Solar Heating Campaign

”Sun over the Danish regions of Thy and Mors”

Material for suppliers of solar heating components

Thy Højspændingsværk & Morsø Elforsyning
(Thy high-tension power station & Morsø electricity supply)

March 2000

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1 Introduction

In February 2000, Thy Højspændingsværk and Morsø Elforsyning (Thy high-tension power station & Morsø electricity supply) in co-operation established an operating agency that i.a. will deal with renewable energy. The operating agency (not yet named) will carry out a solar heating campaign this year. The target group of the campaign comprises all users in the supply area - i.e. app. 28,000 users. Within the supply area of the agency the interest in solar heating is increasing and that is especially because a considerable amount of households are situated in areas outside the collective energy supply (gas/district heating). In connection with the campaign a sale of 100 to 200 systems is anticipated.

The campaign is supported by the Danish Energy Agency and it should start in May and remain in force until (and including) December 2000.

In connection with the campaign the agency will price three different solar heating systems so they can be offered to customers at fixed prices and also be stated in the sales material.

Pricing takes place on behalf of information from the suppliers and in co-operation with selected heating, ventilation and plumbing firms. Choosing which systems should be offered at fixed prices takes place on behalf of information obtained from suppliers, and through a co-operation between the agency and the heating, ventilation and plumbing firms.

The purpose of this material is to collect informative prices from solar heating suppliers. The informative prices shall be sent to "Kildemoes Solvarme" at the following address:

Kildemoes Solvarme
Attn.: Mr Troels Kildemoes Møller
Kløvenhøjvej 10, 7760 Hurup, Thy
Tel.: 9795 6643, mobile: 4033 6643 / Fax: 9795 6390 / E-mail: solkilde@post9.tele.dk

The prices shall be available at the latest on Monday, 10 April 2000, at 2 p.m.

Please write your informative prices on the enclosed form (cf. chapter 5). As the type approval scheme makes it possible to build solar heating systems with components purchased from different suppliers individual prices are requested on solar collector components and on storage devices, respectively.

Initially, we kindly ask you at least to enclose data sheets from component testing concerning the solar collector, storage device and control.

Please also enclose user instructions and installation instructions and any other material necessary to evaluate the suggested components. In connection with subsequent negotiations additional information might be requested.
Further information can be obtained by contacting "Kildemoes Solvarme".

2 Marketing, sales promotion and fees

The agency will undertake all work connected with marketing and sales promotion. When a customer has ”agreed” to purchase a solar heating system then one of the associated heating, ventilation and plumbing firms will enter into a contract with the customer. The heating, ventilation and plumbing firm will buy the components for the system at prices that have been agreed between the supplier(s) and the agency. The heating, ventilation and plumbing firm then resells the complete system to the customer at a fixed price. The objective is to offer the systems at special campaign prices in order to intensify customer interest in the systems.

The heating, ventilation and plumbing firm in question shall pay a minor sales fee to the agency for each solar heating system that is sold. The fee shall cover all marketing and sales promotion costs.

3 System specifications

The following three systems will be sold during the campaign:

Type A: Domestic hot water system for a small family
Type B: Domestic hot water system for a large family
Type C: Domestic hot water system/space heating system

Below, a brief technical description of the three systems will follow:

3.1 Type A: Domestic hot water system for small families

This system is intended for a small family with a limited consumption of hot water (typical consumption 80-140 litres/day). The main components of the system are one or more solar collector components with a total area of app. 3-4 m^2 and a storage device with a total volume of 140-230 litres. Solar heating control and collector circuit components form part of the storage device.

3.2 Type B: Domestic hot water system for large families

This system is intended for a family with a considerable consumption of hot water (typical consumption 140-200 litres/day). The main components of the system are one or more solar collector components with a total area of app. 5-7 m^2 and a storage device with a total volume of 230-300 litres. Solar heating control and collector circuit components form part of the storage device.

3.3 Type C: Domestic hot water system/space heating system

This system is intended for a family that in addition to domestic water also is interested in obtaining space heating through the solar heating system. The main components of the system are a solar collector with a total area of app. 7-10 m^2 and a storage device with a total volume of 230-300 litres. Solar heating control and collector circuit components form part of the storage device.

4 Technical specifications

4.1 Solar collector

The objective is to utilise the same solar collector components for all three systems. The requirements to the solar heating component are as follows: Type approved solar collector with a collector cover of polycarbonate or glass. The absorber shall be made of metal.

4.2 Storage device – type A

The storage device shall consist of a type approved tank with a total volume of 140-230 litres. Solar heating control and collector circuit components shall form part of the storage device. Collector circuit components and solar heating control can, if necessary, be delivered separately.

Collector circuit components:
The collector circuit components shall fit the storage device in question and shall include all necessary parts for the solar collector circuit, cf. the Danish Energy Agency's outline of type approved solar heating systems (e.g. circulation pump, expansion tank, pressure gauge, non-return valve, trap strainer, scalding protection, stop valves, flow regulating device etc.). The expansion tank can, if necessary, be placed outside the storage device. Piping between the storage device and the solar collector shall not be included.

Heat exchanger in tank for solar heating tank:
The tank shall have a spiral heat exchanger or a mantle heat exchanger (low flow tank).

Heat exchanger in tank for supplementary heating:
The tank shall be designed with a heat exchanger (spiral heat exchanger) for boiler operation.

Electric backup:
The tank shall be equipped with a thermostatically controlled immersed electric heater.

Domestic hot water circulation:
The tank does not have to be "optimised" for domestic hot water circulation.

Solar heating control:
Differential control with or without temperature display. The control can, if necessary, be prepared for domestic space heating.

Temperature display:
It must be possible to read the following temperatures on the control or on the thermometers in the tank cabinet:
- Solar collector temperature
- Temp. in the upper part of the tank (above the level of the immersed electric heater)
- Temp. in the middle/lower part of the tank

4.3 Storage device – type B

The storage device shall consist of a type approved tank with a total volume of 230-300 litres. Solar heating control and collector circuit components shall form part of the storage device. Collector circuit components and solar heating control can, if necessary, be delivered separately.

Collector circuit components:
The collector circuit components shall fit the storage device in question and shall include all necessary parts for the solar collector circuit, cf. the Danish Energy Agency's outline of type approved solar heating systems (e.g. circulation pump, expansion tank, pressure gauge, non-return valve, trap strainer, scalding protection, stop valves, flow regulating device etc.). The expansion tank can, if necessary, be placed outside the storage device. Piping between the storage device and the solar collector shall not be included.

Heat exchanger in tank for solar heating:
The tank shall have a spiral heat exchanger or a mantle heat exchanger (low flow tank).

Heat exchanger in tank for supplementary heating:
The tank shall be designed with a heat exchanger (spiral heat exchanger) for boiler operation.

Electric backup:
The tank shall be equipped with a thermostatically controlled immersed electric heater.

Domestic hot water circulation:
The tank does not have to be "optimised" for domestic hot water circulation.

Solar heating control:
Differential control for domestic water with or without temperature display. The control can, if necessary, be prepared for domestic space heating.

Temperature display:
It must be possible to read the following temperatures on the control or on the thermometers in the tank cabinet:

- Solar collector temperature
- Temperature in the upper part of the tank (above the level of the immersed electric heater)
- Temperature in the middle/lower part of the tank

4.4 Storage device – type C

The storage device shall consist of a type approved tank with a total volume of 230-300 litres. Solar heating control and collector circuit components shall form part of the storage device. Collector circuit components and solar heating control can, if necessary, be delivered separately. Valves and insulated plate heat exchanger shall be included in the price of the storage device.

Collector circuit components:
The collector circuit components shall fit the storage device in question and shall include all necessary parts for the solar collector circuit, cf. the Danish Energy Agency's outline of type approved solar heating systems (e.g. circulation pump, expansion tank, pressure gauge, non-return valve, trap strainer, scalding protection, stop valves, flow regulating device etc.). The expansion tank can, if necessary, be placed outside the storage device. Piping between the storage device and the solar collector shall not be included.

Heat exchanger in solar heating tank:
The tank shall have a spiral heat exchanger or a mantle heat exchanger (low flow tank).

Heat exchanger in tank for supplementary heat:
The tank shall be designed with a heat exchanger (spiral heat exchanger) for boiler operation.

Heat exchanger in solar collector circuit for space heating:
The heat exchanger for space heating consists of an insulated plate heat exchanger. The heat exchanger can, if necessary, be included in the storage device. It has to be possible to use the heat exchanger in connection with a total solar collector area of up to app. 10 m^2.

Valves for solar collector circuit:
Valves used when changing between domestic water and domestic space heating consist of two-way or three-way valves. The valves can, if necessary, be included in the storage device.

Electric backup:
The tank shall be equipped with a thermostatically controlled immersed electric heater.

Domestic hot water circulation:
The tank does not have to be "optimised" for domestic hot water circulation.

Solar heating control:
Double differential control with or without temperature display. Controls that can operate according to a strategy called "Automatic priority" have high priority. There are several types of "Automatic priority" but the common feature is that the solar collector at adequate temperatures always deposits heat in the hot water tank or in the space heating circuit. The following is an example of "Automatic priority": a given temperature is requested at the bottom of the hot water tank before changing to space heating production. If this requested temperature is not obtained (perhaps due to lower solar radiation), then the solar heating system automatically changes to domestic heating production.

If solar radiation suddenly increases and the solar collector temperature increases to a value above the temperature at the bottom of the tank, then a change takes place to hot water production.

Temperature display:
It must be possible to read the following temperatures on the control or on the thermometers in the tank cabinet:

- Solar collector temperature
- Temperature in the upper part of the tank (above the level of the immersed electric heater)
- Temperature in the middle/lower part of the tank
- Return temperature for central heating plants

5 Prices

The informed prices shall include solar collector components and storage devices as stated in chapter 4. **The stated prices shall be net installer prices for the solar heating campaign**.

Delivery costs (freight) **shall not** be included in the stated prices for solar collector components and storage devices. Terms of delivery will be determined in connection with subsequent negotiations.

The prices shall be valid from the date of agreement and up to (and including) December 2000.

On behalf of the informed prices the agency will in co-operation with consultants determine the best storage device and solar collector component combinations.

Please use the form on the following page in connection with price information.

Solar collector components

It is possible to state prices for several sizes/types of solar collector components in the form below. Please note that the price of a solar collector component **shall not** include roof mountings, screws, air escape etc. Prices for roof mountings etc. will be determined in connection with subsequent negotiations. It is necessary to state the type number, cf. type approval scheme.

Solar collector 1: Type number	
Net installer price for campaign	
Solar collector 2: Type number	
Net installer price for campaign	
Solar collector 3: Type number	
Net installer price for campaign	

Storage devices

It is possible to state prices for several of the storage devices in question in the form below. Please note that the price of a storage device shall **include 10 litres glycol**. It is necessary to state the type number, cf. type approval scheme.

Storage device: Type A **Type number**	
Net installer price for campaign	
Storage device: Type B **Type number**	
Net installer price for campaign	
Storage device: Type C **Type number**	
Net installer price for campaign	