

Best practise support schemes

Ecoheat4eu

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Introduction

This report contains an analysis of the Ecoheat4EU enquiries concerning best practise support measures related to district heating and cooling in 14 European countries. The basic enquiries were performed between October 2009 and March 2010. Each national answer can be found at the Ecoheat4EU website. Short summaries of the national inputs are available within Ecoheat4EU document D3.1. The national inputs have later been refined based on project meeting discussions. This report contains all changes and additions until November 30, 2010.

With respect to market situation, the 14 countries were divided into 4 country groups according to:

Country group	Countries
Consolidation	Denmark, Finland, and Sweden
Refurbishment	Croatia, The Czech Republic, Lithuania, and Romania
Expansion	France, Germany, Italy, and Norway
New development	Ireland, Spain, and United Kingdom

In Consolidation countries, district heating systems have reached a very mature, almost saturated market share of 50-60%. The market share denotes the share of buildings heated by district heat. Some countries include only residential buildings in the market share, while other countries also include the service sector buildings.

In Refurbishment countries, district heat has also high market shares (10-50%), but the systems need some refurbishment in order to increase customer confidence, energy efficiency, and profitability. The common denominator for the district heating systems in these 4 countries is that they were introduced and developed within planned economies.

In Expansion countries, district heating systems appear in some cities, but the total market share is rather low (3-15%). By expanding existing systems and establishing systems in other cities, the market shares can grow significantly.

In New development countries, very few ordinary district heating systems exist, giving typical market shares below 1%. However, genuine interest for district heating and cooling is growing in these countries.

Within each country group, different demands appear for national legislation and support measures concerning district heating and cooling. The intention is to reflect these non-uniform demands in this summary report.

The subject of this report touches the subjects in ECE 2003, Havskold & Sköldberg 2009, Bubholz & Nowakowski 2010, Nuorkivi & Kalkum 2011 and Kasza et al 2011. The reader of this report can also find valuable information in these five reports.

References:

ECE, Reforming Energy Pricing and Subsidies. ECE Energy Sseries No 21. Economic Commission for Europe. Geneva 2003.

- Havskold M & Sköldbberg H, The Future of Nordic District Heating – A First Look at District Heat Pricing and Regulation. Nordic Energy Perspectives 2009.
- Bubholz M & Nowakowski R, Mapping of Subsidy Systems and Future Consumption of Biomass. Swedish District Heating Association 2010.
- Nuorkivi A & Kalkum B, Policies and Barriers for District Heating and Cooling outside the EU Countries. IEA implementing agreement on DHC and CHP. Helsinki 2011.
- Kasza K, Farkas A, Korhonen H-P, Kuusela M, Benchmarking District Heating in Hungary, Poland, Lithuania, Estonia, and Finland. Pilot co-project of ERRA and Fortum. Budapest 2011.

Support schemes by sector dimension

Advantage and disadvantages by sector dimension (Planning, Generation, Distribution, Demand, and Organisation) with various support measures was one part of the country enquiries. The country answers are summarised in Table 1 for support subgroups and in Table 2 for support main groups. The advantages are more pronounced than the disadvantages. But the answers have not been so selective with respect to sector dimensions. In many country answers, all 5 sector dimensions have been chosen as having a positive influence from the measure reported. Hence, we can not correlate various support measures to the five different sector dimensions with respect to the selection of best practise support measures.

Table 1. Support measures within subgroups by positive or negative influence on five different sector dimensions.

Support subgroup	Data									
	Count of POS - Planning	Count of POS - Generation	Count of POS - Distribution	Count of POS - Demand	Count of POS - Organisation	Count of NEG - Planning	Count of NEG - Generation	Count of NEG - Distribution	Count of NEG - Demand	Count of NEG - Organisation
1 Burden - Carbon tax	1	2	1	2						
1 Burden - Emission trading system										
1 Burden - Energy tax	1	1	1	1						
2 Support - Favourable loans	1	2	1	1		1			1	
2 Support - Feed-in tariff, renewable electricity	2	3	2				1			
2 Support - Investment grant, CHP		3	2							
2 Support - Investment grant, DH connection	1	1	1	4						
2 Support - Investment grant, DH distribution	4	7	8	6	4				1	
2 Support - Investment grant, renewables	3	6	4	3	1					
2 Support - Operation support, CHP incl FIT	4	4	2	2	1					
2 Support - Operation support, renewables										
2 Support - Social support for poor customers	1			1	1					
2 Support - Tax deduction, CHP		2								
2 Support - Tax deduction, DH	1			2	1					
3 Market control - Consumer complaints board										
3 Market control - Price regulation	1	1	1	1						
3 Market control - Third party access		1	1			1				1
4 Planning - Building regulations	1	1	1	2					1	
4 Planning - CHP planning	1	2	1	1						
4 Planning - Heat planning & zoning, DH	4	3	3	5	2					
4 Planning - National energy policy	12	12	11	15	5	1	1	2	3	2
4 Planning - Renewable planning	1	3	3	1						
4 Planning - Waste planning & landfill bans	1	1	1							
Grand Total	40	55	44	47	15	3	2	2	6	3

Table 2. Support measures within main groups by positive or negative influence on five different sector dimensions.

Support group	Data									
	Count of POS - Planning	Count of POS - Generation	Count of POS - Distribution	Count of POS - Demand	Count of POS - Organisation	Count of NEG - Planning	Count of NEG - Generation	Count of NEG - Distribution	Count of NEG - Demand	Count of NEG - Organisation
1 Burden	2	3	2	3						
2 Support	17	28	20	19	8	1	1		2	
3 Market control	1	2	2	1		1				1
4 Planning	20	22	20	24	7	1	1	2	4	2
Grand Total	40	55	44	47	15	3	2	2	6	3

Selection procedure

As described in document D3.2, it was impossible to recommend or select effective or best practise support measures from the analysis performed in document D3.2. This situation appears since the development of district heating during several decades has been the result from various national attitudes towards financing of local infrastructure, various market conditions (as the high oil prices during the 1970's and early 1980's), and various historical support measures (Rüdig 1986). No correlation between the current district heat market shares and the current support measures could be found.

For the selection of best practise support measures, a voting procedure was performed in May 2010 among the various country partners. From the full list of support measures identified from the summary of the country reports, each country had to rank the 10 support measures, which were preferred in each country. The voting procedure was organised with ranking from 1 to 10 with 1 being the measure rated the best. During the voting analysis, the ranking values were changed to reversed order, with 10 being the measure rated the best, in order to get an additive scoring system. The final result from the voting procedure is presented in Table 3. All identified support measures received votes, except for two measures: The emission trading system and operation support for renewables (as green certificates). The overall impression is that the voting outcome gave high prioritisation for planning measures together with investment grants as financial support.

The highest voting score was given to **Planning – Heat planning and/or zoning**. This support measures was in the top 10 list in all countries, except for Sweden. This top choice emphasise the prioritisation of reducing uncertainties and the corresponding financial risk for extending distribution networks. The financial risk is lowered both from the harmonised connection and the reduced connecting pipe construction costs, when buildings are connected at their initial construction.

The highest score within the country partners for the heat planning measure reveals a potential conflict between freedom of choice for heat consumers and the community goals for reaching higher energy efficiency by exploiting urban synergies by district heating systems.

The second best practise measure elected was **Support – Investment grant, DH distribution**. This verifies also that the district heating community would like to see support measures reducing the financial risk for extending distribution networks.

Table 3. Voting scores by country and support measure.

Support measures summary	CZ	DE	DK	ES	FI	FR	HR	IE	IT	LT	NO	RO	SE	UK	Total	Rank
Burden - Carbon tax		7	5		6				3	2		9	10	10	52	6
Burden - Energy tax	2		6	3	1						10				22	
Support - Favourable loans		2	1	7	2	2	5		2		3	3	9	7	43	8
Support - Operation support for CHP, incl Feed-in Tariff	8	10	4	6		6		1	7	3		4	2	5	56	4
Support - Feed-in tariff, renewable electricity			3							4	8				15	
Support - Investment grant, CHP	5	8		8	7		1	8				7			44	7
Support - Investment grant, DH connection	4	1	2	9	5	8	2	10	8		2			3	54	5
Support - Investment grant, DH distribution	9	9		10		9	3	9	9	8	9		3	8	86	2
Support - Investment grant, renewables						7		7	5	7	7		1		34	11
Support - Social support for poor customers						1						8		1	10	
Support - Tax deduction, CHP	7											2			9	
Support - Tax deduction, DH	6			1		10	6	4	4	5		5			41	9
Market control - Consumer complaints board					4										4	
Market control - Price regulation							4		1	9		6		2	22	
Market control - Third party access										1					1	
Planning - Building regulations		6		4	9			5			6		7	4	41	9
Planning - CHP planning		3	8					8				1			20	
Planning - Heat planning and/or zoning	3	5	9	5	8	5	10	3	6	10	5	10		9	88	1
Planning - National energy policy	10	4	10	2	10		9	6	10		4		8	6	79	3
Planning - Renewable planning						4				6	1		6		17	
Planning - Waste planning & landfill bans			7		3	3	7	2					5		27	12

Table 4. Voting scores by country group and support measure.

	Consolidation	Refurbishment	Expansion	New development	Total score	Rank
Burden - Carbon tax	21	11	10	10	52	6
Burden - Energy tax	7	2	10	3	22	
Support - Favourable loans	12	8	9	14	43	8
Support - Operation support for CHP, incl Feed-in Tariff	6	15	23	12	56	4
Support - Feed-in tariff, renewable electricity	3	4	8		15	
Support - Investment grant, CHP	7	13	8	16	44	7
Support - Investment grant, DH connection	7	6	19	22	54	5
Support - Investment grant, DH distribution	3	20	36	27	86	2
Support - Investment grant, renewables	1	7	19	7	34	11
Support - Social support for poor customers		8	1	1	10	
Support - Tax deduction, CHP		9			9	
Support - Tax deduction, DH		22	14	5	41	9
Market control - Consumer complaints board	4				4	
Market control - Price regulation		19	1	2	22	
Market control - Third party access		1			1	
Planning - Building regulations	16		12	13	41	9
Planning - CHP planning	8	9	3		20	
Planning - Heat planning and/or zoning	17	33	21	17	88	1
Planning - National energy policy	28	19	18	14	79	3
Planning - Renewable planning	6	6	5		17	
Planning - Waste planning & landfill bans	15	7	3	2	27	12

The third most popular measure became **Planning – National energy policy**. This choice underlines the necessity of identifying district heating and cooling as very important strategic tool in order to get higher energy efficiency within the energy system. It is difficult to introduce and maintain support measures for district heating and cooling, if district heating and cooling is not an acknowledged vital part of the national energy policy.

The fourth highest voting score was given to **Support – Operation support for CHP**. This choice prioritises the aim of supporting the essential part creating the higher energy efficiency by recycling the inevitable heat losses from thermal generation of electricity. But this support measure lacks a direct link with gathering heat demands in order to make CHP possible.

The fifth ranked support measure became **Support – Investment grant, DH connection**. This is the third verification in the voting outcome that it is important to reduce the financial risk when expanding distribution networks. But this support measure emphasises to facilitate the connection of the customer building to the distribution network. Hence, this financial support is more directed to the final customer than to the heat provider and the heat distributor.

The voting scores by country group and support measure are reported in Table 4, while the corresponding top 5 ranking for each country group is presented in Table 5. The uniform pattern was that all country groups prioritised heat planning measures. National energy policies were prioritised in three country groups, but not among Expansion countries.

The top ranking was not completely uniform between the country groups, since some specific preferences can be identified among the country groups. The Consolidation countries (Denmark, Finland, and Sweden) had a unique preference for a general carbon tax, reflecting that they are seeking for a more long term general market solution than specific financial support. The Refurbishment countries (Croatia, Czech Republic, Lithuania, and Romania) were unique by preferring price regulation, reflecting the focus on heat price levels and the ability to pay situation in these countries. The Expansion countries (France, Germany, Italy, and Norway) and the New development countries (Ireland, Spain, and United Kingdom) have a common view about preferring investments grants for distribution and connection, since they see expansion of district heating and cooling as a high priority.

Reference:

Rüdiger W, Energy conservation and electricity utilities: A comparative analysis of organizational obstacles to CHP/DH. Energy Policy 14(1986):2, 104-116.

Table 5. Top 5 support measures for all together and each country group: Consolidation: Denmark, Finland, and Sweden; Refurbishment: Croatia, Czech Republic, Lithuania, and Romania; Expansion: France, Germany, Italy, and Norway; New Development: Ireland, Spain, and United Kingdom.

Rank	All together
1	Planning - Heat planning and/or zoning
2	Support - Investment grant, DH distribution
3	Planning - National energy policy
4	Support - Operation support for CHP, incl Feed-in Tariff
5	Support - Investment grant, DH connection
Rank	Consolidation
1	Planning - National energy policy
2	Burden - Carbon tax
3	Planning - Heat planning and/or zoning
4	Planning - Building regulations
5	Planning - Waste planning & landfill bans
Rank	Refurbishment
1	Planning - Heat planning and/or zoning
2	Support - Tax deduction, DH
3	Support - Investment grant, DH distribution
4	Market control - Price regulation
5	Planning - National energy policy
Rank	Expansion
1	Support - Investment grant, DH distribution
2	Support - Operation support for CHP, incl Feed-in Tariff
3	Planning - Heat planning and/or zoning
4	Support - Investment grant, DH connection
5	Support - Investment grant, renewables
Rank	New development
1	Support - Investment grant, DH distribution
2	Support - Investment grant, DH connection
3	Planning - Heat planning and/or zoning
4	Support - Investment grant, CHP
5	Planning - National energy policy

12 examples of best practise support schemes

The final ranking list of the 12 prioritised best practise support measures are presented in Table 6. This is the total list for all 14 countries. You should be aware of the different preferences in the four country groups analysed and reported in the preceding section. A horizontal presentation of the current use of these 12 support measures is found in the enclosed appendix.

Table 6. Final ranking list of the 12 best practise support measures elected by the 14 country partners in this project.

Rank	Top 12 support measures	Short description of the support measure	Sector dimension
1	Planning – Heat planning and/or zoning	Strategic energy planning, probably at municipality level. May include encouraging or even enforcing particular energy solutions (zoning). Currently applied in Germany, Denmark, Spain, France, Italy, Lithuania, Norway, and United Kingdom.	Distribution
2	Support – Investment grant, DH distribution	Financial support for district heating pipes through provision of grant, probably from government, but other sources also possible. Currently applied in Germany, Spain, France, Italy, Lithuania, Norway, Romania, and the United Kingdom.	Distribution
3	Planning – National energy policy	The framework, within which relevant legislation, possibly including measures on this list, may be framed. Currently applied in the Czech Republic, Germany, Denmark, Croatia, <i>Lithuania</i> , and Norway.	Planning
4	Support – Operation support, CHP including feed-in tariff	Supporting CHP through regulatory means, one prominent example being by means of a Feed In Tariff or a CHP bonus. Currently applied in the Czech Republic, <i>France</i> , Italy, Lithuania, and Romania.	Generation
5	Support – Investment grant, DH connection	Financial support for connecting customers to existing mains network through provision of grant, probably from government, but other sources also possible. Currently applied in Germany, <i>France</i> , Denmark, Finland, and Sweden.	Demand
6	Burden – Carbon tax	Implementing a tax penalty on fossil fuels proportional to its fossil carbon emissions. Applicable to all energy systems (energy efficient approaches like district heating would prosper). Currently applied in Denmark, Norway, and Sweden.	Generation

Rank	Top 12 support measures	Short description of the support measure	Sector dimension
7	Support – Favourable loans	Providing low interest loans to finance the capital cost of establishing, extending or refurbishing district heating. Currently applied in Germany and Croatia.	All
8	Support – Investment grant, CHP	Financial support for CHP through provision of grant, probably from government, but other sources also possible. Currently applied in Germany and Ireland.	Generation
9	Support – Tax deduction, DH	Implementing a tax benefit for district heating schemes. Currently applied in Finland, France, Italy, Lithuania, and Norway.	Distribution
10	Planning – Building regulations	Using existing regulatory framework to encourage deployment, and in to ensure unnecessary barriers are removed. Currently applied in Ireland, <i>France</i> , Norway, and United Kingdom.	Demand
11	Support – Investment grant, renewables	Financial support for renewables through provision of grant, probably from government, but other sources also possible. Currently applied in Germany, <i>France</i> , Croatia, Ireland, Norway, and Sweden.	Generation
12	Planning – Waste planning & landfill bans	Promoting in a strategic way disposal of waste, so that the energy can be recovered and put to use in district heating schemes. Currently applied in Denmark and Norway.	Generation

Remark: Country applications in italics have added by the country partners in the final project stage and do not appear earlier in the 3.1 and 3.2 reports. These additions are examples of the project learning process.

Conclusions

The three main conclusions from this summary report concerning best practise support schemes are:

- No objective selection procedure for finding best practise support measures was identified. Instead, a subjective selection procedure based on country voting was applied.
- The voting results gave a general preference to planning and financial support measures reducing the financial risk when expanding distribution networks.
- All three distribution support measures were elected to the 12 priority list and two of them top the list. This is a strong contrast to the total number of support measures, dominated by generation support measures.

Appendices

Appendix: Presentation of the current use of the 12 best practise support measures

Rank	Top 12 support measure	Short description of the support measure	Sector dimension
1	Planning – Heat planning and/or zoning	Strategic energy planning, probably at municipality level. May include encouraging or even enforcing particular energy solutions (zoning). Currently applied in Germany, Denmark, Spain, France, Italy, Lithuania, Norway, and United Kingdom.	Distribution

Germany: 1 measure

DE measure 9: Mandatory heat planning acting locally on issues such as environmental protection. All municipal codes in Germany enable municipalities to enforce mandatory heat planning for certain areas of their territory through byelaws. In this regard the different municipal codes are very similar, although they often do not share the same wording. According to a representative survey conducted by AGFW approximately 12% of the current district heat delivery originates from areas which are subject to mandatory heat planning. In regards to the heating market as a whole this would translate to 1.4%.

Denmark: 2 measures

The purpose of the first DK measure is to avoid competition between collective heat supply systems as natural gas and DH and individual systems in order to ensure efficient use of surplus heat and fuels. It is said to ensure the most socio-economic and environmentally friendly utilization of energy by ensuring a market for collective heat supply and is claimed to have positive effect on all impact measures.

The seventh DK issue is the ban on electrical heating. There is a general ban on using electrical heating in Denmark if the building is or will be supplied by any collective heat supply as DH. A positive impact on demand only is listed.

Spain: 1 measure

ES measure 2: Improvement of Energy Plan of Barcelona. This plan is expected to provide knowledge and analysis of energy consumption, energy demand and local as well as global emissions. The purpose is also to do an analysis of the energy state of the city, to plan patterns of actions due to the above, increase quality of service and to develop tools for environmental decision making. It is claimed that this initiative has been very successful with the construction of four networks in the city of Barcelona.

France: 1 measure

The 3rd French support measure mentioned is a feasibility study that requires local authorities/project owners to make the effort of analysing various heating possibilities before choosing the relevant one. This is not yet evaluated.

Italy: 1 measure

IT measure 6: Defining the regional legal framework of concept of local general public interest networks that should also apply to DHC.

Lithuania: 1 measure

LT measure 1: Heat supply plans for cities (article 7 in Law on Heat Sector). The objective with this special plan is to *meet the consumer heating needs at lowest cost* while not exceeding set limits of negative environmental impacts. From the introduction of this Law, special heating plans in all municipalities were prepared in 2004 - 2006. This has led to the closure of some ineffective parts of networks thus lowering supply losses and thereby improving efficiency of the remaining part. Also an increasing use of renewables is mentioned as another consequence.

Norway: 2 measures

The tenth NO support measure is heat planning in the Planning and Building Act, § 11.8 and 12.7: municipalities shall plan for DH if there are possibilities in the community (heat resources, density of population), this leads to:

The eleventh NO support measure, local heat planning: where municipalities, using the PBA act, have offensive plans for DH, supporting DH in competition with building related energy resources.

United Kingdom: 1 measure

UK measure 2: The supplement to Planning Policy Statement 1 (PPS1) sets out the Government's overarching planning policy framework on the delivery of sustainable development through the planning system. It advises rather than instructs. According to PPS1 "Regional planning authorities and local authorities should promote resource and energy efficient buildings; community heating schemes, the use of combined heat and power, small scale renewable and low carbon energy schemes in the developments;..." PPS1 aims to create a more sustainable environment which includes the implementation of low carbon technologies. PPS1 has encouraged the development of local planning policies relating to energy based on local evidence including the undertaking of area based heat mapping exercises which identify the opportunity for district heating.

Rank	Top 12 support measure	Short description of the support measure	Sector dimension
2	Support – Investment grant, DH distribution	Financial support for district heating pipes through provision of grant, probably from government, but other sources also possible. Currently applied in Germany, Spain, France, Italy, Lithuania, Norway, Romania, and the United Kingdom.	Distribution

Germany: 2 measures

DE measure 1: Combine Heat and Power Act with the purpose of increasing the share of electricity in CHP plants to 25% by modernising and constructing new CHP-plants. The basic instrument is to oblige the grid operators to connect CHP plants to their grid and to give priority to buy electricity from cogeneration (the same obligation exists for electricity from renewable energy sources). Unlike the system for electricity from renewable energy sources there is no feed-in tariff system in place but a bonus payment for electricity from cogeneration which is paid on top of the market price. The new Act also includes support measures for DH pipelines as heat sinks for CHP based on this system. The target is to reach 25% electricity from cogeneration by 2020 (from existing 13%).

DE measure 6: The Future Investment Programs I and II were initially introduced in 1973 and 1978 in order to fight the negative effects of oil prices. They stimulated investments in heat supply and distribution in urban areas in order to reduce energy consumption, protect environment, secure supply and increase fuel diversification. Support of a maximum of 35% of investment costs could be given under the programs.

Spain: 1 measure

ES measure 1: One existing initiative includes a subsidy regarding "Improvement of the energy efficiency of thermal installation existing in buildings" The subsidy will in general be 22% of eligible cost. "The maximum amounts are 10 000 Euros for single-family house, block of flats for 200 000 Euros and 200 000 Euros for district networks". The purpose is said to be aimed at improving existing energy installations within a broad definition from electrical installations to thermal installations. The impact is expected to be the improved energy efficiency of all types of installation. It tries to stimulate connection of buildings to existing networks. The effectiveness is so far said to be poor. Another, also existing, initiative comprises seven geographically different subsidies. These are almost all in the area of subsidising new installations of DH/DHC systems for several buildings The principal of these subsidies are to improve energy savings and energy efficiency promoting better use of energy, renewable energy and quality of energy and all things integrated with environment protection. Most of the projects are claimed to be a success.

France: 1 measure

The 2nd French support measure is a heat fund for "renewable heat" (biomass, geothermal, biogas, PV, etc). DH-systems can benefit from the fund if their share of R&R energies is over 50%

(or if they formally commit to get to that objective in a given period of time). The purpose is also to further increase R&R in the fuel mix. The effectiveness is not yet evaluated since it is a new subsidy, created in April 2009, and considering the time needed to set up (investments, building, ...) DH projects. Up to the beginning of 2011 it is said that over 400 km of network have benefited from this heat fund.

Italy: 1 measure

IT measure 7: Providing regional economic support and funding through public procurement, capital investments for DHC systems, particularly based on the use of renewable energy sources and on industrial heat utilization.

Lithuania: 1 measure

LT measure 5: *Structural funds* for infrastructure development. The following investments are said to be able to receive funding from EU structural fund: *Modernization and development of systems and networks, Fossil fuel switching to biomass, Biomass based CHP development, Refurbishment of existing CHP plants and of new ones, Modernization of boiler houses, Energy recovery of municipal waste and Renovation of residential and public buildings*. The present plans include renovation of 1800 km DH routes and modernization of 100MW of energy generation capacity.

Norway: 1 measure

The first NO support measure is a Financial Support Scheme for DH infrastructure for investing in new DH infrastructure or to extend existing infrastructures through the use of Public Service Obligations (PSOs) in competition with other companies not regulated by state aid regulations, 30 million EURO's in 2008 and 59 million in 2009. The objective is to change the energy system by increasing the use of renewables in the heating sector and to make the heating system more flexible. Another objective is to build DH-systems in the 20 largest cities where the lack of infrastructure is the main barrier and for substantial investments in waste incineration plants in reaction to the prohibition of waste in landfills from July 1 in 2009. Support is given to DH systems to receive waste heat and in order to build DH infrastructure in large cities with no previous DH, based on renewables. The support has given investment in infrastructure that otherwise wouldn't have started due to the financial crisis and DH extensions or new grids in 12 larger cities.

Romania: 2 measures

The third Government decision is 462/2006, "District Heating 2006-2015 warmth and comfort program". The purpose is two folded; a) to *rehabilitate* the centralized heat supply by different primarily *technical investments* and b) *thermal rehabilitation of buildings* including for example *individual metering and renovation of building's thermal "envelope"*. The effectiveness is said to be less than expected so far due to a lack of financing.

The fourth and final Government decision mentioned is 1661/2008 which is a national program for energy efficiency and renewable energy use in the public sector for the years 2009-2010. The purpose is mainly to *increase Romania's energy independence and to reduce pollution by*

implementing new technologies. This program is supposed to finance programs having the local government authorities as the direct beneficiaries. Eligible projects comprise: rehabilitation and modernization of DH including changing the type of fuel e.g. switching to biomass and the thermal rehabilitation of public buildings and use of local renewable energy potential for power/heat supply. The effectiveness is so far below expected due to lack of co-financing requested from the beneficiaries.

United Kingdom: 1 measure

UK measure 7: A number of funding programmes have been carried out in UK. These include both grant capital support and assistance with pre-investment activities. One example is the Community Energy programme that sought to deliver new and refurbish old community heating schemes, reducing carbon emissions, alleviating fuel poverty and reducing frontline energy costs. Another one was provided through the Homes and Communities Agency (HCA). The HCA funded schemes aim to ensure energy efficient infrastructure in included schemes that had this aspiration but which, through lack of capital, were set to proceed with individual dwelling heating systems.

Rank	Top 12 support measure	Short description of the support measure	Sector dimension
3	Planning – National energy policy	The framework, within which relevant legislation, possibly including measures on this list, may be framed. Currently applied in the Czech Republic, Germany, Denmark, Croatia, <i>Lithuania</i> , and Norway.	Planning

Czech Republic: 11 measures

CZ measure 1: **The Energy Act no. 458/2000 Coll. Support for CHP: a preferential connection of electricity to the transmission system, contributions.** The Energy law provides the electricity generators with a preferential electricity connection to the transmission system and then to distribution systems provided that the electricity was generated from renewable sources or using CHP technology. Similarly to the other countries, contributions over the market price of electricity are paid by operators of the distribution systems or by the transmission system operator.

CZ measure 2: **The Act on Energy Management no. 406/2000 Coll. Subsidies for CHP investment technology.** The Act on Energy Management states basic principles for receiving subventions on CHP technology investments or on electricity generation by combustion of secondary energy sources from the State Program on energy savings 'support and use of renewable sources of energy'. The measure is claimed to be effective as modernisation and renovation of DH subsequently takes place in CR. Moreover the Act deals with energy audit procedures with an unclear impact on district heating.

CZ measure 3: **Definition of CHP electricity.** Decree no 439/2005 laying down details on method of definition of the quantity of electricity from combined heat and power generation.

CZ measure 4: **Best Available Technology for energy plants.** Decree no 478/2005 laying down the minimum efficiency of energy use during electricity and heat energy production.

CZ measure 6: **Energy demand certificate.** Act no 406/2000 on power economy.

CZ measure 7: **Building energy demand.** Directive no 148/2007 on building energy demands.

CZ measure 8: **Boiler inspections.** Decree no 276/2007 on the method for performing one-off and regular inspections of boilers up to an output of 200 kW.

CZ measure 9: **Heat distribution.** Directive 193/2007 Heat energy distribution and internal heat and cold distributions.

CZ measure 10: **Air conditioning system effectiveness.** Directive 277/2007 on inspection of air conditioning system effectiveness.

CZ measure 11: **Energy Audits.** Act no 406/2000 on energy management.

CZ measure 12: **Metering and its impact on supplier-buyer relations.** In addition to all the foregoing, the Energy Act stipulates metering as a means for charging customers for heat energy supply. The heat energy generation license holder and the heat energy distribution license holder shall provide measurement and charge customers for heat energy supply in accordance with the actual parameters of the heat transfer medium and the readings obtained from its own metering devices. The legislative measure has proven to prevent some commercial supplier-buyer disputes. However, district heating systems deal with extra costs while installing heat meters installations.

Germany: 2 measures

DE measure 3: Ordinance on General Conditions for the Supply of DH set up a general framework for standard business conditions for the supply of DH to consumers, it addresses the specific technical and economical features of DH on the one hand and customer protection on the other.

DE measure 5: Energy Saving Ordinance aiming at reducing primary energy demand of buildings by 30% in the building sector. The ordinance targets the building envelope, the systems engineering and the primary energy sources which are being utilised. Electrical heating is phased out, this applies especially to storage heaters. Electrical heat pumps are not affected.

Denmark: 1 measure

The eighth DK measure, and final issue of concern here is the law on district cooling. In Denmark, municipalities are allowed to operate DC schemes on commercial terms only if this activity is handled by a separate limited liability company. The purpose is to give the municipalities the possibility to operate commercial DC schemes as they already own the DH utilities suitable for DC.

Croatia: 5 measures

HR measure 2: A piece of national legislation regarding the strategy of energy development in Croatia. The purpose is to define a development strategy for 2020 in which the goal is to build a sustainable energy system including security of supply, competitiveness and environmental issues. District heating is said to be one of the priorities of energy policy in Croatia.

HR measure 3: A piece of national legislation regarding general conditions for the supply of district heat including, for example, procedures for approval/permission for connection to network, conditions for connections, reliability of supply and quality etc.

HR measure 4-6: These three initiatives cover issues concerning metering in different ways. The first one is the law on district heat which, inter alia, (4) deals with the installation of meters in order to improve the regulation of DH systems and fulfill the obligation to charge consumers according to actual consumption on at least building level. The second one (5) sets up methodological issues concerning calculation of tariffs and the third initiative here (6) deals with the allocation issues for calculating costs for supplied heat on common meters.

Lithuania

No detailed information is available, since the measure was not included in the initial national report. This country reference was added later in the project, as a result from the embedded learning process in the Ecoheat4EU project.

Norway: 1 measure

The sixth NO support measure is the national energy policy, and goals about a more flexible energy system, increasing the production of renewable heat.

Rank	Top 12 support measure	Short description of the support measure	Sector dimension
4	Support – Operation support, CHP including feed-in tariff	Supporting CHP through regulatory means, one prominent example being by means of a Feed In Tariff or a CHP bonus. Currently applied in the Czech Republic, <i>France</i> , Italy, Lithuania, and Romania.	Generation

Czech Republic: 1 measure

CZ measure 5: **The Energy Regulatory Office: Additional subventions to producers with CHP technology.** The Energy Regulatory Office (the ERO) determines an additional payment to the market price for the electric energy produced by renewables and secondary energy sources in its published Price Decisions every year. The instrument is especially significant when regarding small and middle-sized plants.

France

No detailed information is available, since the measure was not included in the initial national report. This country reference was added later in the project, as a result from the embedded learning process in the Ecoheat4EU project.

Italy: 1 measure

IT measure 2: White certificates for energy generated in high efficiency CHP plants. This measure is however not yet applied on a regular basis, due to a legal action.

Lithuania: 1 measure

LT measure 7: Public sector obligations in the electricity sector, adopted in 2001. Under this legislation power utilities *are obliged to buy and sell electricity from renewables and waste sources and to buy and sell electricity from CHP* when these are connected to the network, *according to public service obligations.*

Romania: 2 measures

First is the Government decision 291/2007 that establishes the legal framework for promotion and development of efficient CHP. Some purposes of the legislation comprise: *increase the share of electricity produced in CHP-operations*, modernising and constructing new CHP-plants as well as expanding existing plants and networks. *Grid operators are obliged to connect CHP plants* to the grid and to buy electricity from cogeneration with priority over conventional electricity. The act also has a positive effect on cogeneration due to the bonus paid for this kind of electricity, a bonus meant to offset the higher investment cost for CHP plants.

The second Government decision is 1215/2009 contains a legislation which supports and clarifies the un-regulated aspects of the previous legislation mostly with respect to the support scheme with the bonus system for cogeneration.

Rank	Top 12 support measure	Short description of the support measure	Sector dimension
5	Support – Investment grant, DH connection	Financial support for connecting customers to existing mains network through provision of grant, probably from government, but other sources also possible. Currently applied in Germany, <i>France</i> , Denmark, Finland, and Sweden.	Demand

Germany: 1 measure

DE measure 6: The Future Investment Programs I and II were initially introduced in 1973 and 1978 in order to fight the negative effects of oil prices. They stimulated investments in heat supply and distribution in urban areas in order to reduce energy consumption, protect environment, secure supply and increase fuel diversification. Support of a maximum of 35% of investment costs could be given under the programs.

France

No detailed information is available, since the measure was not included in the initial national report. This country reference was added later in the project, as a result from the embedded learning process in the Ecoheat4EU project.

Denmark: 1 measure

The third DK point concerns *direct* specific subsidies that generally disappeared around 2000. The collected information shows some subsidies that still might have a very small impact on district heating *indirectly* through subsidies to electricity production. However, it is apparent that subsidies was of significant importance especially during the 1990s. These included: subsidies for converting older houses to DH, completion of planned networks (speed up process) and conversion from coal to gas.

Finland: 1 measure

A general subsidy of 10% to residential buildings joining the DH network for covering some connection costs and some equipment cost. This subsidy was introduced in 2006 and is not seen as having a significant impact on promoting DH (whose position is considered to be strong) but rather helping renovators to make an "impartial choice as to whether DH is a possibility".

Sweden: 1 measure

The first SE measure, system conversion subsidies, aims at promoting efficient and environmentally friendly use of energy and a reduction in electricity use for heating in residential buildings. It is stated that subsidies can be given to single or double households as well as to residential buildings for conversion from electricity panels to heat pumps, bio fuel or District Heating. Up to 30% of the investment cost can be subsidized with a maximum value of

SEK 30 000. This system has not yet been evaluated but there has been a tendency for oil heated houses to convert to heat pumps and for electric heated houses to convert to DH.

Rank	Top 12 support measure	Short description of the support measure	Sector dimension
6	Burden – Carbon tax	Implementing a tax penalty on fossil fuels proportional to its fossil carbon emissions. Applicable to all energy systems (energy efficient approaches like district heating would prosper). Currently applied in Denmark, Norway, and Sweden.	Generation

Denmark: 1 measure

The second DK measure concerns general taxation on energy both fuel and its eventual emissions. The overall purpose is to ensure energy efficiency, divert energy demand away from oil and coal towards natural gas and renewable fuels. This taxation is claimed to impact DH positively making these investments economically more feasible. Also it is claimed that this taxation has made collective systems more competitive thus working in favour for DH systems. A positive impact in all respects except organization is listed.

Norway: 1 measure

The eight NO support measure is carbon taxes on fuel oil and gas.

Sweden: 1 measure

The third SE measure is the carbon dioxide tax which is a fuel taxation based on the carbon content in the fossil fuel. The overall purpose is to phase out fossil fuel for heating and DH is claimed to be the most successful sector in this field because of the increasing cost for oil heating. Seen over a 30 year period this tax can be regarded as very successful as it has resulted in an extensive use of surplus heat from the industry as well as the use of biomass and energy from waste.

Rank	Top 12 support measure	Short description of the support measure	Sector dimension
7	Support – Favourable loans	Providing low interest loans to finance the capital cost of establishing, extending or refurbishing district heating. Currently applied in Germany and Croatia.	All

Germany: 1 measure

DE measure 8: The Loan Program for Energy Efficiency aiming for energy efficient buildings providing financial incentives for energy efficient construction and refurbishment.

Croatia: 1 measure

HR measure 8: Another financial support scheme for financing projects of environmental protection, energy efficiency and renewable energy sources. The purpose is to encourage investments that, for example, encourage cleaner production and reduce waste and emissions from production, renovate landfills, protect and conserve biological and landscape diversity, encourage the use of renewable energy sources (sun, biomass etc.), encourage cleaner transport, etc.

Rank	Top 12 support measures	Short description of the support measure	Sector dimension
8	Support – Investment grant, CHP	Financial support for CHP through provision of grant, probably from government, but other sources also possible. Currently applied in Germany and Ireland.	Generation

Germany: 1 measure

DE measure 6: The Future Investment Programs I and II were initially introduced in 1973 and 1978 in order to fight the negative effects of oil prices. They stimulated investments in heat supply and distribution in urban areas in order to reduce energy consumption, protect environment, secure supply and increase fuel diversification. Support of a maximum of 35% of investment costs could be given under the programs.

Ireland: 2 measures

IE measure 2: CHP Deployment program aimed at providing support for the deployment of CHP by means of grant aid assistance in accordance with EU directive on CHP. The objective is to increase the deployment of small scale CHP (between 50kWe and 1MWe) systems in industrial, commercial, service and public sectors. Decrease fossil fuel usage and increase electricity security via more diversity, increase consumer awareness and the capability of Irish CHP equipment supply chain.

IE measure 3: The third measure is called "Biomass CHP/Anaerobic Digestion (AD) CHP Deployment Program Call for Proposals". The objective is to increase deployment of biomass and AD CHP schemes, reduce fossil fuel usage, increase electricity security, customer awareness and improve the equipment supply chain regarding biomass CHP and AD CHP.

Rank	Top 12 support measure	Short description of the support measure	Sector dimension
9	Support – Tax deduction, DH	Implementing a tax benefit for district heating schemes. Currently applied in Finland, France, Italy, Lithuania, and Norway.	Distribution

Finland: 1 measure

The second Finnish issue put forward as a supporting measure for DH is the "domestic work tax deduction for households", which makes it possible for households to make a maximum deduction of 3000 Euros per person when switching from oil boiler to DH, solar panels or heat pumps.

France: 1 measure

VAT is collected with a rate reduced to 5.5% regarding thermal heat delivered through district heating systems : for all DH networks for the "subscription" part of the bill (the same as for gas or electricity in France); for the part of the bill regarding heat deliveries from DH when the heat is produced from at least 50% of biomass, geothermal energy, waste or recovered energies (R&R). The purpose is to give an incentive to DH-systems to increase share of R&R energy sources into fuel mix.

Italy: 1 measure

IT measure 4: Tax credits for DHC systems using renewables for energy supply.

Lithuania: 1 measure

LT measure 3: *VAT reduction for residential heating adopted 2005 in order to make it cheaper to buy DH.* This is said to have led to lower indebtedness thereby reducing short term borrowing for companies.

Norway: 1 measure

The fifth NO support measure is tax deduction on electricity used in DH production and on the nitrogen dioxide (NOx) tax. Most of the industrial , energy and transport sector have exemption from the NOx tax and have joined an agreement with the ministry of environment of reducing the NOx emissions.

Rank	Top 12 support measure	Short description of the support measure	Sector dimension
10	Planning – Building regulations	Using existing regulatory framework to encourage deployment, and in to ensure unnecessary barriers are removed. Currently applied in Ireland, <i>France</i> , Norway, and United Kingdom.	Demand

Ireland: 1 measure

IE measure 6: The Building Energy Rating (BER) program. The major motive behind this program is to stimulate property owners and developers to invest in upgrading the energy performance of their buildings. This cover usually a combination of insulation, glazing, ventilation control, boilers and heating systems and in some cases lightning systems. By 2008 it is claimed that 82% of new homes have published a BER with the rate B, of these 40% received a B2, 8% an A rating and 10% a C rating.

France

No detailed information is available, since the measure was not included in the initial national report. This country reference was added later in the project, as a result from the embedded learning process in the Ecoheat4EU project.

Norway: 1 measure

The third NO support measure is regulations in the guidelines for the Planning and Building Act of 01/07/2010. Electrical and fossil heating is forbidden in all buildings over 500 m². There is a claim of a minimum of 60% of energy from renewable heat in all buildings over 500 m², and a minimum of 40% for buildings below 500 m². There is an obligation of connection for DH. Exemptions for zero-energy houses can be claimed. DH is regarded as renewable, even with 12% fossil fuel. The goal is for DH to be completely renewable by 2020. Installation of oil-only boilers is forbidden in all new and refurbished buildings (exceptions for the industry and DH sectors). Waste planning and the landfill ban are also important measures.

United Kingdom: 1 measure

UK measure 6: The building regulations are the main mechanism through which energy savings in new buildings is enforced. Following the requirements of the EPBD, the building regulations compliance model/software estimates the carbon dioxide emissions from a new building and compares this to a target emissions rate for compliance. The aim is to deliver zero-carbon houses (by 2016 in England), non-domestic buildings (by 2019) and public sector buildings (from 2018). All new homes and buildings have to comply with building regulations, although the actual regulations vary between the individual countries of the United Kingdom.

Rank	Top 12 support measure	Short description of the support measure	Sector dimension
11	Support – Investment grant, renewables	Financial support for renewables through provision of grant, probably from government, but other sources also possible. Currently applied in Germany, <i>France</i> , Croatia, Ireland, Norway, and Sweden.	Generation

Germany: 2 measures

DE measure 7: The Program for Rational Energy Use, Renewable Energy Sources and Energy Savings was introduced in order "to achieve a significant contribution towards climate protection and the reduction of CO2 emissions". Support can, for example, be given to the construction of biomass, biogas installations and for connection of costumers to DH grid supplied with heat from CHP or DH from renewables.

DE measure 10: The Market Stimulus Package for Renewable Energy Sources is an incentive schema for investments in technology incorporating renewable energy sources in the heating market leading to lower costs. The aim is to increase the share of renewable sources to 14% by 2020. Especially large scale biomass installations, deep geothermal installations and local heating grids are of interest with a special focus on small and medium enterprises.

France

No detailed information is available, since the measure was not included in the initial national report. This country reference was added later in the project, as a result from the embedded learning process in the Ecoheat4EU project.

Croatia: 1 measure

HR measure 7: A financial initiative for support for renewable energy sources and energy efficiency. The purpose is to provide a financial initiative in order to encourage environmental protection, energy efficiency and use of RES by, for example replacing and reconstructing worn out inefficient plants, introducing more efficient technologies, changing to alternative fuels, optimising plants, and encouraging CHP, etc. The financial instruments include for example "soft" loans, interest subsidies, financial aid and donations.

Ireland: 1 measure

IE measure 4: ReHeat deployment program is short for the Renewable Heat deployment program and is aiming towards stimulating installation of new renewable energy plants supplying space, water and process heating in commercial, industrial, services, public sectors as well as Energy Supply Company installations by means of grant assistance. The program is focused on biomass boilers, solar thermal collectors and heat pumps. The objectives are to increase use of renewable energy heating systems, increase the deployment of biomass boilers, ensure efficient design and installation and to achieve carbon emissions savings.

Norway: 1 measure

The second NO support measure is Financial Support for Renewable Heat Production for DH companies for new production from renewable energy and for small scale renewable heat production. The support is regulated by the state aid regulations, max 30% support per company (in average 15-20%). 18 million EURO's in 2008 and 41 million in 2009. The main purpose is to improve efficiency and use renewable heat and to improve security of supply and to reduce the use of electrical heating. The political goal is 25 new TWh of renewable energy by 2020. Support has been given to all new DH plants and some small scale heat plants that wouldn't have been started due to financial crisis.

Sweden: 1 measure

The *second* SE point is a climate change program which gives support to green house gas reducing projects. These programs are not specifically targeting DH but they do include things like the expansion of DH and transition to biofuels for example.

Rank	Top 12 support measure	Short description of the support measure	Sector dimension
12	Planning – Waste planning & landfill bans	Promoting in a strategic way disposal of waste, so that the energy can be recovered and put to use in district heating schemes. Currently applied in Denmark and Norway.	Generation

Denmark: 1 measure

The sixth DK issue concerns waste planning. Waste is considered to be a partly renewable fuel and the priority order for waste is first general prevention, second recycling, third incineration with energy capture and fourth waste deposition. The purpose is foremost to solve environmental waste issues at the lowest possible socio-economic cost. It is listed having positive impact on planning, generation and distribution.

Norway: 1 measure

The thirteenth NO support measure is waste and landfill bans, increasing the amount of waste for waste incineration. Heat from waste incineration is the most important energy resource in the Norwegian district heating systems.