

III. SUPPORT MEASURES FOR DHC

| Country | | Denmark | | |
|---------|-------------------------------|--------------------|-------------------|----------------------|
| # | Name and reference of measure | Type of measure | Responsible organ | Existing or planned? |
| 1 | Heat planning | General regulation | Municipalities | Existing |

Quotations from the measure

The heat market in Denmark is regulated according to the heat supply act in order to avoid competition between collective systems for the supply of heat (natural gas and district heating) and in order to ensure efficient use of surplus heat and fuels.

After introduction in 1979 the planning was conducted in two phases. Local authorities first prepared reports on local heat requirements, supply options and the amounts of energy consumed. Secondly they assessed future heat needs and heat sourcing possibilities. Regional councils then used the obtained data to prepare regional "heat supply summaries" which were again used in the final heat planning carried out by municipalities. The plans were required to show in which areas the various forms of heat supply should be implemented. District heating or natural gas should be allocated areas for development in urban or suburban areas, whereas the choice of heat supply for buildings in the countryside remained free.

Municipalities were given authority to decide if compulsory connection should apply in areas designated for collective heat supply, in order to achieve the benefit of scale necessary to justify the investments in infrastructure.

It is clearly stated in article 3, that it is "(..) *the duty of each district council, in cooperation with the supply companies and other involved parties, to prepare a plan for the supply of heat in the municipality*". And the relevant government minister "(..) *may direct that specific preconditions shall form the basis of the planning for the municipal heat supply (..)*"

This is now a simpler and more decentralised system than what existed before the overhaul of the law in 1990. Back then much of the heat planning had been carried out and also implemented in reality. But the minister responsible for energy can still specify preconditions for the planning. The minister did this in 1990, specifying that areas close to gas infrastructure were to be allocated to supply with natural gas and areas close to existing CHP plants were allocated to district heating. Areas apart from these, but suitable for collective heat supply, were allocated to district heating based on renewable fuels.

Article 4 states that "*Each district council shall approve projects for establishing new collective heat supply plants or for major alterations of existing plants.*"

In the original law general municipal heat plans were binding for everybody. Municipalities can still make general heat plans, but they are indicative. Heat planning now takes place as 3 step process: 1: defining an area and its form of heat supply (district heating, natural gas or individual), 2: establishing infrastructure and 3: establishing obligation to connect. There is no requirement for the municipality to conduct steps 2 and/or 3 if someone else is willing to establish the infrastructure and/or obligation to connect is unnecessary or unwanted.

Municipalities have the responsibility for heat planning and their powers in the field are quite strong. They must ensure "(..) *the most economical utilization of energy*", but they may also for instance "(..) *order an existing heat-supply plant to implement an authorised project(..)*."

If a private collective heat-supply plant estimates that it will be unable to implement an order, it may require that the municipality take over the plant. If a plant owner is ordered to switch to production of combined heat and power, and finds this unrealistic, it is obliged to invite another party to assume responsibility for establishing and operating CHP. The municipality can require a district heating operator "(..) to organize its production facilities in such a way that specified types of energy (..) [are used] to a specified extent." Municipalities can also order collective heat supplier to prepare the heat supply projects mentioned above.

Article 11 gives municipalities the power to direct that when new buildings are taken into use, they shall be connected to collective heat supply or that existing buildings shall be connected to the system, within a certain time limit. Municipalities may freely choose to use the power to make connection compulsory and also have – within limitations – the powers to award dispensations.

Article 15 gives municipalities the power to in a specified area to ban heating systems not compatible with a collective heat supply and the minister power to force them to do it. The latter authority has been used to implement a general ban on electrical heating in both new and existing buildings.

The Purpose of the measure

The purpose of the heat planning is to ensure the most socio-economic and environmentally friendly utilization of energy for heating buildings, by ensuring a market for collective heat supply.

Areas suitable for collective heat supply consist of urban, residential and service areas, with a sufficient heat density. These areas were allocated as supply areas for district heating and natural gas respectively, depending on systematic planning taking into account heat density, availability of local surplus heat sources and/or fuels. Direct competition between gas and district heating was avoided, but attention to the need to establish a market for the natural gas, which at the time was being introduced as a new source of heat, was given in the overall allocation of supply areas.

Building owners in areas outside those suitable for collective supply were left freely to choose their heat supply. Industrial areas were mainly left as supply areas for natural gas, since some demand for high temperature heat was expected. A demand that to a great extent did not materialise.

Eligibility Criteria

Not relevant.

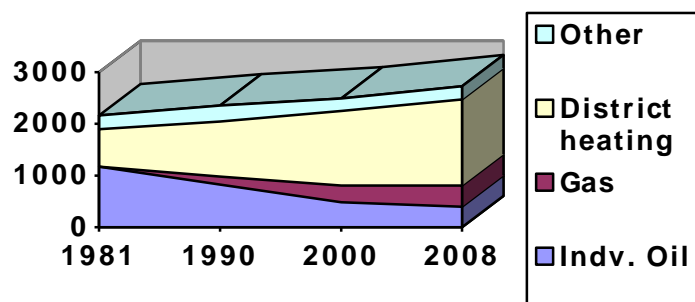
Impact of Measure

| | Planning | Generation | Distribution | Demand | Organization |
|----------|----------|------------|--------------|--------|--------------|
| Positive | X | X | X | X | X |
| Negative | | | | | |

Effectiveness of the measure

The effect on the heating supply in Denmark has been quite considerable. Natural gas has been introduced and district heating has expanded as intended.

**Heat installations in Denmark
(1.000)**



| III. SUPPORT MEASURES FOR DHC | | | | |
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| Country | | Denmark | | |
| # | Name and reference of measure | Type of measure | Responsible organ | Existing or planned? |
| 2 | Taxation | General measure | Government | Existing |

Quotations from the measure

Denmark has also used economic instruments to influence the developments of the energy sector. Taxation on energy was first introduced in 1977, as an energy tax on oil product and electricity, and was intended to give incentives to energy conservation and a shift away from oil and towards other fuels. In order to maintain the competitiveness of industries and enterprises, these were generally exempted from taxation. Only in the mid 1990'ties was energy consumption for space heating and hot tab water (for non-process use) in commercial buildings subjected to energy taxation.

Energy taxes were increased considerably in 1986, when oil prices fell to half the previous level. This was done to maintain energy prices for households at a stabile, high level, which would ensure continued focus on reductions in energy demand and the continued development of the investment heavy district heating and natural gas networks. Construction of these networks was based on an expectation of continued high prices on oil. A secondary aim was to increase tax revenue for government.

1982 saw the introduction of energy tax on coal. Initially this was lower than on oil, in order not to give incentive to revert to the use of oil. Only in early 1990'ties, when CO₂-reductions climbed the political agenda, did the energy tax on coal climb to the level of energy tax on oil.

Natural gas

Natural gas was introduced in 1984 and was not subject to taxation until 1996. As competing fuels were taxed, and gas was sold to prices equal to the price of competing fuels including tax, the absent tax on gas constituted a subsidy (called the "shadow tax") to gas distributors. This subsidy greatly contributed to financing the huge investments made in the completely new gas transmission and distribution system. In 1997 an energy tax equal to 75 % of the tax on competing fuels were introduced, and today there is full energy tax on gas.

CO₂-tax

The CO₂ tax was the first tax on energy consumption levied on commercial enterprises, when it was introduced in this sector in 1993. To reduce the impact on the competitiveness of Danish industry, a system of reimbursement was introduced for particularly heavy energy users.

The CO₂ tax was introduced for households and non-commercial energy consumption already a year earlier (1992), but was compensated with a reduction in energy taxation of the same magnitude, so energy costs did not rise. But since the CO₂ tax is based on the carbon content of the fuel, it did give incentive to fuel shifts. Further changes and increases in the CO₂ tax were parts of a general trend to reduce taxation on income and increase it on resource consumption.

SO₂-tax

The tax on SO₂ is based on the amount of sulphur in the fuel, and is paid by all energy users.

The Purpose of the measure

The purpose of the energy taxation system has not primarily been to support the development of district heating. It has been to ensure energy efficiency, divert energy demand away from oil and coal towards the more environmentally friendly surplus heat, natural gas and renewable fuels. It has thereby had great impact on the competitiveness and development of district heating.

Increasing the price of energy increases the incentive to make consumption of energy more efficient, and thus emphasises the ability of district heating to increase efficiency. By keeping the price of the fossil, individual alternatives high, the benefit, of using the un-taxed/low-taxed surplus heat and renewable energy only available in district heating, is greater. This has contributed to making the heavy investments in district heating economically feasible.

Eligibility Criteria

One main feature of the energy taxation system in Denmark is, and has been, the exemption of industrial processes and (initially) commercial space heating and hot tap water production. The effect on fuel choice and energy efficiency of taxation therefore has been less in that sector. It is, however, doubtful that inclusion of that type of consumption in the taxation scheme would have increased the use of district heating for low temperature, industrial heat demand. Almost all Danish district heating systems are low temperature systems, with supply temperatures normally around 60-90 in winter. A temperature level normally not suitable for very many industrial uses. Furthermore, the industrial base in Denmark is such, that there are very few, very energy intensive industries anyway.

Impact of Measure

| | Planning | Generation | Distribution | Demand | Organization | Taxation has influences heat |
|----------|----------|------------|--------------|--------|--------------|------------------------------|
| Positive | X | X | X | X | | |
| Negative | | | | | | |

planning by making collective solutions more competitive, which has benefited the development of district heating. It has influenced the choice of fuels, and made investment in efficient district heating networks economically feasible, due to the fact that network losses are not exempted from the taxation. It has also helped to reduce overall demand for energy. It has not had any impact on the organisation of the district heating sector.

Effectiveness of the measure

In general taxation has to a great extent had the intended effects, also when it comes to securing investments made in energy efficiency and infrastructures. However, due to the general exemption of industrial use, the impact (and burden) has been unevenly distributed over sectors.

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|---------|-------------------------------|-----------------|-------------------|----------------------|
| # | Name and reference of measure | Type of measure | Responsible organ | Existing or planned? |
| 3 | Subsidies | Specific | Government | |

Quotations from the measure

Subsidies have been an important element in the regulation and development of the Danish energy sector, and many different support schemes have been employed.

Direct subsidies for the development of the district sector networks have been given earlier to development of networks, and to increase the number of connected buildings in district heating areas.

Further subsidies have been given to facilitate the introduction of new heat production technologies or fuels in district heating and to production of electricity in CHP.

Indirectly district heating has benefited from subsidies with other aims. The first subsidy in relation to energy was introduced in 1977, and was a subsidy for energy saving measures. But it was a part of a general stimulus package aimed at countering the increasing unemployment in the construction sector, brought on by the economic crisis following the energy crisis.

Today there are no subsidies to district heating networks, expansion of them or their operation. Subsidies of that nature were used in the 1990'ties but generally disappeared around year 2000.

Subsidies with indirect effect on district heating prices are only given in relation to production of electricity or, to a lesser extent, to investments in new untried or experimental electricity production capacity.

The present system of subsidies for various forms of electricity production are very complicated, and are not generally intended as support for district heating. But insofar as electricity production in CHP receives support, and that the support has influence on the heat price (which it often has in Denmark, see chapter on heat price regulation), then that subsidy indirectly supports district heating through lowering of heating prices. On the other hand, some subsidies are compensation for the fact, that district heating utilities have had to accept fuels and production technologies, specified in the heat planning, that may have lead to heat prices being higher than would have been the case with a more free choice. And then again: Would the district heating systems be so extensive, without the heat planning and its limitations on free choice?

Some examples of support schemes:

Older houses converting to district heating on CHP (Law no. 5, 3. Jan. 1992)

From January 1993 and for a number of years, a subsidy was given to installation of central heating in residential buildings and villas from before 1950, and situated in areas covered by CHP based district heating. A large share of the funds for the subsidy was, with intent, used in Copenhagen, which possessed a large number of such buildings. It was ended in 2001.

Connection to coal-CHP district heating (Law no. 420, 1. June 1994)

The subsidy was given in order to promote connection of buildings to district heating receiving heat from coal based CHP. The subsidy was intended as a way to compensate for an increase in energy tax on coal, by supporting a conversion from individual heat supply to district heating. The subsidy was available from year 1995 to year 2001.

Completion of district heating networks (Law no. 4, 3. Jan. 1992)

The subsidy was intended to ensure faster implementation of the planned expansion and

renewal of district heating networks in the large CHP based district heating systems. Huge investments had been made in heat transmissions systems, and those systems would benefit economically from faster connection of heat consumers. The subsidy was available for 6 years, and around half of allocated funds were to be used in the Copenhagen area. A target, which was achieved. Full expansion of the Copenhagen municipal district heating systems was thus advanced from (planned) year 2000 to year 1997.

Conversion from coal to gas (Law no. 3, 3. Jan 1992)

Some subsidies have been given to conversion of production technologies to a certain fuel or technology or to production of electricity in CHP on certain fuels. One such subsidy was a law from 1992 that subsidized conversion of heat production facilities from heat-only coal boilers to natural gas based CHP.

The Purpose of the measure

The purpose of the above mentioned measures was to support policies that were already in place, by changing the economic parameters that applied to decisions made by consumers and/or district heating utilities. The drive towards expanding the use of district heating was to a great extent implemented in the heat planning system, but economic support from the government improved finances for some of the major investments made. Having the district heating system in Copenhagen completed 4 years early also shortened the pay-back time of the huge investments, which were loan financed. (Interest were considerably higher in the 1990'ties.)

Financial support has also been used ensure attractive district heating prices in order to make certain, that district heating in general was an attractive source of heating, despite the fact that the heat planning to a great extent prescribed the use of that supply. Financial support from government was used to fine-tune the system and to compensate for minor errors. Little support (as far as it had even remote connection with district heating) was aimed at influencing purely commercial decisions made by companies operating in a liberalised market.

Eligibility Criteria

The support schemes directly aimed at district heating were phased out around 10 years ago. The broad principles have been described above.

Impact of Measure

| | Planning | Generation | Distribution | Demand | Organization | Support in relation to |
|----------|----------|------------|--------------|--------|--------------|------------------------|
| Positive | X | X | X | X | | |
| Negative | | | | | | |

district heating mainly aimed to support the implementation of the heat planning system. It has had a positive impact on the execution and the result of the heat planning system. The impact on organisation is difficult to assess.

Effectiveness of the measure

The support schemes are generally believed to have had the intended effect. But again, note must be taken of the fact, that they were just elements in a very comprehensive policy

regarding the supply of heat for space heating and hot tap water.

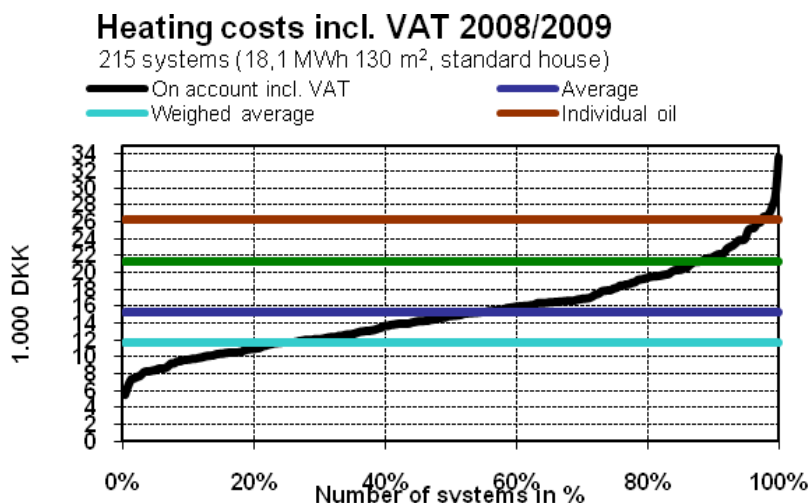
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|---------|-------------------------------|-----------------|-------------------|----------------------|
| # | Name and reference of measure | Type of measure | Responsible organ | Existing or planned? |
| 4 | Heat price regulation | Specific | Government | Existing |

Quotations from the measure

In Denmark the price of district heating is ruled by the principle that a district heating operation shall pay for itself. This in practice means, that the price can include "necessary expenses for fuel, wages, and other operational costs, prospecting, administrative and energy delivery costs as well as costs related to public service obligations, external financing and costs of the previous period, which accrued in connection with establishment and expansion of the networks". (Heat supply act, §20.) Profit is not included in this exhaustive list of permitted cost elements, and is thus not allowed in sales to final customer.

In Denmark the costs of producing, transmitting and distributing district heating, and the associated other approved costs mentioned above, are much lower than the possible alternative heat supply choices such as oil or gas. This leads to average district heating prices much lower than the alternatives: This gives a huge incentive to connect – or remain connected – to district heating. Allocating the benefit to the customers thus supports district heating in Denmark.



Source: Danish District Heating Association, Heat Price statistic 2009.

The non-profit regulation also in general applies to the sale of heat from production plants to a district heating network (wholesale). However, to give better incentives for private operators to invest in renewable heat production or cogeneration capacity, heat prices from installations using renewable fuels or sources, and privately owned, can

include profit in the wholesale price.

The Purpose of the measure

The background for this non-profit regulation is that district heating networks in Denmark are considered natural monopolies. This is not only due to the inherent characteristics of the

network, but also the facts that:

- Heat planning prescribe source of heat for district heating and sometimes also customer connection
- There is no direct competition with natural gas
- Considerable taxation on fossil fuels could lead to windfall profits
- Market share in established district heating areas is often close to 100 %
- District heating networks are normally isolated and not joined into larger, regional or national networks.

The principle, which was introduced in the operation of municipal utilities in the 1950'ties, governs the relation between a municipally owned and run utility and other municipal activities such as schools etc. It prevents municipalities from transferring funds from utilities to other activities and/or to use tax revenue to support utilities. This is contrary to the "stadtwerke" model seen elsewhere, where profit from utilities can play an important role in financing the general activities of municipalities.

The price regulation ensures that the economic benefit of district heating is allotted to the customers. This is opposed to non-regulated district heating sectors in other countries, where prices are set differently. For example equal to the price of the heat supply alternative for the customer.

The principle is being criticised for not giving incentive to economic efficiency and investments in renewable district heating and for leading to a conservative, unconsolidated sector. The principle is being defended with reference to the risk pf allocating a huge windfall profit to the district heating operator, leading to cross subsidization and economic inefficiency.

Eligibility Criteria

The principle applies to all end sales of district heating regardless of ownership of district heating network, organisation etc. It also applies to wholesale of heat to be fed into district heating networks, unless coming from installations based on renewables and not owned by municipalities or consumer cooperatives.

Impact of Measure

| | Planning | Generation | Distribution | Demand | Organization |
|----------|----------|------------|--------------|--------|--------------|
| Positive | X | X | X | X | |
| Negative | | | | | |

Allotting the benefit of

district heating to district heating consumers undoubtedly has led to – on average – lower prices on district heating than on possible alternative sources of heat. This has help district heating to achieve the high market penetration.

Absence of profit has influenced organisation of the sector, with municipal and cooperative ownership dominating. Weather that can be seen as positive or negative depends on attitude.

Effectiveness of the measure

It is not possible to evaluate the price regulation in quantitative terms. The price regulation has on the one hand provided legitimacy for the heavy intervention to the benefit of district heating, by protecting consumers against abuse of the dominant position it has gained. In general there has been little opposition to the intervention, but that is not only due to the price regulation but also the many other initiatives taken to ensure the outcome and to compensate for major unbalances. On the other, the price regulation also clearly ensured that the economic benefits of district heating was allotted consumers and not as windfall profit.

III. SUPPORT MEASURES FOR DHC

Country

Denmark

| # | Name and reference of measure | Type of measure | Responsible organ | Existing or planned? |
|---|-------------------------------|-----------------|-------------------|----------------------|
| 5 | CHP-requirement | General | Gov./Municipal. | Existing |

Quotations from the measure

A cornerstone of Danish energy policy has been the integrated approach to heating and electricity. It has made Denmark a world leader in combined production.

The biggest contribution to the improvement in energy efficiency achieved since the 1970'ties has come from the increased combined production of electricity and heat. It has also made the most important single contribution to the reductions in CO₂-emissions.

The heat supply act regulates electricity production facilities below 25MW and states in §1: "*(..) the supply of heat shall be organised with a view to promoting the highest possible degree of cogeneration of heat and power.*"

The Electricity Supply Act regulates electricity production facilities above 25 MW and states in §1: "*The aim of the law is to ensure, that the electricity supply of the country is organized and conducted in accordance with consideration to security of supply, national economy, the environment and consumer protection. (..) Part 2. The law shall, in accordance with objectives mentioned in part 1, particularly promote a sustainable use of energy, including energy savings and combined heat and power, renewable and environmentally friendly sources of energy (..)*"

Though not explicitly banning condensing electricity production, the objectives above combined with the convenient, centralised heat load provided by the heat planning (described elsewhere) made it almost unthinkable to receive approval of an electricity only thermal installation.

The Purpose of the measure

The aim was to raise the total efficiency of thermal electricity production by extracting the surplus heat and using it in district heating to replace primary fuels otherwise used in individual heating supply. The provisions in the two laws quoted above, made it possible for authorities and (in the case of large power plants) parliament to require the utilisation of surplus heat and impose an obligation to deliver district heating on thermal electricity producers.

Eligibility Criteria

The regulation covers all thermal electricity production from 250 kW and onwards.

Impact of Measure

| | Planning | Generation | Distribution | Demand | Organization |
|----------|----------|------------|--------------|--------|--------------|
| Positive | X | X | X | X | |
| Negative | | | | | |

The regulation has turned a number of district

heating utilities (maybe 250) into also electricity producers, but has not had an impact on organisation of the sector as such.

Effectiveness of the measure

The measure has been very effective. No new thermal electricity capacity of any significant size has been built as electricity only.

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| Country | | Denmark | | |
|---------|-------------------------------|-----------------|-------------------|----------------------|
| # | Name and reference of measure | Type of measure | Responsible organ | Existing or planned? |
| 6 | Waste planning | Specific | Gov./Municipal. | Existing |

Quotations from the measure

In Denmark, the waste system – both household and industrial waste – is seen as a whole, and traditionally a planning approach has been used with regard to regulation. Waste was identified as an environmental issue in the 1970'ties and a systematic approach initiated in the 1980'ties. Waste planning was an instrument for both national and local authorities to ensure a coordinated and prioritized waste management. This was coordinated with other policies, such as the energy policy, that was being developed at the same time.

The first law on recycling and waste reduction came in 1984. One basic principle was the "waste hierarchy", which gave the following order of priority in waste management:

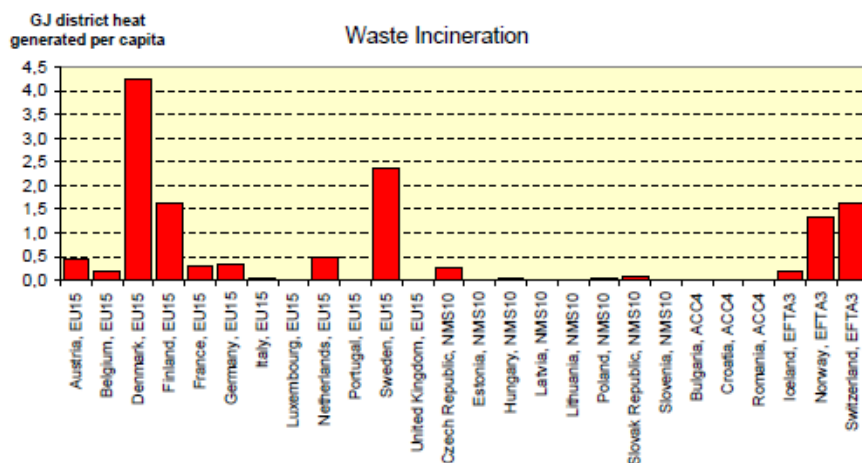
1. Waste prevention
2. Recycling
3. Incineration with energy capture
4. Waste disposal (depositing)

Within the framework of the national waste regulation, and a 4-yearly national waste plan, municipalities every 4 year draw up a 4-year and a long term 12-year waste plan. The plan specifies what waste producers (households and industries) must do with their waste. Location of waste incineration plants and waste disposal sites is also handles by municipalities.

Source:

Ecoheatcool, Ecoheatcool and Euroheat & Power 2005-6.

Since both waste management planning and heat planning were in the hands of municipalities, it is surprising, that the of energy recovery waste in Denmark is Higher than in other countries. At the same time, the share of recycled waste is also higher compared with other countries.



not share from high.

Waste is considered a partly renewable fuel, and incinerators are required to produce both electricity and heat. They receive payment and supplementary support for electricity produced. Heat produced is sold to district heating networks (as prescribed in heat planning), and the income from these energy products has ensured some of the lowest incineration cost in Europe. Taxation adds to incentives, with a high tax on waste to disposal, lower tax on waste for incineration and no tax on waste to be recycled.

Waste incinerators have typically been the centre of local waste management. Usually owned

by one or jointly by more municipalities, but also with private operators. Around this centre occasionally other activities, such as recycling stations etc., are organized. Waste collection is typically outsourced.

Initiative to reform the sector has been taken, after criticism of among other things: lack of efficiency, municipal confusion of roles as regulator and operator etc. New regulation will introduce more competition on waste incineration and waste will be more "mobile" than under the present regime, where waste predominantly is treated locally/regionally.

The coordinated approach has ensured high energy production from waste, easy access to district heating networks for waste incinerators and cheap heat input to district heating (on average the cheapest heat source). This again has benefited the security of supply and the competitiveness of district heating in Denmark.

The Purpose of the measure

The objective is to solve the environmental problem with waste at the lowest possible socio economic costs and at the same time have the waste system contribute to objectives in energy policy. This has been done by, among other things, ensuring the highest possible energy recovery from waste only suitable for incineration.

Eligibility Criteria

Waste management policy comprehensively covers all sources and kinds waste in Denmark.

Impact of Measure

| | Planning | Generation | Distribution | Demand | Organization | The waste policy has |
|----------|----------|------------|--------------|--------|--------------|----------------------|
| Positive | X | X | X | | | |
| Negative | | | | | | |

made cheap heat from combined production using waste as fuel available for district heating.

Effectiveness of the measure

The measure has been quite effective in reaching the intended targets. Around 1/5 of Danish district heating is based on waste, and the price of district heating originating from waste is consistently the lowest.

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|---|-------------------------------|-----------------|-------------------|----------------------|--------------|----------|------------|--------------|--------|--------------|----------|--|--|--|---|--|----------|--|--|--|--|--|
| Country | | | | Denmark | | | | | | | | | | | | | | | | | | |
| # | Name and reference of measure | Type of measure | Responsible organ | Existing or planned? | | | | | | | | | | | | | | | | | | |
| 7 | Ban electrical heating | Specific | Municipalities | Existing | | | | | | | | | | | | | | | | | | |
| <h3>Quotations from the measure</h3> <p><i>"Installing electrical heating in new or existing buildings with an installed water based heating system, is banned, if the building is or will be supplied by collective heat supply (district heating or natural gas."</i> This regulation was implemented in 1988 on the basis of the heat supply act, and updated in 1994 (quoted). The update was that the ban also prevented existing buildings, with an already installed water based central heating system, from converting to electrical heating.</p> <p>Implementation took place as a letter instructing municipalities (as the local heat planning authority) to ban electrical heating in all areas allocated to collective heat supply in their heat plans. Electrical boilers or electrically driven heat pumps are not covered. Dispensation from the ban can be given to low energy or passive buildings.</p> <p>The ban is still in force, but of less relevance as electrical heating only competes with district heating in buildings of low energy standard in new urban developments.</p> | | | | | | | | | | | | | | | | | | | | | | |
| <h3>The Purpose of the measure</h3> <p>Coal based thermal production of electricity dominated in Denmark when the ban was implemented, and electrical heating was thus a very inefficient heating choice, both in energy efficiency and CO2 terms. However, during implementation of the heat planning, it was, in some areas with relative high district heating prices, seen as a way to avoid connecting to district heating. Connecting to district heating was made compulsory by some municipalities, to ensure the critical mass of connections to needed gain the benefits of the collective supply, but the obligation could not be imposed on buildings without a water based heating system. Developers also saw and sees an interest in installing electrical heating in their developments, as it is a low investment compared to district heating and the higher operating cost remains with future residents.</p> | | | | | | | | | | | | | | | | | | | | | | |
| <h3>Eligibility Criteria</h3> <p>The ban was implemented in all municipalities regardless of status of district heating systems, their prices etc.</p> | | | | | | | | | | | | | | | | | | | | | | |
| <h3>Impact of Measure</h3> <table border="1"> <thead> <tr> <th></th> <th>Planning</th> <th>Generation</th> <th>Distribution</th> <th>Demand</th> <th>Organization</th> </tr> </thead> <tbody> <tr> <td>Positive</td> <td></td> <td></td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Negative</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | | | | | | Planning | Generation | Distribution | Demand | Organization | Positive | | | | X | | Negative | | | | | |
| | Planning | Generation | Distribution | Demand | Organization | | | | | | | | | | | | | | | | | |
| Positive | | | | X | | | | | | | | | | | | | | | | | | |
| Negative | | | | | | | | | | | | | | | | | | | | | | |

Effectiveness of the measure

There is no available information regarding the number of electrical heating installations avoided with the ban. The number of electrical heating installations in existing district heating areas is low. New buildings in new urban or suburban areas are often of a standard, where a dispensation from the ban is possible and where district heating supply also is challenging.

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|---------|-------------------------------|-----------------|-------------------|----------------------|
| # | Name and reference of measure | Type of measure | Responsible organ | Existing or planned? |
| 8 | Law on district cooling | Specific | Municipalities | Existing |

Quotations from the measure

District cooling is a relatively unknown phenomenon in Denmark. In 2008 the first and only existing district cooling scheme in Denmark was inaugurated in Hjørring. It is a 1.5 MW absorption chiller, using district heating from CHP and designed to cool a nearby shopping centre and perhaps future office buildings. A larger district cooling scheme in Copenhagen is currently under construction, and will be operational in the spring of 2010. It has the capacity to cool 400.000 m² of building area, and will use sea water as source of free cooling.

A government report from 2007 concluded, that the potential energy savings associated with district cooling were smaller than perhaps expected. The report recommends, that district cooling only is established in areas with a high density of office buildings, shops and/or shopping centres. The report also states, that residential buildings should be constructed with the aim to avoid cooling needs.

Euroheat & Power has in Ecoheatcool estimated the cooling need in Denmark to 12 TWh, but the government thinks only half is realistic, due to the absence of cooling needs in residential buildings. The report calculates the savings in electricity resulting from district cooling to 0,3 TWh/year and fuel savings to 1,1 PJ. This is not muc compared with total yearly consumption of 35 TWh and 840 PJ respectively.

Cooling law

Municipalities were until 2008 prevented from involving themselves in district cooling schemes. After introduction of a district heating law in 2008, they were allowed to operate district cooling schemes on commercial terms, but only in economically separated limited liability companies and they are still not allowed to invest funds from tax revenue in the companies.

The Purpose of the measure

To give municipalities the possibility to operate commercial district cooling schemes, as municipalities already own the district heating utilities serving most of the areas suitable for district cooling.

Impact of Measure

| | Planning | Generation | Distribution | Demand | Organization | The regulatory framework |
|----------|----------|------------|--------------|--------|--------------|--------------------------|
| Positive | x | x | x | | x | |
| Negative | | | | | | |

ork is in place and the option to start district cooling is there. But without financing, it is difficult to get started.

Effectiveness of the measure

Solved only half the problem.