

Good Support Scheme Characteristics



Sven Werner, Halmstad University

Contents

Introduction	2
National legislative frameworks	3
Support measures characteristics	4
Support measures by sector dimension	8
Support measures reported in the national reports	8
Relations to needs, barriers and opportunities	13
Local best practise initiatives.....	15
Checklist of characteristics	17
Conclusions	19

Introduction

This report contains a summary and an analysis of the Ecoheat4EU enquiries concerning national legislation and support measures related to district heating and cooling in 14 European countries. The basic enquiries were performed between October 2009 and March 2010. Complementing and additional information was gathered and finally implemented in November 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 different market situations, 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 new 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.

Within the Ecoheat4EU enquiry, no answer guidance concerning legislative frameworks, support measures, or barriers was given. All answers were given by each country partner as free text and not by predefined multiple choices. Hence, no harmonising or cross-country influences appeared in the original national answers. However, an important discussion and learning process took place among the country partners, when the first draft of this report was distributed. After

this discussion, several countries wanted to revise their answers when having identified more national legislation concerning district heating and cooling, especially concerning support measures.

The country answers reflect mainly the national opinions about what constitutes a legislative framework or a support measure. What is considered to be very important in one country is not considered at all in another country. Hereby, this summary is not the complete map of all legislative frameworks or support measures for district heating and cooling in the 14 countries.

National legislative frameworks

The number of relevant legislative frameworks concerning district heating and cooling are summarised in Table 1 by countries and in Table 2 by the four country groups. In all, 13 typical groups of legislation were identified. The number of reported legislation differs from country to country. For France, 13 different legislative frameworks were reported, while two Consolidation countries (Denmark and Sweden) only reported one legislative framework each, which were the national district heating acts. Three countries (Spain, Italy, and United Kingdom) reported that they had no legislative framework at all for district heating and cooling.

The main focus is on district heating in these legislative frameworks. Only Denmark reported a specific district cooling act, but as a support measure and not as a legislative framework.

The main national Energy act contains the major market rules for district heating and cooling in 5 countries (The Czech Republic, Finland, Croatia, Lithuania, and Norway). More specific district heating acts appear in Germany (AVBFernwärmeV), Denmark, Croatia, Lithuania, Romania, and Sweden. Price regulation legislation has been implemented in The Czech Republic, Croatia, and Romania. Price regulation also exists in Denmark, but the corresponding legislation can be found in the Danish district heating act. Germany has no price regulation, but reports an act that gives some restricting and exclusive market rules for district heat pricing: The AVBFernwärmeV in regards to price clauses. Other relevant acts are energy efficiency, renewable, environmental, taxation, planning, competition, and public utility acts together with national energy policies being the umbrellas for all energy legislation. Only Germany reports important municipal codes enforcing mandatory heat planning.

Table 1. Number of relevant legislative frameworks by country and legislative group.

Count of Legislative group	Country													Grand Total	
	CZ	DE	DK	ES	FI	FR	HR	IE	IT	LT	NO	RO	SE		UK
01 Energy act	1				1		1			1	1				5
02 District heating act		1	1				2			1		2	1		8
03 Heat price regulation	1	2					3					4			10
04 No legislative framework				1					1					1	3
05 Energy efficiency act		2		1		3						3			9
06 Renewable act	1	2													3
07 Environmental act	4	1				2						1			8
08 Taxation act	1	1			1	2									5
09 Planning act		1			1	2					1				5
10 Competition act					1										1
11 Public utility act						4						1			5
12 National policies	1							4				1			6
13 Municipal & regional policies		1													1
Grand Total	9	11	1	2	4	13	6	4	1	2	2	12	1	1	69

Table 2. Number of relevant legislative frameworks by country group and legislative group.

Count of Legislative group	Country group				Grand Total
	Consolidation	Refurbishment	Expansion	New development	
01 Energy act		1	3	1	5
02 District heating act		2	5	1	8
03 Heat price regulation			8	2	10
04 No legislative framework				1	3
05 Energy efficiency act			3	5	9
06 Renewable act			1	2	3
07 Environmental act			5	3	8
08 Taxation act		1	1	3	5
09 Planning act		1		4	5
10 Competition act		1			1
11 Public utility act			1	4	5
12 National policies			2		6
13 Municipal & regional policies				1	1
Grand Total	6	29	27	7	69

The country group distribution in Table 2 reveals that most specific legislative frameworks are reported from the Refurbishing and the Expansion countries. One interpretation is that the refurbishing and expansion focuses give more attention to the barriers and opportunities provided by national legislative frameworks. This has not yet received attention in the New development countries, while it appears to be past history in the Consolidation countries.

In the New development countries, Spain and United Kingdom report no legislative frameworks, but Spain adds an energy efficiency act. Ireland just refers to four different national policies. This fact is not a surprise: You do not need district heating acts, if almost no district heat is used in the country. But also the Consolidation countries report very few legislative acts: Denmark and Sweden just refer to their district heating acts, while Finland mentions four acts: the energy, taxation, planning, and competition acts. But the taxation and the competition acts are also important in Denmark and Sweden, since fossil fuels are strongly taxed and district heating has very dominant position in both countries. According to the national competition acts, this gives a general restriction in district heat pricing. Equal customers must then receive the same price offers.

Support measures characteristics

Support measures have in the performed analysis been classified into four main groups, reflecting the different characteristics in each group:

1. **Burden measures:** A tax or fee burden is generally applied for use of fossil fuels or emissions of fossil carbon dioxide. This burden will give opportunities for non-fossil energy options and higher energy efficiencies as DHC systems.
2. **Financial support:** A governmental, a regional or a municipal investment grant or operation support can be given to promising future market solutions currently having low or zero market shares. The financial support is given in order to facilitate the wider use of the requested technology.
3. **Market control:** Market supervision and control may decrease the risk for market abuse, giving customer more confidence to use the technology. This is especially valid for natural monopolies with heat planning and mandatory connections to district heating.
4. **Planning:** Extension of district heating systems contains some considerable financial risk, since both heat supply and distribution capacity must be installed before more customers are connected. Installed capacity without customers constitutes the risk. Planning measures can reduce this risk by harmonised extensions.

In all, 23 different subgroups of support measures were reported in the national answers to the Ecoheat4EU enquiry: 3 burden measures, 11 financial supports, 3 market controls, and 6 planning measures. These 23 subgroups with their characteristics are presented below by each main group.

1. Burden measures

The 3 subgroups and their characteristics are:

Support measure	Characteristics	Sector dimension
1 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)	Generation
1 Burden – Emission trading system	Implementing a cap system for carbon dioxide emissions. Emissions rights can be traded below the cap.	Generation
1 Burden – Energy tax	Implementing a tax penalty on primary energy use or final end use. Applicable to all energy systems (energy efficient approaches like district heating would prosper).	Generation

2. Financial support

The 11 subgroups and their characteristics are:

Support measure	Characteristics	Sector dimension
2 Support – Favourable loans	Providing low interest loans to finance the capital cost of establishing, extending or refurbishing district heating.	All
2 Support - Feed-in tariff, renewable electricity	Supporting renewable electricity through regulatory means by a Feed-in Tariff.	Generation
2 Support – Investment grant, CHP	Financial support for CHP through provision of grant, probably from government, but other sources also possible.	Generation
2 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.	Demand
2 Support - Investment grant, DH distribution	Financial support for district heating pipes through provision of grant, probably from government, but other sources also possible.	Distribution
2 Support - Investment grant, renewables	Financial support for renewables through provision of grant, probably from government, but other sources also possible.	Generation
2 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.	Generation
2 Support - Operation support, renewables	Supporting renewables through regulatory means by green certificates, both for electricity and heat.	Generation
2 Support - Social support for poor customers	Supporting poor customers in order to avoid heat poverty, also known as “fuel poverty”.	Demand
2 Support – Tax deduction, CHP	Implementing a tax benefit for CHP plants.	Generation
2 Support – Tax deduction, DH	Implementing a tax benefit for district heating schemes.	Distribution

The reason for support measures concerning renewable electricity are considered as support measures for district heating and cooling is that renewables in CHP plants are supported. This gives a strong driving force for providing long term sustainable heat supply from CHP with renewables to district heating systems.

3. Market control

The 3 subgroups and their characteristics are:

Support measure	Characteristics	Sector dimension
3 Market control - Consumer complaints board	Introducing a board responsible for consumer complaints in order to handle and monitor misunderstandings, unfair customer conditions, and market abuse.	Demand
3 Market control – Price regulation	Implementing price regulation in order to supervise district heat pricing in order to avoid market abuse.	Demand
3 Market control – Third party access	Implementing open competition in heat generation and supply in order to avoid market abuse.	Generation

4. Planning

The 6 subgroups and their characteristics are:

Support measure	Characteristics	Sector dimension
4 Planning – Building regulations	Using existing regulatory framework to encourage deployment, and in to ensure unnecessary barriers are removed.	Demand
4 Planning – CHP planning	Strategic power plant planning, exploring all possibilities for CHP when establishing new thermal power plants.	Generation
4 Planning - Heat planning & zoning, DH	Strategic energy planning, probably at municipality level. May include encouraging or even enforcing particular energy solutions (zoning).	Distribution
4 Planning – National energy policy	The framework, within which relevant legislation, possibly including measures on this list, may be framed.	Planning
4 Planning – Renewable planning	Strategic renewable planning, exploring all possibilities for use of renewables when new heat demands are established.	Generation
4 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.	Generation

Support measures by sector dimension

The overview of support measure subgroups in Table 3 reveals that the generation part dominates in the support measure subgroups. Only 3 support measure subgroups focus on heat distribution in district heating systems.

Table 3. Overview of the distribution, by support measure main groups and by sector dimensions, for the 23 support measure subgroups identified.

	All	Planning	Generation	Distribution	Demand	Organisation
1 Burden measures			3			
2. Financial support	1		6	2	2	
3. Market control			1		2	
4. Planning measures		1	3	1	1	
Total	1	1	13	3	5	0

Support measures reported in the national reports

Totally, 97 national support measures were finally reported in the 14 national answers to the Ecoheat4EU enquiry. These answers are summarised in Table 4 to Table 7. The general purport of a support measure was initially not defined or harmonised within the project. Each country partner reported support measures according to their own definitions. When the draft version of this report was distributed, a fruitful discussion began about various support measures. After this learning process, some countries revised their submission, giving some degree of cross-border harmonisation in this final report.

The 7 burden measures reported are carbon taxes (Denmark, Norway and Sweden), energy taxes (Denmark and Norway), and the European emission trading system (Italy and Norway). It is a strong verification that only two countries regard the European emission trading system as a support measure for district heating, revealing its weak support to district heating systems. These carbon trading systems should be beneficial to district heating and cooling systems, since they are more energy efficient than conventional heat supply, according to (Werner et al 2002). The lower primary energy supply comes from a combination of local substitution of fossil fuels used for heating and the provision of more carbon lean electricity from the CHP plants to the wholesale power market. The main ETS problem for district heating systems is that neither DHC customers nor individual boilers belong to the ETS, but the DHC heat supply units do. Hence, this severe border problem gives no direct incentives for new DHC customers, unless the non-ETS sector has a corresponding carbon tax.

The use of energy or carbon taxes for punishing fossil fuels used for heating is not a harmonised measure throughout Europe. It is more accepted for transportation needs (Stern 2007). In Figure 1, the June 2010 retail oil prices are presented for the EU27 countries. The bar diagram reveals that Denmark and Sweden are among the high fossil fuel tax countries. Italy belongs also to this group, but has not considered this as a support measure in the national answer to the Ecoheat4EU enquiry.

The diagram shows that many European countries do not tax fossil fuel in order to promote alternative non-fossil heat supply. Countries with very low taxes on fossil fuels are Belgium, Latvia, Lithuania, and Luxembourg. In United Kingdom, the VAT rate is generally lowered to 5% for fuel oil in order to avoid fuel poverty, mostly for elderly consumers. But this VAT reduction benefits also richer energy consumers with ability to pay ordinary VAT, giving a severe conflict between the social and energy policies in the UK.

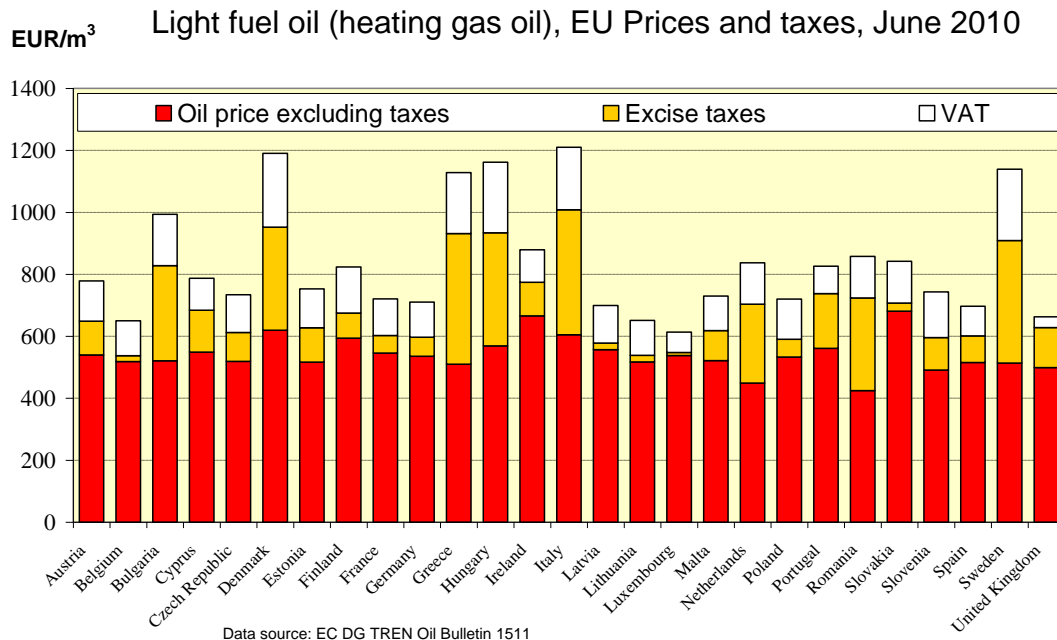


Figure 1. Overview of total retail oil prices in the EU27 countries divided into three components: Without taxes, excise taxes, and VAT. Excise taxes include mostly energy and carbon taxes.

The five most frequent financial support measures are various investment grants for heat distribution (10 measures appearing in 8 countries), investment grants for renewables, operation support for CHP (including feed-in tariffs and the German CHP bonus), investment grants for district heating connections, and tax deduction for district heating. Hence, investment grants dominate the financial support measures.

Table 4. Support measures within subgroups according to country.

Count of Support subgroup	Country														Grand Total
	CZ	DE	DK	ES	FI	FR	HR	IE	IT	LT	NO	RO	SE	UK	
Support subgroup															
1 Burden - Carbon tax			1								1		1		3
1 Burden - Emission trading system									1		1				2
1 Burden - Energy tax			1								1				2
2 Support - Favourable loans		1					1								2
2 Support - Feed-in tariff, renewable electricity		1						1		1					3
2 Support - Investment grant, CHP		1						2							3
2 Support - Investment grant, DH connection		1	1		1							1			4
2 Support - Investment grant, DH distribution		2		1		1			1	1	1	2		1	10
2 Support - Investment grant, renewables		2					1	1			1		1		6
2 Support - Operation support, CHP incl FIT	1								1	1		2			5
2 Support - Operation support, renewables									1						1
2 Support - Social support for poor customers										1					1
2 Support - Tax deduction, CHP														2	2
2 Support - Tax deduction, DH					1	1			1	1	1				5
3 Market control - Consumer complaints board			1				1				1				3
3 Market control - Price regulation			1												1
3 Market control - Third party access										1					1
4 Planning - Building regulations								1			1			1	3
4 Planning - CHP planning			1								1			1	2
4 Planning - Heat planning & zoning, DH		1	2	1		1			1	1	2			1	10
4 Planning - National energy policy	11	2	1				5				1				20
4 Planning - Renewable planning		1						1	1					2	6
4 Planning - Waste planning & landfill bans			1								1				2
Grand Total	12	12	10	2	2	3	8	6	7	7	13	4	3	8	97

Table 5. Support measures within main groups according to country.

Count of Support subgroup	Country														Grand Total
	CZ	DE	DK	ES	FI	FR	HR	IE	IT	LT	NO	RO	SE	UK	
Support group															
1 Burden			2						1		3		1		7
2 Support	1	8	1	1	2	2	2	4	4	5	3	4	2	3	42
3 Market control			2				1			1	1				5
4 Planning	11	4	5	1		1	5	2	2	1	6			5	43
Grand Total	12	12	10	2	2	3	8	6	7	7	13	4	3	8	97

Table 6. Support measures within subgroups according to country groups.

Count of Support subgroup	Country group					Grand Total
	Consolidation	Refurbishment	Expansion	New development		
Support subgroup						
1 Burden - Carbon tax	2		1			3
1 Burden - Emission trading system			2			2
1 Burden - Energy tax	1		1			2
2 Support - Favourable loans			1			2
2 Support - Feed-in tariff, renewable electricity			1		1	3
2 Support - Investment grant, CHP					2	3
2 Support - Investment grant, DH connection		3			1	4
2 Support - Investment grant, DH distribution			3		2	10
2 Support - Investment grant, renewables	1		1		1	6
2 Support - Operation support, CHP incl FIT			4		1	5
2 Support - Operation support, renewables					1	1
2 Support - Social support for poor customers			1			1
2 Support - Tax deduction, CHP					2	2
2 Support - Tax deduction, DH		1	1		3	5
3 Market control - Consumer complaints board		1	1		1	3
3 Market control - Price regulation		1				1
3 Market control - Third party access			1			1
4 Planning - Building regulations					1	3
4 Planning - CHP planning		1			1	2
4 Planning - Heat planning & zoning, DH		2	1		2	10
4 Planning - National energy policy		1	16		3	20
4 Planning - Renewable planning					3	6
4 Planning - Waste planning & landfill bans		1			1	2
Grand Total	15		31		16	97

Table 7. Support measures within main groups according to country groups.

Count of Support subgroup	Country group					Grand Total
	Consolidation	Refurbishment	Expansion	New development		
Support group						
1 Burden	3		4			7
2 Support	5	12	17	8		42
3 Market control	2	2	1			5
4 Planning	5	17	13	8		43
Grand Total	15	31	35	16		97

The 7 tax deduction cases are the tax deduction in Finland for connection to district heating, the tax credit given for renewable district heating in Italy, the reduced VAT in France and Lithuania,

the reduced electricity tax for district heating in Norway, and the climate change levy exemption and the enhanced capital allowances for good quality CHP in UK. The VAT is also reduced for district heat in the Czech Republic, but this has not been considered as a support measure in this country.

Market control measures are not so frequently considered as support measures in the enquiry answers. The only 5 measures reported are the price regulation in Denmark, the third party access in Lithuania, and the consumer complaints boards in Croatia, Denmark, and Norway.

The planning measures are dominated by 20 national energy policies, but 11 of them originate from the Czech Republic and 5 from Croatia, giving preferences for national energy policies as support measures in these two countries. The second most frequent measure is the 10 heat planning, mandatory connection or zoning measures applied in 8 different countries. However, this measure can not be seen as a general European support measure. Mandatory heat planning is apprehended as politically controversial in some fully developed market economies, having high priority for customer freedom of choice. However, the importance of heat planning should not be neglected for creating successful district heating systems by exploiting valuable urban synergies, as in Denmark. Renewable planning appears in 6 reported measures from 5 countries.

Which further supporting measures for district heating and cooling are then missing in this compilation of existing support measures in the 14 countries? Some examples are:

- Emission bans for CFC and other refrigerants, normally been used for cooling devices. This has often been considered to be the strong market harmonisation and driving force for introducing and establishing district cooling systems in Europe during the 1990's.
- Location planning of new power plants and new energy-intensive industries in order to recycle the residual heat from these processes for heating purposes in urban areas. This location planning can be seen as a direct application of the IPPC directive principle (to be replaced by the Industrial Emissions Directive), about best available technology to be used.
- Research and development awareness from national energy and climate change research programs.

The overall structure from the national answers is summarised in Table 7. Consolidation countries use a mixture of general planning measures and burden taxes together with some directed financial support in order to create non-distorted conditions for district heating. District heating becomes then a natural market response for solving other community problems as waste disposal, energy inefficiency, and fossil carbon dioxide emissions. Refurbishing countries have a stronger planning focus, while financial support measures dominate in the Expansion countries. The New development countries try to balance between planning and financial support measures.

Now remains the crucial question: Is it possible to link the success of district heating in some countries with the effectiveness of the support measures applied? The analysis above provides no reliable information about this link. This situation appears since the development of district heating during several decades has been the final result from various historical support measures and various market conditions (as the high oil prices during the 1970's and early 1980's). The historical support measures with the highest impacts are probably the high fuel oil

taxes in Denmark and Sweden since the 1980's. They supported and gave market protection for the heat planning doctrine in Denmark, while they were the main instrument in Sweden. The German investment grant programs (the ZIP-I and ZIP-II programs) had also a significant impact in the 1970's and 1980's.

The major conclusion is then that no correlation between the current support measures and the current district heat market shares can be found. Hence, it is impossible to select or define effective or best practise support measures from this analysis.

My personal opinion as a long-time district heating analyst is that other explanations than support measures can well explain why district heating have been more successful in one country compared to another country. A very important explanation is the divided taxation responsibility between national and municipal taxes in the Nordic countries and in Germany. This local availability to local financial resources has given the possibility to solve local problems with local solutions. This traditional subsidiarity taxation principle made it possible to initiate municipal district heating systems in these countries. France and the United Kingdom are examples of countries with strong governmental power to solve national problems, giving less attention to local problems and solutions.

Another often heard explanation is that the coldness in the Nordic countries, expected to give high heat demands, should have been the strong driving force for district heating. But the heat demands in these countries are not much higher in general than in Central Europe, since the Nordic building envelopes have very good thermal resistances counteracting the cold climate (Werner 2005).

References:

- Werner S, The European heat market. Ecoheatcool WP1, Brussels 2005.
- Sterner T, Fuel taxes: An important instrument for climate policy. Energy Policy 35(2007) 3194-3202.
- Werner S, Spurr M, Pout C, Promotion and recognition of DHC/CHP benefits in Greenhouse Gas Policy and Trading Programs. IEA Implementing Agreement on District Heating and Cooling, Report 2002:S9.

Relations to needs, barriers and opportunities

In the national answers to the Ecoheat4EU enquiry, each country had to provide descriptions of needs, barriers, and opportunities reflecting the current typical national district heating and cooling market environments. These descriptions have been analysed by labelling each issue with relevant keywords with respect to what was highlighted in each issue. The keywords were chosen to consider 5 different aspects: Barriers, Challenges, Needs, Opportunities, and Threats. Totally, 30 description labels were identified and they are summarised in Table 8 to Table 11.

The two issue groups having the highest frequencies were the barriers and opportunities groups. Typical barriers were short paybacks for investments, un-harmonised taxation, and low community acceptance for district heating. Norway and Sweden had a common barrier in the current building regulations, giving priority to energy end use instead of primary energy use. The typical opportunities were growing interest in renewables and expectations of more competitive lighter district heating technology. The largest challenge was the uncertainty of the future heat demand level, while revision of legal frameworks was the highest need. Only one threat was reported: Third party access from Germany.

The pattern was different in the Consolidation country group, the opportunities and challenges outnumbered the reported barriers. In the other three country groups, the barriers outnumbered the opportunities. Apparently, high market shares of district heating give some self-confidence.

Table 8. Number of labels identified by country and issue subgroup

Count of Issue group	Country													Grand Total	
	CZ	DE	DK	ES	FI	FR	HR	IE	IT	LT	NO	RO	SE		UK
Barrier - ETS heat market distortion	1	1													2
Barrier - Labeling distortion											1		1		2
Barrier - Lack of DH experience				1										1	2
Barrier - Lack of heat planning				1		1									2
Barrier - Low community acceptance			1			1		1						1	4
Barrier - Low DH image							1			1			1		3
Barrier - Low natural gas price							1						1	1	3
Barrier - Low payability													1		1
Barrier - Short payback for investments		1				1		1	1					1	5
Barrier - Unharmonised price regulation	1									1		1			3
Barrier - Unharmonised taxation						1				1	1	1	1		5
Challenge - Convincing new customers													1		1
Challenge - Fossil transition				1											1
Challenge - Future demands			1		1					1			1		4
Challenge - Future legal frameworks		1		1											2
Needs - Legislative heat framework								1	1						2
Needs - Ownership rights, heat distribution	1							1	1						1
Needs - Revision of legal framework			1												3
Opportunities - DH solely by market approach					1										1
Opportunities - Gas substitution			1												1
Opportunities - Growing interest in renewables	1			1	1	2		1	1	1		1			9
Opportunities - Heat planning system														1	1
Opportunities - Industrial heat recycling									1						1
Opportunities - Lighter DH technology					1		1		1						3
Opportunities - Lower CO2 emissions			1												1
Opportunities - No institutional barrier					1										1
Opportunities - Positive image for DH		1	1												2
Opportunities - Refurbishment share is growing	1						1								2
Opportunities - Strong market position													1		1
Threats - Third party access			1												1
Grand Total	5	5	6	5	5	6	5	5	5	5	2	6	5	5	70

Table 9. Number of labels identified by country and issue main group

Count of Issue group NBO group	Country														Grand Total
	CZ	DE	DK	ES	FI	FR	HR	IE	IT	LT	NO	RO	SE	UK	
Barrier	2	2		3		4	2	2	1	3	2	5	2	4	32
Challenge		1	2	1	1					1			2		8
Needs	1		1				1	2	1						6
Opportunities	2	1	3	1	4	2	2	1	3	1		1	1	1	23
Threats		1													1
Grand Total	5	5	6	5	5	6	5	5	5	5	2	6	5	5	70

Table 10. Number of labels identified by country group and issue subgroup

Count of Issue group Issue group	Country group				Grand Total
	Consolidation	Refurbishment	Expansion	New development	
Barrier - ETS heat market distortion		1	1		2
Barrier - Labeling distortion	1		1		2
Barrier - Lack of DH experience				2	2
Barrier - Lack of heat planning			1	1	2
Barrier - Low community acceptance			1	3	4
Barrier - Low DH image		3			3
Barrier - Low natural gas price		2		1	3
Barrier - Low payability		1			1
Barrier - Short payback for investments			3	2	5
Barrier - Unharmonised price regulation		3			3
Barrier - Unharmonised taxation	1	2	2		5
Challenge - Convincing new customers	1				1
Challenge - Fossil transition	1				1
Challenge - Future demands	3	1			4
Challenge - Future legal frameworks			1	1	2
Needs - Legislative heat framework			1	1	2
Needs - Ownership rights, heat distribution		1			1
Needs - Revision of legal framework	1	1		1	3
Opportunities - DH solely by market approach	1				1
Opportunities - Gas substitution	1				1
Opportunities - Growing interest in renewables	1	3	3	2	9
Opportunities - Heat planning system				1	1
Opportunities - Industrial heat recycling			1		1
Opportunities - Lighter DH technology	1	1	1		3
Opportunities - Lower CO2 emissions	1				1
Opportunities - No institutional barrier	1				1
Opportunities - Positive image for DH	1		1		2
Opportunities - Refurbishment share is growing		2			2
Opportunities - Strong market position	1				1
Threats - Third party access			1		1
Grand Total	16	21	18	15	70

Table 11. Number of labels identified by country group and issue main groups.

Count of Issue group NBO group	Country group				Grand Total
	Consolidation	Refurbishment	Expansion	New development	
Barrier	2	12	9	9	32
Challenge	5	1	1	1	8
Needs	1	2	1	2	6
Opportunities	8	6	6	3	23
Threats			1		1
Grand Total	16	21	18	15	70

Local best practise initiatives

In the national answers to the Ecoheat4EU enquiry, each country had to provide descriptions of 2 local initiatives reflecting the current characters of district heating and cooling extensions and investments. These local initiatives have been analysed by labelling each initiative with relevant keywords with respect to what was highlighted in each description. The keywords were chosen to consider 8 different aspects: Ownership, planning, use, connection, supply, emissions, and external benefits. Totally, 24 initiative labels were identified and they are summarised in Table 12 to Table 15.

The focus in the local best practise initiative descriptions is presented with the labels having high frequencies. These are in descending order: biomass supply, reductions of greenhouse gases, expansion of existing systems, CHP, Private Public Partnerships, and local climate policies.

In general, one third of the identified initiative labels cover heat supply and generation issues, mostly from renewable resources, giving a strong supply initiative focus. This is also the case in the country groups. The Consolidation countries also highlight planning issues. The Refurbishing countries have a unique focus on use level initiatives, while the Expansion countries focus on extension projects. The New development countries share their focus between ownership and connection initiatives.

Table 12. Labels identified by country and initiative group

Count of Initiative group	Country													Grand Total	
	CZ	DE	DK	ES	FI	FR	HR	IE	IT	LT	NO	RO	SE		UK
1 Ownership - Cooperative			1												1
1 Ownership - Municipal				1											1
1 Ownership - PPP				1		3		1		1				1	7
2 Planning - Design competition					1										1
2 Planning - Heat planning					1									1	2
2 Planning - Local climate policy		2	1								2		1	1	7
3 Use - Cost allocators							1								1
3 Use - Demand side management							1								1
3 Use - Heat meters							1	1				2			4
3 Use - Social pressure												2			2
4 Connection - Development area					2			1							3
4 Connection - Expansion		2		1		3				1			1	1	9
4 Connection - New system		2						1			1			1	5
5 Distribution - Heat transmission	1												1	1	3
6 Supply - Biomass	1		1	1		3				1	2		2		11
6 Supply - CHP	1		1						1	2		2	1		8
6 Supply - District cooling				1											1
6 Supply - Geothermal heat			1					1						1	3
6 Supply - Industrial heat recycling									1				1		2
6 Supply - ORC turbine	1														1
6 Supply - Solar heat			2								1				3
6 Supply - Waste incineration								1	1				1		3
7 Emissions - GHG reduction						3	2		1				2	2	10
8 External - Job creation											1				1
Grand Total	4	6	7	5	4	12	5	5	5	4	8	6	10	9	90

Table 13. Labels identified by country and main initiative groups

Count of Initiative group	Country											Grand Total			
	CZ	DE	DK	ES	FI	FR	HR	IE	IT	LT	NO		RO	SE	UK
1 Ownership			1	2		3		1		1				1	9
2 Planning		2	1		2						2		1	2	10
3 Use							3	1				4			8
4 Connection			4		1	2	3	2			2		1	2	17
5 Distribution	1												1	1	3
6 Supply	3			5	2		3		1	4	3	2	5	1	32
7 Emissions						3	2		1				2	2	10
8 External											1				1
Grand Total	4	6	7	5	4	12	5	5	5	4	8	6	10	9	90

Table 14. Labels identified by country group and initiative group

Count of Initiative group	Country group				Grand Total
	Consolidation	Refurbishment	Expansion	New development	
1 Ownership - Cooperative	1				1
1 Ownership - Municipal				1	1
1 Ownership - PPP		1	3	3	7
2 Planning - Design competition	1				1
2 Planning - Heat planning	1			1	2
2 Planning - Local climate policy	2		4	1	7
3 Use - Cost allocators			1		1
3 Use - Demand side management			1		1
3 Use - Heat meters			3	1	4
3 Use - Social pressure		2			2
4 Connection - Development area	2			1	3
4 Connection - Expansion	1		6	2	9
4 Connection - New system			3	2	5
5 Distribution - Heat transmission	1	1		1	3
6 Supply - Biomass	3	2	5	1	11
6 Supply - CHP	2	5	1		8
6 Supply - District cooling				1	1
6 Supply - Geothermal heat	1		1	1	3
6 Supply - Industrial heat recycling	1		1		2
6 Supply - ORC turbine		1			1
6 Supply - Solar heat	2		1		3
6 Supply - Waste incineration	1		1	1	3
7 Emissions - GHG reduction	2	2	4	2	10
8 External - Job creation			1		1
Grand Total	21	19	31	19	90

Table 15. Labels identified by country group and main initiative groups

Count of Initiative group	Country group				Grand Total
	Consolidation	Refurbishment	Expansion	New development	
1 Ownership	1	1	3	4	9
2 Planning	4		4	2	10
3 Use		7		1	8
4 Connection	3		9	5	17
5 Distribution	1	1		1	3
6 Supply	10	8	10	4	32
7 Emissions	2	2	4	2	10
8 External			1		1
Grand Total	21	19	31	19	90

Checklist of characteristics

Support measures for district heating and cooling are introduced in order to overcome market barriers and to exploit hidden opportunities. The overall aim to reach is the main advantages with district heating and cooling: Higher energy efficiency giving lower primary energy use, lower carbon dioxide emissions, and lower energy import dependence. District heating systems provide also the possibility to introduce renewables in dense urban areas.

The checklist contains 10 issue advices concerning what to consider when implementing support measures for district heating and cooling systems.

	Issue	Advice
A	National energy policy	Acknowledge the major benefit (higher energy efficiency) with district heating and cooling in the national energy policy. This will give the essential national policy support for applying proper supporting measures for district heating and cooling.
B	General versus specific measures	<p>Consider whether you want a general solution for a community problem (as energy inefficiency) or you want to support district heating systems direct financially. Since natural gas and fuel oil is the major energy commodities used for heating in Europe, taxes on carbon dioxide emissions or fossil energy would be the general support measures for all future alternative heat supply. Then district heat has to compete with other non-fossil heat supply.</p> <p>Another general measure is specific national climate change investment programmes, where district heating and cooling can be supported, if the programme aims are fulfilled.</p>
C	Maturity of district heating	<p>Avoid giving direct financial support to developed and mature district heating systems with high market shares, as in the Consolidation countries. Direct financial support should only be applied for extra stimulation of district heating system expansions in Re-furbishing, Expansion, and New development countries.</p> <p>But when applying more general support measures as fossil fuel taxation and climate change investment programmes, mature district heating systems will also benefit if they fulfil the general program aims.</p>

	Issue	Advice
D	Financial support character	Consider the support effectiveness between initial investment grants and annual supports as feed-in tariffs, CHP bonuses, or green certificates. Investors put a higher risk reduction value in upfront investment grants, since annual support later can be changed or completely removed by another parliament composition. Hence, annual financial support has a long term political risk.
E	Market control	Consider market control measures only when district heating and cooling systems have reached a strong and dominant position in the heat market, thus creating weak competition from competing heat and cold supply.
F	Heat planning	Consider to add heat planning to other community planning activities as waste management, traffic, water, sewage, and land use planning.
G	Planning perspective	The district heating and cooling benefits will be bankable with proper waste planning, location planning of energy-intensive processes, and building regulations. District heating and cooling providers will then take active parts in developing these plans.
H	Market distortions	District heating and cooling sometimes lose competitiveness from market distortions. Erase these distortions, rather than introducing counteracting support measures directed towards district heating and cooling systems.
I	Policy conflicts	Avoid conflicts with other policy areas. It is common that energy prices are kept low by subventions for social reasons, as the lower VAT rate in United Kingdom. Solve the social problems without interfering with energy policy.
J	Sector dimension	Consider which sector dimension (planning, generation, distribution, demand, or organisation) to support. Generation measures dominate, but distribution measures are appreciated by district heat providers, since the financial risk in distribution are reduced.

Conclusions

The main conclusions from this summary report concerning support schemes characteristics are:

- Different approaches to district heating and cooling legislative frameworks in the 14 European countries.
- Strong focus on generation measures in the typical measure groups reported, but distribution measures became stronger when number of measures reported are summarised.
- Planning and financial support measures dominate.
- Support measures are more directed towards district heating than to district cooling, revealing that district cooling do not have the same policy attention as district heating.
- Barriers and opportunities dominate the national environments for district heating and cooling.
- Still a strong supply and connection focus, when the countries communicate typical local initiatives. Lower focus on ownership, use, distribution, and external benefits.
- The selection of country groups was relevant, since many different outcome characteristics were identified by country groups.