

WP 1 Market Analysis – Denmark

Summary

The market for solar heating systems in Denmark has until the mid 90ies been characterized by a steady increase in the market. After 1996 the market has for several reasons decreased. In the end of 2001 the subsidy has furthermore been removed and the market is at a minimum. Statistics are no more available but the estimate for 2002 is between 500 and 700 installed systems.

About 80% of the collector areas are on one family houses, 10% on middle-sized systems, and 10% on systems for district heating. The worlds largest system for district heating with 18.000 m² of solar collectors is situated in Denmark.

Approximately half of the systems for one family houses are combined systems. However most of the combined systems are based on a principle, which is not seen in other countries.

There are approx. 8 Danish producers of solar collectors. It is estimated that the two largest companies Batec and ArCon share the major part of the home market. Another third company is Velux, the large producer of roof top windows.

Most storages are produced at special lines at 3-4 major Danish producers of hot water tanks. Some (minor) producers specialised in tanks for solar heating systems exist/has existed. Most tanks are put in white cabinets with pump, expansion valves etc integrated under the tank. Typical tank sizes are 150 – 250 liters.

It has been the policy that the systems should be offered and marketed by the local installer and a quality scheme has educated approx. 50% of all installers to have a solar installation certificate.

As in other countries the installers has not been able alone to increase the market sufficiently and campaigns e.g. with utilities has been experienced. In the middle of the 90ies especially one gas utility was active while for the latest year an electricity utility has been active.

It is the opinion that the testing of components together with the certification of installers has secured a good quality of the systems in Denmark. The test certificate and the installation by a certified installer was the condition for obtaining the subsidy. Furthermore the size of the subsidy was dependent of the performance of the system, which lead to good performing systems.

1 Introduction

In Denmark the solar energy resources are fairly good - actually better than in many other locations in Northern Europe. The global insolation on horizontal is approx. 1020 kWh/m² per year.

Since the start of the 80ies a steady subsidy programme has characterised the Danish market. This has until the mid 90ies caused a steady increase in the market, without “stops and go’s” as was seen in many other countries.

However in November 2001 the new Danish government abolished the subsidy programme. This has caused a new and in some respect still inexperienced market situation. However there is no doubt that the market in Denmark in 2002 will be on a minimum.

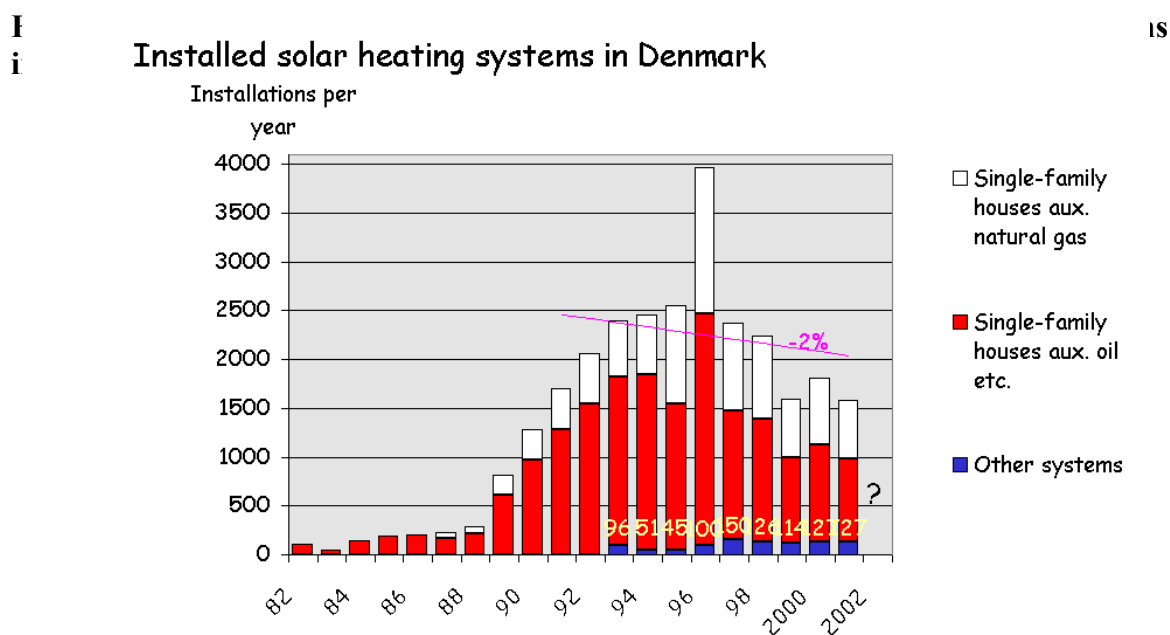
The following report is based on the experiences until November 2001. It is too early to draw conclusions on how the market will develop and how the market development can be increased in the new situation.

The Danish population is approx. 5,37 Mio.

2 Background to the solar heating market

2.1 The domestic solar heating market

The development of the Danish market is seen on Figure **Fejl! Ukendt argument for parameter.:**



Other systems (multiple houses, industries etc.) only stated from '93. Numbers for '99 are estimates.

In 1999 and 2000 the estimated figures for the total Danish collector market were [2]:

1999:	15.650 m ²
2000:	13.000 m ²

The total area of collectors in operation were in 2000 estimated to [2]:

259.000 m²

Characteristics are:

- Until November 2001 there was a steady subsidy programme, and during the 80ies there was a steady growth in the market. The subsidy for plants was given to the customer, and the programme also supported R&D and campaigns.
- The market was like the wind turbine industry initiated by grassroots, but was soon supported by governmental programmes and professionals.
- In 1995/96 the natural gas companies had success with the combined marketing of solar water heaters and natural gas boilers.
- After 1996 the market has decreased. It has not been investigated why, but the following reasons are often discussed.
 - The subsidy pr. plant was decreased with 20%
 - Subsidy within district heating areas was abolished.
 - Installers were getting busy with other more profitable installations.
 - Sales of pellet burners increased in the same period.
 - At the most enthusiastic natural gas companies within the campaigns the potential of customers for the combined natural gas /solar heating solution was saturated.
 - In the public attention the focus was put on PV instead of solar thermal.
 - General decrease in the public awareness on environment?
- In November 2001 the new Danish government abolished the subsidy programme. Until February 2002 it was unknown if the abolition was permanent or preliminary. This stopped the market in the winter. After the end of February it was clear that the stop was permanent and the market has increased, however not to the same level as before. After the abolition of the subsidy there are performed no statistics of the sales. It seems to be the policy of the new Danish government that the liberal market without subsidy should perform conversion to new energy techniques. Furthermore they seem not so concerned about CO₂ savings as earlier governments. It is estimated that the sales in year 2002 will have dropped to 500 to 700 systems.
- Because of the steady situation on the Danish market until November 2001 the accumulated number of installations is quite high compared to other European markets, although the market has stagnated.

It is estimated that the collector areas are distributed as follows:

One family plants DHW	40%
One family plants- combined DHW and space heating	40%
Middle sized plants	10%
District heating plants	10%

After November 2001 the market has decreased, but may take new directions. Before November 2001 it was a premise for the subsidy that certified installers should install the systems. After November 2001 it is not a premise and you might see more self built systems and systems marketed via other channels than the installers

Furthermore it was a premise that system components should have Danish certificates to obtain the subsidy. After November 2001 you have seen new imported components on the market without certificates.

Since no statistics have been obtained after November 2001 the information in the following paragraphs are given with respect to the situation before 2001 where the subsidy was abolished.

2.2 The demand side

The number of houses in Denmark is seen in the table

Number of houses 2001	Within district heating areas	Outside district heating areas	Total
Farm houses	1.660	120.676	122.336
Detached houses	391.368	604.788	996.156
Row houses	202.542	109.432	311.974
Multi family houses	787.566	137.043	924.609
Student hostels	24.931	4.069	29.000
Other residences	5.637	8.062	13.699
Holiday cottages	98	14.216	14.314
Total	1.413.802	998.286	2.412.088

One family houses

The main market segment is systems for one family houses (approx. 82 % of the market). They are either systems only for domestic hot water (41%) or combined systems for DHW and space heating (41%).

Especially since the subsidy was abolished in 1996 for systems in district heating areas, most systems are sold outside district heating areas. District heating covers in Denmark approx. 59% of all dwellings.

Outside district heating the dwellings are heated by oil burners (19%), natural gas (13%), electricity (6%) or biomass burners (stoves, wood or pellet boilers) (2 %) [3].

Until today it is estimated that 29.000 solar systems are installed. The dwellings with solar heating systems are 1.2% of all dwellings. For dwellings outside the district heating areas the percentage is 2.9 %. The potential for solar heating installation outside district heating areas is therefore still very high.

In Denmark new building is only 15.000 residences per year, of which app. 10.000 are one family houses.

The solar heating market for new building is very little. Much of the new building is within district heating areas. Attempts have been done without much success to make housing companies interested in offering solar heating systems in new building. The very majority of systems are therefore installed in existing buildings.

The incentives for the buyer to purchase a solar have not been studied recently. Old studies indicate independence and environmental concern as important factors. Especially in connection with the natural gas campaigns it is expected that independence played a role.

Especially for houses in the countryside there has been an increasing interest of combined systems with a larger collector area that allows the burner to be stopped for a long summer period. The systems are often installed in combination with a wood fired or pellet fired boiler.

The economy of the systems is not well enough to sell the systems by itself, however in 2001 the least expensive systems (with subsidy) had an economy that made the investment sound for a private consumer.

It is seen that with the “right” marketing it is not so much facts as “sound economy” etc. that sells the systems. Some installers have with intensive marketing been able to sell much more systems than others have.

Certified solar installers install nearly all systems

(Statistic figures from: [3])

Middle sized systems.

The middle-sized systems are systems between 10 and 300 m². The segment covers 10% of the systems

The systems are installed in the following categories:

Administration	7,1%
Multifamily houses	18,6%
Kinder gardens	2,0%
Camping sites	35,9%
Residential homes	1,4%
Harbour facilities	1,1%
Hotels	3,4%
Youth hostels etc	4,1%

Exhibitions	1,3%
Nursing homes	4,4%
Restaurants	0,6%
Schools	2,4%
Sport facilities	7,8%
Hospitals	2,5%
Industry, workshops etc.	7,4%
	100,0%

The percentage is the percentage of collector area [6]

Especially the marketing for camping sites has been successful. The manufacturers performed this marketing. It is the impression that the market for the camping sites is driven by economic and public relation reasons.

A programme, where interested organisations could order a free pre-design and pre-evaluation by a solar specialist has existed for several years. It has been estimated that this programme has resulted in a number of installed middle-sized systems, and has been a help for decision-makers. Experiences from the programme have shown that economics are very dependent on the individual circumstances.

It is the impression that it is enthusiasts in the organisations and/or political interest (for systems influenced by public decisions), who are the driving forces in the market for middle sized systems. In some cases they address the manufacturer, who does the design, in other cases they involve a consultant company who performs a tendering procedure.

Certified solar installers install all systems

Systems for district heating plants.

In Denmark some of the worlds largest solar heating systems has been installed in connection with district heating plants.

The largest system is situated at Marstal on the island Ærø and has a collector area of 9043 m². The system is currently being expanded to 18.000m².

There are approx. 8-10 systems in Denmark with areas between 9.043 and 500 m². [4]

It has been the governmental policy that district heating plants (if not already) should be converted to co-generation plants for both heat and electricity. Since the technique of co-generation is difficult for biomass fired heating plants the interest of solar systems has been highest in combination with biomass-fired plants where exemption for the co-generation conversion has been obtainable.



Figure Fejl! Ukendt argument for parameter. Solar collector field in Marstal.

Other systems

Besides the systems registered in connection with the subsidy programme, there has been a market for collectors for heating of private outdoor swimming pools. There are no reliable statistics of this market but it is estimated to be less than 10% of the systems.

Public information sources.

The Danish Energy Agency financed a central information office with the aim to inform individuals about energy and renewable energy. People could call the office and could order different information material.

Furthermore the Energy Agency partly financed about 20 Environmental and Energy information offices located all over the country. The offices have the same information material as the central office, but it is possible for the customer to visit the office, which also is involved in local arrangements and campaigns.

The Danish Energy Agency has an informative web site about solar energy [7].

2.3 The national solar heating industry and products

Solar collectors

There are approx. 8 Danish producers of solar collectors. It is estimated that the two largest companies Batec and ArCon share the major part of the home market. ArCon has had an annual turnover on about 4 Mio Euro with 25 employees [10]. Another third company is Velux, the large producer of roof top windows, who however not has a big part of the home market.

Furthermore collectors are imported from Viessmann (Germany), Solarhart (Australia), AE (American Energy Technologies) and Thermomax (US).

All collectors produced in Denmark are flat plate collectors, most with metallic selective absorber, (Aluminium with copper tubes, Copper or stainless steel) and with glass or polycarbonate covering.

For district heating plants special collectors on app. 12 m² with glass cover and Teflon film under the cover are produced.

Some of the imported collectors are vacuum tube collectors, but they do not have a large market share.

It is mainly the two biggest Danish manufacturers ArCon and Batec who export products.

Batec produces a copper absorber (CuStrip), which is exported as finished article or semi-manufactured. With respect to areas it is estimated that the exported absorbers are up to 50% of the production.

ArCon mainly export their solar collector panel for district heating plants. It is used for large systems especially in Sweden and in Germany. It is estimated that up to 50% of the production of ArCon goes to export.



Figure Fejl! Ukendt argument for parameter. Flat plate single glazed solar collector panel from Batec

Storages

Most storages are produced at special lines at 3-4 major Danish producers of hot water tanks. Some (minor) producers specialised in tanks for solar heating systems exist/has existed.

A production of stainless steel tanks has stopped. The remaining tanks are steel tank protected with enamel (earlier also protected with Rilsan). Most tanks are put in white

cabinets with pump, expansion valves etc integrated under the tank (Figure **Fejl! Ukendt argument for parameter.**). Typical tank sizes are 150 – 250 liters.



Figure Fejl! Ukendt argument for parameter. Solar storage (202 litres) from Batec together with gas boiler

Most common tank design are with a solar spiral heat exchanger in the bottom and auxiliary spiral heat exchanger in the upper 60-100 litres (Figure **Fejl! Ukendt argument for parameter.** Number of installed solar heating systems in Denmark [1]). Most tanks are furthermore delivered with and electric immersion heater also placed in the upper volume to perform the additional heating in summer where the oil or biomass burner is turned off. In Denmark much effort has been put on developing very efficient storages for low flow systems. These are with a mantle as the solar heat exchanger (Figure **Fejl! Ukendt argument for parameter.** Number of installed solar heating systems in Denmark [1]).

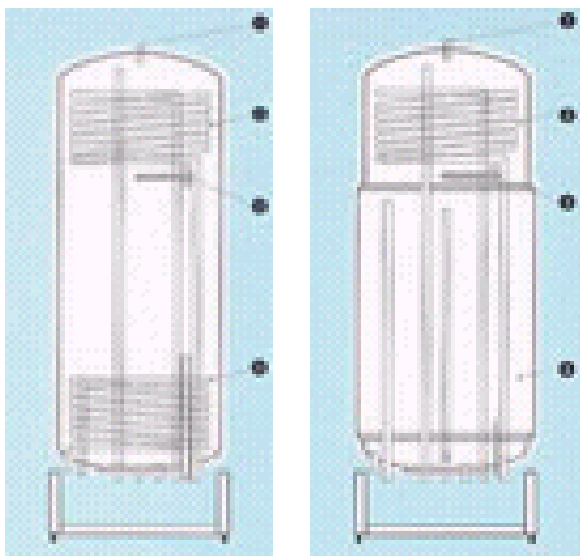


Figure Fejl! Ukendt argument for parameter. Storage with spiral heat exchanger and storage with mantle heat exchanger (Nilan)

Tank in tank storages for combisystems are imported or in one case produced in Denmark. They do not have a large market share.

Units.

Companies offer units with the combination of an oil or gas fired boiler and a solar storage. The 2 devices are put in the same cabinet, but boiler and storage are not integrated with the same water volume.



Figure Fejl! Ukendt argument for parameter. Unit with oil boiler in the same cabinet as the solar storage (Thermosol)

Systems.

It is estimated that around half of the one family systems are systems only for DHW while the other half are combined systems for DHW and space heating. The combined systems are nearly all with the same design where you, compared to the DHW system have an extra heat exchanger between the collector loop and the central heating loop. In this way heat is delivered from the solar collector, when the sun is shining and there is a heat demand.

The combisystems are popular because they can supply solar heat in the summer for example to the floor heating in a bathroom, while the burner is turned off in summer.

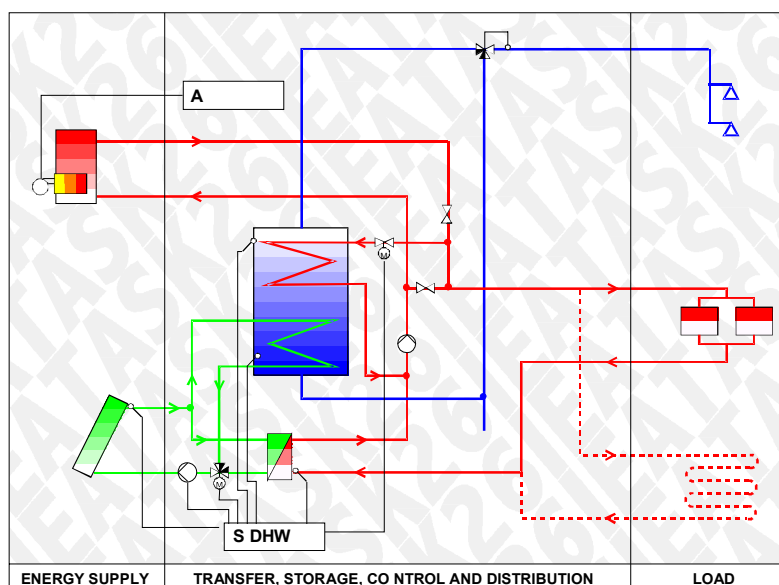


Figure Fejl! Ukendt argument for parameter. System layout for a typical Danish combisystem with heat exchanger in the collector loop [6]

Larger systems.

The middle-sized systems are designed for the site either by the manufacturer, consultants or in some cases the installer. They follow often the same layout as the smaller systems.

Systems for district heating.

Especially the company ArCon has specialised in systems for district heating and has for several years been the only one to produce the appropriate solar collector of 12.5 m². Recently the other major company Batec has started to produce a similar collector.

Most district heating systems are without or with only a short-term storage and covering around 5-10 % of the total heat demand. However experiments with long time storage is carried out.

Branch organisations

The manufacturers have their own association as part of the “The Danish Federation of Small and Medium-Sized Enterprises”. The organisation has performed a few marketing and information projects but is not very active.

The installers are organised in two organisations which each has its own solar energy section. The sections are active in campaigns etc.

Guarantee

The main producers offer 5 years guarantee on collectors, 5 years guarantee on corrosion of storages and 1 year guarantee on other components.

2.4 The solar heating distribution and installation chain

Because it is the local installers who are present, when the domestic hot water tank has to be changed, it has been the Danish policy to stimulate all the installers to be the ones to market the solar systems.

There has been a special programme to stimulate that solar prepared tanks were set up in the renovation situation, although the customer in this often hurrying situation could not decide on solar. The programme did not have a large success.

The installers often sell one or two brands that they are familiar with.

It is often claimed that the margin on solar components are typical around 15% and less than the margins on other devices not for solar. It is therefore maybe seen that the installers are not enthusiastic about solar in periods were they have enough to do with other things, while the sales increase in periods where they are not busy.

The sales in one year by the certified installers are shown on Figure **Fejl! Ukendt argument for parameter.** It is seen that most installers only sell few systems while enthusiastic installers are able to sell many systems (and to make a business of it).

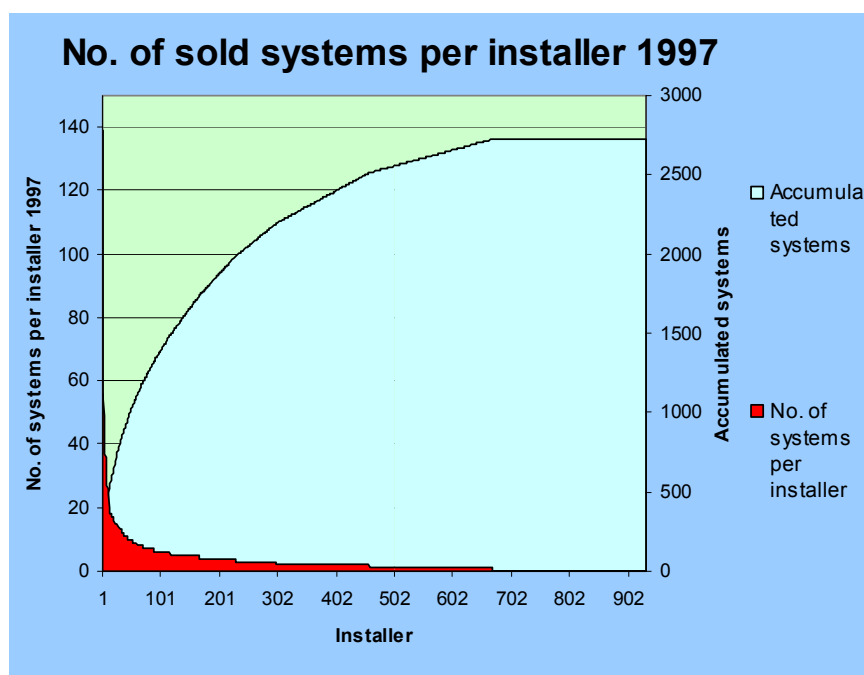


Figure Fejl! Ukendt argument for parameter. Number of sold systems per installer 1999

It is sometimes claimed that the paperwork that was associated with having the subsidy (and which was performed by the installers) also reduced the installers interest in solar.

Furthermore it is claimed that installers without certificate, sometimes would advise against solar.

There are approx. 2000 installers in Denmark. Approximately 800 of these are certified solar installers. To be certified you take a course of 2-3 days on a technical school. The Solar Energy Centre at the Technological Institute designed the course.

The course is on technical and environmental aspects and not on marketing. The course is finished with an examination.

Some manufacturers have or have had their own installation department, but most manufacturers operate via the local installer.

Wholesales dealers are only little involved in solar, which they consider too small a market to be interesting.

2.5 Sales and marketing

Manufactures and installers perform advertising. It is in most cases the installer, who has the contract with the customer.

In the middle of the 90ies especially one or two natural gas companies were successful in selling the combination of a gas burner and a solar heating systems.

On the installation they had an agreement with installers on fixed prices, and they had special offers on components from the producers. This in combination with the combined installation of the gas burner and the solar heating systems decreased the additional price for the solar heating system.

It is estimated that the motivation of the customers was:

- Little additional price for solar
- Not so dependent of gas prices, as without solar.
- Confidence in knowledge and support from the Gas Company.

After the liberalisation of the market and after the number of potential customers not having converted to gas was reduced, the gas companies have lost their enthusiasm.

It has been tried to involve oil companies and electricity companies. One large electricity company has had some success mainly because of the same reasons as the gas companies.

2.6 Independent testing / publication of product information

The Solar Thermal Testing Laboratory is situated at the SolarEnergyCentre at the Danish Technological Institute.

Collectors have been tested for efficiency and durability. Storages have been tested for heat loss, stratification and capacity of heat exchangers. Controllers have been tested for functionality

Test procedures have been developed together with the Danish Technical University. The procedures were going to, and could easily be adapted to the European standard.

Test reports were public and for the use of calculation of the subsidy a publication called “the solar heating overview” was published every ½ year.

The publication gave calculated “standard” performances of the collectors and storages used for the calculation of the subsidy. It also gave recommended prices of the products.

Testing was free of charge because of a subsidy programme for smaller industries, and therefore nearly all components on the Danish market had certificates.

With a test certificate subsidy could be obtained as a standard procedure at the Danish Energy Agency.

Systems with components without a certificate had in every case to be approved at the Solar Thermal Testing Laboratory, where the performance was calculated in order to get the subsidy.

2.7 Costs for solar heating products

Typical prices of installed systems are:

Small one family system for DHW with 3.5 m² solar collector and 165 litre storage:

3.235 Euro (25% VAT and subsidy not included)

Large one family system for DHW with 5.7 m² solar collector and 258 litre storage.

3.970 Euro (25% VAT and subsidy not included)

Large one family system for combined DHW and space heating with 7.7 m² solar collector and 258-litre storage:

4.865 Euro (25% VAT and subsidy not included)

The prices are taken from the Danish “price list” and are guaranteed end prices for completely installed systems in 2001, at existing buildings, however excluded removal of old hot water tanks [9].

However in 2001 a competition with internet sales introduced prices, which for the winning systems were approx. 10-15 % less expensive

Cost of a combisystem especially popular in the countryside is:

Large one family system for combined space and DHW heating with 10 m² solar collector and 500 litre storage:

5.660 Euro (25% VAT and subsidy not included)

The subsidy was until November 2001 approx. 25% of the above prices or more or less the same as the VAT.

Typical pay back times at installations with oil burners as back up and including subsidy were 15 years for installations with little hot water demand (100 litres per day, which is the most common) or installations with combined systems, and 12 years for installations with large hot water consumption (200 litres per day – not so common).

2.8 Policy environment for solar heating industry

The solar heating has only a minor place in The Danish plan for energy development from 1996 (Energi 21),

It is the plan that that the share of the renewables within the energy production shall raise from 9% to 12-14% in 2005 and to approx. 35% in year 2030.

However the priority is on

- Wind turbines
- Waste, biomass and biogas
- Energy crops
- Geotermi
- Heat pumps

The share of solar heating in 2030 was expected to be 3.4 PJ/year or app. 1.4 % of the total production. The 3.4 PJ/year corresponds to 3.000.000 m² of solar collectors or 300.000 systems with an installation rate of 10.000 systems pr. year.

It has been the aim of the government to support the industry to have annual sales of around 5000 systems, since it was expected that if this number was obtained the prices could be decreased and the industry could develop further without support.

The support has for approved systems been given as 4 DKK (0,54 Euro) per kWh that the systems saves per year (approx. 20-30% of the total cost of the system).

There has furthermore been a programme were you could apply for support to R&D projects, campaign activities etc., and with support to the Testing Laboratory. This programme has for some years typical been on 1,8 to 2,7 Mio Euro per year.

2.9 Regulatory framework

In the building regulation it is stated that either the house should be insulated after certain standards and with certain max. window areas or the annual heat consumption to space heat and ventilation should not exceed 75 kWh/m² for one store single-family houses.

In the above it is possible to include heat gains from solar heating systems but only delivered for the space heating. There have been seen no effect of this on the sales of solar heating systems.

Furthermore solar heating systems have to fulfil the regulations concerning domestic hot water systems and electricity. This means that connections to the DHW systems and to the electric grid have to be performed by authorised installers. However it is possible for self-builders to do the rest of the installation themselves.

Because the subsidy was only given to systems installed by certified solar installers there is not many self-builders in Denmark.

The natural gas companies have an obligation to inform customers about solar energy.

2.10 Education and dissemination activities

Installers were educated in connection with the certification scheme.

Education of consultant engineers and architects were earlier occasionally offered with the purpose to make the involved partners in building more familiar with solar heating.

Furthermore PC-tools have been elaborated and offered to facilitate the design and decision phase of a solar heating project.

2.11 Information, marketing and sales campaigns / actions

A number of campaigns and actions have taken place.

Campaigns at energy and environmental offices in collaboration with The Danish Energy Agency and installers.

The Danish Energy and Environmental Offices performed the first campaigns in DK in collaboration with The Danish Energy Agency and local installers. The Energy and Environmental Offices are local offices driven partly by volunteers and partly by support from the Energy Agencies.

Local campaigns were initiated by the offices and supported by general information activities by the Danish Energy Agency (poster, TV spots etc.). The offices participated in exhibitions and arranged open houses arrangements etc. in collaboration with local installers.

The campaigns had success in late 80ies and early 90ies by increasing the knowledge of solar heating and in initiating the market.

However to accelerate the market in the start of the 90ies it was concluded that a collaboration with the energy utilities should be tried.

Campaigns at natural gas utilities.

The campaigns at the natural gas companies used direct mail and sales visits by the companies' sales men.

The campaigns were successful in the start but also quite expensive.

They addressed only potential customers who had not yet converted to natural gas, and the natural gas companies lost interest when the potential for new gas customers were decreased.

Campaigns at electricity utilities

Minor campaigns have taken place at different electricity companies. The aim for the companies has been to introduce a “green “ image.

One major electricity utility has had a successful campaign introducing solar heating systems at electricity-heated customers. Direct mail was used.

It is estimated that the success had the following reasons:

- Electrical heated customers in general are requested to save electricity and to convert to central heating. However customers fond of their electrical heating panels feel that they do something when they install solar heating systems.
- The private economy is good when solar heat substitute electricity.
- The systems sold were claimed to be especially non-expensive.

Campaigns in local areas.

Different kinds of campaigns have been tested.

Campaigns introducing both solar and biomass was performed in some local areas in Jutland and on the Danish “renewable energy island” Samsø. Some of the campaigns had a very high rate of consultant visits at customers.

Association of installers.

An association of approx. 35 installers and 5-6 manufacturers has performed advertising and has a common website.

The installers had a 2-3 days course on sales techniques in connection with solar heating.

The installers were also active in solar before the common campaign, which did not increase the sales very much [8].

Internet sales

As part of the Danish IEA task 24 participation a competition and a price list on the internet was elaborated.

Customers could order systems from the internet. The competition together with the internet sales introduced new reduced prices on the Danish market, because it reduced the marketing costs for the manufacturers and installers

However only very few systems were ordered via the internet.

Local individual campaigns at installers:

Especially one installer sells 80-100 systems per year because he “works on” the customers.

Procurement.

As part of the IEA task 24 Solar Procurement attempts have been made to organise buyer groups for solar.

Attempts were made at companies and housing companies and at utilities. However not very many systems were sold.

Conclusion on lessons learned from the campaigns?

2.12 Success and failure factors

It has been difficult to detect the decrease in sales during the second half of the 90ies.

Main conclusions are however:

- Experiences have shown that increased sales have needed intensive market activities.
- Increasing the sales need a substantial marketing effort and maybe general attention on solar heating systems. Most actors on the solar market are too small or do not have incentives to finance the market efforts needed
- In the Danish Energy plan solar heating does not play an important role. The role of the subsidy programme has been (with few means) to subsidise the branch to the level, where it can function on normal market conditions. However there has not been an official demand or decision to develop solar contribution to a certain level.
- In some campaigns price compared to savings has played a role, in others it seems not so important
- The installers play an important role. The policy of the Energy Agency and of most manufacturers has been to convince the local installer to sell and install solar heating systems. Some few installers sell many systems and have a business of it. However most installers see it only as one component together with other things they can sell and install. Furthermore selling solar systems were connected to the following disadvantages:
 - You had to be a certified installer (had to take a course)
 - Paperwork in connection with getting the subsidy.
 - Margin on solar heating components not as big as on other components (they claim)Because of the disadvantages there is a tendency that installers focus on solar energy only in periods when they have not so much to do with other things.

2.13 Lessons learned

Main lessons are:

- You can sell solar heating systems if you can afford the necessary quite high marketing costs.
- However actors with the primarily interest in solar are small and without large means.
- Especially one installer is successful in selling solar. It is not easily explained and has not been studied in details what distinguishes his methods from others.
- An investigation was performed by e-mails in 2001 to manufacturers, researchers, consultants and persons involved in information about solar. The addressed persons were asked to give their personal opinion of the main reasons to the decrease in sales in Denmark.

The results showed no focus on one particular reason. Main reasons were the lack of interest by installers (which however were not addressed in the investigation) Furthermore there was a tendency that researchers explain the decrease by reduced cost/efficiency (since the subsidy was reduced), while manufacturers explain the decrease by less supported activities on campaign and information.

There was in 2001 granted money for a barrier investigation that has not been performed yet.

2.14 Opportunities for new market development initiatives

With the abolishment of the subsidy programme a further decrease of the sales have been seen.

However some possibilities might be seen:

- A new market segment can be customers that themselves want to support environment, since this is not high priority by the government.
- The resistance to solar at installers can be decreased since it is not associated with having courses and paperwork for the subsidy.
- Self-built systems are becoming more favourable since the subsidy earlier needed installation (or surveillance) by a certified installer.
- Many customers have maybe invested in pellet burners because of favourable economy. In the last year the price of pellets have increased substantial there might be a market segment in customers with pellet burners who want to turn it off in summer and are worried about increasing pellet prices.

2.15 Opportunities for governmental support

At the moment there are no signs of governmental interest in supporting solar energy.

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