International Energy Agency Solar Heating & Cooling Programme

Task 24 Solar Procurement

FINAL MANAGEMENT REPORT

International Energy Agency
Solar Heating and Cooling Programme

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November 2003

All data in this report refer to conditions at the end of Task 24 – Summer 2003

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PREFACE

IEA Solar Heating and Cooling Programme

The International Energy Agency (IEA) was established in 1974 as an autonomous agency within the framework of the Economic Cooperation and Development (OECD) to carry out a comprehensive programme of energy cooperation among its 25 Member countries and the Commission of the European Communities.

An important part of the Agency's programme involves collaboration in the research, development and demonstration of new energy technologies to reduce excessive reliance on imported oil, increase long-term energy security and reduce greenhouse gas emissions. The IEA's R&D activities are headed by the Committee on Energy Research and Technology (CERT) and supported by a small Secretariat staff, headquartered in Paris. In addition, three Working Parties are charged with monitoring the various collaborative energy agreements, identifying new areas for cooperation and advising the CERT on policy matters.

Collaborative programmes in the various energy technology areas are conducted under Implementing Agreements, which are signed by contracting parties (government agencies or entities designated by them). There are currently 42 Implementing Agreements covering fossil fuel technologies, renewable energy technologies, efficient energy end-use technologies, nuclear fusion science and technology and energy technology information centres.

The Solar Heating and Cooling Programme was one of the first IEA Implementing Agreements to be established. Since 1977, its 21 members have been collaborating to advance active solar, passive solar and photovoltaic technologies and their application in buildings.

Current members: Australia, Austria, Belgium, Canada, Denmark, European Commission, Finland, France, Germany, Italy, Japan, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and United States.

A total of 34 Tasks have been initiated. Each Task is managed by an Operating Agent from one of the participating countries. Overall control of the programme rests with an Executive Committee comprised of one representative from each contracting party to the Implementing Agreement. In addition, a number of special ad hoc activities – conferences and workshops – have been organised. The Tasks of the IEA Solar Heating and Cooling Programme, both current and completed, are as follows:

Completed Tasks:

Task 1: Investigation of the Performance of Solar Heating and Cooling Systems
Task 2: Coordination of Solar Heating and Cooling R&D
Task 3: Performance Testing of Solar Collectors
Task 4: Development of an Insulation Handbook and Instrument Package

Task 5: Use of Existing Meteorological Information for Solar Energy Application
Task 6: Performance of Solar Systems Using Evacuated Collectors
Task 7: Central Solar Heating Plants with Seasonal Storage
Task 8: Passive and Hybrid Solar Low Energy Buildings
Task 9: Solar Radiation and Pyranometry Studies
Task 10: Solar Materials R&D
Task 11: Passive and Hybrid Solar Commercial Buildings
Task 12: Building Energy Analysis and Design Tools for Solar Applications
Task 13: Advance Solar Low Energy Buildings
Task 14: Advance Active Solar Energy Systems
Task 16: Photovoltaics in Buildings
Task 17: Measuring and Modelling Spectral Radiation
Task 18: Advanced Glazing Materials for Solar Applications
Task 19: Solar Air Systems
Task 20: Solar Energy in Building Renovation
Task 21: Daylight in Buildings
Task 23: Optimization of Solar Energy Use in Large Buildings
Task 26: Solar Combisystems

Current Tasks:
Task 22: Building Energy Analysis Tools
Task 24: Active Solar Procurement
Task 25: Solar Assisted Air Conditioning of Buildings
Task 27: Performance of Solar Facade Components
Task 28: Solar Sustainable Housing
Task 29: Solar Crop Drying
Task 31: Daylighting Buildings in the 21st Century
Task 32: Advanced Storage Concepts for Solar Thermal Systems in Low Energy Buildings
Task 33: Solar Heat for Industrial Process

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Also, visit the IEA SHC website at http://www.iea-shc.org.

ACKNOWLEDGEMENTS

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Konsult and Formas, the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (Sweden). Finally, we wish to express our thanks to the IEA Secretariat and many organisations and companies for their major input and to Ann-Charlotte Hamvik for the excellent editing of this report.

The Task 24 Solar Procurement Documentation, earlier on the Task homepage http://www.ieaTask24.org, can after the closing of the Task be found on the website of the IEA SHC Programme: http://www.iea-shc.org.

Hans Westling
Task 24 Operating Agent

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1 EXECUTIVE SUMMARY

Creating a sustainable market for innovative solar water heating products can be of benefit in several ways, such as: Cost savings, CO2 reduction and customer satisfaction.

Reducing market barriers, establishing international standards and encouraging international exports of solar water heating systems are key factors to facilitate growth of the solar industry, both domestically and internationally. Experience has shown that coordinated, large-scale international purchasing improves the competitiveness of emerging technologies; the same is true for bulk purchasing by single companies.

The aim of the cooperative procurement efforts of the IEA SHC Task 24 has been to increase the use of solar water heating systems by encouraging coordinated large-scale purchasing. The objectives have been to reduce marketing, distribution and hardware costs, as well as to improve system performance. This Task would also help organisations meet environmental commitments. The procurement efforts have focused primarily on small domestic active solar water heating systems, but have also applied to larger commercial systems. Substantial cost and price reductions with 7 – 30 per cent have been reached.

Task 24 was started 1 April 1998 and was completed 31 March 2003. The following countries have participated in Task 24: Canada, Belgium, Denmark, The Netherlands, Sweden and Switzerland.

2 TASK 24 OF THE IEA SHC AGREEMENT

Task 24 “Solar Procurement” is one of thirty-four different Tasks within the International Energy Agency (IEA) Solar Heating & Cooling (SHC) Programme, which currently has 20 IEA member countries and collaboration with the European Commission**.**

Task 24 was started on the 1st of April 1998 and was completed on the 31st of March 2003. Six countries have participated in Task 24: Canada, Belgium, Denmark, The Netherlands, Sweden and Switzerland.

3 OBJECTIVES

The main objective of Task 24 has been to *create a larger and sustainable market for active solar water heating systems (mainly domestic systems)*.

This would be achieved through major cost and price reductions for all cost elements, including marketing and installation, as well as performance improvements and joint national and international purchasing.

Task 24 has been divided into two Subtasks, each co-ordinated by a lead country:

Subtask A: Procurement and Marketing (Lead Country: The Netherlands).
The objectives of Subtask A have been:
- To raise general interest in active solar thermal solutions, and
- To form buyer groups to purchase state-of-the-art and innovative systems.

Within the Procurement and Marketing Subtask, a First Round with small national projects and a low degree of joint international collaboration has taken place. A Second Round has been planned with more international collaboration and tendering. It has however not been possible to fulfil these extended international activities within the time-frame of Task 24. The initiatives will partly continue within the EU "Soltherm Europe Initiative" project.

Subtask B: Creation of Tools (Lead Country: Denmark)
The objectives of Subtask B have been:
- To collect, analyse and summarise experience
- To create tools to facilitate the creation of buyer groups and the realisation of projects and procurements. The tools will be included in a manual, "Book of Tools"
- To define a process for prototype testing and evaluation, using existing methods.

4 ACCOMPLISHMENTS AND UNIQUE CONTRIBUTIONS

4.1 Subtask A "Procurement and Marketing"

The main task of Subtask A was to create a larger and sustainable market for active solar water heating systems. This was done by the creation of buyer groups and raising general interest, mainly by the projects carried out by these buyer groups. The extra challenge for Task 24 compared to other procurement projects was that solar water heaters are not widely accepted products yet, unlike elevators, housing appliances and light bulbs.

Depending on the national market development, culture and ambitions, the participating countries chose the following strategies to achieve their goals:

Country	Buyer group/Market development strategy
Belgium:	• Organisation of regional and local campaigns • Establishment of a system and installers quality system • Establishment of a buyer/user platform for medium size systems
Canada:	• Participation of industry developing a solar water heater (market) focusing on acceptable pricing as key aspect in their development strategy
Denmark:	• Development of new marketing channels • Using internet as marketing and sales channel
Netherlands:	• Formation of large buyer groups • Development of new marketing channels • Development of international trade
Sweden:	• Organisation of regional campaigns • Organisation of joint procurement between the campaigns
Switzerland:	• Organisation of national and regional campaigns • Introduction of qualified installer system

One of the biggest challenges for Subtask A proved to be the formation of buyer groups. Finding (representatives of) buyers willing to invest a lot of time and effort in buying and marketing a relative unknown product as a solar water heater was not easy. Within IEA SHC Task 24 buyer groups were organised for projects aiming at the realisation of solar water heaters in:

- New estates
- Existing houses
- Large systems

In the following paragraphs the projects are summarised according to these 3 categories.

New estates

Countries: The Netherlands

The Netherlands is a special case concerning new-estate-development. Many large real estates, with sizes varying from 500-5,000 buildings, are developed in a structured way.

Task 24 projects	**New estates - Special characteristics**
Essent/Rendo new housing development	• Large number as standard application • Co-operation with utilities, municipalities • Quality control from estate design until commissioning • Tender: 3 suppliers selected > freedom for developers/architects
Market introduction WWF solar houses	• Development of WWF Solar House Certificate • Market introduction project of 1.500 WWF Solar Houses • Co-operation with 19 real estate developers • International announcement of solar water heater tender

Existing houses

Countries: Belgium, Canada, Denmark, The Netherlands, Sweden, Switzerland.

General aspects of all campaigns aiming at existing houses:

- They are targeted at city or region
- There is co-operation (municipality, utility)
- Main focus is on home-owners of existing dwellings
- The campaigns are also linked to replacement of the old heating system
- Effective marketing in short period takes place
- Often a standard offer including installation is presented

Task 24 projects	Existing houses - Special characteristics
Belgium	
Soltherm Wallonie	• Quality charter suppliers and installers (BELSOLAR) • 150 installers and 40 architects trained • >50 municipalities active
Canada	
EnerWorks development of new SWH	• Focus on cost • Focus on target market • Work with existing distribution channels
Denmark	
Thy & Morse Energy	• Regional campaigns
Internet campaign	• Together with industry • 20-30% price reduction • No marketing budget for campaign
Netherlands	
ASN Bank, WWF	• New marketing channel
SOL*ID	• 1st national installers organisation
BELDEZON (Call the sun)	• 1st national info/marketing/sales concept: • Campaigns in 11 municipalities/regions
Sweden	
Earlier: http://solupphandling.bfr.se Now: http://solupphandling.formas.se	• Internet registration and marketing • Combined with local marketing • Technology procurement, including testing • New supplier with new collector wins tender
Switzerland	
Lucerne campaign	• Buyers take long decision time (30-200 days) • Aimed also at fuel switch, which was not a success
Baselland: Solar Dusche	• 60 installers trained, 20 'Solarprofis'
Solar begeistert	• Campaign developed on results market study • National campaign supporting local initiatives • Collaboration between branch organisation, industry, installers

Large systems

Countries: The Netherlands, Belgium

Large-system projects aim at the realisation of collective solar water heaters in the tertiary sector.

Task 24 projects	Large systems - Special characteristics
The Netherlands	
Space for Solar	• Buyer group of 50 housing associations • 10,000 m^2 turn-key delivery tender • Decision processes slow due to rent price laws
Belgium	
Soltherm tertiary sector	• Network for potential buyers, systems under construction, system users

Numbers of systems installed within the framework of Task 24

Task 24 aimed at initiating 10, 000 solar systems. During the course of the Task, contracts for approximately 4,200 systems (recalculated to domestic systems) were signed, 3,785 of which were installed. Most of the systems were installed in The Netherlands, mainly because strategies for systematic market development had already been developed and tested in that country. In other countries, like Denmark, it appeared to be very difficult to realise systems, mainly because of external influences like the abolition of subsidies. Compared to the system prices given in the "Sun in Action" report published in 2003, prices in Task 24 projects were 7-30% lower. The following figures show the numbers of systems sold and the system prices per system and per m^2 per country early 2003.

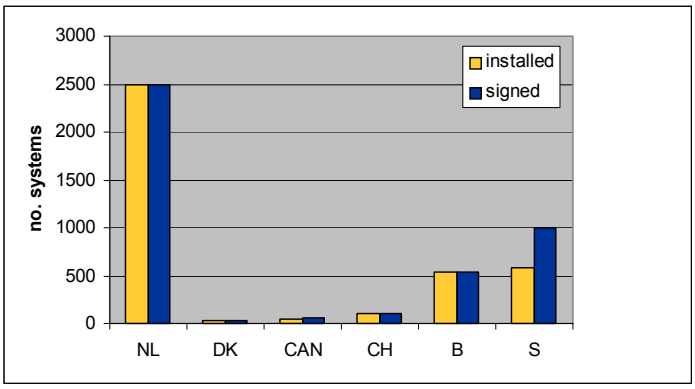
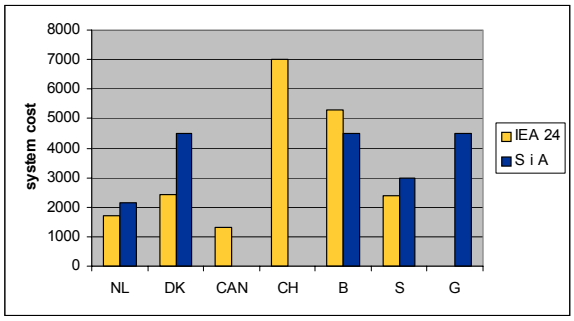


Figure 1: Number of systems sold



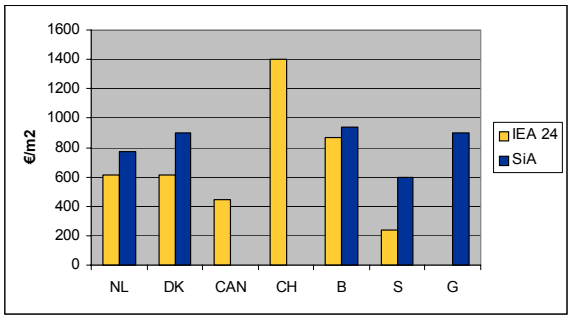


Figure 2: Prices per system (EURO) ***Figure 3: System prices per m^2 (EURO)***

Concluding one can say that the goals of Subtask A have been reached:

- Many buyer group approaches have been developed:
  - Local approaches appear to work best
  - Sustainable market approaches like the "Call the Sun" concept have been developed
- External influences, like the abolition of the Danish subsidies, appeared to be important for the results of the Subtask.
- There has been a lot of synergy between the countries. Knowledge, experiences and tools have been shared.
- A cost reduction of 7-30% was achieved.
- The Subtask will be followed up and the projects running will continue after the end of the Task. Task results will be used in the "Soltherm Europe Initiative" project. Future co-operation between the expert organisations is also expected.

4.2 Subtask B "Creation of Tools"

The main results of Subtask B can be summarised in the following accomplishments:

- Task 24 website including the Task 24 manual "Book of Tools/Business Tools"
- Brochure and background report (published at the beginning of the Task)
  - *"Large Scale Solar Purchasing – A Business Opportunity"*,
  - *"Opportunities for Large-Scale Purchase of Active Solar Systems"*.
- Evaluation reports of the 1st Round
- 6 newsletters

Task 24 website including the "Book of Tools/Business Tools"

The website has been hosted by Canada at the address: http://www.ieaTask24.org. The Canadian company Vanderpas Design Inc. has done the programming and the layout, while the Danish Subtask B participants have edited the content.

When the last edition of the website has been finalised, and after the closing of Task 24, it will be transferred to the website address: http://www.iea-shc.org.

As a help for the procurement process, both internal in the Task and for following projects, it was decided to document the experiences of the Task together with collected information, guidelines etc. in a manual, “Book of Tools/Business Tools”.

In order to be able currently to update learning etc. it was early in the Task decided that the best way of handling the information would be to organise the information on a website. The website could be used both interactively or to download the latest updated information.

Some of the features of the website are explained below.

Features of the Task 24 website

Explanation of the procurement process (section “Procurement”)

In this section, there is an explanation of the procurement process together with examples of successful procurement projects within other branches

Experiences summarised in a number of ”Do´s and Don't´s” (section ”Do´s and Don't´s”)

Experiences from performing the projects within the Task and analyses of non-Task projects and campaigns have been formulated in the list of “Do’s and Don’ts”.

Information for different types of buyer groups outlining advantages and giving examples of realised projects (section “Buyer Groups”)

Information given in this section is specifically directed towards buyer groups within the following categories:

- Buyer Groups for Individuals/Internet-based Buyer Groups
- Utilities
- Home Builders and Construction Companies
- Landlords and Housing Association
- Municipalities
- Non-Government Organisations
- Vacation Resorts and Hotels

Documentation of 21 cases or projects realised within or outside Task 24 (section “Projects”)

Cases:
At the start of the Task, information on 11 solar heating campaigns, previously preformed or ongoing, was collected and analysed. Those project descriptions are referred to as “cases”. Every case is described in a sheet, which can be downloaded and may serve as inspiration for buyer groups.

Projects:
During the Task, 10 campaigns or procurement processes carried out as part of the Task have been described and analysed. They are referred to as "projects". The project description sheets are downloadable from the website.

"Business Tools" (section "Business Tools)

The "Business Tools" are a number of useful documents for the procurement process or campaigns in general elaborated by the Task. The tools give guidelines and information within the following subjects:

- Determining of marketing potential
- Determining of sales goals
- Procurement goals & performance analysis
- Statistics (on solar energy market)
- Tenders
    - A model tender package and a collection of realised tenders are included
- Quality criteria
- Examples of marketing brochures
- Furthermore, there are links to the database elaborated of the EC Altener Soltherm project on solar water heating.

Background information on solar water heating (section "Benefits & Facts")

The background information explains the technology of solar water heaters, together with economy, market, manufacturer association, etc.

A comprehensive list of reference literature with links and downloads (section "Downloads & References")

All downloads and literature references have been included on the same site. The site also contains an archive of internal IEA Task 24 documents (minutes of meetings, status reports, etc**).**

Useful links (section "Links") and Contact information (section "Contact Us")

Furthermore, the website contains useful links to organisations and other relevant websites together with contact information for persons involved in the IEA SHC Task 24.

Brochure and background report

The brochure "Large Scale Solar Purchasing – A Business Opportunity" and the background report "Opportunities for Large-Scale Purchase of Active Solar Systems" were elaborated at the beginning of the Task with the purpose of attracting interest in the Task and giving background information on the market and technology of solar water heaters

Evaluation report of the 1st Round of the Task

The evaluation report was finished in May 2001 after the 1st Round of the Task. It summarises experiences gained in the first projects within the Task.

The projects realised in the 2nd Round have been separately evaluated. The evaluations are given in the project description sheets.

The summarised experiences have been formulated in the list of "Do's and Don'ts", which is part of the website.

Newsletters

Six newsletters have been elaborated and dispersed via e-mail. They are also downloadable from the website.

Quality criteria

During the Task 24 duration period, EC standards for solar water heaters have been approved. Furthermore, the Solar Keymark labelling has been set up. It has been decided to rely on these documents for:

- Quality criteria on systems
- Testing
- Labelling

Documents on qualification of installers and quality of installation have been adopted from ASTIG documents developed in co-operation between ASTIG (now ESTIF) and Task 24.

4.3 Extended international collaboration

Many of the procurements have, to an increasing extent, been communicated to international media and to the European Commission's "Official Journal". It is the first time that countries have tried to spread their requests for proposals (RFPs) directly by using a website downloading mechanism for the full request for proposals, as was the case for the Swedish activity, which was followed by other countries.

In connection with the above-mentioned Swedish activity, also a number of different systems got the opportunity to be carefully tested. The test results and experience were communicated to the respective manufacturers as valuable material for further refinement of their systems.

In the figure below examples are shown of areas where two or more countries have initiated collaborative work for procurement documents or models for more efficient processes.

	Canada	Den-mark	Nether-lands	Switzer-land	Sweden	Belgium
Small systems	●	●	●		●	●
Medium sized systems			●		●	●
Company solar projects		●		●		
Internet buyer group	●			●	●	
Website	●	●				
Tender documents	●	●	●	●	●	●
Buyer tool	●	●	●	●	●	
Manual		●		●		
Training of installers			●	●		●

Figure 4: Examples of collaborative areas within Task 24

5 INVOLVEMENT OF INDUSTRY

In the preparation phase of IEA SHC Task 24, industry was involved and contributed to the objectives and the work-plan of the Task. The contributions came from important manufacturers in the countries that started the Task and from ASTIG (since 2003 ESTIF).

During the Task the solar industry was involved in various ways:

- Parallel to the semi-annual experts meetings, industry workshops were organised. At these workshops, various buyer groups were presented and discussed, and discussions on issues such as the aim and set-up of Task 24 or how to deal with international tenders were organised. The results of these discussions were used in the Task. Apart from the workshops visits to solar factories and excursions to solar thermal projects were organised in close co-operation with the national industry.

- In general before every semi-annual experts meeting there was a meeting with the Active Solar Thermal Industry Group (ASTIG, now ESTIF) represented by its chairman Mr. Teun Bokhoven and Mr. Peter Out, the leader of Subtask A. The national experts of the participating countries also consulted with their

national branch organisations before every meeting. Industry involvement was a standard agenda point on each experts meeting.

- A charter for solar water heaters and a code of conduct for high quality installation of solar water heaters intended for installers were developed. The system quality charter was mainly based on the European quality standards for solar water heaters (12975-77) and was meant to fill in the gap until the Solar Keymark quality label was developed. The quality charter forms the basis for the tender documents developed within the framework of the Task. Concerning the code of conduct for installers, the ASTIG General Meeting decided that, although the general opinion of such a code was positive, ASTIG could not be the sender of such messages because of the way the market channels are operating.

- The ASTIG and ESIF organisations were asked for comments on the standard tender documents produced during the Task. Comments from ASTIG were incorporated. No reaction was received from ESIF concerning the Task, although many efforts (letters/e-mails/faxes/phone calls) were made to get in contact with ESIF.

- On a national level the following examples of collaboration with industry and manufacturers can be mentioned:
    - *Belgium:* Together with the national branch organisation Belsolar, quality charters were developed for both systems and installers. These charters are closely linked to the charters mentioned above.
    - *Canada:* The Task co-operated with EnerWorks in the field of market research and future solar water heater market development in Canada.
    - *Denmark:* The Danish experts worked closely together with the Danish industry during the development of the internet campaign.
    - *The Netherlands:* There is close co-operation in the "Space for Solar" campaign with the winner of the tender. Together with Ecofys new projects are acquired.
    - *Sweden:* There have been arguments with the national industry and ASTIG about the tender procedure used. Part of these arguments can be ascribed to the "normal" case that a tender cannot be won by all tenderers, but some miscommunication also played a role. However, in the Swedish procurement all systems offered in the tender were tested free of charge and all manufacturers received free advice about how their systems could be improved.
    - *Switzerland:* During the Task the "Solarprofis" quality label for installers was developed in co-operation with industry and promoted in the campaigns. In the national "Solar Begeistert" campaign, the "Solarprofis" also play an important role.

Concluding one can say that in practise industry was involved during the Task, both on a national and international level. Main establishments were the efforts to realise uniform quality standards for both systems and installation work and the incorporation

of these standards in the system tenders of the various buyer groups**.** There has also been co-operation in new market development approaches, such as using the internet.

6 INFORMATION AND DISSEMINATION

The Task 24 information activities were planned and set up in an *Information Plan*. As mentioned above, a special brochure, "Large Scale Solar Purchasing – A Business Opportunity", was produced at the beginning of the Task. It described the background and intended work and was produced to track the interest in the Task among countries, governments, manufacturers, and housing companies. Also a background report was produced – "Opportunities for Large-Scale Purchase of Active Solar Systems".

During the years, the Operating Agent and the Task Experts have actively informed about the Task 24 activities at various international and national events. The Task 24 experts have regularly attended different *national and international solar conferences*. *Paper presentations* have been given at many conferences. Some examples may be mentioned: the "Solar Energy & Utilities" conference in Vejle, Denmark in 1997, the "EuroSun" congress in Portoroz, Slovenia in 1998, the "Gleisdorf Solar 2000" conference in Gleisdorf, Austria in 2000, and the "EuroSun" congress in Copenhagen, Denmark in 2000. Specific experience from the Swedish procurement was presented by some of the Experts at the "Northsun" conference in Leiden, The Netherlands in 2001.

As mentioned above, a *website* on Task 24 was produced. It includes the *"Book of Tools/Business Tools"* produced in Subtask B. It was originally planned to be a printed manual, but was later changed to be a web manual in order to facilitate updating and spreading of the information given.

A number of *newsletters* have also been written during the years, the last one in February 2003.

Documentation before experts meetings and minutes from the meetings have been produced to facilitate the national information activities for the experts.

7 ACTIVITIES COMPLETED AND YET TO BE COMPLETED

Many of the projects that have been initiated will continue after the closing of Task 24. This is the case for many of the European projects, and also for the Canadian projects. The system quality actions were already linked to the development of the "Solar Keymark" label. This label will be further developed and introduced in the coming years. Quality standardisation work will also continue on a national level, for example in the "Belsolar" quality scheme and the "Solarprofis" approach.

The support from the Task was in most projects concentrated on the formation of buyer groups and initiation of projects. Procurement of the systems was part of the Task work. The projects initiated comprised much more than the formation of a buyer group and a procurement procedure. In practise, there were also publicity campaigns, feasibility

studies needed to be produced, commissioning had to take place, etc. These activities will not stop at the Task deadline, but will continue until the individual projects are finished. The participating countries also consider starting an Internet Monitoring Project, where the performance in practise of realised systems will be measured. Here a uniform method will be used, by which already 162 systems have been evaluated since 1991. In this way, the new systems introduced during this Task can be compared with existing systems. The method also presents easy-to-understand performance information for the individual users of the systems.

Much of the knowledge gathered and tools developed in this Task have been and will be transferred to the "Soltherm Europe Initiative". The "Soltherm Europe Initiative" will also take over the Dutch "Solhas" project, which aims at organising an international buyer group of housing associations.

The Task also generated a lot of market information, like the enquiries into the attitude of people towards solar water heating carried out in Canada and Switzerland. It will be investigated how this market information can be linked to other market information research activities carried out by the IEA, the European Commission or ESTIF.

8 UNRESOLVED ISSUES

It was not possible to fulfil a complete Second Round of co-ordinated international tenders within the time available for Task 24. As described above, some of the international projects will however continue in other projects, such as the EC "Soltherm Europe Initiative".

9 MANAGERIAL RECOMMENDATIONS

It is difficult to give some general recommendations for future Tasks. However, below is an overview of *some findings and recommendations* based on the accomplishments from the Task 24 projects.

1. Support and funding	1. It is important to have continued top-level support and long and sustainable funding and resources. 2. Moral, financial and political support is important for a project when the goal is to change the current market situation and to involve new organisations. 3. A project must not be underfinanced. The task-sharing asked for at the start of a project must be kept to. 4. Continuity of experts in a project is very important. 5. Full agreement among the sponsoring organisations concerning the goals is essential. 6. Major political, organisational or policy changes may affect an ongoing project. For Task 24 change of Government (Denmark), outcome of referendum (Switzerland), change of responsible national organisation (Sweden) and change of policy (Netherlands) had a negative influence on the projects.
2. Market change and stakeholders	1. International work to change a market is difficult when trade or supplier organisations in some countries regard Task activities as a threat against the market equilibrium. 2. It is essential to have a readiness to act beyond the opinion of stakeholders who are not in favour of changed market conditions. 3. A market project requires an environment of demand-side oriented decision-makers. 4. New players may enter the market, as was the case after Task 24 projects in Denmark and Sweden. 5. Transfer of market behaviour is a social process and takes a long time.
3. Buyer groups and procurement	1. Produce international procurement material also in other languages than the country's mother tongue. 2. Communicate procurements to international media, such as the "Official Journal of the European Communities". 3. Use Internet tools. For example publish requests for proposals (RFPs) at a website to make them easy available for downloading, which will facilitate the spreading of the RFPs. 4. Use Internet buyer groups, which was an important instrument in Task 24. It enabled rapid exchange of experience, easy access to tender documents, easy registration of interested buyers, etc. 5. In some Task 24 countries it was difficult to create a large enough volume for joint procurement. More flexibility in the formulation of criteria may be

	important when innovations are asked for. 6. European Standards for Solar were adopted in parallel with Task 24 and efforts were made to link them to the Task projects. Standards combined with labelling are important for an efficient use of procurement mechanisms. 7. A more international competitive market will facilitate industrialisation.
4. Time-schedule	1. The time-schedule for a Task must not be drawn up too optimistically. It takes time to establish a network of buyers, identify projects and allocate funding, all of which must be done before the actual procurement projects start. 2. Countries, joining a Task at a later stage, have a limited time to fulfil their projects.
5. Information	1. It is important to raise the general interest in Solar solutions through different information activities, such as articles, leaflets, paper presentation at conferences, demonstration, direct-mailing, etc. 2. A special budget should be set aside already at the start of a Task for information activities and for co-ordination of marketing campaigns. 3. Further use of Internet website tools is important.
6. Exchange of experience	1. Transfer of knowledge and mutual inspiration is an important result of the Task 24 work. 2. Task 24 has been an inspiration to several other projects, such as the "Soltherm Europe Initiative". 3. The international work carried out in Task 24 has been of great assistance to further development of Solar solutions.

Further experience from the Task projects and analyses of non-Task projects and campaigns can be seen in the list of "Do's and Don'ts", which was earlier on the Task 24 website http://www.ieatask24.org, but after the closing of the Task will be on the website of the IEA SHC Programme: http://www.iea-shc.org.

10 PARTICIPATING EXPERTS

Experts from six countries have participated in Task 24. A list of their names is given in Appendix 1.

11 MEETINGS

During the years, a number of experts meetings, and national and international workshops and seminars have taken place. A list is included in Appendix 2.

12 REPORTS AND OTHER MATERIAL

Extensive documentation has been compiled in Task 24, including material before experts meetings and minutes with appendices after meetings. A list is given in Appendix 3. Most of the material was earlier uploaded to the Task 24 website http://www.ieatask24.org. After the closing of the Task, it will be found on the website of the IEA SHC Programme: http://www.iea-shc.org.

The Task 24 archives include all Task Status Reports, documentation before experts meetings, minutes and documentation after experts meetings, some material produced in-between meetings and the Final Management Report. The archives will be kept by FORMAS, The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning, as well as by the acting Operating Agent, Hans Westling, Promandat AB.

APPENDICES

1. IEA SHC Task 24 Solar Procurement – List of Experts
2. IEA SHC Task 24 Solar Procurement – List of Meetings
3. IEA SHC Task 24 Solar Procurement – Reports and other material
4. Example of Business Tools: Procurement Goals and Performance Analysis

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Appendix 1 – List of experts participating in Task 24

Contact details as of the end of Task 24 – Summer 2003

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Gerald Van Decker, Canada
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Trine Jacobsen, Denmark
Jan-Erik Nielsen, Denmark
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Adrie van de Water, Netherlands
Björn Johansson, Sweden
Heimo Zinko, Sweden
Jan-Olof Dalenbäck, Sweden

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Appendix 2 – List of meetings

Year	Task 24 Experts Meetings	Workshops and Seminars
1997	Preparatory Workshops: - Utrecht, Netherlands, 6-7 February - Vejle, Denmark, 15-16 May - Gothenburg, Sweden, 17-19 September	
1998	Stockholm, Sweden, 6-7 April Utrecht, Netherlands 10-11 September	
1999	Utrecht, Netherlands, 4-5 May Vejle, Denmark, 30 September – 1 October	IEA Task 24 Workshop, Eindhoven, Netherlands, 6-7 May
2000	Ottawa, Canada 28 February - 1 March Lucerne, Switzerland, 2-4 October	"IEA Task 24 Active Solar Procurement Workshop", Ottawa, 29 February "IEA Task 24 Workshop", Lucerne, 3 October
2001	Sunne, Sweden 21-23 March Utrecht, Netherlands 26-28 September	Workshop "Solar Heating 2001 – Examples from Europe and Sweden", Sunne, 21 March Workshop with manufacturers, Utrecht, 26 Sept.
2002	Copenhagen, Denmark 21-22 March Namur, Belgium, 15-16 October	
2003	Banff, Alberta, Canada, 20-21 March	

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Appendix 3 – Reports and other material

Task 24 Brochure: *Large Scale Solar Purchasing – A Business Opportunity*. IEA SHC Task 24 in co-operation with IEA CADDET Renewable Energy Technologies Programme, 1998.

Task 24 Report: *Opportunities for Large-scale Purchase of Active Solar Systems*. IEA SHC Task 24 in co-operation with CADDET Renewable Energy Technologies Programme, 1999.

Task 24 Manual: *Book of Tools /Business Tools*. Produced by Klaus Ellehauge as a web manual, earlier on the Task 24 homepage http://www.ieatask24.org. After the closing of Task 24 it will be available on the website of the IEA SHC Programme: http://www.iea-shc.org.

*Task Status Report*s, compiled by Hans Westling, Operating Agent, Promandat AB, in collaboration with the Task 24 Experts:
April 1998, October 1998, May 1999, October 1999, June 2000, October 2000, May 2001, October 2001, May 2002, October 2002, May 2003

Task 24 Annual Contributions compiled by Hans Westling, Operating Agent, Promandat AB, to the *IEA SHC Annual Reports* 1998, 1999, 2000, 2001, 2002.

IEA Task 24 Active Solar Procurement - Evaluation after the 1st Round 1998-2001. Special Evaluation Report compiled by Klaus Ellehauge, Task 24 Subtask B Leader, in collaboration with all Task Experts. May 2001.

Task 24 Solar Procurement – Midterm Evaluation, compiled by Hans Westling, Operating Agent, Promandat AB. October 2001.

Final report on the Swedish activities: *Rapportering av svenska aktiviteter under perioden 1998-2002 inom International Energy Agency, IEA, Solar Heating and Cooling, SHC, Task 24 "Active Solar Procurement"*, compiled by Hans Isaksson, December 2002. The report is in Swedish. An English translation is forthcoming.

Documentation before and Minutes after Task Preparatory Workshops:

- Utrecht, The Netherlands, February 1997
- Vejle, Denmark, May 1997
- Gothenburg, Sweden, September 1997

Documentation before and Minutes after Task 24 Experts Meetings:

- Stockholm, Sweden, April 1998
- Utrecht, The Netherlands, September 1998
- Utrecht, The Netherlands, May 1999
- Vejle, Denmark, September/October 1999
- Ottawa, Canada, February/March 2000
- Lucerne, Switzerland, October 2000
- Sunne, Sweden, March 2001
- Utrecht, The Netherlands, September 2001
- Copenhagen, Denmark, March 2002
- Namur, Belgium, October 2002
- Banff, Alberta, Canada, March 2003

Conference papers:

Solar Thermal Procurement. Paper by Hans Westling for the International Conference on Solar Energy & Utilities, Vejle, Denmark, 1997.

Solar Procurement. Collaborative Buyer Actions for Efficient Distribution. Paper by Hans Westling, Jan-Olof Dalenbäck and Heimo Zinko for the EuroSun 98 Congress, Portoroz, Slovenia, 1998.

IEA SHC Task 24 – Grosseinkauf von thermischen Solaranlagen. Paper by Hans Westling for the "Gleisdorf Solar 2000" 5. Internationales Symposium für thermische und photovoltaische Sonnenenergienutzung, Gleisdorf, Austria, 2000.

IEA Task 24 Solar procurement - Subtask B: The Book of Tools. Paper by Klaus Ellehauge and Iben Østergaard for the Eurosun Congress, Copenhagen, Denmark, 2000.

Swedish SDHW System Procurement Competition – Description and Experiences. Paper by Jan-Olof Dalenbäck and Peter Kovacs for the Northsun 2001 conference on Solar Energy in Buildings, Leiden, The Netherlands, 2001.

Brochures, leaflets and manuals:

Several national brochures, leaflets and manuals have been produced during the years in the countries participating in Task 24. See Appendices to the documentation before and after Task 24 Experts Meetings.

More information about Task 24, earlier available on the Task 24 home-page http://www.ieatask24.org, will after the closing of the Task be available on the website of the IEA SHC Programme: http://www.iea-shc.org.

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Appendix 4 – Example of Business Tools: Procurement Goals and Performance Analysis

The text on the following pages is an example from the Task 24 website section Business Tools.

Business Tools

Procurement Goals and Performance Analysis

Goal Setting

The goals to be achieved by the procurement process are to be set up together with the buyer group. Goals could be defined within the following qualities of the solar heating system:

1. Procurement Goals

- Cost-performance (e.g. total installed cost/value of annual energy delivered present value)
- Life Cycle Analysis
- Simple Payback Time
- Energy payback time
- Environmental aspects

2. Reliability and durability:

- Corrosion protection
- Protection against high temperatures (stagnation)
- Water tightness
- Scalding protection
- Freeze protection
- Heat transfer fluid degradation protection

3. Energy production:

- Yearly energy production
- Fraction of solar
- Minimum heat losses
- Comfort

4. Installation:

- Ease of installation
- Need of space
- Integration with existing installation (hot water tanks prepared for solar heating)
- Roof integration

5. Costs:

- Component costs
- Installation
- Value of energy produced

6. Aesthetics:

- Collector design
- Tank design
- Further design

Goal Evaluation

It is to be specified to which evaluation methods the above qualities are to be measured. Suggestions could be:

Energy production:

- Collector efficiency testing according to CEN TC 312 prEN 12975 or similar standard
- Storage and Controller testing according to CEN TC 312 prEN 12977 or similar standard

and/or

- Complete system testing according to CEN 312 prEN 12976 for factory made systems
- Overall yearly production and solar fraction etc. calculated by specific computer simulation program (e.g. TRNSYS)

Reliability and durability:

- Tested according to above or other standards
- Estimate of components life span

Installation:

- Estimate of man-hours for installation
- Evaluation of need for space, integration etc.

Costs:

- System price quotations (from suppliers)
- System installation quotations
- Calculation of ratio/total investment/net solar energy production

The aesthetics impression of as well the collectors as the whole installation shall be positive.

Evaluation of tenders

Evaluation of tenders could be carried out regarding the same qualities and evaluation methods as stated above.

Furthermore could the following be considered:

- Warranty on products/installation
- Labeling
- Experience and financial position of deliverer

The relative weights of each of the above should reflect the customer's purchase criteria.