

Example Tender Package

Collector Subsystems for Large Solar Heating Systems

Incomplete preliminary draft

October, 2000

IEA 24 Solar Procurement - Subtask B

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This example of a tender package contains documents that are intended as examples of tendering for a project within IEA task 24 Solar Procurement. The example is for a project with tendering for *Collector Subsystems for Large Solar Heating Systems*. It is based on a Swedish request for proposal belonging to large systems, where the buyers only want to buy large solar collector systems to be installed as functioning surfaces with two connections: supply and return, respectively, to the solar circulation system. The circulation system itself, the piping, the way it is connected to the planned or existing auxiliary system and heating system is the buyer's own responsibility and the buyers design and purchase all other system parts on their own. That means that questions regarding how to order installation and to negotiate warranties and so on also have to be handled by the buyers themselves. However, this example document is to some extent more general than the actual request for proposal in order to serve as a guideline for other tender documents within IEA task 24. In the process of the further development of the tender documents it is anticipated that even more common usable documents will be prepared.

Another example of a package has been prepared for a project with tendering for *Solar Heating Systems for Single-Family Houses*.

In addition to the fact that the two documents have been prepared as examples of different solar heating systems, the two documents have also been prepared as examples of projects with different levels of information and specification requirements.

The document for *Large Solar Collector Systems* reflects a high level of information that is often required for large projects while the documents for *Solar Heating Systems for Single-Family Houses* reflect a lower level of information for minor and more informal projects.

Both tender packages are prepared on the basis of a third package called the "*Brutto Text*" which contains alternative formulations which can be used for different projects at different levels. The documents do not reflect the different national laws, and therefore adaptations to such might be needed.

For comments or suggestions about the documents please contact *Klaus Ellehauge*:
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IEA Task 24, "Active Solar Procurement" evolved in 1998, with the objective of creating a sustainable, enlarged market for active solar heating systems. It will run for five years. For more information see Appendix D or the website address: <http://www.ieatask24.org>

October, 2000

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1 REQUEST FOR PROPOSAL

Technology procurement competition

Solar collectors for use in larger solar heating systems

An International technology procurement competition forming part of IEA Task 24, Solar Procurement

On behalf of the xxxxxx

And the Buyer Group xxxxxx

for IEA Task 24

1.1 Executive Summary of the request for proposal

Address

Tenders in **sealed envelopes**, clearly marked: **Tender for Solar collectors for use in larger solar heating systems, IEA Task 24**, and addressed to

Organisation: xxxxxxx
Attention: xxxxxxx
Box: xxxxxxx
Address: xxxxxxx
Phone, Fax, e-mail xxxx, xxxx, xxxx

Deadline:

Tenders must be received no later than **12.00 Wednesday 31 May 2000**. (Local time)
Proposals received after the closing time will not be accepted. Proposals received by fax will be rejected.

Scope

This request for proposal deals with the purchasement of large solar collector subsystems intended to be installed on the roof of buildings or on the ground. The solar collectors should be delivered to different constructions sites at differentiated occasions within a certain time-frame. A buyer group is guarantying the purchasement of the collectors according to the specifications given in the following chapters.

As part of the IEA 'Technology Procurement, Solar Heating' project (International Energy Agency, Solar Heating and Cooling, Task 24, Solar Procurement), Sweden, Denmark, Canada, the Netherlands and Switzerland are co-operating on joint procurements of solar heating technology for a sustainable enlarged solar market.

This request for proposal deals with the Swedish purchasement program of the Swedish Buyer Group. The Swedish Organisations Council for Building Research (BFR), the National Energy Administration (STEM) and the LIP Secretariat in Stockholm are the main supporting organisations of the Swedish part of the work.

1.2 General information

1.2.1 Delivery

The product to be delivered are solar collector subsystems for systems involving more than 200 m² solar collectors for use in Sweden (which has a Nordic climate). The collectors must be suitable for mounting on new or existing buildings, on flat or sloping roofs. Those suitable for mounting on flat roofs must also be suitable for ground mounting. Hence, the mounting arrangement can vary, depending on the construction of the building and/or roof as follows:

- mounting on a frame support structure (on a flat roof or on the ground)
- mounting on an existing roof, retaining the under-roof as a sealing layer. (The purchaser group has specified that the solar collectors must be mounted on the existing under-roof structure, or must replace it.)

- as roof hatches, with the collectors also providing a sealing function.

The total delivery within this request for proposal amounts to 8000 m² solar collector subsystems to be delivered in the time span from November 2000 to December 2001.

1.3 IEA Solar Procurement

This request for proposal is part of an international collaboration with the objective of creating a sustainable, enlarged market for active solar heating systems. IEA Task 24, "Active Solar Procurement" evolved in 1998 and will be in force for five years. A further description is given in Appendix E.

Operation of the Swedish part of the project is in the hands of a project organisation that administers and runs the project. The National Coordinator is Hans Isaksson, of K-Konsult Energi Stockholm AB. A related technology procurement competition, for solar heating systems for the supply of domestic hot water in detached houses, is being run in parallel with this competition.

1.4 The project organisation and the Buyer Group (national)

One of the tasks of the project group is to bring together a *purchaser group*, whose members commit themselves to the purchase, within the framework of the project, of solar collector subsystems for larger solar heating systems. In this context, 'larger systems' are those requiring over 200 m² per project, although there can be departures from this target size. The Chairman of the purchaser group is xxxx.

At present, the group consists of about a score of interested purchasers from local authorities, housing companies, construction companies and energy utilities. (See Appendix D for further details.) The purchaser group is assisted by an *evaluation group* (see below) for evaluating competition entries received.

1.4.1 *The Swedish technology procurement competition for solar collector subsystems for larger/smaller (alternative) solar heating systems*

The Swedish technology procurement competition "Solar collector subsystems for larger heating systems" is for a solar collector assembly as specified in chapter 2. It can be seen from Appendix D, that options have been placed for a total of about 8000 m² of solar collector subsystems for various projects. Publicity for, and marketing of, this technology procurement project will continue by various means, including advertising campaigns, until 15 August 2000. The objective is to have received binding orders by that time for at least 5000 m² of solar collector subsystems. If the amount of binding orders amounts to less than 5000 m², the Buyer Group reserves the right to discontinue the procurement.

1.5 Phases of the technology procurement competition

The competition has been divided into the following phases:

- *The Evaluation Phase* = evaluation of the collectors' technical performance and economic aspects, together with ranking of the tenders.

- *The Delivery Phase* = delivery in accordance with the framework incentive agreement (see the model form in Appendix C), drawn up in accordance with the binding orders received by the dead-line mentioned above. See Appendix D for a list of buyers at the time of writing.

1.6 Advertising the technology procurement competition

The competition will be advertised both nationally and internationally via the EU "Official Journal" and xxxxxx (other official channel for tenders). The competition documents in Swedish will be sent directly to known national manufacturers and to the Swedish Solar Energy Association for distribution to their members. In addition, the national and English documents will also be available on the web site: <http://solupphandling.bfr.se/> and on IEA Task 24's web site at <http://www.ieatask24.org>.

1.7 Qualifications for submitting entries

In order to ensure the quality of the solar systems, all installations under this project are to comply with certain pre-qualification criteria. Most of these are designed to ensure that the systems installed have a proven track record of successful performance. The main pre-qualification criterion is as follows:

- The deliverer of the solar subsystem proposed must have a track record of at least 10 larger installations successfully operating for at least 1 year.

The following information must therefore be included with the tenders:

- Confirmation that the solar collectors offered are based on experience derived from the models on which the track record is based (some modifications for enhancement of the price/efficiency relationship are eligible).
- Information on the production capacity of your manufacturing plant.
- Bank references and two trade references.

The solar collectors that are the subject of this competition shall have been tested and certified by an impartial test organisation, or shall have been submitted to an approved National Testing and Research Institute for initial testing according to European Standards or Standard recommendations.

A prerequisite for participation in the competition is the ability to be able to fulfil the above Phases of the procurement and also subsequently to be able to mass-produce and deliver solar collectors having a performance equal to that of the submitted tender.

A check will be made to ensure that participants fulfil the general requirements in respect of financial soundness set out in the relevant Public Procurement Act.

The Buyer Group may make such investigation as it deems necessary to determine the ability of the Tenderer to perform the work, and the Tenderer shall furnish the Buyer Group with all such information and data it may request for this purpose. The Buyer Group reserves the right to reject any tender, if the evidence submitted by, or investigation of such Tenderer fails

to convince the Buyer Group that such Tenderer is properly qualified to honour the contract and to complete the work as contemplated therein.

1.8 Submission of tenders

1.8.1 Submission date and address

Tenders must be received by the *Chairman of the Buyer Group* no later than **12.00 Wednesday 31 May 2000**. (Local time).

Three sets of all documents, in the form of one original and two copies, shall be supplied.

Please note: Tenders received after the closing time and date will not be accepted. It is in the Tenderers' best interest to deliver their tender to Buyer group well in advance of the closing time and date.

Tenders should be submitted in **sealed envelopes**, clearly marked: **Tender for Solar collectors for use in larger solar heating systems, IEA Task 24**, and addressed to

Organisation: xxxxxxx
Attention: xxxxxxx
Box: xxxxxxx
Address: xxxxxxx
Phone, Fax, e-mail xxxx, xxxx, xxxx

Also mark envelopes, wrappers etc.: **Tender for Solar collectors for use in larger solar heating systems, IEA Task 24**.

1.8.2 Forms to be used

All tenders must be completed on the blank Tender Form included in the contract, Appendix A. All tenders shall state the price for each unit requested, and shall include a complete Form of Tender and must be signed by the Tenderer with his business address. The Form of Tender must be included with other contract documents when the tender is submitted.

1.8.3 Information to be included

- A price for supply of the products and services specified in chapter 2
- Details and drawings of the design of solar collector subsystem suggested, *including all the technical data requested in the Tender Form*.
- Estimate of costs of the solar collector subsystem and installation time required according to specified situation. If the specified situation is unclear specify in detail the amount of work and the components which are included in the cost estimate.
- Warranty information
- The pre-qualification information detailed in paragraph 1.7.
- The price supplied should be fully itemised, and should be expressed as a cost per annually delivered kWh (see specification in chapter 2).
- Cost for mounting and transportation should be stated separately.

1.9 Opening of tenders

Authorised officers of Buyer Group organisation will open and document all tenders in a protocol. The Tenders will thereafter be evaluated by an expert committee

1.10 Evaluation

1.10.1 Who is going to select the tenders?

Entries received before the closing date will be evaluated by an evaluation group which is organised by the Buyer Group, consisting of:

aaaa, convenor, Chairman of the Buyer group.

bbb

ccc

ddd

eee

If necessary, the Evaluation Group will on behalf of the Buyer Group call on the services of other experts.

1.10.2 How will the evaluation be done?

The criteria are formulated as *mandatory* and *desired* criteria.

As mentioned above, a substantial improvement in the total cost/performance relationship is most important in achieving greater market penetration of solar heating technology. For this reason, the cost aspects of the system and hardware components, performance and the erection/installation time and cost aspects will be *mandatory* in evaluating entries received.

All *mandatory requirements* must be fulfilled.

In addition to the mandatory requirements, there are also *desired requirements*. Achievement or improving of the desirable requirements, and analysis of other information provided, will be included in the evaluation with the relative weightings as shown below (example):

- Cost of erection/installation aspects, based on the supplier's information 30 %
(May be based on tender, specialist judgements and real tenders from installers if installation is not included.)
- Solar heat costs less than the obligatory requirement cost of 200 SEK/MWh for 1000 m² and other specified conditions in Appendix D. 30 %
- Environmental aspects, aesthetic aspects, degree of completeness of information in the proposal 20 %
- Maintenance/life term and warranty aspects 20 %

1.10.3 Final evaluation

The Buyer Group will nominate one or more winners.

1.10.4 Right to accept or reject tenders

The members in the Buyer Group have the final decision regarding the selection of the systems to be included in the final ranking.

1.11 Property in the goods/system, origination rights etc.

The manufacturer/supplier retains intellectual property in the goods/systems, origination rights etc. for the solar collectors described in the competition entry. If the entry contains information on components that will be the subject of patent applications, this shall be specifically pointed out in the entry.

1.12 Secrecy of competition entries and development

Section xxx, Paragraph yyy of the zzz Act applies to the competition documents and other documents relating to the project and held by xxxx. One of the effects of this is that a company's commercial and operating affairs and circumstances, such as inventions, designs or economic conditions, that have not been made public in any other way are regarded as secret provided that it can be assumed that the company would suffer damage if such information became available to the public, to competitors or to others. This protection under the Secrecy Act applies for 20 years from the date of receipt of the documents.

1.13 Questions and Addenda

Please submit any questions or concerns regarding these documents in writing, to:

The chairman of the Buyer Group, xxxxx, or by e-mail to yyyy.

Questions received will be collated and replied to by not later than 20 April 2000. All questions and answers, in Swedish and in English, will be available from this date on web sites <http://xxxxxx> and www.ieatask24.org.

During the tendering period, no officer, agent or employee of the Buyer Group is authorised to orally alter any portions of these documents.

Any alterations required will be issued to all Tenderers as written addenda. Addenda shall be considered as an integral part of the contract documents. The Tenderer shall list in its tender all addenda that were considered when the tender was prepared.

1.14 Time plan

Competition documents sent out/published	2000-02-28
Submission of written questions concerning the competition documents	2000-03-31
Written replies to written questions received	2000-05-15
Latest date for submission of competition entries	2000-05-31
Evaluation	2000-06-01 -2000- 07-31
Nomination of the winner(s)	2000-08-15
First deliveries	2000-11-01
Last order in this Contract	2001-05-31
Last delivery in this Contract	2001-07-31

1.15 Prices

Tendered prices must be firm and not subject to any escalation clauses. Prices are exclusively V.A.T and are to be open for acceptance for 90 days after the closing of this tender. Prices should be F.O.B. delivered including all weight and delivery charges to the addresses indicated in Appendix xxxx. Prices are to be quoted in xx and shipping, ordering and handling charges must be stated separately. Relevant taxes to be paid are also noted separately.

1.16 General conditions and contractual structure

The general Contract conditions for this project are given in APPENDIX B, General Conditions of Contract .

The main parts of a future contract are found in the Model Contract Form, Appendix C. Priority of Contract Documents (if disparity).

1.17 Laws

The contract arising out of acceptance of this tender shall be interpreted in accordance with the laws of Sweden.

1.18 Litigation (Alternative if applicable)

No tender shall be accepted from any person or corporation who, or which, has a claim or who has instituted legal proceedings against xxxx or against whom yyyy has a claim or has instituted legal proceedings with respect to any previous contract, without prior approval from the zzzz. (However different national laws may restrict the use of this clause)

1.19 Warranty

The system must be covered entirely and explicitly by its warranty. In order to participate in the project all manufacturers will have to provide written notice of the full intent of the warranty, and of their ability to fulfil the warranty within xxx working days of notice. Furthermore, for the purpose of the project, the manufacturer must state that any aspect of the following items i) and ii), respectively, will not invalidate their warranty, in particular:

- i) the use of heat meters

ii) the interference due to the work of installers.

If the manufacturer is concerned that any aspect of these items may invalidate his warranty, then the manufacturer must state his concern and provide solutions to address this concern. Furthermore the manufacturer should include any details of the design and engineering of a complete system that might invalidate the warranty.

1.20 Activities of tender submitter

Conflicts of interest etc.:

The Tenderers shall disclose to the Buyer Group prior to the awarding of the contract any potential conflict of interest. If such a conflict does exist, the Buyer group may, at its discretion, withhold the contract from the Tenderer until the matter is suitably resolved.

Tenderers will upon request provide all pertinent information regarding ownership of their company. This information must be supplied within forty-eight (48) hours of request.

2 SPECIFICATIONS

2.1 Documentation

Documentation consists of

- Collector test certificate
- Documents required in standards (i.e. installer instruction manual etc.)
- Specifications given in Form for submission of tender, technical description (Appendix A)
- Additional documents

The requested documentation is specified in connection with the requested specifications as given below.

2.2 General specifications and test certificate

Collector subsystems offered within these tendering procedures have to fulfil requirements according to existing or upcoming European test standards for:

- Solar Collectors

And if relevant

- Factory made systems (piping safety etc)
- Custom built systems (piping, safety etc.)

For references to standards and test methods see section 3.

Documentation:

- Test certificates from internationally recognised test institute preferably working according to EN45001, and/or other documents stating that requirements and tests are fulfilled".
- Documents required in standards (i.e. installer instruction manual etc.)

2.3 Additional specifications and documentation

2.3.1 Type

The collector must belong to one of the following types (to be indicated)

- Flat plate
- Evacuated tube

The area of each collector module should be of an appropriate size to facilitate transport, installation and connecting up. *A larger module has better thermal performance, but the area of the collectors must be such as to enable them to be rationally transported and installed.*

Sharp corners and edges, and the use of a large number of loose parts, should be avoided. If the weight of any item exceeds 60 kg, it must be provided with lifting points, devices etc.

Documentation

- Manufacturing drawings of the collectors, with details of materials.
- Details of collector dimensions and weights.

2.3.2 Aesthetics

- The design of the system must go as well as possible with the rooftop.
- The availability of different frame colours should also be specified in the tender.

Documentation

- Provide photos or promotional brochures.

2.3.3 Mounting - Installation

- It must be possible for the solar collectors to be mounted in at least *two* of the following three alternatives:
 1. On a frame (on a flat roof or on the ground)
 2. On the roof, while retaining the existing under-roof as a weatherproof layer
 3. On the roof trusses, to serve as a fully weatherproof structure.
- The enquiry material is for the solar collector system itself, i.e. for the collectors, including the necessary hardware for mounting the collectors on frames, directly on the roof or integrating them into the roof, together with all necessary interconnection components.
- ***The preferred method of mounting*** the collector is integrated into the roof (i.e. replacing the roof tiles). However, it is recognised that few manufacturers offer this type of mounting option, so collectors mounted onto roof surface will also be considered.
- The design of collector mounting will make adequate provision for waterproofing any breaking through of the roof covering. The mounting method proposed should be specified in the tender. All means (like gutters and lead slabs etc.) have to be included to ensure water tightness of the roof. Preferably testresults have to be included
- Recommended minimum inclination must be indicated
- The collectors must be designed so that they can be easily connected into larger hydraulic units suitable for use in/with larger systems.
- Installation time (overall time on the roof) should be less than xx hours per m² collector by two skilled workers.

Documentation

- Description of roof sealing functions

- Description of collector fixtures on the roof including tightening procedures (roof placed or roof mounted solar collectors)
- Description of water protection functions for roof integrated solar collectors
- Description of mounting.
- Filling, draining and commissioning instructions
- Information on the heat transfer media.
- Installer instruction manual
- Drawings of supporting frame (if applicable)

2.3.4 Collector assembly piping

Documentation

- Description incl. dimensions of connections, joints and dimensions of connecting pipes
- Hydraulic scheme incl. flow specification (type of cooling fluid) and pressure drop at recommended flow respectively at maximum permissible flow for one *collector module* respectively for one *hydraulic collector unit* (assembly of collectors to be installed to give an hydraulic entity. Further hydraulic collector units are to be installed in parallel).
- Recommended pipe and component sizes for different collector areas should be specified in the tender.

2.3.5 Installation work

Documentation

Installation work to be included in the tender

- The prices for the collector assembly should include all *components costs* for connecting the collectors to a complete field assembly of 200 m² with two main connections to the circuit: Inlet and outlet.
- Costs for installation work, support structures and fixtures on the roofs should be calculated for a reference installation of 200 m² that can be used for priced calculation of installation. (see Appendix xxx roof specification).

2.4 Costs

2.4.1 Maximum cost of ratio total investment/net solar energy production.

Mandatory requirement

- The cost of solar heat must not exceed SEK 200/MWh, at an annuity rate of 0.08 and when operating at a mean temperature, TC, of $0.5 * (T_{in} + T_{out}) = 50$ °C. The cost of heat shall be given on the basis of an order quantity of 10000 m².
- Base calculation of the energy yield of a collector on insolation for TMY of xxxx on an unshaded south-facing collector mounted at an angle of 45°. These parameters should also be those used of the testing institute in its evaluation and testing

- The cost of solar heat shall be taken to mean the cost of the collector subsystems, including all components necessary for connecting them to an operating solar collector system/array of at least 200 m² in size, and including two connection points and any necessary shut-off, venting, connecting or safety devices. Costs of support frames, installation work, transport and value-added tax are not to be included in this calculation.

Comments

- *As an example, the solar heat cost of SEK 200/MWh for the offered equipment can be achieved with an energy yield of 380 kWh/m²,year if the cost of a complete collector installation of the minimum competition size (200 m²) does not exceed SEK 950/m². Alternatively, it can be achieved by collector arrays with other cost/yield relationships at TC = 50 °C, e.g. SEK 800/m² and 320 kWh/m²,year, SEK 1200/m² and 480 kWh/m²,year or SEK 1500/m² and 600 kWh/m²,year.*

2.5 Erection/installation costs (mandatory requirement)

- Typical erection costs for a minimum order unit (200 m²).
- The erection costs shall include erection/installation and connection of collectors, which have been delivered to the project site to a solar collector system/array, having two connection points for the supply and return connections, and including miscellaneous materials, support framework, lifting equipment as needed for installation on a three-storey building, site costs and costs of safety equipment.
- Labour costs shall be given in the form of man-hours, with other costs in SEK.
- Quote costs for at least two of the following three alternatives:
 - collectors mounted on a frame (on a flat roof or on the ground)
 - collectors mounted on the roof, while retaining the existing under-roof as a weatherproof layer
 - collectors mounted on the roof trusses, to serve as a fully weatherproof structure.
- Typical freight costs for a distance of 300 km (within YYYYYYYY), for a minimum order unit (200 m²).

Additional requirements

- It must be possible to transport the collectors by road and install them in a straightforward manner at a low cost.

2.6 Guarantee (Mandatory requirement)

- The collectors shall have 5 years' guarantee at minimum.

2.7 Environmental declaration:

Mandatory requirement, see chapter 4.5.

3 STANDARDS, REFERENCES AND TESTS

3.1 General

3.1.1 Standards and tests

- Collector efficiency testing according :
 - *CEN TC 312 prEN 12975-1:1977E Thermal solar systems and components - Collectors - Part 1: General requirements*
 - *CEN TC 312 prEN 12975-2:1977E Thermal solar systems and components - Collectors - Part 2: Test methods*
- Complete system testing according to CEN 312 prEN 12976-1 prEN 12976-2 and for factory made systems. Some items from these standards apply for the following measures:
 - *Safety*
 - *Freeze resistance*
 - *Pressure resistance*
 - *Weather resistance*

3.2 Solar collector testing

Mandatory requirement

The test procedure includes:

- Examination of drawings and materials specifications
- Examination of installation and operation and maintenance instructions
- Pressure testing
- Stagnation and thermal shock testing
- Resistance to wind and snow loading
- Resistance to rain
- Determination of thermal performance
- Calculation of annual energy yield at $T_c = 25, 50$ and $75\text{ }^\circ\text{C}$
- Resistance to freezing
- Material tests (certain components)
- Preparation of description of properties
- Resistance to shocks and hail.

Additional test procedures can be added by some testing institutes. These procedures are not mandatory but can serve for getting the product approved according to national rules.

The thermal performance

The annual thermal performance can be derived from the efficiency factors, f. i. at $T_c = 25\text{ °C}$, 50 °C and 75 °C . These values must be stated in the competition entries. When evaluating the entries, the evaluation group will make its own calculations of solar energy yield, based on efficiency factors stated in the test certificate. The thermal performance should be calculated for south orientation and for suitable inclination, f. i 30 or 45 °.

Mean temperatures of $T_c = 25\text{ °C}$, 50 °C and 75 °C are defined as being the mean values of entry and exit temperatures of the heat transfer medium when passing through the collectors. 50 °C is a suitable temperature for comparing solar collectors.

3.3 Information on solar collector testing

For further information on development testing and performance testing and evaluation in accordance with Swedish national rules, please contact Hans Wennerholm (+46 33-16 55 40) (hans.wennerholm@sp.se) or Peter Kovacs (+46 33-16 56 62) (peter.kovacs@sp.se).

APPENDIX A, Form for submission of tender

Performance details - Solar collector subsystems for large solar heating systems

Type/name of the system:	
Place of manufacture:	
Company submitting the tender:	
EN ISO 9000 quality assurance, certificate no.:	
Date/Signature:	
Name in block capitals:	
Address:	
Telephone:	
Fax:	
E-mail:	

Contents

1. Information required
2. Technical description
3. Environmental declaration
4. Other documentation

1 Information required

Enter the information required for mandatory and desirable requirements, and/or required information, respectively in the last column. Enter quantified data in figures or other requirements confirmed as appropriate, in accordance with chapter 2, Performance Specification, e.g. by 'Fulfilled', 'Included', a.s.o. See also technical description, chapter 4.2.

COMPETITION CONDITIONS			PROPOSAL
OBLIGATORY REQUIREMENTS	DESIRABLE REQUIREMENTS	FORM OF PRESENTATION	
1. Solar collectors			
1: Certification			
2: Two of three mounting arrangements			
	1. All three mounting alternatives		
	2. Purpose-designed.		
		1. Test certificate	
		2. Drawings	
		3: Dimensions and weights (per collector module)	Width m Height m Depth m Weight kg
		4: Installation instructions	
2. Connection			
1. System drawings with technical instructions for array			
2. Commissioning instructions			
3. Costs			
1: Max. E 200/MWh			E /MWh
2. Guarantee (at least five years)			years
3. Transport and erection costs			
		1. Erection cost (for 200 m ²)	Labour hours Other costs E
		2: Transport cost (200 m ² x 300 km)	E

COMPETITION CONDITIONS			PROPOSAL
OBLIGATORY REQUIREMENTS	DESIRABLE REQUIREMENTS	FORM OF PRESENTATION	
4. Environment			
1: No CFCs or other hazardous gases in the insulation			
		1: Environmental declaration (see chapt. 2.10)	
5. Marking			
1: Data plate			
		1: Information on plate and siting	

2 Technical description

The solar collectors shall be documented in sufficient detail to enable the evaluation group to form a reasonable idea of the system's cost/performance relationship. In addition, the documentation must clearly indicate the most important material and environmental characteristics, in order to be able to gain an idea of the collectors' life and of the environmental impact of both normal operation and subsequent disposal. Please use the following forms in order to facilitate presentation and make it easier to compare all entries on an equal basis.

Definitions:

Solar collector module: The smallest constituent unit of a solar collector (e.g. a solar collector case).

Hydraulic solar collector unit: The combination of parallel and series-connected collector modules that forms a unit for connection. Hydraulic collector units are then, in turn, connected only in parallel.

Solar collector system: An area of solar collectors, consisting of one or more hydraulic collector units.

SOLAR COLLECTORS ¹⁾	DESCRIPTION
Type (flat plate, vacuum, CPC etc.)	
Method of mounting (Yes / No) - on frame (flat roof and ground) - on sloping roof - on roof trusses	
Minimum slope angle (°)	
Lifting device (required if module weight exceeds 60 kg)	
Number of fixing points per module	
Module dimensions - gross area (m ²) - glazed area (m ²) - absorber area (m ²) - width (horizontal) (m) - height (up the roof surface) (m) - thickness (m) - reflector area (m ²)	

SOLAR COLLECTORS ¹⁾	DESCRIPTION
Module data - Weight including heat transfer medium (kg) - Max. operating pressure (MPa)	
Solar collector coefficients, test results	η_0 = b_1 = (W/m ² ·K) b_2 = (W/m ² ·K ²)
Thermal yield , in accordance with test certificate.	At 25 °C (kWh/m ²) At 50 °C (kWh/m ²) At 75 °C (kWh/m ²)
Stagnation temperature (ambient temperature 30 °C, and insolation 1000 W/m ²)	
Cover sheet - type or material - thickness - coefficient of transmission	
Absorber (colour if applicable) - type - thickness - surface coating (colour if applicable) - coefficient of absorption, α - coefficient of emission, ϵ	
Recommended heat transfer medium - concentration - boiling point (°C) - freezing point (or bursting point) (°C)	
Recommended flow / pressure drop Flow l/(h,m ²) Pressure drop (kPa) - per module - per hydraulic unit	
Mounting plates (flashing) included? (Material, colour)	

¹⁾ If information is provided in appendices, please refer to them.

3 Example of data plate

Marking (see chapter 2.6)

4 Aesthetic aspects

Aesthetic aspects of the appearance of the collectors and the collector system will be considered when evaluating the entries. As far as it is possible to judge such an aspect objectively, the appearance of the roof-mounted collectors shall be 'natural', and of a style that is likely to be accepted by the general public. This means that the design of the collector, the glazing and the design and colour of the absorber need to be considered in order to achieve a satisfactory solution. Roof structure designs that look as if they belong on factory roofs should be avoided. If necessary, the evaluation group will be asking architects and/or other experts to consider the architectonic aspects.

Aesthetic aspects: Design aspects that the manufacturer wishes to emphasise from an aesthetic point of view. Refer if necessary to attached documents, illustrations, photographs etc.

5 Environmental declaration

The solar collector modules offered and specified in these documents

Type

Serial no.

contain the *following reusable materials per 200 m²*:

Metals Aluminium kg

Iron and steel

Galvanised steel

Copper, brass, bronze

Other metals

Other Glass kg

Polymers (plastic, rubber etc.)

Foamed materials

Mineral wool and glass fibre

Wood

Other material

Recommended heat transfer medium/media

Chemical substance

Environmental impact

Discharge restrictions

In addition, each 200 m² of solar collector contains the following quantities *of the following non-reusable* materials:

.....
.....

In addition, the system contains the following products (e.g. tin, Teflon™, paints and varnishes, toxic substances etc.), the use of which is covered by restrictions due to their adverse environmental impact:

.....
.....

6 Other documentation

The following documentation must be attached to the entries:

APPENDIX B, General Conditions of Contract

Not included here – may be national or international well known
Conditions

APPENDIX C, Model form of framework agreement

FOR THE SUPPLY AND DELIVERY OF SOLAR COLLECTOR SUBSYSTEMS FOR LARGE SOLAR HEATING SYSTEMS

The following points will be included in any framework agreement:

1. The parties to the agreement:
The purchaser:
The supplier:
2. The purchaser undertakes to support the ordering of at least m² of solar collector in the form of call-off orders from various property owners/organisations/private persons, as based on the terms and conditions in this framework agreement. Orders are subject to the receipt of any necessary public authority permissions etc. and to the achievement of approved test results.
3. Delivery of systems
4. The competition is divided into phases, as described in the competition documents. The Purchaser shall authorise the start and continuation of each phase.
5. Contract documents
These consist of the contract, the competition documents and appendices, any requirements associated with orders, the competition entry and applicable parts of AOLS 81.
6. Prices
Solar collectors: SEK/MWh
Erection/installation cost:
Transport cost:
Prices including value-added tax.
7. Times
8. Testing in accordance with ...
9. Warranty
10. Terms of payment
11. Property rights, design rights etc. and the right to refer to this competition in marketing.
12. Confidentiality
13. Service and maintenance
14. Representatives
15. Resolution of any disputes
16. Termination (if results cannot be achieved within the intended time etc.)
17. Call-off rights within the prescribed time period for the specified group of purchasers.
18. Rights to, and prohibition of, assignment

APPENDIX D, Example of Additional documents

A technology procurement of solar collectors for larger solar heating systems in Sweden

The purchaser group

Publicity for the technology procurement programme for larger solar heating systems is being run from the autumn of 1999 until 15th August 2000, by which time options on collector quantities should have been firmed up into orders. As at 31st March 2000, options to purchase collectors have been given by the companies listed below. In addition, further marketing activities are being carried out, which means that further new purchasers should come forward.

The companies listed are members of the sector associations etc. listed below.

Purchasers who have placed orders or given options for the technology procurement of solar collector subsystems for larger solar heating systems:

AAAA
 BBBB
 CCCC

Companies that have expressed interest in participating belong to the following sector organisations:

DDDD
 EEEE
 FFFF

The purchaser group project

The group was invited to join the technology procurement project as potential purchasers of solar collectors for installation as follows:

- a) mounting on a frame support structure (on a flat roof or on the ground)
- b) mounting on an existing roof, retaining the under-roof as a sealing layer (the purchaser group has specified that the solar collectors must be mounted on the existing under-roof structure, or must replace it)
- c) as roof hatches, with the collectors also providing a sealing function.

As at 31st March, the purchaser group has given options for the purchase of about 8000 m² of solar collectors, as follows:

- | | |
|--|----------------------|
| a) amounting on a frame support structure (on a flat roof or on the ground) | 500 m ² |
| b) mounting on an existing roof, retaining the under-roof as a sealing layer | 7 000 m ² |
| c) mounting on roof trusses, providing a sealing function | 500 m ² |

Publicity for, and marketing of, this technology procurement project will continue XXXXXXXX, by which time it is expected that the existing options will have been firmed up

into binding orders for at least 10 000 m² of collector subsystems. However, if the amount of binding orders amounts to less than 4 000m², the purchaser group reserves the right to terminate the procurement

Information about planned promotion activities

Not included

APPENDIX E, IEA task 24 Solar Procurement

Introduction

A sustainable and much larger market for active solar water heating systems is necessary in many countries if the sun is to be an important source of energy for water heating in the future.

An important way to create such a market is through price reductions. This can be done from the demand and supply sides. This task focuses on the demand side via the creation of large Buyer Groups. Large volume purchasing can reduce marketing costs and stimulate innovation in the development of products with improved cost performance.

With the objective of creating a sustainable, enlarged market for active solar heating systems, IEA Task 24, "Active Solar Procurement" evolved in 1998 and will run for five years. Interested parties, such as utilities, homebuilders, and non-governmental organisations (NGOs), are invited to take part in purchasing solar water heaters.

Background

As part of the IEA, Solar Heating and Cooling Implementing Agreement, Canada, Denmark, the Netherlands, Sweden and Switzerland are co-operating in Task 24 "Active Solar Procurement" on joint procurements of solar heating technology.

The National Energy Agencies of the participating countries are the main financiers of the (national) elements in the Procurement Task. Future Procurement activities will deal with co-ordinated international Procurement efforts.

It has been noted at the international level that:

- although many countries have put a considerable amount of work into research, development and demonstration of solar heating technology there has not yet, despite this, been any significant market breakthrough. However, the work that has been carried out in these fields over many years has created a sound knowledge base for solar heating technology.
- the market for solar heating is local, and sales are generally through local contractors to a few environmentally aware buyers. Most systems are manufactured in the same country as that in which they are installed, and there are significant price differences between countries.
- today, solar heating installations are too expensive to achieve any larger scale market penetration. A considerable fraction of this cost is simply due to the high proportion of marketing input needed in order to sell just a few installations. In addition, production volumes are low, insufficient to support rational production, which also contributes to an unnecessarily high cost.

Objectives

The objective of this IEA project is to create an organised Buyer Group interest in solar heating systems. This potential market exists in the form of the Buyer Groups in each of the countries: other countries are considering joining the project. The purchasing volumes thus created create new opportunities for manufacturers to invest in more efficient production processes and to rationalise their marketing and distribution. In this way, technology procurement projects can open the way for manufacturers to find larger national or international markets.

The overall objective is to create and maintain an expanding market for solar heating systems. An important factor in any such attempt to influence the market is that the cost/performance relationship must be improved. This also includes more rational installation methods, as installation costs constitute an important part of the total cost.

Scope - Solid initial market

By pooling the market into strong buyer groups, forward-looking buyers can influence production and encourage manufacturers to use more innovative technologies to develop products, components, and systems. Through the

introduction of buyer groups, a solid initial market base will be formed, which will reduce investment risks and unit costs.

This will be fulfilled through major cost and price reductions for all cost elements, including marketing and installation, as well as performance improvements by means of joint national and international purchasing. The task deals with small active solar water heaters, although large systems may also apply.

The major results of this work will be to encourage a steady growth in the solar domestic hot water (SDHW) market and to promote the evolution of the market, from being national to becoming international.

The project organisation and the Buyer Group (national)

One of the tasks of the project group is to bring together a *Buyer Group*, whose members commit themselves to the purchase, within the framework of the project, of solar collector subsystems for large solar heating systems.

Further information on IEA task 24 Solar Procurement

More information on solar procurement and the opportunities available together with cases of procurement projects within solar heating and within other technologies can be found on the website address:

<http://www.ieatask24.org>