workshop was held August 31 - September 3, 1998 in Hilton Head, South Carolina, United States. The workshop organizers—the IEA building-related programmes and the U.S. Department of Energy—set out to provide a unique international forum for dialogue between government officials and their peers in building-sector businesses, and technology and design fields. This was achieved through an imaginative and dynamic program of presentations and working sessions.

> The transition from today's sustainable buildings to those of the future will require the solutions of many R&D problems as well as the effective dissemination of information to the key audiences. Currently, the governments of 24 countries and the European Commission collaborate on major building-related energy R&D programmes under the auspices of the IEA. It is therefore timely that the IEA takes steps to expand its R&D work to include sustainable buildings.

Workshop Objective

Workshop participants worked together to define high priority activities to help the IEA programs as well as national programs define their R&D agendas and future work plans. For the purpose of this workshop, "sustainable buildings" were defined as buildings designed, based on a life-cycle analysis, to minimize both direct and indirect adverse impacts on the indoor, local, regional and global environments. These buildings incorporate sustainable materials and components, and use a minimum amount of energy. They also are designed and located to be used in an environmentally-sensitive way.

Workshop Structure

The success of the workshop depended upon participants having ample time to talk, brainstorm, debate and produce recommendations in a conducive setting. To maximize the time available for these activities, a questionnaire was distributed to all participants prior to the workshop, and the results served as a starting point for workshop discussions.

Day One

The first day of the workshop was dedicated to developing a common understanding of the market needs. Presentations were given addressing market needs in the building sectors of Europe, Pacific Rim and North America. These were followed by presentations on the capabilities of current technologies and design know-how. Presentation topics included, sustainable communities (siting, land-use, transportation systems), building envelope and whole building design (passive solar, daylighting and advanced windows), mechanical and electrical systems (conventional, active

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Workshop

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solar, heat pumps, energy storage, photovoltaics, demand-side management, etc.), indoor air quality, waste management (construction and operation).

Day Two

Workshop participants were divided into six 'homogenous' groups according to their area of expertise. Their goal for the day was to discuss and develop two lists 1) a consensus list of market needs which are not being met with current technologies and design know-how and 2) a consensus list of technologies and design capabilities for meeting these unmet market needs. By the end of the day, the participants had gained a common understanding of what is required for sustainable buildings to evolve in the marketplace and what work remains to be done.

Day Three

Participants continued to work in small groups, however, this time they were divided into mixed expertise groups. The goal for this day was to refine the lists developed by the homogenous groups and then to identify and describe high priority work. After a full day of hard work and intense discussions, each group ranked the work they considered to have the most significant impact on moving the building sector market in IEA Member countries towards greater sustainability. Concept papers were then written by workshop participants on the 15 highest priority activities.

Final Session

The closing plenary of the workshop provided an opportunity for each of the 15 new activities to be presented and discussed by all the workshop participants. These reports were then followed with a discussion on the next steps. In order to assess how relevant the workshop results were someone from the each sector (building-sector businesses, technology and design, and government building/construction programs) reflected on the results. In addition, representatives from the IEA building-related programs, the European Commission and the CIB summarized how they foresaw their programs applying the activities developed during the workshop as well as opportunities for future collaboration.

IEA BUILDING RELATED PROGRAMMES

Solar Heating and Cooling

Energy Conservation in Buildings and Community Systems

District Heating and Cooling

Photovoltaic Power Systems

Heat Pumping Technologies

Energy Storage

Demand-side Management

Future Buildings Forum
(forum focused on issues related to buildings of the next century)

Workshop Results

Concept papers were written for each of the 15 high priority activities identified by the workshop participants. Each paper describes the problem to be addressed, the objectives of the proposed work, the approach to performing that work and the expected results.

15 High Priority Areas

Design and Technology

- Development of building energy systems (B.E.S) sustainable buildings
- Advanced envelope technologies
- Indoor environment quality
- Whole building design processes and tools
- Standards, codes and project specific requirements relevant to energy aspects and sustainable buildings
- Protocol for environment rating systems
- Strategies for sustainability in existing buildings

Market Development

- Sustainable building market development program
- Concept for creative financing schemes and incentives to promote the market for sustainable buildings

Information and Education

- Information and dissemination systems
- Education
- Professional training for sustainable buildings
- Production of product/process data sheets

Policy

- A factor 10 city in 30 years - what will it take?
- Environmental government policy: are our solutions the "ecolution"✷

New Work Gets Underway in Programme

The Solar Heating and Cooling Programme ended 1998 with the wheels in motion for four new Tasks. Two Tasks have completed their formal planning phases, and international teams of experts have or will soon begin their collaborative work. The other Tasks are in the early stage of planning.

Solar Assisted Air Conditioning of Buildings

In many countries, air conditioning is the dominant energy consuming service in buildings. And in many regions of the world, the demand for cooling and dehumidification of indoor air is growing due to increases in cooling loads and people's expectations for indoor comfort. Conventional cooling technologies are handling these increases, but in doing so their weaknesses are being exacerbated. The main problems, aside from their high energy consumption, are that these technologies cause high electricity peak loads and use refrigerants which have negative environmental impacts.

To address these problems, the SHC Programme has initiated Task 25, *Solar Assisted Air Conditioning of Buildings*. The main objective of this new Task is to improve conditions for the market introduction of solar assisted cooling systems. The Task will deal mainly with thermal driven cooling/air-conditioning technologies and their operation with solar thermal collectors. Besides the well-known absorption chillers, several other technologies will be covered, including:

- desiccant cooling technique with solid desiccants, either driven by solar water collectors or solar air collectors
- new desiccant cooling cycles with liquid sorbents
- closed-cycle solid sorption (thermo-chemical, adsorption)
- advanced low temperature steam jet cycles
- advanced combined systems (e.g., solar dehumidification with conventional temperature control)

Results of this Task's work are geared towards air-conditioning industries, planners, architects, facility managers and building owners. Several publications such as a "Solar Air Conditioning Design Book," participation at a major trade fair, industry workshops and a user-friendly design tool will help to disseminate results to these relevant audiences.

This five-year Task will begin in June 1999. The work is organized in four subtasks:

- Subtask A: Survey of solar assisted cooling
- Subtask B: Design tools and simulation programs
- Subtask C: Technology, market aspects and environmental benefits
- Subtask D: Solar assisted cooling demonstration projects

And, the countries participating in the work are Austria, Denmark, France, Germany, Italy and the Netherlands.

For more information contact the Operating Agent, Hans-Martin Henning, Fraunhofer Institute for Solar Energy Systems, Germany (see page 8 for address).

Solar Combisystems

Solar heating systems which provide both domestic hot water and space heating, so called solar combisystems or SDHW&H systems, are increasing their market share in countries, such as Austria, Germany, Denmark, the Netherlands and Switzerland. In some countries, such as Sweden, they have been the dominant system for a long time. Although much is already known about domestic solar hot water systems, less is known on solar combisystems which are more complex systems and have interactions with subsystems. And, these interactions profoundly affect the overall performance of the solar part of a system. This general complexity of solar combisystems has led to the development of numerous different system designs, many of which have only recently been commercially produced. Many experts, however, believe that there is still a great potential for reducing costs and improving the systems' performance and reliability.

The main objective of Task 26, *Solar Combisystems*, is to contribute to the introduction of more solar combisystems on the market by the improving the design and performance of systems. Experts will develop 1) tools for comparison and rating systems, 2) definitions of boundary conditions and performance indicators, and 3) test methods as a basis for fair comparisons of industrial solutions. This Task will focus on combisystems for houses and will not cover solar district heating systems or systems with seasonal storage or central solar heating plants with seasonal storage.

Results from this work are intended for the solar industry (manufacturers, architects, planners, engineers, technicians, installers) and perspective buyers (housing companies, utilities, homeowners). A handbook of good designs and practices for solar combisystems will be produced as well as an annual industry newsletter highlighting new developments and information.

This three-year Task began in December 1998. The work is organized in three subtasks:

- Subtask A: System survey and dissemination of Task results
- Subtask B: Development of performance test methods and numerical

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Solar Technologies Find a Niche in Norway

Norway is unique in that practically all electricity is generated from the renewable source, hydropower (113 TWh), and about 50% of the national energy supply is covered by electric power. Of the total production of hydropower in Europe, not including Russia, Norway produces 30%. Norway also has a significant supply of petroleum. The country has been exporting petroleum since 1975. And, in 1995 oil production reached 3 million barrels per day, which corresponds to 15 times the country's oil consumption.

When describing the energy situation in Norway, it is important to point out that the electricity market has been liberalized and a new energy law was enacted in 1991. These reforms have removed nearly all market regulations, and Norwegian households and commercial consumers may now purchase power from any producer in the country. Prices in this free electricity market vary tremendously due to fluctuations in precipitation and temperature, which in turn causes discrepancies between the supply and demand of electricity. For example, in the autumn of 1995 electric power was traded at 0.03 NOK/kWh, while the price in the late winter exceeded 10 times that value.

GOVERNMENT FUNDING

Government funding of renewables has fluctuated a great deal over the last 20 years reflecting various political priorities. Table 1 shows the total government support for research, development and market introduction. The large increase in funds for bioenergy in 1997 and 1998 was based on the expectation that bioenergy would make a significant contribution to the short-term domestic energy supply. The numbers for 1999 are estimates of the allocation of funds between the different sources (solar, biomass, wind, wave).

The government funds for renewables, which includes solar energy, comes under the program for energy efficiency and is separated into two main sectors:

- Research and development – This includes basic research as well as product and industry development, and evaluation of new prototypes.
- Market introduction – This includes demonstration projects, marketing and information activities as well as education and training.

The main R&D activity on renewables is organized under the program, "Efficient and Renewable Energy Technologies (NYTEK)," which has a total budget of NOK 300 million for the 6 year period, 1995 - 2000. Out of this, NOK 140 million is government funding and the remainder is from industry. To date, approximately 20% of the budget has been spent on solar energy projects, primarily photovoltaics. The main objective of the NYTEK R&D program is to develop the Norwegian industry in the sectors of efficient and renewable energy.

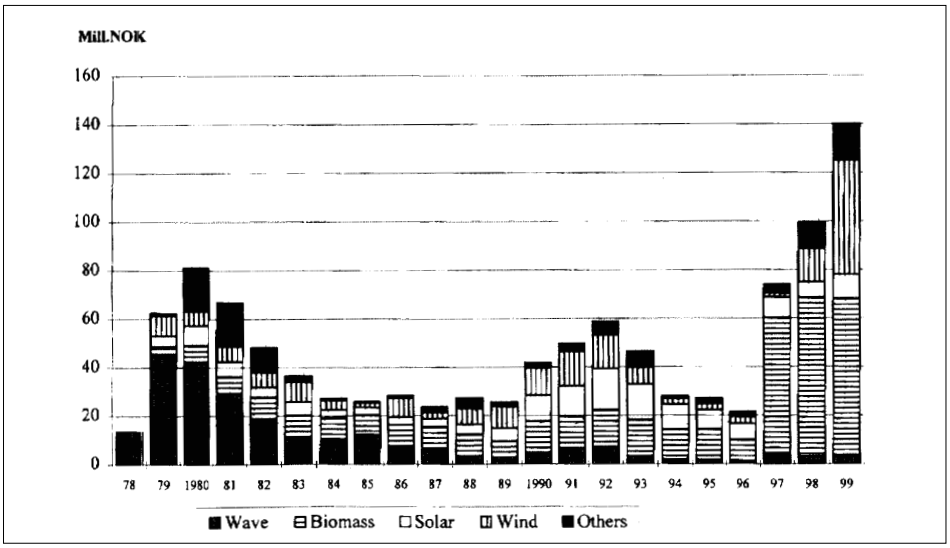
RECENT NORWEGIAN DEVELOPMENTS

Energy Roof and Plastic Solar Collector

In 1990, researchers at the University of Oslo established the company Solnor AS to commercialize their invention, the energy roof. This system proved to be surprisingly efficient, surprising because of the simple drain-back design between two corrugated aluminum plates. About 1,500m^2 of this energy roof have been installed to date.

In 1995, a new plastic solar collector design was developed in collaboration with General Electric Plastics in the Netherlands, and the company SolarNor AS was established. The developer of the energy roof, Solnor, was integrated into SolarNor in 1997. This solar collector has a cover of transparent Lexan double plate insulation and the material Noryl protects the underlying absorber. The absorber has an inner structure of channels filled with small porous spheres. The surface area of the working water is large due to capillary forces, and this large surface area in turn effectively absorbs solar heat. The thickness of the collector without insulation is 3.1 cm,

Table1. Government Funds for New Renewable Sources of Energy
(corrected for inflation)

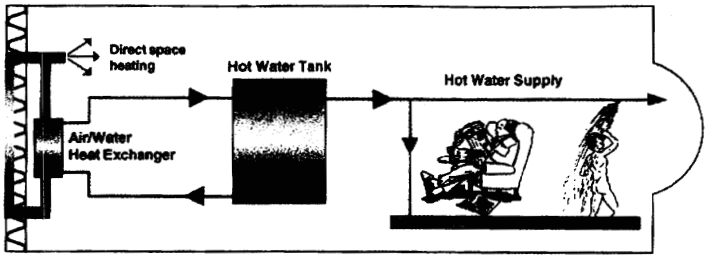


An example of SolarNor's plastic solar collector.

and the weight is only 8 kg/m^2. Commercial production began in 1996.

Facade Integrated Solar Air Collector

ABB Miljø AS has, in collaboration with SunLab, developed a facade integrated solar air collector for office buildings, called the "Friendly Wall." This collector heats air for direct space heating or conversion into hot water by using an efficient heat exchanger. Based on measurements taken in a test plant in Oslo, the energy contribution is calculated to be 300 – 350 kWh per m^2. The collector is suitable for buildings with central heating and which use a fair amount of hot water for domestic purposes, such hotels and apartment buildings.



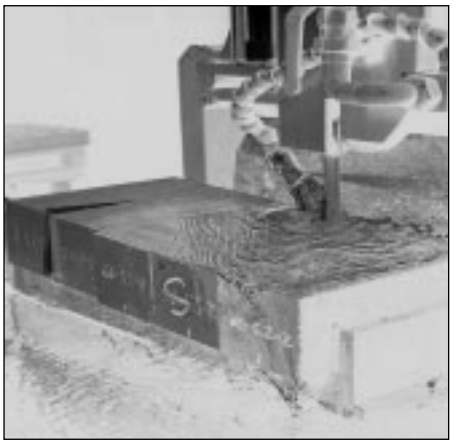
A diagram of how the "Friendly Wall" works in a home.

Solar Heating

The commercial market for solar heating has been very limited. A rough estimate indicates that approximately 500 solar heating systems have been installed in Norway, and of these 500, 200 are solar hay drying systems (70,000 m^2) installed on farms. The solar hay drying systems are primarily made on a commercial basis and receive no grants from the government. The concept is very simple– an unglazed collector preheats the outdoor air 2 - 6 C° before it enters the dryer. Based on a survey of 25 farmers using hay and corn-dryers built in Norway, nearly all were very pleased with their systems' performance. The main argument for using this system is higher quality rather than saving energy; the alternative would be to use cold air drying. The remaining 300 solar heating installations are for swimming pools, DHW systems for residential buildings and a few commercial buildings as well as a few space heating installations in residential buildings.

Photovoltaics

Norwegian Elkem ASA, one of the world's largest producers of ferro alloys and silicon metal, has for several years been developing alternative processes to produce pure silicon for PV cells. Much of the raw materials for PV production today are remainders from the electronics industry, so called polyscrap. Due to the growing market for PV panels, pure silicon has become scarce, and therefore, a reliable supply is needed. To meet this demand, ScanWafer AS was established in 1994 with aim to become the most cost-effective producer of high quality solar cell wafers in the world. Favorable electricity costs and high technical competency has led the way for this high-tech company to meet its goal. The process ScanWafer AS uses is to first upgrade the silicon and then melt it before begining directional crystallization. Production at the factory began in April 1997 and the first deliveries to European customers were made in November of same year. Full production capacity of approximately 12 million wafers annually is expected in 1999. The production capacity for the next few years has already been sold to customers in Europe and Asia. The ScanWafer's recent equity increase brought in major Norwegian companies as shareholders, pricing the company at more than NOK 100 million (USD 13.3 million).



Production of ScanWafer's solar cell wafer.

Situated between latitudes 58 and 71 north, Norway has limited hours of daylight in winter, and "midnight sun" during the summer. Together with relatively low electricity prices based on large hydropower resources, the natural conditions for the use of PV technology are not particularly favorable. Despite this situation, small PV systems have become very popular in Norway, especially among owners of cottages and recreational homes. For such applications, the electricity is mainly used for lighting, and in many cases is a cost effective alternative to grid connection, diesel, etc. A total of approximately 80,000 installations generate nearly 4 MWp. Fifteen years ago a typical panel generated 15 to 20 Wp. However, due to the rising

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Norway

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demands for electrical equipment such as color TVs, combined with lower prices the typical "cottage" panel now generates 60 Wp.

Lighthouses and minor navigational lights have traditionally used electricity derived from gas or kerosene, and sometimes from the national grid. The Coast Directorate of Norway started experimenting in 1979 with a small 20 Wp PV panel for a lighthouse in the Oslo fjord. The success of this installation inspired a plan to change all gas or kerosene installations with PV panels, including smaller light buoys. Batteries are an important part of these systems to ensure there operation at all times, and only NiCd-type batteries are used in them. A typical installation for a small lighthouse is a 12 V system with modules of 40 - 60Wp. By January 1998, there were approximately 2,000 smaller solar powered lights and beacon lights along the Norwegian coast. Seven lighthouses are solar powered, but due to the space requirements needed for a sufficient panel area this number will be difficult to increase as most of the lighthouses are located on very small islands. In total, a capacity of 273-kWp light power has been installed.

The Future of Solar

The government estimates that the potential for solar energy in Norway will be 5 - 25 TWh by the year 2030. The large difference between the low and the high estimate is due to uncertainties in the future cost of conventional energy sources, technical development and competitive alternatives (energy conservation, heat pumps, wind energy, etc.). However, a market based on the lowest figure still represents substantial industry potential for solar energy technology exports and domestic uses.

More information can be found in the 1998 booklet, "New Renewable Energy – Norwegian Developments." It is available free of charge from the Norwegian Executive member, Fritjof Salvesen, fax: +47 67 15 02 50, e-mail: fritjof.salvesen@kanenergi.no.✷

Thanks To...

Katsuhiko Hayashi who served as the Japanese Executive Committee member. He will be replaced by **Katsuhiko Masuda**, of the RNE Development Program, New Sunshine Program Promotion Headquarters.

Welcome To...

Maria Luisa Delgado, of the Renewable Energy Department of CIEMAT, who will serve as the Spanish Executive Committee member.

Hans-Martin Henning, of Fraunhofer Institute for Solar Energy Systems in Germany, who is serving as the Operating Agent for Task 25, Solar Assisted Air Conditioning of Buildings.

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 which have been developed or conceptualized in a SHC Task and are now being commercially manufactured, marketed or used.

Vacuum window

The world's first full-scale framed vacuum window was exhibited at the Task 18, *Advanced Glazing and Associated Materials for Solar and Building Applications*, booth at Glastec 1996. The window had been tested earlier by Task experts and the results enabled validation of calculation methods used for determining window U-value. The center glass had a U-value of 0.8 W m^{-2} K^{-1} and whole window U-value of 1.2 W m^{-2} K^{-1}. As a result of this work, Professor Collins of the University of Sydney and Nippon Sheet Glass of Japan have agreed to the commercialization of this product, the Spacia vacuum window.

Building Energy Software

The American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) continues to find new uses for BESTEST (Building Energy Simulation Test and Diagnostics Method). The proposed ASHRAE Standard Method of Test (SMOT) for evaluating building energy design and analysis tools is based on BESTEST, a procedure for design tool evaluation applications. ASHRAE also is considering its use as a qualifying tool for performance path software for ASHRAE Standard 90.2 (residential standard) and the International Energy Conservation Code. BESTEST was developed at the National Renewable Energy Laboratory in the U.S. and then refined and field tested by experts of SHC Task 12, *Building Energy Analysis and Design Tools for Solar Applications*. And now, SHC Task 22, *Building Energy Analysis Tools* is in the process of increasing BESTEST capabilities by developing a procedure to evaluate HVAC system design algorithms.✷

New Work

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models for combisystems and their components

- Subtask C: Optimization of combisystems for the market

And, the countries participating in the work are Austria, Denmark, Finland, France, Germany, the Netherlands, Sweden, Switzerland, and the United States.

For more information contact the Operating Agent, Werner Weiss, Arbeitsgemeinschaft Erneuerbare Energies (AEE), Austria (see page 8 for address).

Performance Assessment of Solar Building Envelop Components

In response to the rapid progress being made in the development and improvement of energy efficient solar and thermal materials and components, the Solar Heating & Cooling Programme will continue its work in this area. Experts will build upon the Programme's unique international resource of expertise and facilities in the areas of solar and thermal performance measurements, and reliability and durability assessments. For example, the Working Group on Materials in Solar Thermal Collectors has successfully developed and validated a methodology to determine the durability of solar absorber coatings. This methodology has been adopted as a draft ISO standard. And an earlier SHC Task on advanced glazings made significant progress in developing methods for measuring key performance parameters of glazing products (for example, total solar energy transmittance, angle dependent optical properties and U-value) for describing the solar and thermal performance of windows.

The goal of this new work, Task 27, *Performance Assessment of Solar Building Envelop Components*, is to accurately determine the solar and thermal performance of materials and components, such as advanced glazing, for use in more energy efficient sustainable buildings and to promote increased confidence in the use of these products by developing appropriate methods for the assessment of their durability, reliability and environmental impact. The Task planning got underway in November 1998 and will continue for six to twelve months. The first meeting will be held this March in Germany.

For more information contact the Task Organizers, Michael Köhl, Fraunhofer Institute for Solar Energy Systems, Germany, fax: +49/761-40116681, e-mail: mike@ise.fhg.de and Mick Hutchins, Oxford Brookes University, U.K., fax: +44/1865-484263, e-mail: mhutchins@brookes.ac.uk.

Solar Sustainable Housing

There is a new and growing movement in Europe to build houses with such a minimal heat demand that a conventional heating system is no longer needed, not even a wood stove!

To achieve this, the approach taken until now has largely focused on conservation, reducing energy demand (i.e. super insulation, earth heat exchangers and ventilation heat recovery). However, by adding solar energy the same very low levels of remaining auxiliary energy demands (i.e.15 kWh/m^2) can be maintained while increasing the architectural freedom and opening up the house to admit more daylight and view to the outside world. Approaches include passive solar measures, daylighting, thermal storage, active solar domestic hot water and space heating, integrated PV systems, and natural cooling.

To explore opportunities for integrating solar strategies with conservation strategies, the SHC Programme has initiated a new project Task 28, *Solar Sustainable Housing*. A one-year Task planning phase to detail the work to be conducted began this past January. And, the first Task planning workshop was held in Darmstadt, Germany on February 24-25.

Experts in this Task will collaborate on the design of next generation solar sustainable housing, monitoring and documenting successful built projects, and developing guidelines and a PC-design tool. The end goal is the wider penetration of such buildings in the housing market of the participating countries. Issues to be investigated include not only energy, but gray energy and environmental impact, aesthetics, user behavior, and costs.

For more information contact the Task Organizer, Robert Hastings, Forschungstelle Solararchitektur, Switzerland (see page 8 for address). ✷

The 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 as well as other useful information.

Our Internet address is:

http://www.iea-shc.org

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 19 members of the IEA Solar Heating and Cooling Agreement have initiated a total of 26 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 19: Solar Air Systems
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Task 21: Daylight in Buildings
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Task 22: Solar Building Energy Analysis Tools
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Task 23: Optimization of Solar Energy Use in Large Buildings
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SOLAR UPDATE

The Newsletter of the IEA Solar Heating and Cooling Programme

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Prepared for the IEA Solar Heating and Cooling Executive Committee
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Editor:
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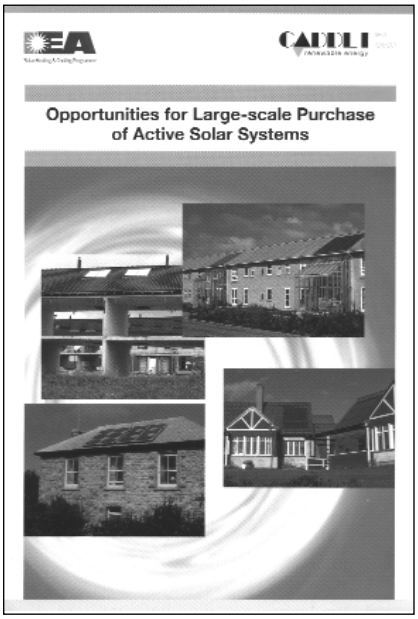
Solar Renovation Demonstration Projects

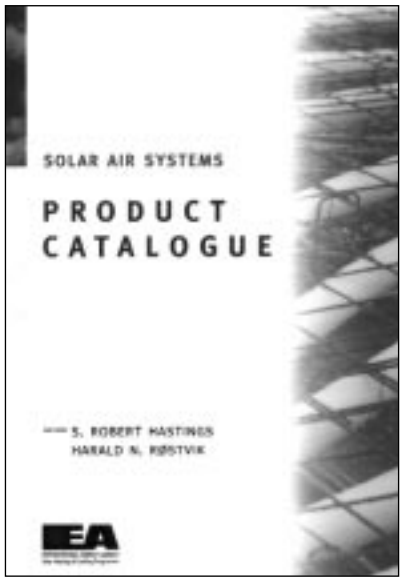
This report documents 16 solar renovation projects, including their design processes. These projects, which include the renovation of houses, school, laboratories and factories, show how solar energy in building renovation can be integrated in an architecturally, technically and economical manner. The solar techniques used are building-integrated solar collectors, glazed balconies, ventilated solar walls, transparent insulation, second skin facades, daylight elements and photovoltaic systems. These demonstration buildings are intended to provide inspiration and sound examples for architects, engineers, building owners and investors.

This report may be ordered from Esbensen Consulting Engineers, FIDIC, Vesterbrogade 124B, DK-1620 Kbenhavn V, Denmark, Fax: +45-33-26-73-01. Cost US$55.



Opportunities for Large-Scale Solar Purchasing of Active Solar Systems

This publication provides an overview of the solar domestic hot water systems market and technology. It is comprised of four reports from authors in different countries. These four reports discuss the similarities between different solar hot water systems and the basis for more coordinated system specifications and international trade opportunities. Specialists will find detailed background data on market development, emission reductions, price competitiveness, examples of possible buyers in different countries as well as details on the opportunities and barriers of solar procurement efforts.



This publication is available from the SHC Executive Secretary, see page 8 for address. Cost postage & handling.

Solar Air Systems Product Catalogue

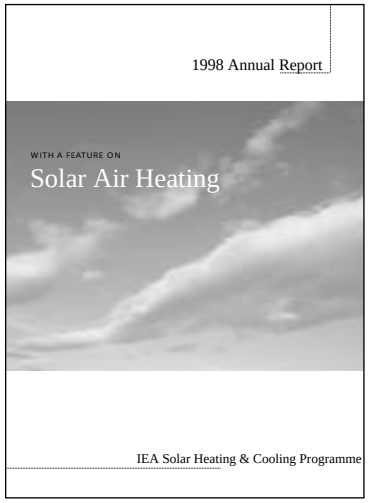
This catalogue has been written to inform building designers of components that are available 'off the shelf= for putting together a solar air system. Manufactured components or whole systems may be less expensive, more efficient and more reliable than custom-designed, site-built systems. The goal of this catalogue is therefore to prevent the wheel from being repeatedly reinvented.

This report may be purchased from James and James Publishers, Waterside House, 47 Kentish Town Road, London NW1 8N2, England. Fax: +44-171-387-8998. Free when purchase the report, Solar Air Systems - Built Examples.

Solar Air Systems - Built Examples

The purpose of this report is to document experiences from a wide range of buildings that incorporate solar air systems. The documented buildings are located in nine European and North American countries with differing climates. Applications include single-family houses, apartment buildings, schools, gymnasiums, large industrial buildings and commercial buildings. Six different types of solar air systems in 33 buildings are documented demonstrating the maturity and reliability of solar air systems.

This report may be purchased from James and James Publishers, Waterside House, 47 Kentish Town Road, London NW1 8N2, England. Fax: +44-171-387-8998. Cost ,45.



Solar Heating and Cooling 1998 Annual Report

The annual report provides detailed information on Programme activities and Task accomplishments during 1997. The feature article is on the coming of age of solar air systems.

This report may be ordered from the SHC Executive Secretary, see back page for address. Cost: US$ 20.✷

Executive Conference on Solar Business Opportunities in the Building Sector

The worldwide markets for buildings are changing. Buyers and tenants are demanding higher performing, more comfortable and healthier buildings. And, forward-looking businesses, communities and energy companies are searching for ways to respond to these customer demands. To address these market changes, the IEA, European Commission, Danish Energy Agency and United States Department of Energy will hold an international executive conference on emerging business opportunities associated with integrated solar energy products for buildings in the 21st century.

This conference will provide a unique international forum for chief executive officers (CEOs) of the building, energy and utility sectors to interact with each other. The conference will focus on four topics: major market forces, built environment of the future, new technologies and products, and business opportunities. The conference will be held 30-31 August 1999 in Denmark, and is by invitation only.

Information regarding CEO participation can be obtained from Lex Bosselaar, Novem, b.v., Netherlands, Fax: +31-30-231-6491, E-mail: L.Bosselaar@novem.nl.

Hybrid Thermal/PV Solar Systems Workshop

Due to a growing interest in hybrid solar thermal collectors and systems, the SHC Programme, in collaboration with the PVPS Programme, is organizing a workshop on this topic.

A few hybrid products are now available on the market, but more work is required to further develop this technology. In practice, the combination of two different technologies, although both solar, gives rise to new and sometimes unexpected problems. The objective of this workshop is to review state-of-the-art thermal hybrid systems. Discussions will be limited to hybrid systems which combine into one collector a PV and thermal collector. Workshop participants will review the ongoing work in this field and discuss issues such as benefits, technical barriers, potential costs, needed R&D, opportunities and benefits of international collaboration, etc. The workshop is planned for the summer/fall of 1999 in the Netherlands.

For more information contact: Lex Bosselaar, Novem, b.v., Netherlands, Fax: +31-30-231-6491, E-mail: L.Bosselaar@novem.nl.

Advanced Solar Thermal Storage Workshop

Finding an efficient storage medium or improving the performance of an energy storage technology for solar building applications has often been considered a component development challenge. However, another approach is to look at energy storage in a broader system context of how to overcome the intermittence of the solar energy input. What this requires is to consider the solar building system as a whole.

Recognizing that energy storage continues to be one of the main challenges for the future of solar building applications, the SHC Programme plans to hold a follow-up workshop to the February 1997 workshop held in Finland. This follow-up workshop will focus on identifying new R&D activities in this field. The topics to be discussed by workshop participants will include materials and concepts (e.g., microcapsulated PCM in building materials, sorption storage), integrated systems and applications (e.g., passive solar, climitization), and pilot and demonstration plants. The workshop is planned to be held October 1999 in Germany.

For more information contact: Volkmar Lottner, Forschungszentrum J(lich - BEO, Germany, Fax: +49-2461-61-31-31, E-mail: v.lottner@FZ-Juelich.de.

Solar Cities

While much is known about solar applications for a single building, there is still much to learn about solar applications on a city-wide scale. The SHC Programme, in partnership with the International Solar Energy Society(ISES), is considering a new activity to address the integration of technical measures on a city-wide basis in an attempt to establish the most cost-effective and practical methods for emissions reductions using solar energy.

A workshop will be held 12-14 April 1999 in Switzerland to explore how to help accelerate the intensive use of solar energy in cities. The objective of the workshop is to brainstorm concepts for solar cities and to identify work needed to support their implementation.

For more information contact: Robert Hastings, Forschungstelle Solararchitektur, Switzerland (see page 8 for address).✷