



Overview of District Heating and Cooling Markets and Regulatory Frameworks under the Revised Renewable Energy Directive

Annexes 1 and 2
Final version



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District Heating and Cooling in the European Union

Overview of Markets and Regulatory Frameworks under the Revised Renewable Energy Directive

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List of acronyms

ADEME	Agence de l'Environnement et de la Maîtrise de l'Energie (French agency for environment and energy management)
AGFW	Energieeffizienzverband für Wärme, Kälte und KWK (German energy efficiency association for heating, cooling and CHP)
APG	Algemene Pensioen Groep (Dutch Pension Fund)
Art	Article
ATES	Aquifer Thermal Energy Storage
AVBFernwärmeV	Verordnung über Allgemeine Bedingungen für die Versorgung mit Fernwärme (Ordinance on General Terms and Conditions for the Supply of District Heating Germany)
BTES	Borehole Thermal Energy Storage
CAPEX	Capital Expenditure
CAPM	Capital Asset Pricing Model
CCS	Carbon Capture and Storage
CHP	Combined Heat and Power
COC	Condensable Organic Compounds
COP	Coefficient Of Performance
CoP	European Statistics Code of Practice
COx	Oxides of Carbon
CPC	Compound Parabolic Collector
CSP	Concentrated Solar Power
CTR	Centralkommunernes Transmissionsselskab I/S (Metropolitan Copenhagen Heating Transmission company)
DC	District Cooling
DCS	District Cooling Systems
DH	District Heating
DHC	District Heating and Cooling
DHW	Domestic Hot Water
DN	Nominal Diameter (in mm)
EC	European Commission
ECJ	European Court of Justice
EED	Energy Efficiency Directive
ELAN	Evolution du logement de l'aménagement et du numérique (Evolution of housing, development and the digital environment)
EPBD	Energy Performance of Buildings Directive
EPC	Energy Performance Coefficient
EPCC	Engineering, Procurement, Construction and Commissioning
ESIF	European Structural and Investment Funds

ESP	ElectroSubmersible Pump
ESS	European Statistical System
EU	European Union
EWRC	Energy and Water Regulatory Commission (Bulgaria)
GHG	GreenHouse Gases
GW	GigaWatt
GWB	Gesetz gegen Wettbewerbsbeschränkungen (Act against Restraints of Competition in Germany)
GWh	GigaWatt hour
HC	Heating and Cooling
HeizkostenV	Verordnung über Heizkostenabrechnung (Ordinance on the Settlement of Heating Costs)
IHP	Independent Heat Producer
kW	KiloWatt
kWh	KiloWatt hour
L-CNG	Liquid to Compressed Natural Gas
LNG	Liquefied Natural Gas
MID	Measuring Instruments Directive
MS	Member State
MW	MegaWatt
MWe	MegaWatt electric
MWh	MegaWatt hour
MWth	MegaWatt thermal
na; n/a	not available
NCC	National Commission on Energy Prices (Lithuania)
NECP	National Energy and Climate Plan
NERC	National Energy Regulatory Council (Lithuania)
Nm3	Normal cubic meter
No.	Number
NOx	Oxides of Nitrogen
NRA	National Regulatory Authority
NUP	National Urban Policy
nZEB	nearly Zero Energy Building
OPEX	Operational Expenditure
ORC	Organic Rankine Cycle
P2P	Point-to-Point
PEC	Primary Energy Consumption
PM	Particulates Matter
pp	Percentage Points
RED	Renewable Energy Directive

RES	Renewable Energy Sources
RES-HC	Renewable Heating and Cooling
SCR	Selective Catalytic Reduction
SNCR	Selective Non-Catalytic Reduction
SOx	Oxides of Sulphur
TO4	Thematic Objective 4
TPA	Third Party Access
TPS	Third Party Supplier
TSO	Transmission System Operator
UK	United Kingdom
URE	Energy Regulatory Office Electricity (Poland)
URSO	Úrad pre reguláciu sieťových odvetví (Office for Regulation of Network Industries Slovakia)
VAT	Value Added Tax
VEKS	Vestegnens Kraftvarmeselskab I/S (DH Company Copenhagen)
VOC	Volatile Organic Compounds
VST	Vilniaus Šilumos Tinklai (DH Company in Lithuania)
WWTP	WasteWater Treatment Plant

Annex 1: Country fact sheets

Austria

Table 1: Size of the cities served by DHC and geographical concentration

	DH	DC
Size of the cities served by DHC	<ul style="list-style-type: none"> ○ DH systems can be found in cities with different size. 	<ul style="list-style-type: none"> ○ DC systems are only present in big urban areas
Geographical concentration of the DHC systems	<ul style="list-style-type: none"> ○ DH systems are present in every region in Austria. ○ In urban areas, the concentration of DH networks is high. ○ Very small systems are present mainly in the countryside 	<ul style="list-style-type: none"> ○ The major DC systems are in Vienna and Linz. ○ Since 2012, DC has expanded in Lower Austria to cover hospitals' needs.
Sources	<ul style="list-style-type: none"> ○ Euroheat & power, Country by Country 2019 ○ FGW, Information from the Austrian District Heating Industry 2011¹ ○ Austrian Heatmap² ○ Own survey with national DHC stakeholders (Association of Gas and District Heating Supply Companies FGW) 	

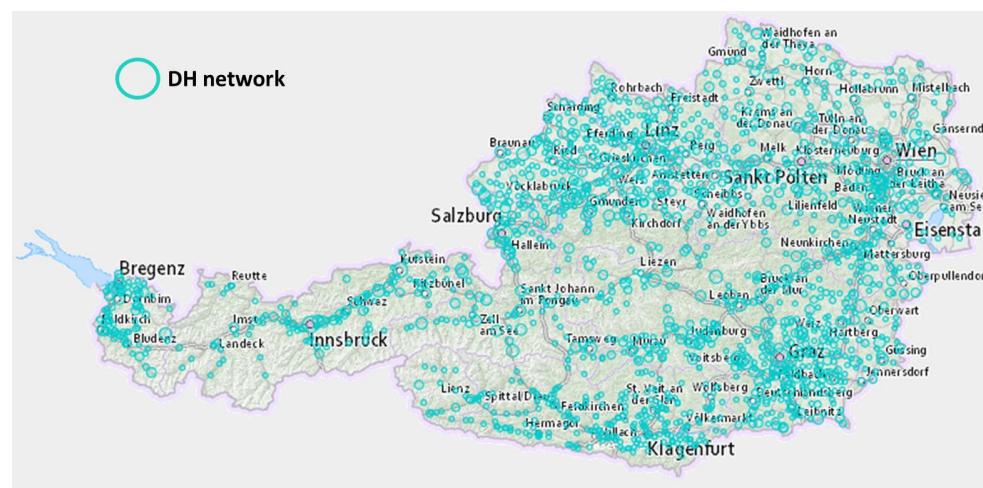


Figure 1: DH systems location (source: Austrian Heatmap)

Table 2: Ownership of the DHC networks

	DH	DC
Ownership repartition in terms of number of networks	<ul style="list-style-type: none"> ○ Large DH networks (around 25 networks) in cities are usually owned by municipalities or energy utility companies ○ Medium and smaller systems (around 400 companies) are in private hands. ○ Very small DH systems (over 3,000 systems) are owned by collectives 	<ul style="list-style-type: none"> ○ DC systems are almost exclusively owned by municipalities
Sources	<ul style="list-style-type: none"> ○ Own survey with national DHC stakeholders (Association of Gas and District Heating Supply Companies FGW) 	

¹ <https://www.fernwaerme.at/media/uploads/misc/fernwaerme.pdf>² <http://www.austrian-heatmap.gv.at/karte/>

District Heating and Cooling in the European Union

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Table 3: Main suppliers and level of competition

	DH	DC
Number of DHC suppliers	<ul style="list-style-type: none"> ○ There are around 750 DH local utilities 	<ul style="list-style-type: none"> ○ DC suppliers are in general also DH suppliers
Main DHC suppliers	<p>The bigger suppliers are present in the big cities</p> <ul style="list-style-type: none"> ○ Wien Energie (1) ○ FernWärme Graz (2) ○ Linz AG (3) ○ Salzburg AG (4) ○ KELAG Wärme (5 or 6) ○ EVN (5 or 6) ○ Energie AG ○ Stadtwerke Klagenfurt 	<ul style="list-style-type: none"> ○ Wien Energie ○ Linz AG ○ EVN
Sources	<ul style="list-style-type: none"> ○ International Energy Agency, 2014 Austria Review³ ○ Own survey with national DHC stakeholders (Association of Gas and District Heating Supply Companies FGW) ○ Cities communication 	

Table 4: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> • DHC networks are owned and managed at local level. • Heating networks are governed by the Commercial Code (exception biomass based DHC networks according to Article 2 (4) No. 9 Gewerbeordnung).⁴
Regulation of prices for consumers	<ul style="list-style-type: none"> • Cartel law and competition monitoring is carried out by E-Contol and BWB (see authorities and supervision below). • DH prices are also regulated with the Price Act. The Price Act governs the prices of material goods and services. However, the law does not provide for a general price regulation, but assumes the existence of the free market, whereby it provides for certain possibilities of intervention.⁵ • There are only a few large municipalities with (regional) price regulation. Any regional price regulations only affect the local municipal DHC suppliers. There are also corresponding arbitration boards. For price increases in the networks concerned, the competent price authority must be appealed to. This usually consists of representatives of the municipality and consumer advocates.⁶
Regulation of metering	<ul style="list-style-type: none"> • According to the Heizkostenabrechnungsgesetz (HeizKG), a minimum of 55% and a maximum of 75% of the total energy costs shall be allocated according to individual meters, the remainder (25-45%) by heated living space.⁷ • Smart heat meters are used in pilot projects.⁸
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> • There is no regulation on third party excess to DHC networks. The connection to the grid is based on individual contracts.⁹
Regulation regarding grid	<ul style="list-style-type: none"> • There is no federal regulation providing a legal framework for the connection of consumers.¹⁰

³ <https://webstore.iea.org/download/direct/449>

⁴ <https://www.ris.bka.gv.at/eli/bgbI/1994/194/P2/NOR40096299>

⁵ <https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10007215>

⁶ Source: Own survey with national DHC stakeholders

⁷ <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf>

⁸ Source: Own survey with national DHC stakeholders

⁹ <http://www.res-legal.eu/search-by-country/austria/single/s/res-hc/t/gridaccess/aid/connection-to-the-grid-37/lastp/94/>

¹⁰ Source: Own survey with national DHC stakeholders

Regulatory framework, authorities and supervision, statistical reporting	
access and usage (demand perspective)	<ul style="list-style-type: none"> The connection to the grid is based on individual contracts. Information on the connection process are provided by the Austrian Association of Gas- and District Heating Supply Companies (FGW).¹¹
Support framework for renewable heat	<ul style="list-style-type: none"> Environmental Assistance in Austria - UFI: Promoting small-scale RES heating and cooling is applied at a federal level carried out through the national corporate environmental support programme (UFI). There are special investment incentives for solar thermal installations, heat pumps, geothermal energy and biomass heating plants, especially for businesses. All projects eligible for support are listed on the website of the settlement agency Kommunalkredit Public Consulting (KPC) Investment Subsidy for solar thermal installations: Under the Climate and Energy Funds, a support mechanism for large solar thermal installations is in place. The funds come from the Climate and Energy Funds. The Kommunalkredit Public Consulting GmbH is entrusted as a settlement agency with the practical development of support programmes. The support mechanism is split into 5 categories: Solar process heat, feed-in of solar heat into district heating grids, high solar coverage rates (>20%) in service and commerce, combinations of solar thermal with heat pumps, new technologies and innovations.
Support framework for CHP	<ul style="list-style-type: none"> Support of combined heat and power with Cogeneration Act (KWK-Gesetz): Investment grants for high-efficiency CHP plants.
Support framework for grid infrastructure	<ul style="list-style-type: none"> The support of infrastructure is mainly based on the Heating and Cooling Network Expansion Act (WKLG), which provides a framework for increasing the district heating (and cooling) infrastructure in the country. According to this act, there are investment incentives for the integration of renewable energy sources in order to reinforce the small-scale regional heat supply in rural areas as well as the expansion of district heating in urban centres. The maintenance and optimisation of existing biogenic district heating networks is the subject of funding within the Domestic Environmental Support scheme.¹²
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> RES-H building obligations: The implementation of building related measures mainly lies in local competence. However, the conclusion of the Article 15a B-VG Agreement between the Austrian federal and state governments introduced an essential step to the harmonisation and reinforcement of RE measures in the building sector. There are four different specialisation programmes for RES-installers: Certified heat pump installer, certified solar heat installer and planner, certified photovoltaic installer and planner, certified biomass heating installer.
Statutory provisions	<ul style="list-style-type: none"> UFG (Umweltförderungsgesetz - Environmental Aid Act) Guidelines 2009 (Förderungsrichtlinien 2009 für die Umweltförderung im Inland - Funding Guidelines 2009 for the Environmental Assistance in Austria) Solar Guidelines (Leitfaden Solarthermie – Solare Großanlagen) EEffG (Bundesgesetz über die Steigerung der Energieeffizienz bei Unternehmen und dem Bund (Bundes-Energieeffizienzgesetz – Federal Act on the enhancement of energy efficiency targeting businesses and the federal government) WKLG (Wärme- und Kälteleitungsausbaugetsetz - Heating and Cooling Network Expansion) WKLG-Förderrichtlinie 2015 (Subsidy Guidelines on the Heating and Cooling Network Expansion 2015) Article 15a B-VG Agreement (Vereinbarung gemäß Art. 15a. B-VG zwischen dem Bund und den Ländern über Maßnahmen im Gebäudektor zum Zweck der Reduktion des Ausstoßes an

¹¹ <https://www.gaswaerme.at/>

¹² https://ec.europa.eu/energy/sites/ener/files/documents/at_final_necp_main_en.pdf, p. 161

Regulatory framework, authorities and supervision, statistical reporting	
	<p>Treibhausgasen - Agreement pursuant to Article 15a. B-VG between the federation and the federal states on measures in the building sector for the purpose of reducing emissions of greenhouse gases)</p> <ul style="list-style-type: none"> • Cogeneration Act (KWK-Gesetz) • Price Act - Preisgesetz 1992 • Heizkostenabrechnungsgesetz (HeizKG) • Gewerbeordnung
Relevant authorities and supervision	<ul style="list-style-type: none"> • The energy regulatory authority E-Control is responsible for strengthening competition, establishing and ensuring compliance with the rules in the heating market. • The Austrian Federal Competition Authority (BWB) is an independent authority, free from directives, which deals with the seizure and investigation of infringements of cartel law and European competition law. • Independent association of the Austrian gas and heating business (FGW) is an independent, statutory representation of the interests of all companies supplying gas and heat in Austria. The FGW is committed to the economic, safe and environmentally friendly use of gas, district heating and district cooling in Austria. • There is a conciliation body for consumer transactions
Statistical reporting methods and sources	<ul style="list-style-type: none"> • The federal statistics (Statistics Austria) is a (non-personal) information system of the government providing data on the economic, demographic, social, ecological and cultural situation in Austria. This information helps administrative bodies in planning and political decision-making procedures and in controlling the measures they have taken. Information on their methods can be found on their website.¹³ • The Austrian Energy Agency (AEA) collects data in the energy sector and publishes scientific studies. • The Austrian Federal Ministry of Climate Action, Environment, Energy, Mobility, Innovation and Technology is responsible for collecting and submitting annual statistics on DHC as required by the European Energy Efficiency Directive.¹⁴
Sources	<ul style="list-style-type: none"> • Euroheat and Power, Country by Country 2019 Report, https://www.euroheat.org/publications/country-by-country/ • RES legal, http://www.res-legal.eu/ • JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/ki_na28630enn%281%29.pdf • NECP, https://ec.europa.eu/energy/sites/ener/files/documents/-_at_final_necp_main_en.pdf • KPC, https://www.umweltfoerderung.at/alle-foerderungen.html • E-Control, https://www.e-control.at/ • BWB, https://www.bwb.qv.at/en • FGW, http://www.gaswaerme.at/ • Conciliation body for consumer transactions, https://www.verbraucherschlichtung.at/ • Statistics Austria, https://www.statistik.at/web_en/statistics/index.html • AEA, https://en.energyagency.at/

¹³ https://www.statistik.at/web_en/documentations/index.html

¹⁴ Source: Own survey with national DHC stakeholders

Table 5: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> There is a conciliation body for consumer transactions.¹⁵ The Federal Ministry of Labour, Social Affairs and Consumer Protection ('Sozialministerium') acts as a general co-ordinator of consumer related affairs in different fields, such as general consumer protection laws, etc. There is a non-governmental organisation dedicated to consumer protection called the Consumer Information Association (Verein für Konsumenteninformation).¹⁶
Available information on consumer perception and satisfaction	<ul style="list-style-type: none"> Marketmind, a company for market research and consulting published a study on the image of DH in 2019 compared to other forms of heating. DH is ahead in most image criteria. Its image disadvantage is the individual controllability. Satisfaction among private households is high and among property developers very high.¹⁷ According to a newsletter article, complaints are mostly made about high pricings and the monopoly-like structures that make changing suppliers impossible. Contrary to energy and gas, there is no authority controlling the prices.¹⁸ The Austrian Federal Chamber of Labour published a policy brief in 2019 in which they also looked at DHC customer satisfaction. More and more consumers are complaining to the Chamber of Labour about excessive or overly complex heating bills for DH. Consumers are generally unsatisfied especially since the composition of costs as well as the annual energy bills are largely incomprehensible.¹⁹

¹⁵ <https://www.verbraucherschlichtung.at/>¹⁶ https://ec.europa.eu/info/sites/info/files/national-consumer-organisations_at_listing_0.pdf¹⁷ https://www.fernwaerme.at/media/uploads/content/fernwaerme_imagetestudie_2019.pdf¹⁸ <https://www.derstandard.at/story/2000051973151/fernwaerme-preise-fuer-kunden-voellig-intransparent>¹⁹ https://www.akeuropa.eu/sites/default/files/2019-12/8_Policy%20Brief%20District%20Heating%20and%20Cooling.pdf

Belgium

No data was available for DC systems.

The next 3 tables concern only Flanders. No detailed data was available for the other regions of Belgium. In Wallonia, there are about 40 to 50 DHC networks. The majority of them is small sized (only 5 networks have an installed capacity higher than 5 MW) and there are usually the results of a public initiative (source: "Workshop on DHC networks in Wallonia" by the renewable energy cluster Tweed20).

Table 6: Size of the cities served by DH and geographical concentration

	DH
Geographical concentration of the DHC systems	In Flanders, all networks are in urban areas. However, there is a large variation of smaller and medium-sized networks in general, also in smaller and larger urban areas.
Sources	Own survey with national DHC stakeholders (VREG: Flemish Regulator for Electricity and Gas)

Table 7: Ownership of the DH networks

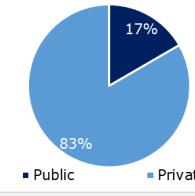
	DH						
Ownership repartition	About 10 networks (of 60 in total in Flanders) are owned and managed by electricity and gas DSO Fluvius, which is a public company. Other networks are mostly privately owned and the newer networks are usually private initiatives as well. <div style="text-align: center;"> Ownership DH repartition in terms of number of networks  <table border="1"> <thead> <tr> <th>Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Public</td> <td>83%</td> </tr> <tr> <td>Private</td> <td>17%</td> </tr> </tbody> </table> </div>	Category	Percentage	Public	83%	Private	17%
Category	Percentage						
Public	83%						
Private	17%						
Sources	Own survey with national DHC stakeholders (VREG: Flemish Regulator for Electricity and Gas)						

Table 8: Main suppliers and level of competition

	DH
Main DHC suppliers	Luminus (also energy supplier), Veolia, Fluvius (also DSO), MIROM and INDAVER (also waste treatment companies) operate several DH systems. Other local suppliers are dedicated only to one specific DH system.
Sources	Own survey with national DHC stakeholders (VREG: Flemish Regulator for Electricity and Gas)

²⁰ https://www.slideshare.net/cluster_tweed/rseaux-de-chaleur-en-wallonie-gembloux-08-octobre-2019

Table 9: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> The legal framework in Belgium concerning DH is a regional competence, which means there is (in theory) a different legal framework in Flanders, Wallonia and Brussels. There is no federal legal framework, apart from one law concerning social tariffs for DH. However, this law is currently not yet in force (August 2020). In practice, only Flanders has rules concerning DH. Currently there is no legal framework in place in Brussels or Wallonia.²¹ The specific legal provisions for Flanders is called Energy Decree. There is a mandatory registration of active DHC networks or modifications of existing networks in force (Energy Decree - Energiebesluit Article 3/1.3.1).²²
Regulation of prices for consumers	<ul style="list-style-type: none"> There is no regulation regarding prices.²³ The Belgium federal government is responsible for defining rules for consumption-based billing, allocation rules and billing information. Currently there is no regulation for billing on federal level.²⁴ Flemish Government decree²⁵: The Flemish Government can set further rules on the transparent and accurate calculation of the individual consumption and of the distribution of the costs of the thermal or hot water consumption for: hot water for domestic use; heat from the building installation for heating the common areas; for heating apartments. No further information is available.
Regulation of metering	<ul style="list-style-type: none"> Flanders: The type of meters is specified in the Energy Decision and new meters have to be remotely readable; existing meters have to be remotely readable from 2027 (Energy Decree - Energiebesluit Article 3/1.2.1).²⁶
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> There is no regulation regarding grid access and there are no legal requirements regarding unbundling.²⁷ In practice, there is no open retail market in Flanders; most DH networks are vertically integrated, apart from a number of special cases where a larger interconnected system is cut into segments with separate system operators. A planned DH network in the city of Antwerp received government support on the condition that it would be operated as an "open source" DH network. So far, the concept is not clearly defined and the concerned partners are still trying to figure out what this system should look like in practice.²⁸
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> There is no regulation regarding grid access of consumers.²⁹
Support framework for renewable heat	<p>In Belgium, energy is a matter of regional competence. However, there is one fiscal measure on the federal level that promotes the use of heat production from renewable energy source, namely the tax deduction on investment costs for companies.</p> <p>Brussels</p> <ul style="list-style-type: none"> Subsidy Primes énergie 2018: Within the bounds of its available budget, the Brussels-Capital region provides energy subsidies for residential, industrial as well as service sector buildings located in the Brussels region.

²¹ Source: Own survey with national DHC stakeholders

²² <https://codex.vlaanderen.be/portals/codex/documenten/1019755.html>

²³ Source: Own survey with national DHC stakeholders

²⁴ <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf>

²⁵ Decree of 14 March 2014 amending the Energy Decree of 8 May 2009

²⁶ <https://codex.vlaanderen.be/portals/codex/documenten/1019755.html>

²⁷ Source: Own survey with national DHC stakeholders

²⁸ Source: Own survey with national DHC stakeholders

²⁹ Source: Own survey with national DHC stakeholders

Regulatory framework, authorities and supervision, statistical reporting	
	<ul style="list-style-type: none"> Subsidy Aide à l'investissement: Within the bounds of its available budget, the Brussels-Capital provides investment assistance for companies, which develop environmental projects, including investments in renewable energy systems. The energy subsidies support investments in solar water heaters as well as in heat pumps for the production of heat and sanitary hot water. The investment assistance promotes the use of heat pumps as well as biogas and biomass CHP and trigeneration plants.
Flanders	<ul style="list-style-type: none"> Premium: Grid operators and municipalities are responsible for setting up premium schemes to support heating and cooling from renewable energy. Therefore, the amount of premium attributed and eligible technologies differs among municipalities. Quota system: In Flanders, CHP producers are eligible for CHP certificates. The amount of CHP certificates granted for 1000 kWh of primary energy saved in a qualitative CHP-facility compared to a situation in which the same quantity of electricity or heat were produced separately is multiplied with the respective technology-specific banding factor (Art. 7.1.2. §2 Energy Decree). Ecological investment subsidy: As of the first of February 2013, companies can apply for an ecological investment subsidy (EP PLUS) for investments included on a limitative list with eligible technologies. The eligibility of the kind of renewable energy sources for support differs depending on support schemes.
Wallonia	<ul style="list-style-type: none"> Subsidy (Primes énergie): Several energy subsidies are provided by the Walloon Region for the generation of heat from biomass, shallow geothermal energy and solar thermal energy plants. Subsidy (Aide à l'investissement): Within the bounds of its available budget, the Walloon Region provides investment assistance for companies that initiate projects aimed at developing the sustainable use of energy, including investments in renewable energy plants. Subsidy (UREBA): Within the bounds of its available budget, the Walloon region provides UREBA subsidies, which aim to support public bodies in their initiatives to reduce the energy consumption of their buildings. Projects using renewable energy sources are subsidised. Loan (Ecopack): Households willing to improve the energy performance of their houses may benefit from a zero-per cent interest loan for the realisation of several refurbishment works. Certain renewable energy technologies are eligible for the loan. Supported Research: As of 2003, the Walloon Region Energy Fund supported studies and actions, including demonstration projects, to promote electricity production from natural gas and renewable sources and quality co-generation. The support schemes of the Walloon region promote the use of biogas and biomass CHP plants, biomass heating plants, aerothermal, geothermal as well as solar thermal installations.
Support framework for CHP	<ul style="list-style-type: none"> CHP is involved in some support schemes of renewable energies (see line support renewables) When coordinating the call to electricity suppliers, the transport-grid manager, taking into account the needed supply security, gives priority to plants using renewable energy sources for power production, or to cogeneration units
Support framework for grid infrastructure	<ul style="list-style-type: none"> There is no direct support programme for DHC infrastructure, but the support programmes for renewables may affect the construction of infrastructure (see line support renewables)
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> There are training programmes for RES-installers, a certification scheme for heat pumps installations as well as an indirect fiscal mechanism for research, development and demonstration (RD&D) programmes. Moreover, the exemplary role of public authorities is ensured through a public energy service company in charge of achieving and financing

Regulatory framework, authorities and supervision, statistical reporting	
Statutory provisions	<p>energy saving projects in public federal buildings.</p> <ul style="list-style-type: none"> • CIR 92 (Code des impôts sur les revenus 1992 Exercice d'imposition 2017 (revenus 2016) /Wetboek van de inkomstenbelasting 1992 – Belastingjaar 2017 (inkomsten over 2016) - Income Tax Code of 1992, tax year 2016) • AR/CIR 92 (Arrêté royal d'exécution du Code des impôts sur les revenus 92 du 27 Août 1993, lequel est dénommé, en abrégé, "AR/CIR 92" / Koninklijk besluit tot uitvoering van het wetboek van de inkomstenbelasting 1992, afgekort als "KB/WIB92" - Royal Decree on the execution of the Income Tax Code of 1992) • Avis relatif à la déduction pour investissement (Avis relatif à la déduction pour investissement (Administration générale de la Fiscalité. Impôts sur les revenus / Bericht in verband met de investeringsaftrek van de Algemene administratie van de fiscaliteit – inkomstenbelasting - Notice of the federal tax administration revenues department regarding the tax deduction on investments)
Brussels	<ul style="list-style-type: none"> • Prime énergie 2018 C7 (Prime Energie C7 – Chauffe-eau solaire CES/ Energiepremie C7 - Zonneboilers) - Energy Subsidy C7 – Solar Water Heater) • Prime énergie 2018 C4 (Prime Energie C4 – Pompe à chaleur - Chauffage (PAC) Energiepremie C4 Warmtepomp – verwarming) - Energy Subsidy C4 – Heat pump for heat production) • Prime énergie 2018 C5 (Prime Energie C5 – Pompe à chaleur / Energiepremie C5 Warmte pomp Sanitair heet water- Sanitary hot water (PAC) - Energy Subsidy C5 – Heat pump for the production of sanitary hot water) • Conditions générales primes énergie 2018 (Décision du 19 octobre 2017 du Gouvernement de la Région de Bruxelles-Capitale d'approbation du programme d'exécution relatif à l'octroi d'aides financières en matière d'énergie / Besluit van 19 oktober 2017 van de Regering van het Brussels-Hoofdstedelijke Gewest betreffende de goedkeuring voor het uitkeren van financiële steun aan energie projecten - Decision of 19 October 2017 of the Government of the Brussels-Capital region approving the implementation programme on the allocation of energy subsidies) • Arrêté du 2 avril 2009 (Arrêté du 2 avril 2009 du Gouvernement de la Région de Bruxelles-Capitale relatif aux aides à l'économie d'énergie et à la production d'énergie à partir de sources d'énergies renouvelables / Besluit van 2 april 2009 van de Brusselse Hoofdstedelijke Regering betreffende de steun voor energiebesparingen en productie van energie met behulp van hernieuwbare energiebronnen - Decree of 2 April 2009 of the Brussels-Capital region regarding the promotion of energy efficiency and energy production through renewable energy sources)
Flanders	<ul style="list-style-type: none"> • Energy Decree – Decreet houdende algemene bepalingen betreffende het energiebeleid – het Energiedecreet van 8 mei 2009 (Law Establishing General Conditions for Energy Policy – Energy Law of 8 May 2009) • Energy Regulation – Besluit van de Vlaamse Regering houdende algemene bepalingen over het energiebeleid – het Energiebesluit van 19 november 2010 (Regulation of the Flemish Government on General Conditions for Energy Policy – Energy Regulation of 19 November 2010) • Decree on BF for GC and CHPC – Ministerieel besluit houdende actualisatie van de huidige bandingfactoren en vastlegging van de bandingfactoren van groenestroomcertificaten en warmtekrachtcertificaten voor projecten met een startdatum vanaf 2016 (Ministerial Decree updating the current banding factors for green certificates and combined heat and power certificates. – 18 March 2015)
Wallonia	<ul style="list-style-type: none"> • Arrêté du 21 octobre 2010 (Arrêté du 21 octobre 2010 du Gouvernement wallon visant à octroyer une prime pour l'installation d'un chauffe-eau solaire - Decree of 21. October 2010 of the Walloon Government aiming at allocating a subsidy for the installation of solar water heaters)

Regulatory framework, authorities and supervision, statistical reporting	
	<ul style="list-style-type: none"> • Circulaire du 29 septembre 2006 (Circulaire du 29 septembre 2006 relative aux modalités d'application de l'arrêté du Gouvernement Wallon du 2 décembre 2004 - Circular of 29 September 2006 regarding the application conditions of the Decree of the Walloon Government) • Arrêté du 2 décembre 2004 (Arrêté du 2 décembre 2004 du Gouvernement Wallon portant exécution du décret du 11 mars 2004 relatif aux incitants destinés à favoriser la protection de l'environnement et l'utilisation durable de l'énergie - Decree of 2 December 2004 of the Walloon Government implementing the decree of the 11 March 2004 on the incentives aiming at the promotion of environmental protection and sustainable use of energy) • Décret du 11 mars 2004 (Décret du 11 mars 2004 relatif aux incitants destinés à favoriser la protection de l'environnement et l'utilisation durable de l'énergie - Decree of 11 March 2004 regarding the incentives aiming at the promotion of environmental protection and sustainable use of energy) • Arrêté du 28 mars 2013 (Arrêté du 28 mars 2013 du Gouvernement wallon relatif à l'octroi de subventions pour la réalisation d'études et de travaux visant l'amélioration de la performance énergétique des bâtiments (UREBA) - Decree of 28 March 2013 of the Walloon Government regarding the allocation of subsidies for projects aiming at improving the energy performance of their buildings). • Arrêté du 26 mars 2015 (Arrêté du Gouvernement wallon du 26 mars 2015 instaurant un régime de primes aux particuliers favorisant les économies d'énergies et la rénovation des logements - Decree of 26 March 2015 establishing a subsidy scheme for households supporting energy saving measures and housing refurbishment) • Arrêté du 30 avril 2015 (Arrêté du Gouvernement wallon du 30 avril 2015 portant exécution l'Arrêté du Gouvernement wallon du 26 mars 2015 instaurant un régime de primes aux particuliers favorisant les économies d'énergies et la rénovation des logements - Decree of 30 April 2015 implementing the decree of 26 March 2015 establishing a bonus scheme for households supporting energy saving measures and housing refurbishment) • Arrêté du 31 mai 2017 (FLW) (Arrêté du Gouvernement wallon du 31 mai 2017 portant approbation du règlement général définissant les principes généraux d'octroi des crédits en fonds B2 par le Fonds du Logement des Familles nombreuses de Wallonie – Decree of 31 May 2017 of the Walloon Government approving the rules defining the allocation of grants by the Walloon Housing Fund for large families) • Arrêté du 31 mai 2017 (SWCS) (Arrêté du Gouvernement wallon du 31 mai 2017 portant approbation du règlement général définissant les principes généraux d'octroi des crédits par la Société wallonne du Crédit social et des Guichets du crédit social - Decree of 31 May 2017 of the Walloon Government approving the rules defining the allocation of grants by the Walloon Social Credit Corporation)
Relevant authorities and supervision	<ul style="list-style-type: none"> • The Belgian Competition Authority is an independent administrative authority that contributes to the definition and implementation of competition policy in Belgium, by pursuing anticompetitive practices and reviewing the main merger operations. • Flemish Energy Agency (Vlaams Energieagentschap; VEA) is a government agency of the Flemish Region under the Flemish Ministry of Environment, Nature and Energy, tasked with the preparation and execution of Flemish energy policy.
Statistical reporting methods and sources	<ul style="list-style-type: none"> • The Belgian statistical office (STATBEL) collects, produces and disseminates reliable and relevant figures on the Belgian economy, society and territory. The collection is based on administrative data sources and surveys, the production is carried out in a scientific manner and with respect to quality, and statistics are disseminated on time and

Regulatory framework, authorities and supervision, statistical reporting	
Sources	<p>in a client-friendly manner. Information on the methods can be found on their website.³⁰</p> <ul style="list-style-type: none"> • RES legal, http://www.res-legal.eu/ • JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/ki_na28630enn%281%29.pdf • IEA policy database, https://www.iea.org/policies • Heat Roadmap Belgium, https://vbn.aau.dk/ws/portalfiles/portal/287929422/Country_Roadmap_Belgium_20181005.pdf • Belgian Competition Authority, https://www.belgiancompetition.be/en • VEA, https://www.energiesparen.be/over_vea • STATBEL, https://statbel.fgov.be/en/about-statbel

Table 10: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> • The Ombudsman Service for Energy is an independent federal service and takes the form of a legal entity. It is responsible for distributing inquiries and complaints relating to the functioning of the electricity and natural gas market and for dealing with conflicts between final consumers and electricity and natural gas companies.³¹ • The Belgian consumer organisation Test-Achats is an independent organisation defending the interests of consumers in Belgium since 1957. Test-Achats is the main interlocutor with the Belgian authorities on matters affecting the protection of the consumer. Test-Achats is fully funded by its approx. 350,000 members who subscribe to its magazines and services.³²
Available information on consumer perception and satisfaction	<ul style="list-style-type: none"> • No studie on consumers' perceptions or satisfaction could be found.

³⁰ <https://statbel.fgov.be/en/about-statbel/methodology>³¹ <https://www.ombudsmannenergie.be/de>³² <https://www.test-achats.be/>

Bulgaria

Very little data is available for district cooling, as it is not developing significantly for the time being. A pilot district cooling installation was built in Plovdiv using district heat and an absorption chiller. It is managed by EVN Bulgaria Toplofihatsia.

Table 11: Size of the cities served by DHC and geographical concentration

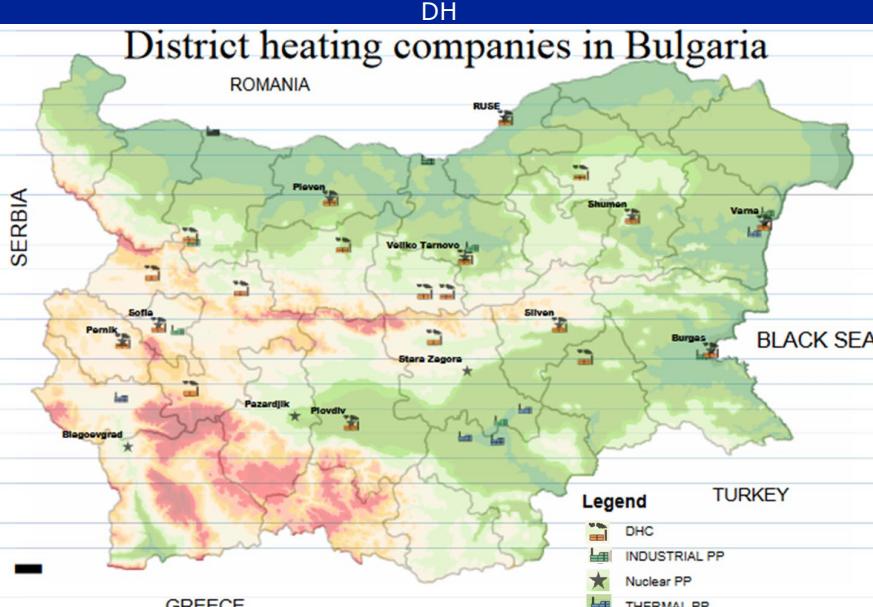
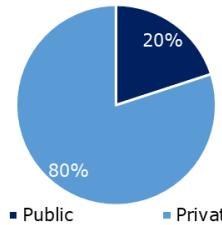
	 <p>DH District heating companies in Bulgaria</p>
Map: District Heating companies in Bulgaria (Source: STATE ENERGY REGULATORY COMMISSION -- BULGARIA 2002 ³³)	
Geographical concentration of DHC systems	<ul style="list-style-type: none"> ○ District heating is the main form of heating and domestic hot water supply in densely populated cities in Bulgaria, serving 26.5% of the Bulgarian population ○ About 65% of the national heat supply is produced by the district heating system in the capital city, Sofia
Sources	<ul style="list-style-type: none"> ○ World Bank Group, PROJECT PERFORMANCE ASSESSMENT REPORT, BULGARIA, DISTRICT HEATING PROJECT (IBRD-47030, 47040), 2018³⁴ ○ Euroheat & power, Country by Country 2019 ○ NATIONAL DISTRICT HEATING ASSOCIATION ○ STATE ENERGY REGULATORY COMMISSION --BULGARIA (2002) ○ Own survey with national DHC stakeholders

Table 12: Ownership of the DHC networks

	 <p>DH Ownership DH repartition in terms of number of networks</p> <table border="1"> <tr> <td>Public</td> <td>80%</td> </tr> <tr> <td>Private</td> <td>20%</td> </tr> </table>	Public	80%	Private	20%
Public	80%				
Private	20%				
Ownership of the DHC systems					
Sources	<ul style="list-style-type: none"> ○ World Bank Group, PROJECT PERFORMANCE ASSESSMENT REPORT, 				

³³ STATE ENERGY REGULATORY COMMISSION --BULGARIA (2002), [link](#)

³⁴ <https://ieg.worldbankgroup.org/sites/default/files/Data/reports/ppar-bulgariadistrictheating.pdf>

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	DH
	BULGARIA, DISTRICT HEATING PROJECT (IBRD-47030, 47040), 2018
	o STATE ENERGY REGULATORY COMMISSION --BULGARIA (2002)
	o Euroheat & power, Country by Country 2019
	o NATIONAL DISTRICT HEATING ASSOCIATION

Table 13: Main suppliers

	DH
Main suppliers	<ul style="list-style-type: none"> o Toplofikatsia Sofia o EVN Bulgaria Toplofikatsia o Toplofikatsia Pleven o Toplofikatsia Burgas
Sources	<ul style="list-style-type: none"> o Own survey with national DHC stakeholders

Table 14: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> • DHC networks are owned and managed by individual heat supply companies. The district heating company in Sofia is owned by the municipality. In other large cities in Bulgaria the district heating companies are owned by private entities.³⁵ • DHC operators, operating heat transmission networks with connected plants above 10 MW, are stipulated in the Bulgarian legislation and need a license. The primary act related to the district heating matters is the Energy act.³⁶
Regulation of prices for consumers	<ul style="list-style-type: none"> • The prices for DH are regulated by the national regulator, the Energy and water regulatory commission (EWRC), in accordance with the Energy act and the Ordinance No 5 as of 23.01.2014 for the heat energy prices regulation. The price regulation is performed accordingly to a price regulation method of EWRC, based on the CAPM method. Additionally, EWRC has the right to exclude from the pricing model certain necessary activities and company costs in order to retain the regulated prices for heat at nonmarket levels. An additional instrument for the regulatory price control is the option for regulatory amendment of the prices during the pricing period due to alterations in the natural gas and emissions prices. This is an additional price retaining instrument because the regulator has the discretion to alter the DHC regulated prices once in a six-month period if the natural gas prices change with 15%, but does not have an effective obligation to do so.³⁷
Regulation of metering	<ul style="list-style-type: none"> • Companies are obliged to perform monthly metering of the heat consumption. The metering data is provided to the heat cost allocation companies which perform the distribution accordingly to the calculation methodology of the allocation method chosen by the clients.³⁸ • Metering of the individual consumption in multi apartment and multi-purpose buildings is possible where horizontal building heating installations exist. In multi apartment buildings with vertical installations the only option is that the heat is metered at inlet and the distribution is performed by a heat cost allocator for each unit.³⁹ • Metering and heat cost allocation rules for space heating and hot domestic water are defined in the Energy Act and in a related Ordinance of the Minister of Energy and Energy Resources.⁴⁰

³⁵ Euroheat & Power, Country by Country Report 2019

³⁶ Source: Own survey with national DHC stakeholders

³⁷ Source: Own survey with national DHC stakeholders

³⁸ Source: Own survey with national DHC stakeholders

³⁹ Source: Own survey with national DHC stakeholders

⁴⁰ <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf>

Regulatory framework, authorities and supervision, statistical reporting	
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> The legal basis for third party access to the DHC grids exists in art. 133-138 as of the Energy act and is detailed in a related Ordinance on heat supply. The right to access and the conditions for its termination are not stipulated in the Energy act. The legislation itself arranges the connection matters, applicable for consumers and producers. With the execution of the connection contract, the party receives access to the grid.⁴¹
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> The grid connection for clients are stipulated in the Energy act and detailed in the Ordinance on heat supply. Additional requirements, regarding the administrative procedures are stipulated in the Spatial Development Act. The provisions concern all administrative checks and steps which should be executed by the parties-namely the administrative permits, the inspection and the research for capacity availability of the grid, the contractual relations.⁴²
Support framework for renewable heat	<ul style="list-style-type: none"> Tax regulation mechanism: The use of renewable energy technologies in buildings is promoted through a system of tax incentives for building owners. In general, all technologies are eligible for support.
Support framework for CHP	<ul style="list-style-type: none"> Ordinance for CHP: The Act regulates support of electricity from combined heat and power plants
Support framework for grid infrastructure	<ul style="list-style-type: none"> Support for and implementation of projects for construction of heat transmission networks in settlements that meet the requirements for a designated area when the economic viability of consumption of heat from renewable sources is proved and a preliminary investment design has been submitted for the heat production.⁴³ Support for and implementation of projects for construction of small decentralised heating and/or cooling systems.⁴⁴
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> Loan: The Bulgarian Energy Efficiency Fund offers financing grants for projects aiming at improving the energy efficiency of public, industrial and residential buildings. Installers of renewable energy facilities have to be registered and certified by the State Agency for Metrological and Technical Surveillance. Any investment project for a new building with a total floor coverage of over 1000 m² must comply with the possibilities of using decentralised systems for the use of renewable energy. In these buildings, at least 15 percent of the total heating and cooling needed for the building shall have to be produced from renewable sources.
Statutory provisions	<ul style="list-style-type: none"> EEA (Energy Efficiency Act) EA (Energy Act - promulgated in SG No 107/2003, last amended in SG No 48/2015) Local Tax Act (Local Tax and Fees Act) Ordinance No. RD-16-1057 (Ordinance No. RD-16-1057 from 10 December 2009 on energy audits, the certification of buildings, issuing energy performance certificates and certificate categories) ERSA (Energy from Renewable Sources Act) Ordinance No. 41 (Ordinance No. 41 of 9 January 2012 on the vocational education for "fitters of energy equipment and installations")
Relevant authorities and supervision	<ul style="list-style-type: none"> Commission for Protection of Competition is empowered to enforce the Law on Protection of Competition, the Public Procurement Act and the Concessions Act. Energy and Water Regulatory Commission (EWRC) is responsible for tariff setting and quality of services of enterprises in the gas, electric, district heating and water supply and sewage sectors. EWRC is also responsible for licensing of enterprises in the gas, electric and district heating sectors and issues permits for construction of transit gas or oil pipelines.
Statistical	<ul style="list-style-type: none"> National statistical institute (NSI) is the central statistical institution.

⁴¹ Source: Own survey with national DHC stakeholders

⁴² Source: Own survey with national DHC stakeholders

⁴³ https://ec.europa.eu/energy/sites/ener/files/documents/bq_final_necp_main_en.pdf

⁴⁴ https://ec.europa.eu/energy/sites/ener/files/documents/bq_final_necp_main_en.pdf

Regulatory framework, authorities and supervision, statistical reporting	
reporting methods and sources	Their main objective is to improve the development, production and dissemination of quality statistical information about all user groups according to their information needs. They collect data of DHC. Information on the methods can be found on the website. ⁴⁵
Sources	<ul style="list-style-type: none"> • Euroheat and Power, Country by Country 2019 Report, https://www.euroheat.org/publications/country-by-country/ • RES legal, http://www.res-legal.eu/ • JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf • NECP, https://ec.europa.eu/energy/sites/ener/files/documents/bq_final_necp_main_en.pdf • Commission for Protection of Competition, http://www.cpc.bg/Default.aspx • EWRC, http://www.dker.bg/en/home.html • National statistical institute, https://www.nsi.bg/en

Table 15: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> • The Ministry of Economy aims to deliver an effective functioning market economy by driving up competitiveness and effective consumer protection. The Consumer Policy Unit plays a central role in the delivery of the objectives of the Ministry of Economy in the field of consumer protection. • The Commission for Consumer Protection is the main enforcement authority which has a wide range of statutory powers and duties.⁴⁶ • Consumer protection of heat energy services is also a competence of the Energy and Water Regulatory Commission.⁴⁷ • The Bulgarian National Consumers Association (BNAAC) aims to protect the rights and interests of consumers by providing information that supports consumers' choices in the market, giving assistance about infringing upon consumers' rights and interests, representing consumers' interests in case of any legislative changes.⁴⁸
Available information on consumer perception and satisfaction	<ul style="list-style-type: none"> • No surveys to assess the level of customer satisfaction have been conducted since 2005.⁴⁹ • According to the Entranz Project, rising energy prices in 2007 and the obligation to install meters in the early 2000s resulted in people disconnecting from the DH system.⁵⁰

⁴⁵ <https://www.nsi.bg/en/content/475/basic-page/quality>⁴⁶ <https://kzp.bg/>⁴⁷ <https://www.dker.bg/>⁴⁸ <http://aktivnipotrebitevi.bg/en>⁴⁹ <https://ieg.worldbankgroup.org/sites/default/files/Data/reports/ppar-bulgariadistrictheating.pdf>⁵⁰ https://www.entrance.eu/files/downloads/D2_4/D2_4 Complete FINAL3.pdf, p.10

Croatia

No data was available for DC systems.

Table 16: Size of the cities served by DHC and geographical concentration

	DH
Geographical concentration of the DH systems	<ul style="list-style-type: none"> ○ Most large continental cities are served by district heating ○ There are DH networks in 18 cities of Croatia, the major networks being concentrated in 9 big cities including the capital Zagreb and the cities of Osijek, Sisak, and Velika Gorica ○ Apart from Zagreb, the usual size of the cities is up to 50,000 inhabitants ○ In Zagreb, around 1 third of the households is served by district heating (above 100,000 households).
Sources	<ul style="list-style-type: none"> ○ Programme of Exploiting Heating and Cooling Efficiency Potential for 2016-2030, Ministry of the Economy, 2015⁵¹ ○ Annual energy report 2018 (Ministry of Environment and Energy)⁵² ○ Own survey with national DHC stakeholders



Figure 2: District heating systems in Croatia proportionnally to the number of consumers (source: Annual energy report 2018)

Table 17: Ownership of the DHC networks

	DH						
Ownership repartition in terms of number of networks	<ul style="list-style-type: none"> ○ DH utilities are mainly public. A part of the systems is under PPP ownership. <p style="text-align: center;">Ownership DH repartition in terms of number of companies</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>State ownership</td> <td>80%</td> </tr> <tr> <td>Municipal ownership and PPP</td> <td>20%</td> </tr> </tbody> </table> <p style="text-align: center;">■ State ownership ■ Municipal ownership and PPP</p>	Category	Percentage	State ownership	80%	Municipal ownership and PPP	20%
Category	Percentage						
State ownership	80%						
Municipal ownership and PPP	20%						

⁵¹https://ec.europa.eu/energy/sites/ener/files/documents/croatia_report_eed_art_141update_en.pdf

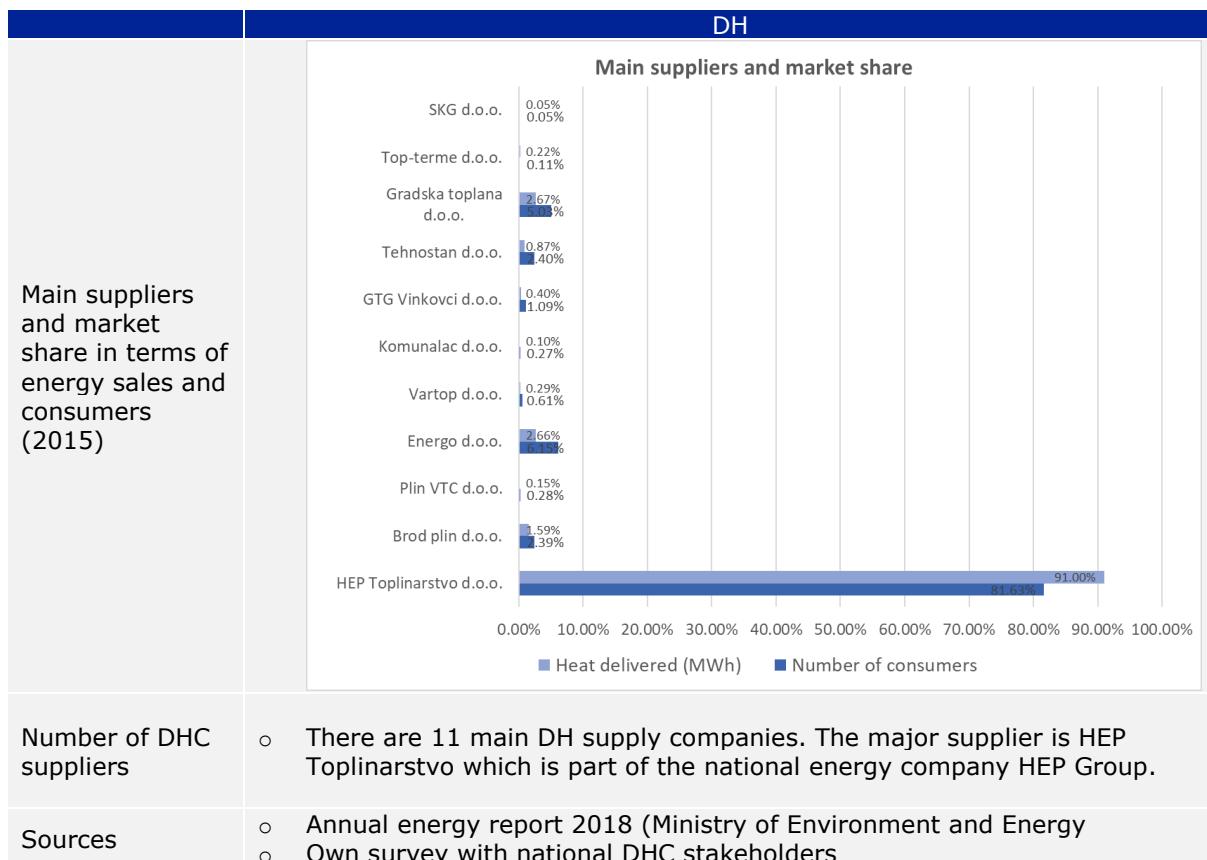
⁵²<http://www.eihp.hr/wp-content/uploads/2019/12/Energija2018.pdf>

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DH	
Sources	<ul style="list-style-type: none"> ○ Programme of Exploiting Heating and Cooling Efficiency Potential for 2016-2030, Ministry of the Economy, 2015 ○ Own survey with national DHC stakeholders

Table 18: Main suppliers and level of competition



- Number of DHC suppliers
- There are 11 main DH supply companies. The major supplier is HEP Toplinarstvo which is part of the national energy company HEP Group.

- Sources
- Annual energy report 2018 (Ministry of Environment and Energy)
 - Own survey with national DHC stakeholders

Table 19: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> • Thermal energy buyers and sellers are licensed and registered by Croatia's Energy Regulatory Agency (HERA).⁵³ • In centralised and closed heating systems, the thermal energy buyer activity and all energy activities related to the thermal energy sector are performed by the same vertically integrated energy entities, with no other thermal energy suppliers or buyers who would perform the supply and delivery of thermal energy.⁵⁴ • The Energy Act defines the principles of the energy market, energy prices and tariffs, public service requirements and licensing principles. • The Heat Market Law regulates planning, organisation and functioning of DH. The main goals of the act are to create conditions for the safe and reliable delivery of heat, market development, the protection of end-customers, heat price competitiveness, efficient production and use of heat, and to minimise negative impacts on the environment and sustainable development, in line with EU rules.

⁵³ https://www.hera.hr/en/docs/HERA_Annual_Report_2018.pdf

⁵⁴ https://www.hera.hr/en/docs/HERA_Annual_Report_2018.pdf

Regulatory framework, authorities and supervision, statistical reporting	
	<ul style="list-style-type: none"> Even though the Thermal Energy Market Act adopted in 2013 introduced substantial changes to the regulation, organisation and functioning of the thermal energy sector, it did not lead to increased competition in thermal energy supply and thermal energy buyer activities, as had been expected
Regulation of prices for consumers	<ul style="list-style-type: none"> According to the Thermal Energy Market Act, in independent heating systems and closed heating systems, the prices of thermal energy delivered to thermal energy buyers and end consumers are formed freely in accordance with market conditions.⁵⁵ HERA, Croatia's Energy Regulatory Agency, is in charge of the heating tariffs in centralised heating systems.
Regulation of metering	<ul style="list-style-type: none"> In Croatia the installation of heat meters or heat cost allocators is required when there are two or more units in a central heated building. The Ordinance on the Method of Distribution and Calculation of the Cost of Delivered Heat (OMD) prescribes how the heat costs had to be distributed among owners of "autonomous usable units" and provides several basic models for the allocation the costs, differentiated by the type of meter used and the installed heating systems. Correction factors to consider unfavourable position of naturally colder flats are not used.⁵⁶
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> The grid connection of suppliers must be licensed and registered by HERA, but there is no further specific TPA regulation⁵⁷
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> There is no information available.
Support framework for renewable heat	<ul style="list-style-type: none"> There are currently no support schemes for RES heating and cooling. However, the Energy Strategy adopted in 2009 obliges the Croatian State to encourage the future use of RES and to achieve a higher percentage of primary use of RES in the heating sector (cooling is not mentioned).
Support framework for CHP	<ul style="list-style-type: none"> Since 2016, Act on Renewable Energy Sources and High-efficiency Cogeneration introduced a tendering procedure through with a premium tariff and a guaranteed feed-in tariff for installations of less than 500 kW.
Support framework for grid infrastructure	<ul style="list-style-type: none"> There are currently no support schemes for grid infrastructure. According to the NECP, it is planned to use ESI Funds for modernisation of DHC infrastructure.
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> Training programmes for Installers (Program izobrazbe): The training offers theoretical and practical instructions on the installation and maintenance of various types of renewable energy systems. The participants receive a special certificate, if a final examination is passed successfully.
Statutory provisions	<ul style="list-style-type: none"> Act on the Regulation of Energy Activities (Official Gazette No. 177/04) Energy Act (Official Gazette Nos. 120/12, 14/14, 102/15 and 68/18), Energy Efficiency Act (Official Gazette No. 127/14) (MNE (2014)56090 Renewable Energy Sources and High-Efficiency Cogeneration Act (Official Gazette Nos. 100/15 and 111/18) Thermal Energy Market Act (Official Gazette No. 80/13) OMD Ordinance on the Method of Distribution and Calculation of the Cost of Delivered Heat (Official Gazette No. 99/14; 27/15; 124/15) (MNE (2014)55428) Heat Market Act (Official Gazette No. 80/13; 14/14) (MNE (2013)56093) Croatian Energy Regulatory Agency (HERA) is an independent,
Relevant	

⁵⁵ https://www.hera.hr/en/docs/HERA_Annual_Report_2018.pdf

⁵⁶ <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf>

⁵⁷ https://www.hera.hr/en/docs/HERA_Annual_Report_2018.pdf and <https://www.hera.hr/en/html/activities.html>

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Regulatory framework, authorities and supervision, statistical reporting	
authorities and supervision	<p>autonomous, non-profit legal entity which acts as a public authority competent for the regulation of energy-related activities.</p> <ul style="list-style-type: none"> The Croatian Competition Agency (CCA) independently and autonomously performs the activities within its scope and powers regulated under the Competition Act (Official Gazette 79/09) and the Act on the Amendments to the Competition Act (Official Gazette 80/13).
Statistical reporting methods and sources	<ul style="list-style-type: none"> The Croatian Bureau of Statistics (DZS) is the main producer, disseminator and coordinator of the Official Statistical System of the Republic of Croatia as well as the main representative of the national statistical system in front of European and international bodies competent for statistical affairs. Information on their methods can be found on their Website.⁵⁸
Sources	<ul style="list-style-type: none"> Euroheat and Power, Country by Country 2019 Report, https://www.euroheat.org/publications/country-by-country/ RES legal, http://www.res-legal.eu/ JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/ki_na28630enn%281%29.pdf IEA policy database, https://www.iea.org/policies HERA, https://www.hera.hr/en/html/index.html CCA, http://www.aztn.hr/ DZS, https://www.dzs.hr

Table 20: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> The Croatian Association for Consumer Protection (CACP) is strictly independent and non-political.⁵⁹ The Croatian Energy Regulatory Agency (HERA) has set up a consumer protection program regarding energy activities (including thermal energy).⁶⁰
Available information on consumer perception and satisfaction	<p>In 2018 HERA carried out two inspections of energy entities due to complaints received from thermal energy end consumers, and resolved 57 cases from thermal energy end consumers, authorised representatives of co-owners, energy entities, thermal energy consumers, institutions and other parties.</p> <ul style="list-style-type: none"> - 13 complaints related to thermal energy invoices. - 19 complaints related to payment of the fixed part of the thermal energy price. - 2 complaints related to the transparency of invoices and - 3 complaints related to the work of the thermal energy buyer.⁶¹

⁵⁸ https://www.dzs.hr/default_e.htm

⁵⁹ <http://www.huzp.hr/>

⁶⁰ <https://pubs.naruc.org/pub.cfm?id=5378D584-2354-D714-5104-4117ADDB3BB2>

⁶¹ https://www.hera.hr/en/docs/HERA_Annual_Report_2018.pdf, p. 27, 144

Cyprus

Table 21: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> There is no DHC infrastructure in Cyprus.
Regulation of prices for consumers	<ul style="list-style-type: none"> There is no specific regulation on prices for consumers and no heat cost allocation rules are defined.
Regulation of metering	<ul style="list-style-type: none"> There is no information available.
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> There is no regulation regarding DHC grid access.
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> There is no regulation regarding DHC grid access.
Support framework for renewable heat	<ul style="list-style-type: none"> Support Scheme for Solar Water Heaters for residences: Support the establishment and replacement of a Solar Water Heater System for Residences. The grant is allocated to 350 € for all the system and 175 € only for solar panels. Certification Programmes for RES installations: According to the latest LPRES Regulation 2015, a national registry for small RES producers is established. Interested applicants should submit their application and their subscription lasts for six years. Small RES producers are defined as installers of biomass, PV, solar thermal and geothermal systems, whose capacity does not exceed 30 MW (art.2 par.1 and art.3 LPRES Regulation 2015). There is no support program for renewable heat in DHC.
Support framework for CHP	<ul style="list-style-type: none"> Support Scheme for the Production of Electricity from Renewable Energy Sources for self-consumption 2017: Photovoltaics and biomass/biogas self-generation systems in commercial and industrial units. Total available power: 80 MW
Support framework for grid infrastructure	<ul style="list-style-type: none"> There is no specific support program for DHC grid infrastructure.
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> RES-H building obligations: Decree No. 446/2009 contains the following regulations for buildings: Mandatory solar installations on every new residential building to satisfy domestic hot water requirements and RES installations on every new building for power generation. All buildings must be Nearly Zero Emissions Buildings (NZEB) by 31 December 2020 (art.5a Law No.142(I) 2006). Nearly Zero Emissions Buildings (NZEB) have also been defined by Regulations (Law No.142(I) 2006 Decree 2014)
Statutory provisions	<ul style="list-style-type: none"> Decree No. 446/2009 (Decree on the Energy Performance of Buildings (Minimum Energy Performance Requirements for Buildings)) Law No. 142(I)2006 (Law of the Regulation on the Energy Performance of Buildings) LPRES Regulation 2015 (Law on the Promotion of Renewable Energy and Energy Efficiency (Certification of small RES installers)) Law No.142(I) 2006 Regulations 2014 (Law of the Regulation on the Energy Performance of Buildings Decree 2014)
Relevant	<ul style="list-style-type: none"> Commission for the Protection of Competition (C.P.C.) of the Republic of

Regulatory framework, authorities and supervision, statistical reporting	
authorities and supervision	<p>Cyprus has the exclusive competence for the harmonious operation of the market, within the rules of fair competition far from any anticompetitive distortions as means to boost economic growth and social welfare.</p> <ul style="list-style-type: none"> The Ministry of Energy, Commerce and Industry (MCIT) has the task of designing and implementing policies in the fields of energy, commerce, industry, competition and consumer protection with a view to rationalizing the use of indigenous energy resources, ensuring energy supply.
Statistical reporting methods and sources	<ul style="list-style-type: none"> The aim of the Statistical Service of Cyprus (CYSTAT) is to provide reliable and up-to-date statistical information. The Statistical Service is the competent authority responsible for the compilation and the publication of most of the official statistical data in Cyprus. Information on the methods can be found on the Website.⁶²
Sources	<ul style="list-style-type: none"> Euroheat and Power, Country by Country 2019 Report, https://www.euroheat.org/publications/country-by-country/ RES legal, http://www.res-legal.eu/ JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/ki_na28630enn%281%29.pdf IEA policy database, https://www.iea.org/policies C.P.C., http://www.competition.gov.cy/competition/competition.nsf/index_en/index_en?OpenDocument CYSTAT, https://www.mof.gov.cy/mof/cystat/statistics.nsf/index_en/index_en MCIT, http://www.mcit.gov.cy/mcit/mcit.nsf/index_el/index_el?OpenDocument

Table 22: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> The Consumer Protection Service (Ministry of Energy, Commerce and Industry) is responsible for the enforcement of legal acts on consumer protection.⁶³ No information about a DHC-specific association could be found.
Available information on consumer perception and satisfaction	<ul style="list-style-type: none"> No study on the perception or satisfaction of DHC consumers could be found.

⁶² https://www.mof.gov.cy/mof/cystat/statistics.nsf/dmlquality_en/dmlquality_en?OpenDocument⁶³ www.consumer.gov.cy

Czech Republic

No data available for DC.

Table 23: Size of the cities served by DHC and geographical concentration

	DH										
Map: Localisation of DH systems											
	Size of the cities with DHC networks (Teplárenské sdružení ČR⁶⁴⁾										
% of DH networks according to the number of inhabitants	<table border="1"> <thead> <tr> <th>Number of Inhabitants</th> <th>% of DH networks</th> </tr> </thead> <tbody> <tr> <td>< 20 000 inhabitants</td> <td>64%</td> </tr> <tr> <td>20 000 < ... < 100 000 inhabitants</td> <td>31%</td> </tr> <tr> <td>100 000 < ... < 500 000 inhabitants</td> <td>4%</td> </tr> <tr> <td>> 500 000 inhabitants</td> <td>1%</td> </tr> </tbody> </table>	Number of Inhabitants	% of DH networks	< 20 000 inhabitants	64%	20 000 < ... < 100 000 inhabitants	31%	100 000 < ... < 500 000 inhabitants	4%	> 500 000 inhabitants	1%
Number of Inhabitants	% of DH networks										
< 20 000 inhabitants	64%										
20 000 < ... < 100 000 inhabitants	31%										
100 000 < ... < 500 000 inhabitants	4%										
> 500 000 inhabitants	1%										
Geographical concentration of the DH systems	<ul style="list-style-type: none"> ○ DHC systems are present in all types of cities. It covers all region of the country except the central part. 										
Sources	<ul style="list-style-type: none"> ○ Teplárenské sdružení ČR ○ Own survey with national DHC stakeholders 										

Table 24: Ownership of the DHC networks

	DH
Description	<ul style="list-style-type: none"> ○ The small systems are owned by the municipalities while the bigger systems are partly private
Sources	<ul style="list-style-type: none"> ○ Teplárenské sdružení ČR ○ Own survey with national DHC stakeholders

⁶⁴<http://www.tscre.cz/?pq=0213&1587458689#All%20networks%20have%20their%20number%20of%20citizens%20served%20and%20their%20operator>

Table 25: Main suppliers and level of competition

		DH																		
		Main DH suppliers and market share in terms of consumers																		
Main suppliers and market share in terms of consumers																				
<table border="1"> <thead> <tr> <th>Supplier</th> <th>Market Share (%)</th> </tr> </thead> <tbody> <tr> <td>Other smaller suppliers</td> <td>29%</td> </tr> <tr> <td>Elektroly Opatovice</td> <td>5%</td> </tr> <tr> <td>E.ON Energie</td> <td>6%</td> </tr> <tr> <td>Veolia Energie</td> <td>7%</td> </tr> <tr> <td>MVV Energie CZ</td> <td>9%</td> </tr> <tr> <td>CEZ</td> <td>12%</td> </tr> <tr> <td>Pražská tepelná</td> <td>13%</td> </tr> <tr> <td>Innogy Energo</td> <td>19%</td> </tr> </tbody> </table>			Supplier	Market Share (%)	Other smaller suppliers	29%	Elektroly Opatovice	5%	E.ON Energie	6%	Veolia Energie	7%	MVV Energie CZ	9%	CEZ	12%	Pražská tepelná	13%	Innogy Energo	19%
Supplier	Market Share (%)																			
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CEZ	12%																			
Pražská tepelná	13%																			
Innogy Energo	19%																			
Number of DHC suppliers		<ul style="list-style-type: none"> ○ There are 39 supply companies but the market is dominated by the 7 main suppliers detailed on the graph above. 																		
Sources		<ul style="list-style-type: none"> ○ Teplárenské sdružení ČR ○ Own survey with national DHC stakeholders 																		

Table 26: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> • DH is regulated by the Energy Act (No 458/2 Col.). • DH networks require a licence. The granting of a licence is necessary to meet the requirements concerning technical competence, financial security, staff training, etc. Basic requirements are: integrity, full legal capacity and professional competence. The complete list of conditions is specified in the Energy Act.
Regulation of prices for consumers	<ul style="list-style-type: none"> • Heat prices are regulated by the Energy regulatory office as laid down by the Energy Act and are based on justified costs and reasonable profit. • Change of energy carrier (e.g. switching from steam to hot water) has to be announced to customers at least one year in advance by DHS operator. Following such a change, the cost of technological adaptations must be met by the customer they may terminate their heat supply contract (Energy law).
Regulation of metering	<ul style="list-style-type: none"> • DH companies are required to measure heat supplied to customers. • The requirements for measuring the supply of thermal energy are set by Energy Act (No. 458/2 Col.) • Heat cost allocation rules are described in the Act No. 67/2013 Sb. According to these rules, a minimum of 30% and a maximum of 50% of the total space heating costs shall be considered as fixed costs and have to be distributed according to living area (m²); the remainder are allocated according to individual meters (usually, heat cost allocators). • Smart heat meters are used in pilot projects.⁶⁵
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> • DHC grid operators have to connect and purchase heat from third party (Energy Act). Priority access only for RES or excess heat.⁶⁶

⁶⁵ Source: Own survey with national DHC stakeholders⁶⁶ Source: Own survey with national DHC stakeholders

Regulatory framework, authorities and supervision, statistical reporting	
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> Customers must meet the technical conditions to gain grid access, covered by Energy act (No. 458/2 Coll.) Customers require a building permit to disconnect from DH. In order to obtain the permit, customers need to show that a local heating system is more economically suitable for them. In the event of disconnection, the customer has to cover the costs directly related to disconnection.
Support framework for renewable heat	<ul style="list-style-type: none"> Operational Programme Entrepreneurship and Innovation for Competitiveness 2014-2020 (OP PIK): The programme allocates investment grants from the European Regional Development Fund (ERDF) for small, medium and large companies. Eligible for support is the construction or reconstruction of biomass plants and solar thermal collectors for water heating are supported. Operational Programme Environment 2014-2020 (OP ŽP): The programme allocates investment grants from the European Regional Development Fund (ERDF). The installation of biomass and solar thermal collectors is eligible for support. Tax regulation mechanism: Properties used solely for the generation of heat from biogas, biomass, hydrothermal, geothermal energy or heat pumps are exempt from real estate tax (§ 9 par. 1 Letter m Act No. 338/1992).
Support framework for CHP	<ul style="list-style-type: none"> Feed-in tariff. A feed-in tariff can only be granted to operators of RES plants (CHP with biomass) with an installed capacity up to 100 kW. Biomass plants up to 100 kW are eligible only if they were put into operation before 31 December 2015 and the building permit was issued before 2 October 2013. Green bonus: All producers of electricity from RES (CHP with biomass) are entitled to select the premium tariff option. Moreover, CHP is included in the support schemes of renewables (OP PIK, OP ŽP and tax reduction)
Support framework for grid infrastructure	<ul style="list-style-type: none"> The Ministry of Industry and Trade Czech republic and the Ministry of the Environment of the Czech Republic provides financial grants to DHC operators
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> RES-H building obligations: Since 2012, all public buildings, each new building and any building over 1,000 m² undergoing a major refurbishment have to obtain an energy performance certificate (EPC). Certification of installers: The certification programme for installers is based on the Energy Management Act. In order to receive such a license, all applicants have to pass a professional examination before an examining committee. The Energy Management Act aims to increase energy efficiency during distribution and transfer, energy consumption and gas storage together with related activity. Law prescribes obligations of individual and legal entities during handling energy, i.e. performing energy audits, obeying rules for creation of State Energy Conception and town planning energy schemes.
Statutory provisions	<ul style="list-style-type: none"> Act No. 458/2000 Col. (Energy act) Act No. 406/2000 (Act on Energy Management) Decree No. 78/2013 (Decree on Energy Performance of Buildings) Act No. 67/2013 Sb
Relevant authorities and supervision	<ul style="list-style-type: none"> Energy regulatory office (ERO) is an administrative authority responsible for regulation in the energy sector. Competences of the Energy Regulatory Office are e.g. price controls, support for competition in the energy industries, supervision over markets in the energy industries, support for the use of renewable and secondary energy sources, support for the combined heat and power generation, support for the decentralized energy production and protection of customers. The ERO operates as an independent chapter in the state budget and does not have any economic activities, any ownership interests in domestic or foreign companies, or any special-purpose transfers; it is not entitled to provide subsidies and returnable financial assistance, does not have any expenses resulting from licensing contracts and does not have any

Regulatory framework, authorities and supervision, statistical reporting	
	<p>subordinated organisational components.</p> <ul style="list-style-type: none"> The Office for the Protection of Competition (ÚOHS) is the central authority of state administration responsible for creating conditions that favour and protect competition, supervision over public procurement and consultation and monitoring in relation to the provision of state aid. Association for the District Heating of the Czech Republic (ADH CR) is an interest group of legal entities, entrepreneurs in the field of heat supply. The mission of the Association is to protect the interests of its members and to promote development of district heating systems and combined heat and power generation.
Statistical reporting methods and sources	<ul style="list-style-type: none"> The Czech Statistical Office (CZSO) is a central body of the state administration of the Czech Republic. Information on the methods can be found on their website.⁶⁷
Sources	<ul style="list-style-type: none"> Euroheat and Power, Country by Country 2019 Report, https://www.euroheat.org/publications/country-by-country/ RES legal, http://www.res-legal.eu/ JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kj_na28630enn%281%29.pdf IEA policy database, https://www.iea.org/policies ERO, https://www.eru.cz/cs/ ÚOHS, https://www.uohs.cz/en/homepage.html CZSO, https://www.czso.cz/csu/czso/home ADH CR, http://www.tscr.cz/?lang=en

Table 27: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> The Ministry of Industry and Trade (MIT) is the main responsible authority for consumer-related issues.⁶⁸ The Energy Regulatory Office is the agency in charge of enforcing consumer rights in the market area of Energy. It includes the sectors electricity, natural gas, district heating and RES.⁶⁹ Czech Consumer Organization (dTest) is a national consumer organisation.⁷⁰
Available information on consumer perception and satisfaction	<p>The local research "M-Vector" examined between 2013 and 2014 households' experiences with and attitudes to energy tariff reforms. The World Bank summarised the findings :</p> <ul style="list-style-type: none"> Almost half the respondents rated energy provider performance as a 3 on a 5-point scale. Although the availability of services improved, the quality of such services leaves much to be desired. There are frequent service interruptions and voltage fluctuations that often damage electrical equipment, and the heat output of district heating is unsatisfactory. Respondents complained that service providers refuse to take responsibility and compensate for damages. Rural residents complained about a lack of clarity in billing and slow repair efforts when service suffers interruptions. Residents of multistory buildings in cities stated they have limited or no access to their meters and have no way to check that their bill is accurate. Bill formats are inconsistent across the country; in urban areas bills tend

⁶⁷ <https://www.czso.cz/csu/vykazy/data-collection> and https://www.czso.cz/csu/czso/metadata_database

⁶⁸ <https://www.mpo.cz/en/>

⁶⁹ <http://www.eru.cz/en/informacni-centrum>

⁷⁰ <https://www.dtest.cz/>

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to be more comprehensive and provide information on usage and tariffs, while in rural areas bills provide limited information and are sometimes handwritten.⁷¹

⁷¹ <http://documents1.worldbank.org/curated/en/582021468245408944/pdf/ACS12511-WP-REPLACEMENT-Adapting-to-Energy-Costs-web.pdf>, p.127

Denmark

Table 28: Size of the cities served by DHC and geographical concentration

	DH	DC
Geographical concentration of the DHC systems	<ul style="list-style-type: none"> ○ DH is the dominant source of heating in the residential sector. ○ DH networks are mainly located in 6 major large urban areas which tend to expand to the surrounding areas with medium and small-sized systems. 	<ul style="list-style-type: none"> ○ There are 5 km of DC networks in Denmark located in the main big cities to cover tertiary cooling. ○ 3 DC networks are present in the capital city Copenhagen.
Sources	<ul style="list-style-type: none"> ○ Euroheat & power, Country by Country 2019 ○ International Energy Agency, 2017 Denmark Review⁷² ○ Regulation and planning of district heating in Denmark, Danish Energy Agency, 2017⁷³ 	

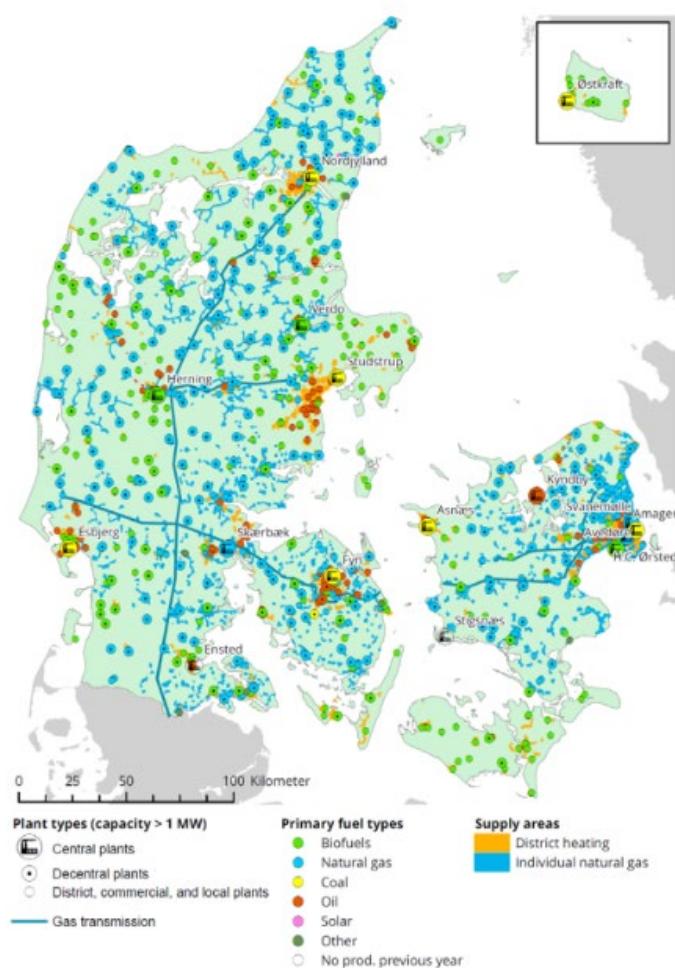


Figure 3: Denmark's heating supply (2017)

⁷²<https://webstore.iea.org/download/direct/266?fileName=EnergyPoliciesofIEACountriesDenmark2017Review.pdf>

⁷³https://ens.dk/sites/ens.dk/files/Globalcooperation/regulation_and_planning_of_district_heating_in_denmark.pdf

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Table 29: Ownership of the DHC networks

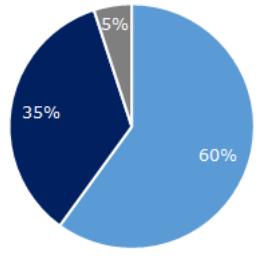
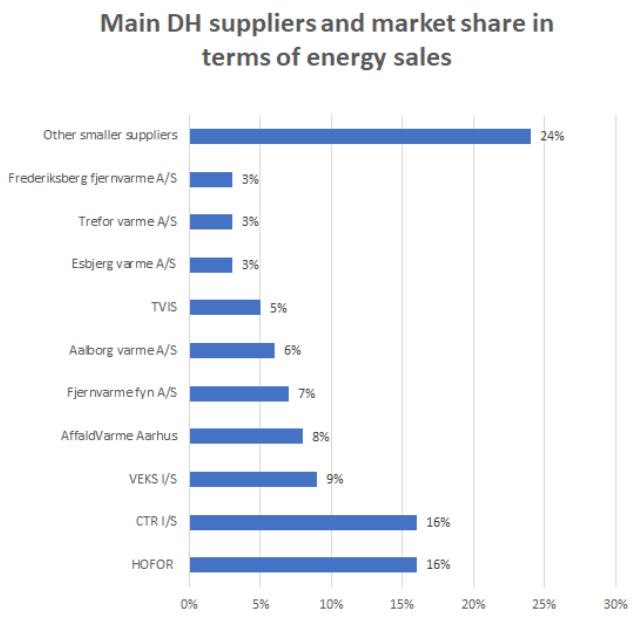
	DH	DC						
Ownership repartition in terms of number of networks (2017)	Ownership DH repartition in terms of number of networks  <table border="1"> <tr> <td>Public</td> <td>Customers cooperative</td> <td>Private</td> </tr> <tr> <td>60%</td> <td>35%</td> <td>5%</td> </tr> </table> <p>DH are mainly owned by municipalities and customer cooperatives</p>	Public	Customers cooperative	Private	60%	35%	5%	DC networks are in general in public ownership.
Public	Customers cooperative	Private						
60%	35%	5%						
Sources	<ul style="list-style-type: none"> ○ Euroheat & power, Country by Country 2019 ○ Own survey with national DHC stakeholders ○ District heating in Denmark, Danish Utility Regulator, 2019, Statistics 2017 							

Table 30: Main suppliers and level of competition

	DH	DC																								
Market description	<ul style="list-style-type: none"> ○ All the biggest cities have their own operator, the smaller systems are mostly operated by consumer cooperatives or private companies. ○ There are around 600 DH suppliers ○ HOFOR is the biggest supplier (operating in Copenhagen) 	<ul style="list-style-type: none"> ○ There are a few DC suppliers owned by the municipalities. 																								
Main suppliers (2016)	Main DH suppliers and market share in terms of energy sales  <table border="1"> <thead> <tr> <th>Supplier</th> <th>Market Share (%)</th> </tr> </thead> <tbody> <tr> <td>Other smaller suppliers</td> <td>24%</td> </tr> <tr> <td>Frederiksberg fjernvarme A/S</td> <td>3%</td> </tr> <tr> <td>Trefor varme A/S</td> <td>3%</td> </tr> <tr> <td>Esbjerg varme A/S</td> <td>3%</td> </tr> <tr> <td>TVIS</td> <td>5%</td> </tr> <tr> <td>Aalborg varme A/S</td> <td>6%</td> </tr> <tr> <td>Fjernvarme fyn A/S</td> <td>7%</td> </tr> <tr> <td>AffaldVarme Aarhus</td> <td>8%</td> </tr> <tr> <td>VEKS I/S</td> <td>9%</td> </tr> <tr> <td>CTR I/S</td> <td>16%</td> </tr> <tr> <td>HOFOR</td> <td>16%</td> </tr> </tbody> </table>	Supplier	Market Share (%)	Other smaller suppliers	24%	Frederiksberg fjernvarme A/S	3%	Trefor varme A/S	3%	Esbjerg varme A/S	3%	TVIS	5%	Aalborg varme A/S	6%	Fjernvarme fyn A/S	7%	AffaldVarme Aarhus	8%	VEKS I/S	9%	CTR I/S	16%	HOFOR	16%	<ul style="list-style-type: none"> ○ HOFOR is the biggest supplier. It represents 93% of DC customers in Denmark. Indeed, it operates the biggest DC networks in Copenhagen. ○ Frederiksberg Forsyning is the second biggest.
Supplier	Market Share (%)																									
Other smaller suppliers	24%																									
Frederiksberg fjernvarme A/S	3%																									
Trefor varme A/S	3%																									
Esbjerg varme A/S	3%																									
TVIS	5%																									
Aalborg varme A/S	6%																									
Fjernvarme fyn A/S	7%																									
AffaldVarme Aarhus	8%																									
VEKS I/S	9%																									
CTR I/S	16%																									
HOFOR	16%																									
Sources	<ul style="list-style-type: none"> ○ International Energy Agency, 2017 Denmark 	<ul style="list-style-type: none"> ○ Euroheat & power, 																								

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	<p>Review</p> <ul style="list-style-type: none"> ○ Nordic Heating and Cooling 2017, Nordic Council of Ministers, statistics 2015-2016⁷⁴ ○ Dansk Fjervarme⁷⁵ ○ Own survey with national DHC stakeholders 	<p>Country by Country 2019</p> <ul style="list-style-type: none"> ○ HOFOR Greater Copenhagen Utility, HOFOR, 2016, Statistics 2015 ○ Own survey with national DHC stakeholders
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Table 31: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting		
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> • The largest generation plants tend to be owned and operated by large energy companies, whilst smaller plants are typically owned by municipalities or consumer owned cooperatives.⁷⁶ • The Danish Heat supply Act de facto has led to an unbundling of heat generation and heat supply to the customers.⁷⁷ • In case a DH company is for sale, it has to be offered to the consumers (organised as a co-operative) or to the municipality at the market price (Heat Supply Act). • A company, which submit a project proposal to the municipality and have it approved in accordance with the Heat Supply Act will automatically get a licence to supply heat.⁷⁸ 	
Regulation of prices for consumers	<ul style="list-style-type: none"> • The Heat Supply Act protects DH consumers against abuse of the dominant position of the DH operator. The Act regulates prices for DH, production, transmission/production and sale, and conditions of sale. Prices can only cover "necessary costs" (purchase of energy, financial costs, operations, administration etc.) but, with a few minor exemptions, not a profit.⁷⁹ 	
Regulation of metering	<ul style="list-style-type: none"> • Metering is regulated by Danish guidelines for individual measurement of electricity, gas, water, heating and cooling⁸⁰. It is mandatory, that metering systems are used to measures the actual heating demand. • The Danish guidelines for individual measurement of electricity, gas, water, heating and cooling also include a specific section on the allocation of cooling cost in multi user buildings, distinguishing between existing and new buildings. In case of district cooling or central water-based cooling system, a specific cold meter for the refrigeration system have to be installed (air cooling systems are excluded). • A minimum of 40% of the total heating costs must be allocated according to individual meters. If only the space heating is considered, a minimum of 60% must be allocated according to individual heat meters or heat cost allocators. The consumption independent part includes the fixed costs such as, for network access.⁸¹ 	
Regulation regarding grid access and usage (supply)	<ul style="list-style-type: none"> • DH market is dominated by non-profit ownership structure, and legislation has a strong customer orientation. The connection to the grid is based on the individual contracts.⁸² 	

⁷⁴ <http://norden.diva-portal.org/smash/get/diva2:1098961/FULLTEXT01.pdf>

⁷⁵ <https://www.danskfjernvarme.dk/viden/statistik-subsection/aarsstatistik>

⁷⁶ Source: Own survey with national DHC stakeholders

⁷⁷ Source: Own survey with national DHC stakeholders

⁷⁸ Source: Own survey with national DHC stakeholders

⁷⁹ Euroheat & Power, Country by Country Report 2019

⁸⁰ <https://www.retsinformation.dk/Forms/R0710.aspx?id=163405> and

<https://www.retsinformation.dk/Forms/R0710.aspx?id=174884>

⁸¹ <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf>

⁸² https://ens.dk/sites/ens.dk/files/Globalcooperation/regulation_and_planning_of_district_heating_in_denmark.pdf

Regulatory framework, authorities and supervision, statistical reporting	
perspective) Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> Until 2019 municipalities could impose a compulsory connection to collective heat solution. This option has been removed from the Heat Supply Act, but existing obligations, covering around half of all DH customers, remain in force.⁸³
Support framework for renewable heat	<ul style="list-style-type: none"> Tax regulation mechanism: There are different taxes on the production, processing, possession, receipt and dispatch of fossil fuels for heating. Renewable energy sources are exempt from these taxes. All renewable energy technologies are exempt from the tax obligation. Price based mechanism: The use of biogas for heating purposes is supported through a direct premium tariff (§ 43 d VE-Lov).
Support framework for CHP	<ul style="list-style-type: none"> Centralised CHP plants and most decentralised CHP plants sell electricity at the market price in the Nordic power market. According to the heat supply law, municipalities, in cooperation with utilities and other stakeholders, are responsible for local heat planning. Heat planning determines the choice of collective heat solution in areas suitable for network-based supply, and thus excludes direct competition between district heating and natural gas. In addition to the income from electricity sales on the spot market, most of the decentralised CHP plants receive an electricity production subsidy. Originally, this subsidy was granted as a feed in tariff with three different tariff levels depending on the time of delivery, but has been converted to a fixed annual amount, which was available until the end of 2018. Since 2018, only power and CHP plants using renewable energy sources will receive an addon to the market price of electricity. For example, electricity produced from biomass receives an add-on to the market price of EUR 20 per MWh.
Support framework for grid infrastructure	<ul style="list-style-type: none"> There is no direct support program for DHC grid infrastructure.⁸⁴
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> When establishing or extending DH supply in an area, rules regulate which fuels can be used. In the case of CHP, more or less all fuel types can be chosen. But for heat only production, the fuel types allowed depend on whether the DH facility is in an area with or without natural gas supply. In general, there are two types of training programmes for installers of RES plants: The Quality Assurance Scheme for the installers of solar heating plants, PV installations and biofuels, and the Heat Pump Scheme covering the installation of heat pumps. Apart from that, the vocational education for specific professions covers all the requirements of the European RES Directive. There are two types of Research, Development and Demonstration Programmes: "Forsk-El Programme Forsk-El Programme "and "The Energy Technology Development and Demonstration Programme EUDP".
Statutory provisions	<ul style="list-style-type: none"> Act No. 772 of 24 July 2000 (Heat supply act) Act 555/2007 (Act on the Energy Technology Development and Demonstration Programme) VE-Lov (Law on the Promotion of Renewable Energy) Ministerial Order No 563 of 2 June 2014, MNE (2014)53300 BEK Nr. 563 vom 02/06/2014 (Guidelines for individual measurement of electricity, gas, water, heating and cooling)
Relevant authorities and supervision	<ul style="list-style-type: none"> The Danish Energy Regulatory Authority within the energy area oversees the district heating sector and deals with complaints regarding prices and conditions, and their rulings can be appealed to the Energy Appeal Board. All DH and CHP units have the obligation to submit information to the

⁸³ Euroheat & Power, Country by Country Report 2019⁸⁴ Source: Own survey with national DHC stakeholders

Regulatory framework, authorities and supervision, statistical reporting	
	<p>Danish Energy Regulatory Authority on prices and conditions, so that the authority can deal with complaints and objections.</p> <ul style="list-style-type: none"> The Danish Energy Agency administers energy and supply in Denmark as well as climate initiatives. Danish District Heating Association (Dansk Fjernvarme) represents over 400 members all over Denmark, supplying 64% of Danish households with district heating. Energy Appeal Board: A private Energy Supplies Complaint Board, established by sector organisations, issues rulings on complaints not regulated by the heat supply act, and its rulings are generally adhered to by energy utilities.
Statistical reporting methods and sources	<ul style="list-style-type: none"> Statistics Denmark is the central authority on Danish statistics. Their mission is to collect, compile and publish statistics on the Danish society. Information on the methods can be found on the website.⁸⁵ The Danish Board of District Heating (DBDH) provides several publications on DHC.⁸⁶ Additionally, the Danish Energy Agency and the District Heating Association publish statistics on DHC.
Sources	<ul style="list-style-type: none"> Euroheat and Power, Country by Country 2019 Report, https://www.euroheat.org/publications/country-by-country/ RES legal, http://www.res-legal.eu/ JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/ki_na28630enn%281%29.pdf Danish Energy Agency (2017): Regulation and planning of district heating in Denmark, https://ens.dk/sites/ens.dk/files/Globalcooperation/regulation_and_planning_of_district_heating_in_denmark.pdf Bürger, Veit; Steinbach, Jan; Kranzl, Lukas; Müller, Andreas (2019): Third party access to district heating systems - Challenges for the practical implementation. In: Energy Policy 132, p. 881–892. DOI: 10.1016/j.enpol.2019.06.050. Danish Energy Regulatory Authority, https://ens.dk/en Danish Energy Agency, https://ens.dk/en Danish District Heating Association, https://www.danskfjernvarme.dk/ Statistics Denmark, https://www.dst.dk/en DBDH, https://dbdh.dk/

Table 32: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> The Danish Competition and Consumer Authority is an authority under the Ministry of Economic and Business Affairs. The principal aims of the Authority are to create a foundation for a coordinated and active contribution in the field of consumer affairs and to contribute to the creation and maintenance of a high level of consumer protection as regards quality, safety, health and financial and legal rights by means of mediation and the exercise of influence.⁸⁷ The Danish Consumer Council is the most well-established consumer organisation in Denmark. The Consumer Council is an umbrella

⁸⁵ <https://www.dst.dk/en/OmDS/lovgivning> and <https://www.dst.dk/en/OmDS/strategi-og-kvalitet/kvalitetspolitik>⁸⁶ <https://dbdh.dk/publications-2/>⁸⁷ <https://www.en.kfst.dk/>

	<p>organisation including 30 national member organisations and five local consumer groups.⁸⁸</p> <ul style="list-style-type: none"> The Danish Energy Regulatory Authority oversees the DH sector and ensures the protection of consumers. All DH companies have the obligation to submit information to this Authority on prices and conditions, so that it can deal with complaints and objections.⁸⁹ The Energy Sector Board of Appeal (Energiklagenævnet) and the Energy Supplies Complaints Board (Ankenævnet på Energiområdet) are the main bodies when it comes to the DH related dispute solving.⁹⁰
Available information on consumer perception and satisfaction	<ul style="list-style-type: none"> Consumers in Copenhagen are in general very satisfied with the quality of the service. All DH companies have a dedicated team to support their clients. The level of transparency of the prices and strategy is very high, and customer satisfaction surveys are performed on an annual basis. There are almost no voluntary disconnections from the network.⁹¹ Consumers in Gram are in general very satisfied with the quality of the service, as expressed in frequent exchanges with the cooperative's employees. The level of transparency of the prices, and strategy is very high and directly influenced by the consumers.⁹² According to ClimateXChange (2018) the general satisfaction and trust in the DH sector is high.⁹³

⁸⁸ <https://taenk.dk/> and https://ec.europa.eu/info/sites/info/files/national-consumer-organisations_da_listing.pdf

⁸⁹ <https://ens.dk/en> and https://www.euroheat.org/wp-content/uploads/2017/01/study-on-efficient-dhc-systems-in-the-eu-dec2016_final-public-report6.pdf, p. 15

⁹⁰ <https://norden.diva-portal.org/smash/get/diva2:1098961/FULLTEXT01.pdf>;
https://ens.dk/sites/ens.dk/files/contents/material/file/regulation_and_planning_of_district_heating_in_denmark.pdf

⁹¹ https://www.euroheat.org/wp-content/uploads/2017/01/study-on-efficient-dhc-systems-in-the-eu-dec2016_final-public-report6.pdf, p.23

⁹² https://www.euroheat.org/wp-content/uploads/2017/01/study-on-efficient-dhc-systems-in-the-eu-dec2016_final-public-report6.pdf, p.23

⁹³ <https://www.climatechange.org.uk/media/3569/lessons-from-european-district-heating-regulation.pdf>

Estonia

Table 33: Size of the cities served by DHC and geographical concentration

	DH	DC
Geographical concentration of the DHC systems	<ul style="list-style-type: none"> ○ 230 DH systems in Estonia ○ In small residential areas, DH is the most common way of heating for the majority of inhabitants. ○ A large number of micro-sized DH systems (having a maximum ten heated buildings) were established during the Soviet era 	<ul style="list-style-type: none"> ○ The only two DC networks in operation are located in Tartu (94,000 inhabitants)
Size of the cities served by DHC	<ul style="list-style-type: none"> ○ From small villages (about 100 inhabitants) up to the biggest cities in Estonia (420,000 inhabitants). 	
Sources	<ul style="list-style-type: none"> ○ Euroheat and Power, Country by country 2019 ○ Republic of Estonia Competition Authority, Main developments of District Heating in Estonia (2016) ○ Own survey with national DHC stakeholders 	

Table 34: Ownership of the DHC networks

	DH	DC
Ownership description	<ul style="list-style-type: none"> ○ Most of the DH networks are privately owned 	<ul style="list-style-type: none"> ○ The only two DC networks in operation located in Tartu are privately owned
Sources	<ul style="list-style-type: none"> ○ Euroheat and Power, Country by country 2019 ○ Republic of Estonia Competition Authority, Main developments of District Heating in Estonia (2016) ○ Own survey with national DHC stakeholders 	

Table 35: Main suppliers and level of competition

	DH	DC												
Main suppliers and market share in terms of revenue (2016)	<p>Main suppliers- Market share in terms of revenue</p> <table border="1"> <thead> <tr> <th>Supplier</th> <th>Market Share (%)</th> </tr> </thead> <tbody> <tr> <td>Fortum Eesti</td> <td>4.30%</td> </tr> <tr> <td>VKG AS</td> <td>6.30%</td> </tr> <tr> <td>Narva Soojusvõrk AS</td> <td>9%</td> </tr> <tr> <td>Tartu Keskkatlama AS (Fortum)</td> <td>11.50%</td> </tr> <tr> <td>Utilitas Tallinn AS</td> <td>40%</td> </tr> </tbody> </table>	Supplier	Market Share (%)	Fortum Eesti	4.30%	VKG AS	6.30%	Narva Soojusvõrk AS	9%	Tartu Keskkatlama AS (Fortum)	11.50%	Utilitas Tallinn AS	40%	<ul style="list-style-type: none"> ○ The only two DC networks are operated by Tartu Keskkatlama AS (Fortum)
Supplier	Market Share (%)													
Fortum Eesti	4.30%													
VKG AS	6.30%													
Narva Soojusvõrk AS	9%													
Tartu Keskkatlama AS (Fortum)	11.50%													
Utilitas Tallinn AS	40%													
Market description	<ul style="list-style-type: none"> ○ Estonia's national strategy is to fully regulate the District Heating sector and its prices. Thus, from the point of view of District Heating companies, there is no open market for District Heating. ○ The majority of DH actors are private companies, mostly Estonian, except for Fortum. ○ The market share of the companies who own the 16 biggest networks is about 86%. 													

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	DH	DC
Sources	<ul style="list-style-type: none"> ○ Euroheat and Power, Country by country 2019 ○ Republic of Estonia Competition Authority, Main developments of District Heating in Estonia (2016) ○ Galindo Fernández, M., Roger-Lacan, C., Gährs, U., Aumaitre, V., Efficient district heating and cooling systems in the EU - Case studies analysis, replicable key success factors and potential policy implications, EUR 28418 EN, doi: 10.2760/371045 ○ Own survey with national DHC stakeholders 	

Table 36: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> • The District Heating Act defines the parties in the district heating market and their specific responsibilities and rights.⁹⁴ • The District Heating Act established the definition of the "District Heating area". The DH area is the area within the borders of a municipality with a special building code. Every municipality has right to establish a DH area as an area with a special building code. • DHC networks must have an operating licence (para. 18, District heating Act).⁹⁵ The operating licences are valid for an indefinite period and are issued by the Republic of Estonia Competition Authority.
Regulation of prices for consumers	<ul style="list-style-type: none"> • The District Heating Act determined the DH market as being subject to regulation by the state. The ex-ante regulation was implemented to the heat price of any CHP plant (irrespective of the size of the plant) if heat was supplied to the DH network, and to the end-user heat price of a DH company if its annual heat sales exceeded 50 GWh.⁹⁶ • Since 2010, all DH prices are regulated. The Estonian Competition Authority (ECA) shall fix the end-user price (ex-ante price regulation, para. 9 District Heating Act).
Regulation of metering	<ul style="list-style-type: none"> • A DHC operator must organise the metering of heat consumed from the network and maintain corresponding records (para. 15, District Heating Act)
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> • Regulated third party access to the DH network: If there is an application to generate heat to the DH network or there is need for new capacities, the network operator is obligated to select the generator on open tendering procedures (para. 14 District Heating Act) • Nevertheless, the most companies are integrated (generation and network).
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> • In a DH area all new buildings, with some exceptions, are required to be connected to the DH network (para. 5 District Heating Act). • Within technical limits of the network, a DHC operator is required to provide a network connection to the customer (para. 10 District Heating Act).
Support framework for renewable heat	<ul style="list-style-type: none"> • Wider use of renewable energy sources in energy production: The purpose of this measure is to allocate the funds from the EU European Regional Development Fund (period 2007-2013) to increase the share of renewable energy sources in energy production. The supported activities include fuel switch from fossil fuel to renewable.
Support framework for CHP	<ul style="list-style-type: none"> • In 2007, feed-in tariffs were introduced in order to promote electricity production based on renewable energy sources and CHP. • The Electricity Market Act was amended in order to set a feed-in tariff of 0.05 €/MWh either for the electricity produced by small fossil fuel fired CHP plants (up to 10 MWe) that are installed in order to replace existing DH boiler(s) or for the electricity produced by larger CHP plants using waste, peat or residual gas from shale oil production as fuel

⁹⁴ Euroheat & Power, Country by Country Report 2019

⁹⁵ <https://www.eesti.ee/en/licences-and-notices-of-economic-activity/energetics/heating-undertaking-licence/>

⁹⁶ Euroheat & Power, Country by Country Report 2019

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Regulatory framework, authorities and supervision, statistical reporting	
	<ul style="list-style-type: none"> In both cases the CHP plant should meet the requirements for high efficiency cogeneration. The higher feed-in tariff (0.07 €/MWh) was introduced for CHP plants that use renewable fuels. Wider use of renewable energy sources in energy production: The supported activities include CHP stations with grid connections and infrastructure. The only investments not supported were for CHP larger than 2 MW electrical and 4 MW thermal energy (outside the islands), and projects with a budget over 50 million €.
Support framework for grid infrastructure	<ul style="list-style-type: none"> Wider use of renewable energy sources in energy production: The supported activities also include reconstruction of district grid. Projects with a budget over 50 million € aren't supported.
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> 2nd National Energy Efficiency Target Programme: Every year the Ministry of Economic Affairs and Communications carries out an open call and evaluation of proposals, where municipalities are eligible to present the proposals on increasing the efficiency in their facilities or district heating.
Statutory provisions	<ul style="list-style-type: none"> The Electricity Market Act The District Heating Act⁹⁷
Relevant authorities and supervision	<ul style="list-style-type: none"> The Estonian Competition Authority (Estonian: Konkurentsiamet) is an independent authority both in decision-making procedures and in accountability. The objective of competition supervision is to ensure fair competition and safeguard the functioning of market. The aim of competition rules is to eliminate competitive restrictions. Responsibilities: Electricity, Natural Gas, District Heating, Competition, Railway, Postal Sector, Water Sector. The Responsibilities include tariff setting, licensing, monitoring of supply service quality, monitoring of retail and wholesale market and promotion of competition. The Estonian Power and Heat Association (EPHA) has an established position among Estonian energy industry stakeholders. The majority of the DH companies in Estonia are active participants in the initiatives of the Estonian Power and Heat Association.
Statistical reporting methods and sources	<ul style="list-style-type: none"> Statistics Estonia (Estonian: Statistikaamet) is the Estonian government agency responsible for producing official statistics regarding Estonia. It is part of the Ministry of Finance. Information on the methods can be found on the Website.⁹⁸
Sources	<ul style="list-style-type: none"> Euroheat and Power, Country by Country 2019 Report, https://www.euroheat.org/publications/country-by-country/ RES legal, http://www.res-legal.eu/ JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kj_na28630enn%281%29.pdf IEA policy database, https://www.iea.org/policies District heating regulation in Estonia, https://rekk.hu/downloads/events/tavho_ws_2015_mart_ots.pdf Konkurentsiamet, https://www.konkurentsiamet.ee/en Statistikaamet, https://www.stat.ee/en EPHA, https://epha.ee/

Table 37: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for	<ul style="list-style-type: none"> The Ministry of Economic Affairs and Communications has the main responsibility for consumer policy matters. The Ministry is responsible for

⁹⁷ <https://www.riigiteataja.ee/en/eli/ee/513012015005/consolidate/current>

⁹⁸ <https://www.stat.ee/methodology>

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consumer protection	<p>the drafting of general product safety legislation and also legislation in the area of consumer economic interests.⁹⁹</p> <ul style="list-style-type: none">• The Consumer Protection Board is a public enforcement authority, the main task of which is to supervise the compliance with consumer law, protect the legitimate rights of consumers and to represent their interests, to develop and implement consumer policy in accordance with the provisions of the UN Guidelines, of the Consumer Protection Act and of European Union consumer policy.¹⁰⁰
Available information on consumer perception and satisfaction	<ul style="list-style-type: none">• The company Fortum Tartu owns and operates the DH system in Tartu and performs a customer satisfaction survey every year which shows that the level of satisfaction is very good and stable.¹⁰¹• The satisfaction of DHC consumers in Tallinna was analysed with a survey conducted by Norstat Estonia for the companie Utilitas. The most important results of the survey were the increase in customer satisfaction with all heat service quality indicators compared to the previous survey.¹⁰²

⁹⁹ www.mkm.ee

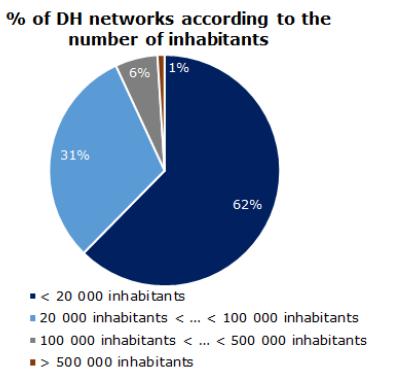
¹⁰⁰ <https://www.ttja.ee/et>

¹⁰¹ https://www.euroheat.org/wp-content/uploads/2017/01/study-on-efficient-dhc-systems-in-the-eu-dec2016_final-public-report6.pdf, p.47

¹⁰² <https://www.utilitas.ee/tallinna-kutte-klientide-rahulolu-on-tousnud/>

Finland

Table 38: Size of the cities served by DHC and geographical concentration

	DH	DC										
Map: Localisation of DHC systems (2018)	 <p style="text-align: center;">District heating production units</p>	-										
Geographical concentration of the DHC systems	<ul style="list-style-type: none"> ○ DH is well developed in the Southern part of the country ○ Almost all municipalities have a DH network 											
Size of the cities served by DHC	<ul style="list-style-type: none"> ○ The size of the cities served by DH varies from quite small towns with ca. 3000 inhabitants (like Karvia and Veteli) to big cities like Helsinki (capital city with more than 600,000 inhabitants). ○ More than half of the municipalities in Finland have a district heating system ○ And almost all municipalities have at least a small DH network (small biomass heating plant delivering heat to ca. 5 - 20 customers in the center of the municipality). 	<ul style="list-style-type: none"> ○ DC is mainly present in large cities, especially in Helsinki 										
% of DH networks according to the number of inhabitants (2018)	 <table border="1"> <thead> <tr> <th>Number of Inhabitants</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>< 20 000 inhabitants</td> <td>62%</td> </tr> <tr> <td>20 000 inhabitants < ... < 100 000 inhabitants</td> <td>31%</td> </tr> <tr> <td>100 000 inhabitants < ... < 500 000 inhabitants</td> <td>6%</td> </tr> <tr> <td>> 500 000 inhabitants</td> <td>1%</td> </tr> </tbody> </table>	Number of Inhabitants	Percentage	< 20 000 inhabitants	62%	20 000 inhabitants < ... < 100 000 inhabitants	31%	100 000 inhabitants < ... < 500 000 inhabitants	6%	> 500 000 inhabitants	1%	-
Number of Inhabitants	Percentage											
< 20 000 inhabitants	62%											
20 000 inhabitants < ... < 100 000 inhabitants	31%											
100 000 inhabitants < ... < 500 000 inhabitants	6%											
> 500 000 inhabitants	1%											
Sources	<ul style="list-style-type: none"> ○ International Energy Agency, 2018 Finland Review¹⁰³ ○ District heating in Finland, Energiateollisuus, statistics 2018¹⁰⁴ ○ Own survey with national DHC stakeholders 											

¹⁰³ <https://webstore.iea.org/download/summary/2372>¹⁰⁴ https://energia.fi/en/news_and_publications/statistics/district_heating_statistics/district_heating_and_cooling

District Heating and Cooling in the European Union

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Table 39: Ownership of the DHC networks

	DH	DC
Ownership description	<ul style="list-style-type: none"> ○ DH ownership is mainly public ○ DH networks are mainly operated by join-stock companies owned by municipalities. However, there are few privately owned DH companies as well. The share of privately owned companies is ca. 10% (in number of companies) or 15% (calculated as a share of DH sold). 	<ul style="list-style-type: none"> ○ DC companies and networks are mainly owned by municipalities (Fortum owned by State and private investors, Vierumäen Infra owned by private investors).
Sources	<ul style="list-style-type: none"> ○ International Energy Agency, 2018 Finland Review ○ Own survey with national DHC stakeholders 	

Table 40: Main suppliers and level of competition

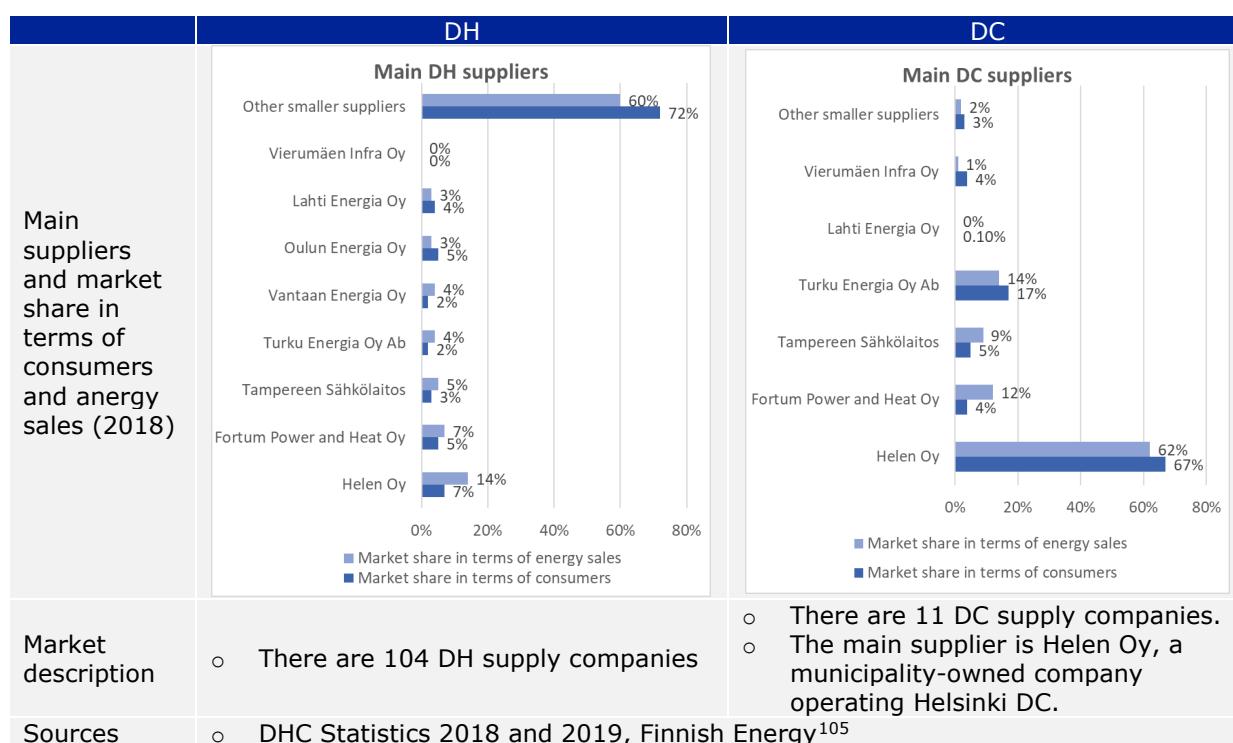


Table 41: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> • DHC networks are owned and managed by the individual companies. DHC is not regulated and there is free competition on heating markets. District heating companies' heat procurement or their obligation to join customers or heat producers in the networks are not regulated, either.¹⁰⁶
Regulation of prices for consumers	<ul style="list-style-type: none"> • Finland does not have specific legislation concerning the selection or pricing of heating or heating methods, but the dominant market position requires pricing to be on equal terms for all customers. Based on the Competition Law the Finnish Competition and Consumer Authority can initiate investigations if they suspect an abuse of pricing. • All business activities are supervised by general competition and

¹⁰⁵https://energia.fi/en/news_and_publications/statistics/district_heating_statistics/district_heating_and_cooling

¹⁰⁶ Euroheat & Power, County by Country Report 2019

Regulatory framework, authorities and supervision, statistical reporting	
	consumer protection legislation. Based on general competition legislation, the Finnish Competition and Consumer Authority considers DH to be in a dominant market position in relation to their existing customers. This sets out some requirements for DH companies. Misuse of the dominant market position is forbidden in the competition act. For instance, it is forbidden to bind the product prices, dump customers with too low prices or have unreasonable pricing. Pricing must be sufficiently cost related, transparent and similar customers must be treated in the same way. ¹⁰⁷
Regulation of metering	<ul style="list-style-type: none"> From the beginning of 2015 the act on energy efficiency has given some obligations to DH companies. These also concern metering (and billing) of DH. However, these new obligations do not actually change the prevailing practice in DH companies.¹⁰⁸ In particular, the energy efficiency act does not require the installation of individual consumption meters or heat cost allocators. After the adoption of the EED, the Finnish Ministry of Employment and Economy asked the Technical Research Centre of Finland (VTT) to investigate the cost-efficiency of individual heat meters and heat cost allocators in multi-apartment buildings. The conclusion of the study was that individual heat meters or even heat allocators would not be a cost-effective in Finland.¹⁰⁹
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> There is no specific regulation on third party access to DHC networks.¹¹⁰
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> Customers are free to choose the heating method they want to use. Customers are not obligated to connect to DH networks and DH companies have no obligation to connect customers to their networks.¹¹¹
Support framework for renewable heat	<ul style="list-style-type: none"> State grant for investment in RES: The so-called "energy aid" is a state grant for investments in RES production facilities and research projects related to it. Grants are available for projects, which promote the use or production of renewable energies, advance energy efficiency and reduce the environmental effects caused by energy production and use (§3, §5 Decree No. 1063/2012). At least 25% of the projects' financing must come from non-governmental funds. Energy aid may be granted to companies, municipalities and other communities. According to the Ministry of Economic Affairs and Employment, all technologies are eligible for grants.
Support framework for CHP	<ul style="list-style-type: none"> A fixed "Heat bonus" is paid for heat produced by CHP plants working on biogas and wood fuel.¹¹²
Support framework for grid infrastructure	<ul style="list-style-type: none"> There is no specific support program for DHC grid infrastructure.
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> Investment support for farmers: Decree No. 241/2015 states the conditions for the allocation of investment support for farmers, which can be used for the construction of heating facilities working on renewable energies. The support can be allocated for the construction, expansion or renovation of heating facilities used for agricultural production. The condition for the allocation of the grant is that the plant needs to work on

¹⁰⁷ Euroheat & Power, County by Country Report 2019¹⁰⁸ Euroheat & Power, County by Country Report 2019¹⁰⁹ <https://cris.vtt.fi/en/publications/selvitys-huoneistokohtaisten-l%C3%A4mp%C3%B6m%C3%A4rk%C3%A4n-A4r%C3%A4mittareiden-ja-l%C3%A4mmityskus>¹¹⁰ Source: Own survey with national DHC stakeholders¹¹¹ Euroheat & Power, County by Country Report 2019¹¹² <http://www.res-legal.eu/search-by-country/finland/tools-list/c/finland/s/res-hc/t/promotion/sum/128/lpid/127/>

Regulatory framework, authorities and supervision, statistical reporting	
	<p>either waste, aerothermal, geothermal, solar thermal, biomass or any other renewable source.</p> <ul style="list-style-type: none"> • Research and development: Grants are available for research and development projects that involve the generation of renewable energy or the application of RES technologies (§ 5 Decree No 1063/2012). Among other costs, the costs for preparation, administrative planning costs are eligible for subsidies (§ 6 ff. Regulation No. 1063/2012). • Training programmes for installers: In 2013, the Finnish government introduced a training and certification programme for installers. The programme is carried out by the energy agency MOTIVA OY. The certifications are not compulsory for installers or construction companies.
Statutory provisions	<ul style="list-style-type: none"> • Act No. 1396/2010 (Act on the Production Subsidy for Electricity Produced from Renewable Energy Sources) • Decree No. 1397/2010 (Regulation on Production Subsidy for Electricity Produced from Renewable Energy Sources) • Decree No. 241/2015 (Government Decree on the Allocation of Farm Investment Aid) • Regulation No. 1063/2012 (Government Decree on General Conditions for Granting Energy Aid) • Regulation No. 1063/2012 (Government Decree on General Terms and Conditions for Granting Energy Aid) • Act no. 1429/2014 (Energy Efficiency Act) • Act No. 590/2013 (Monitoring the Electricity and Natural Gas Markets)
Relevant authorities and supervision	<ul style="list-style-type: none"> • The Finnish Competition and Consumer Authority (FCCA) is tasked with ensuring good market performance. The Competition Division removes barriers to competition, ensuring that consumers are offered competitive alternatives. The Consumer Division, on the other hand, ensures that consumers have access to sufficient, accurate, and truthful information for making choices, and that the practices companies use in marketing and their customer relations are appropriate and the contract terms applied by them are reasonable. • Finnish Energy represents companies that produce, acquire, transmit and sell electricity, gas, district heat and district cooling and offer related services.
Statistical reporting methods and sources	<ul style="list-style-type: none"> • Statistics Finland combines collected data with its own expertise to produce statistics and information services. Statistics Finland is the only Finnish public authority specifically established for statistics. It produces the vast majority of Finnish official statistics and is a significant international actor in the field of statistics. They also collect and publish statistics on district heating, e.g. production, consumption or prices of DH. Information on the methods can be found on the website.¹¹³
Sources	<ul style="list-style-type: none"> • Euroheat and Power, Country by Country 2019 Report, https://www.euroheat.org/publications/country-by-country/ • RES legal, http://www.res-legal.eu/ • JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/ki_na28630enn%281%29.pdf • FCCA, https://www.kkv.fi/en/ • Statistics Finland, https://www.stat.fi/index_en.html • Finnish Energy, https://energia.fi/en

¹¹³ http://www.stat.fi/tup/menetelmapalvelut/index_en.html

Table 42: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> The responsibility for the general consumer policy matters lies with the Ministry of Employment and the Economy (MEE).¹¹⁴ The Finnish Competition and Consumer Authority is responsible for consumer protection. It also controls that prices of DHC are on equal terms for all customers and reflect the costs. Suomen Kuluttajaliitto (Finnish Consumers' Association) is an independent promoter of the interests and rights of consumers.¹¹⁵
Available information on consumer perception and satisfaction	<ul style="list-style-type: none"> Adato Energia Oy carries out an annual survey on the customer satisfaction among energy companies' customers. According to the summary of the survey, customers are particularly satisfied with, the friendliness of the energy companies' customer service staff, the handling of agreed matters and the willingness to service. The uninterrupted distribution of electricity and heat and the reliability of the companies are also praised.¹¹⁶ The Finnish DHC company Finnish Energy regularly measure their customer satisfaction. In 2016, the customer satisfaction levels of DH companies surpassed those of the banks and insurance companies. The price is the most common topic in the customer feedback.¹¹⁷ Ruokamo (2016) investigates in his paper residential homeowner attitudes regarding innovative home heating systems with choice experiment. The results revealed that ground heating and district heating were favoured over the other studied main heating alternatives.¹¹⁸ Rouvinen and Matero (2013) examine in their paper how different attributes of residential heating systems affect private homeowners' choice of heating system following renovations. The data were retrieved by a questionnaire mailed to a random sample of Finnish private owners. The results show an overall preference for ground heat and district heat which is consistent with other research.¹¹⁹

¹¹⁴ <https://tem.fi/en/frontpage>¹¹⁵ https://ec.europa.eu/info/sites/info/files/national-consumer-organisations_fi_listing_0.pdf¹¹⁶ <https://www.adato.fi/uutiset/aiankohtaista/energiaa-alan-asiakastutkimuksen-mukaan-yhtioiden-asiakastytyvaisyyks-pysynyt-korkealla/>¹¹⁷ https://energia.fi/files/2983/Opportunities_and_challenges_of_opening_DH_networks_-How_to_heat_the_future_home.pdf¹¹⁸ <https://doi.org/10.1016/j.enpol.2016.04.017>¹¹⁹ <https://doi.org/10.1016/j.biombioe.2012.10.010>

District Heating and Cooling in the European Union

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France

Table 43: Size of the cities served by DHC and geographical concentration

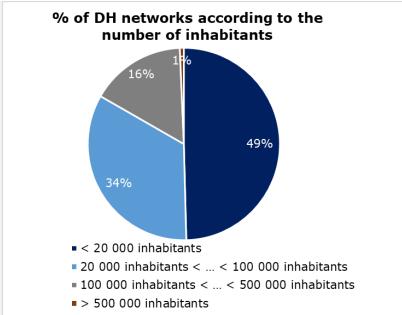
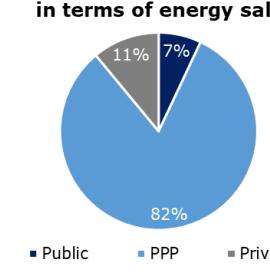
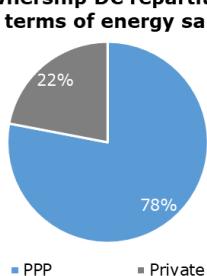
	DH	DC								
Maps (2018) Source: SNCU annual DHC survey (2019) ¹²⁰										
% of DHC networks according to the number of inhabitants (2018)	 <table border="1" style="margin-left: auto; margin-right: auto;"> <caption>% of DH networks according to the number of inhabitants</caption> <tr> <td>< 20 000 inhabitants</td> <td>49%</td> </tr> <tr> <td>20 000 inhabitants < ... < 100 000 inhabitants</td> <td>34%</td> </tr> <tr> <td>100 000 inhabitants < ... < 500 000 inhabitants</td> <td>16%</td> </tr> <tr> <td>> 500 000 inhabitants</td> <td>1%</td> </tr> </table>	< 20 000 inhabitants	49%	20 000 inhabitants < ... < 100 000 inhabitants	34%	100 000 inhabitants < ... < 500 000 inhabitants	16%	> 500 000 inhabitants	1%	
< 20 000 inhabitants	49%									
20 000 inhabitants < ... < 100 000 inhabitants	34%									
100 000 inhabitants < ... < 500 000 inhabitants	16%									
> 500 000 inhabitants	1%									
Geographical concentration of the DHC systems	<ul style="list-style-type: none"> ○ More and more small and medium networks are being developed in small and medium cities ○ Most communities with more than 30,000 residents benefit from the DHC networks. ○ Region Ile de France (which includes Paris) represents 45% of the energy sales by DH 	<ul style="list-style-type: none"> ○ District cooling networks are developed in big metropolitan areas (Paris and its suburbs, Marseille, Grenoble, Toulouse, Bordeaux, Montpellier ...). ○ Some networks have been developed to deliver cooling to Paris airport facilities (Orly, Roissy, Le Bourget). 								
Sources	<ul style="list-style-type: none"> ○ SNCU annual DHC survey (2019) ○ National Opendata platform(data.gouv) ○ Own survey with national DHC stakeholders 									

Table 44: Ownership of the DHC networks

	DH	DC										
Ownership repartition in terms of energy sales	 <table border="1" style="margin-left: auto; margin-right: auto;"> <caption>Ownership DH repartition in terms of energy sales</caption> <tr> <td>Public</td> <td>7%</td> </tr> <tr> <td>PPP</td> <td>11%</td> </tr> <tr> <td>Private</td> <td>82%</td> </tr> </table>	Public	7%	PPP	11%	Private	82%	 <table border="1" style="margin-left: auto; margin-right: auto;"> <caption>Ownership DC repartition in terms of energy sales</caption> <tr> <td>PPP</td> <td>22%</td> </tr> <tr> <td>Private</td> <td>78%</td> </tr> </table>	PPP	22%	Private	78%
Public	7%											
PPP	11%											
Private	82%											
PPP	22%											
Private	78%											

¹²⁰ <https://www.fedene.fr/wp-content/uploads/sites/2/2019/12/SNCU-Rapport-Global-2019-Restitution-enquete-r%C3%A9seaux.pdf>

District Heating and Cooling in the European Union

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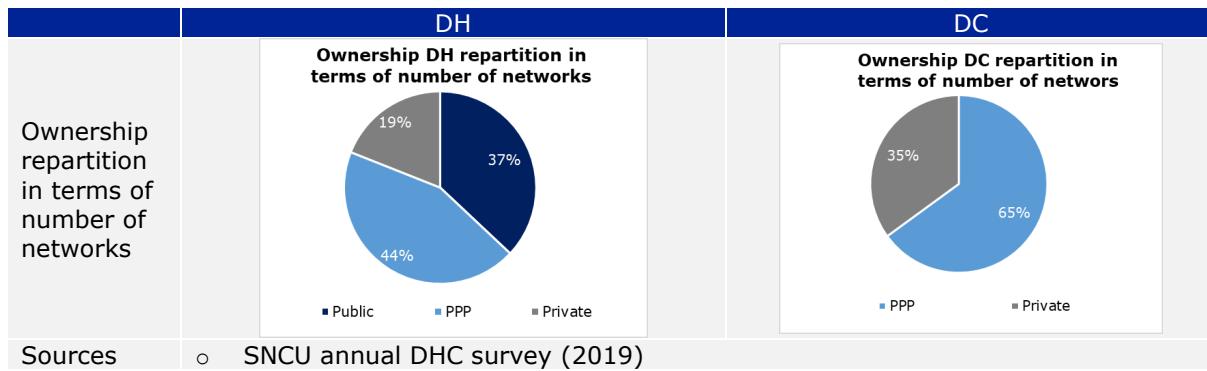


Table 45: Main suppliers and level of competition

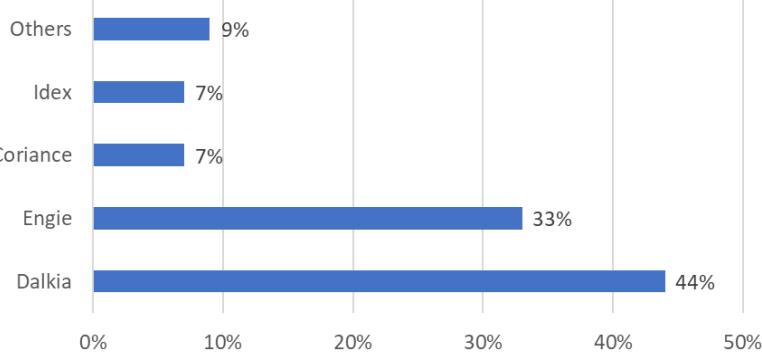
	DH	DC										
Main suppliers and market share in terms of revenue (2018)	Main DHC suppliers and market share in terms of revenues  <table border="1" style="margin-top: 5px; border-collapse: collapse;"> <tr> <td>Dalkia</td> <td>44%</td> </tr> <tr> <td>Engie</td> <td>33%</td> </tr> <tr> <td>Coriance</td> <td>7%</td> </tr> <tr> <td>Idex</td> <td>7%</td> </tr> <tr> <td>Others</td> <td>9%</td> </tr> </table>	Dalkia	44%	Engie	33%	Coriance	7%	Idex	7%	Others	9%	
Dalkia	44%											
Engie	33%											
Coriance	7%											
Idex	7%											
Others	9%											
Market description	<ul style="list-style-type: none"> ○ 4 operators represent 90% of the total market revenues i.e. more than 2 billion euros ○ CPCU (Paris), CCIAG (Grenoble), SERM (Montpellier), UEM (Metz) are the main mixed equity companies (i.e. public-private ownership) 											
Sources	<ul style="list-style-type: none"> ○ Ademe, Etat des lieux de la filière 2019¹²¹ ○ Own survey with national DHC stakeholders 											

Table 46: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> • Public distribution of heat is a competence of the local or regional authorities. In order to operate a DHC network under public service delegation, a public tender procedure must be organized by the local authority (e.g. metropolis, cit). The selected operator will then have a contractual right to operate the network over a certain number of years. The network remains the property of the local authority. Depending on the type of contractual agreement proposed by the local authority, the investments in the infrastructures can be carried by the local authority or by the selected operator. Private DHC networks are also established. These private networks are usually smaller (limited to private property areas) and/or present a higher risk of business development. In order to

¹²¹ https://www.ademe.fr/sites/default/files/assets/documents/reseau-de-chaleur-etat-des-lieux-filiere_2019.pdf

Regulatory framework, authorities and supervision, statistical reporting	
	develop such networks, a DHC operator does not need any particular approval from the local public authority (except the authorization to use public land when applicable). ¹²²
Regulation of prices for consumers	<ul style="list-style-type: none"> When a private operator operates a public DHC network, prices are negotiated with the local public authority during the tender procedure and then set in the agreement entered into between the operator and the public authority, for the duration of the agreement. Prices can be adjusted following specific indexing formulas and revised in certain circumstances set in the agreement. For public DHC networks operated by the local authority itself and private DHC networks, prices are also set in the terms and conditions of the service.¹²³
Regulation of metering	<ul style="list-style-type: none"> Since 2015, all DHC networks must meter the thermal energy delivered to each building (law n°2010-788 of 12th July 2010). Since October 2020, it is mandatory to meter individual consumption for each building unit in multi-apartment and multi-purpose buildings when technically and economically feasible (loi ELAN n°2018-1021 and decree n°2019-496). According to the Decree n° 2016-710, the expenses related to collective heating are divided into "fuel or energy expenses" and "other heating expenses" (i.e. operation and maintenance costs, electric consumption linked to the functioning of the heating system such as pumps, fans, burners, control devices etc). Fuel or energy expenses shall be divided between the premises served, distinguishing between "common" and "individual" expenses. The "common expenses" are calculated as the 30% of the total fuel or energy expenses. These "common expenses" are then allocated according to rules defined in the co-owner regulation. The other 70% (individual expenses) are split between the premises, according to actual consumption measured by individual heat meters or by individual heat cost allocators. "Other heating expenses" shall be distributed according to the conditions set in the co-owner regulation (e.g. by premise living area).¹²⁴ Smart heat meters are used in pilot projects.¹²⁵
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> In order to promote the use of renewable energies, territorial collectivises are entitled to classify heating networks located in their area, provided they are supplied with at least 50% of heat from renewable energy sources (Art. L712-1, Code de l'énergie). The application for the classification of a heating network shall be submitted by the owner of the heating network (Art. 1, Décret du 23 mars 2012). It shall contain a feasibility study, as well as information regarding the economic and technological performances of the heating network (Art. 12, Décret du 23 mars 2012). The classification of the heating network is granted by the territorial collectivises. The service area of the classified heating network is defined as a priority development area (Art. L712-2, Code de l'énergie). Heat production plants with a capacity over 30 kW installed in new buildings as well as in buildings subjected to significant renovations and located within priority development areas are obliged to be connected to the heating network (Art. L712-3, Code de l'énergie). However, a heat production plant can only be connected to the heating network if the connecting costs are below the tariffs set by the territorial collectivises for each priority development area (Art. R712-9, Code de l'énergie). As this regulation refers only to priority development areas, which usually do not include potential third party supplier, TPA is in practise not regulated.
Regulation regarding grid	<ul style="list-style-type: none"> New and renovated buildings located within a classified area are obliged to be connected to the heating network. The costs related to the

¹²² Source: Own survey with national DHC stakeholders¹²³ Source: Own survey with national DHC stakeholders¹²⁴ <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf>¹²⁵ Source: Own survey with national DHC stakeholders

Regulatory framework, authorities and supervision, statistical reporting	
access and usage (demand perspective)	connection to a heating network as well as all the related expenses shall be borne by the end consumer. ¹²⁶
Support framework for renewable heat	<ul style="list-style-type: none"> The Energy Transition Law (2015) promotes green growth and aims to reinforce France's energy independence. An ambitious target is set for DHC: a fivefold increase in heat and cool deliveries using renewable and recovered energy by 2030 Reduced VAT rate: DH end users can benefit from a reduced VAT rate (5,5%) applicable to the fixed share of the bill (which is otherwise submitted to 20% VAT) and to the variable share of the bill (based on energy consumption) if the network uses at least 50% of renewable and recovered energy sources. The Heat Fund: This fund, in place since 2009, supports the production of heat from renewable and recovered energy sources in the industrial, tertiary and public housing sectors. DC has been eligible since 2018 for the Heat Fund for the creation of networks with cold substations linked to new renewable cold production for cold uses considered as necessary.
Support framework for CHP	<ul style="list-style-type: none"> The support scheme for CHP contains an obligation to purchase electricity produced by cogeneration (in particular as regards biomass installations).
Support framework for grid infrastructure	<ul style="list-style-type: none"> White Certificates: Under this system, energy producers, suppliers or distributors are required to undertake energy efficiency measures for the final user that are consistent with a pre-defined percentage of their annual energy deliverance. The following actions can be eligible to white certificates: increase in insulation of DH pipes; changing current networks to low temperature heating systems; connecting residential and tertiary buildings to a DH network using renewable energy sources. However, this scheme cannot be cumulated with funding from the Heat Fund usually.
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> The Energy Transition Law includes clauses that aim at developing DHC: DHC master plans are to be produced by municipalities; DHC are to be taken into account in regional and local planning documents. The French multiannual energy program (Programmation pluriannuelle de l'énergie, PPE) development objectives were determined for 2018 and 2023. The objectives are reviewed and completed every five years. The second PPE, covering the period 2023-2028, sets targets for 2028 to reach a quantity of renewable heat and cold and recovery delivered by the networks between 31 and 36TWh in 2028. There are also objectives for renewable cold. A working group on renewable heat and cooling was launched in March 2019 by the Ministry of Ecological and Solidarity Transition to identify and remove the barriers to the development of the sector. The Minister for Ecological and Solidarity Transition announced on 7 October 2019 the implementation of 25 measures to develop the DHC sector with 5 key objectives: increasing the mobilisation and attractiveness, improving consumer information and protection, strengthening the economic competitiveness, increasing renewable and recovery energy delivered, enhancing innovation and investing in Research & Development. Thermal building regulation: The existing thermal regulation (RT2012) provides for a construction bonus for virtuous DH networks. The future regulation, under development, stipulates an experimentation with the label E+C- (Low energy buildings / Low carbon buildings) that introduces the concept of environmental performance in buildings. There are training programmes for installers of RES-systems: the association Qualit'EnR promotes quality installations in the field of solar thermal energy, geothermal energy, photovoltaic, biomass as well as heat pumps. The organisation Qualibat grants qualifications and certifications to professionals of the building trade, including installers of renewable energy plants.

¹²⁶ Source: Own survey with national DHC stakeholders

Regulatory framework, authorities and supervision, statistical reporting	
	<ul style="list-style-type: none"> Certification schemes for RES-installations: The quality label "Alliance Qualité Photovoltaïque" (AQPV) aims at promoting the marketing of photovoltaic panels produced in France with high quality standards. The label Flamme Verte certifies high quality wood-heating systems. The certification label NF PAC grants certifications for heat pumps.
Statutory provisions	<ul style="list-style-type: none"> CGI (Code général des impôts - Tax Code) Code de l'énergie (Energy Code) CCH (Code de la construction et de l'habitation - Construction and Housing Code) Planning law of 3 August 2009 regarding the implementation of the "Grenelle de l'Environnement" Summit (Loi n° 2009-967) TAV: Tax regulation - Eligibility of refurbishment works improving energy quality to the reduced VAT rate (BOI-TVA-LIQ-30-20-95-20140225) Décret du 21 December 2016 regarding the positive-energy and high environmental performance standards of new buildings commissioned by public authorities Décret du 23 March 2012 on the classification of heating and cooling networks Décret no 2016-710 due 30 May 2016 relating to the individual determination of the quantity of heat consumed and the distribution of heating costs in collective buildings Arrêté du 30 May 2016 relating to the allocation of heating costs in apartment buildings Arrêté du 26 October 2010 regarding the thermal characteristics and energetic performance requirements
Relevant authorities and supervision	<ul style="list-style-type: none"> The French Autorité de la Concurrence, based in Paris, is the French national competition authority. It is directly responsible for monitoring company concentrations and violations of competition legislation and has the necessary powers and resources to independently investigate and make recommendations to the relevant ministers. Direction générale de la concurrence, de la consommation et de la répression des fraudes (DGCCRF): within the Ministry of the Economy, the DGCCRF oversees the proper functioning of the markets for the benefit of consumers and businesses. The DGCCRF is advocating: compliance with competition rules; economic consumer protection; safety and conformity of products and services. French National Federation of local authorities (La Fédération nationale des collectivités concédantes et régies, FNCCR) is an association of local authorities specialising in networked local public services. The energy department of the FNCCR acts for the respect of major principles relating to missions of general interest and the organisation of public services: quality and efficiency of the service provided, equality of treatment between user-consumers, organisation and control of the service by the competent local authorities, social and territorial solidarity thanks in particular to tariff equalisation. The French Association for Heat Pumps (AFPAC) brings together a representative panel of members from the heat pump industry. It responds to the new expectations of consumers who are increasingly demanding information. Uniclima is the union of historical trade unions in the thermal, air and refrigeration industries. Activities: Structure of reception and exchanges of the actors of the profession and accompaniment of the companies in the regulatory and normative work.
Statistical reporting methods and sources	<ul style="list-style-type: none"> The National Institute of Statistics and Economic Studies (Institut national de la statistique et des études économiques, INSEE) is a Directorate-General of the Ministry for the Economy and Finance. INSEE's mission is to collect, analyse and disseminate information on the French

District Heating and Cooling in the European Union

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Regulatory framework, authorities and supervision, statistical reporting	
	<p>economy and society across the entire French territory. The methods of INSEE are described on their website.¹²⁷</p> <ul style="list-style-type: none"> French Federation for Energy & Environment Services (FEDENE) brings together 500 companies providing services to buildings, equipment, energy infrastructures and occupants in the fields of energy and the environment. FEDENE collects statistical data, especially through regional and national surveys.¹²⁸ French National Association for Waste Management, Energy & DHC (AMORCE) is an information network with 950 members that exchanges experiences and accompanies municipalities and local actors in questions of energy transition, territorial waste management and sustainable water management. AMORCE publishes studies in the field of energy and networks.¹²⁹
Sources	<ul style="list-style-type: none"> Euroheat and Power, Country by Country 2019 Report, https://www.euroheat.org/publications/country-by-country/ RES legal, http://www.res-legal.eu/ JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/ki_na28630enn%281%29.pdf Autorité de la concurrence, https://www.autoritedelaconcurrence.fr/fr DGCCRF, https://www.economie.gouv.fr/dgccrf/consommation AFPAC, http://www.afpac.org/ Uniclima, http://www.uniclima.fr/ INSEE, https://www.insee.fr/fr/accueil FEDENE, http://www.fedene.fr/ FNCCR, http://www.fnccr.asso.fr/ AMORCE, http://www.amorce.asso.fr/

Table 47: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> The Ministry of Economy, Finance and Industry is responsible for the development and implementation of consumer policy. The Directorate General for Competition Policy, Consumer Affairs and Fraud Control (Direction Générale de la Concurrence, de la Consommation et de la Répression des Fraudes, DGCCRF) ensures the implementation of government policies in the area of consumer policy. The Competition Authority is an independent administrative authority, specialising in the control of anti-competitive practices, expertise on the functioning of markets and the concentration control. There are several national consumer associations able to represent and defend consumers like the Union Fédérale des Consommateurs (UFC).¹³⁰ One of them is the CLCV (Consumption, housing and living environment), which is a national association which exclusively defends the specific interests of consumers and users. It intervenes in all areas of daily life and the living environment.¹³¹
Available information on consumer perception and satisfaction	<ul style="list-style-type: none"> Ipsos conducted a market study in 2019. The survey mainly deals with the willingness to connect to DHC. Among other questions, they asked about the awareness and knowledge of DHC and the majority said "I have heard of it, but I don't know how it works". In addition, they asked whether the participants were generally interested in a connection,

¹²⁷ <https://www.insee.fr/fr/information/2515839>

¹²⁸ <https://www.fedene.fr/etudes-publications/reseaux-de-chaleur-et-de-froid/>

¹²⁹ <https://amorce.asso.fr/publications?search=&universe=2&yearMin=&yearMax=>

¹³⁰ https://ec.europa.eu/info/sites/info/files/national-consumer-organisations_fr_listing.pdf

¹³¹ https://www.inc-conso.fr/sites/default/files/guide_associations_consommateurs_2019.pdf, p.20

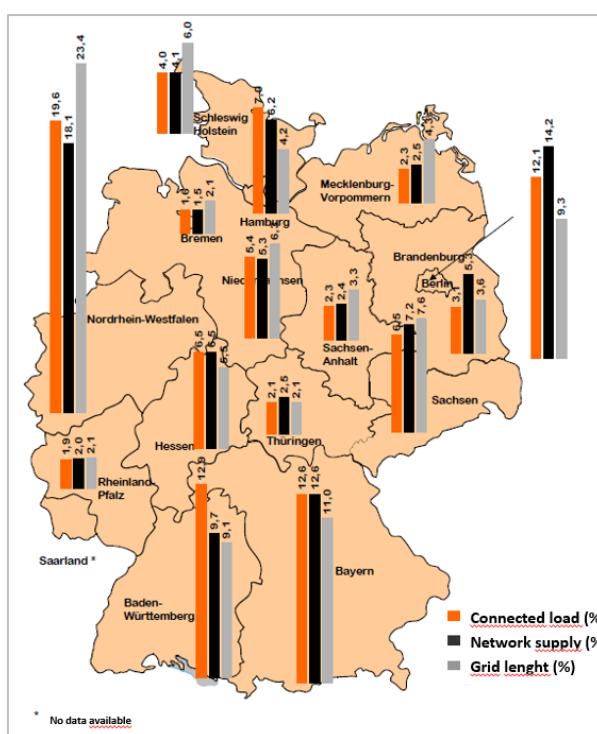
whereby most were rather interested and only a few were completely averse.¹³²

¹³² https://viaseva.org/wp-content/uploads/2021/04/Rapport_Re%CC%81seau-de-chaleur_Via-Seva_19-079429-01-1.pdf

Germany

Table 48: Size of the cities served by DHC and geographical concentration

	DH	DC
Geographical concentration of the DHC systems	<ul style="list-style-type: none"> Networks are mainly concentrated in urban areas. DH connections to new buildings are growing. 	<ul style="list-style-type: none"> DC networks are mainly situated in big urban areas. The main networks are in the following cities: Heidelberg (Uniklinikum), Berlin (Innenstadt), Stuttgart (Universität), München (Innenstadt) The regions counting the more networks are Hessen, Baden-Württemberg, Bayern and Berlin.
Sources	<ul style="list-style-type: none"> Euroheat & power, Country by Country 2019 AGFW, Main Report 2018, Statistics 2018¹³³ Own survey with national DHC stakeholders 	



District Heating and Cooling in the European Union

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Table 50: Main suppliers and level of competition

	DH	DC
Market description	<ul style="list-style-type: none"> ○ DH is mainly operated by local municipal utilities ○ The biggest one in terms of DH sales are Vattenfall Wärme Europa AG (Berlin: ca. 7%), Stadtwerke München GmbH (4%), Wärme Hamburg GmbH (3%) ○ Among the other suppliers are EnBW, Vattenfall, E.ON, Uniper, Innogy, Dalkia, Engie and Getec 	DC suppliers are usually also DH suppliers.
Sources	<ul style="list-style-type: none"> ○ International Energy Agency, 2020 Germany Energy Policy Review¹³⁴ ○ Own survey with national DHC stakeholders 	

Table 51: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> • DHC companies need to be registered in the German Commercial Register (Handelsregister).¹³⁵
Regulation of prices for consumers	<ul style="list-style-type: none"> • Cartel/Competition law (GWB) and competition monitoring is carried out by the Federal Cartel Office (see authorities and supervision below). • General conditions including the pricing are regulated by the Ordinance on general conditions for the supply of District Heating (AVBFernwärmeV). According to the AVBFernwärmeV, both price changes in the generation and supply of district heating and the development of prices on the heating market must be taken into account and the relevant calculation factors must be shown in full and in a generally comprehensible form. The aim of this is to ensure that prices are cost-oriented.
Regulation of metering	<ul style="list-style-type: none"> • The ordinance on Heating Costs Accounts (HeizkostenV) specifies that proportionate consumption of heat and hot water by the users must be recorded. Heat meters or heat cost allocators must be used to record the proportional heat consumption. The meters must comply with the rules of technology (§ 5 HeizkostenV). • According to § 18 of the Ordinance on general conditions for the supply of District Heating (AVBFernwärmeV), in order to determine the consumption-dependent charge, the DH company must use measuring equipment which must comply with the calibration regulations. The quantity of heat supplied shall be determined by measurement (heat measurement). Instead of heat measurement, measurement of the water quantity is also sufficient (substitute method) if the devices for measuring the water quantity were installed before September 3, 1989. • In Berlin there is a project by Vattenfall in which smart meters are used to measure heat.¹³⁶ • The Act on Metering specifies (§ 29 MsbG), that CHP plants ≥ 7 kW must be equipped with a smart meter (within the next 5 years).
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> • There is no specific regulation on third party access to DHC networks. • According to Competition law (GWB) third parties are generally entitled to access to networks or infrastructures as long as grid access is technically feasible and can be reasonably expected of the grid operator. • The connection to the grid is based on the individual contracts (negotiated grid access).

¹³⁴<https://www.bmwi.de/Redaktion/DE/Downloads/G/germany-2020-energy-policy-review.pdf?blob=publicationFile&v=4>

¹³⁵ Source: Own survey with national DHC stakeholders

¹³⁶ <https://xn--wrme-loa.vattenfall.de/berlin/services/smart-meter>

Regulatory framework, authorities and supervision, statistical reporting	
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> The connection to the grid of consumers is based on the individual contract with the district heating supply company. General conditions of these contracts are regulated by the Directive on General Conditions for the Supply of District Heating (AVBFernwärmeV) A municipality may determine by statute that within a certain area each property must be connected to the district heating grid (more information in BKartA (2012): Sektoruntersuchung Fernwärme¹³⁷).
Support framework for renewable heat	<ul style="list-style-type: none"> KfW Renewable Energy Programme - Standard: The Programme gives low interest loans for investments inter alia for the erection, expansion or purchase of installations for heating generation from renewable energy sources. It is a long-term and low-interest loan with a fixed interest period of 5 or 10 years including a repayment-free start-up period. KfW Renewable Energy Programme - Premium: Support of renewable energies in the heating market with low-interest loans. The installations need to supply heat or cold predominantly in Germany and have to be operating for at least 7 years.
Support framework for CHP	<ul style="list-style-type: none"> Combined Heat and Power Act (KWKG): The Act regulates the feed-in and remuneration of electricity from combined heat and power plants in Germany.
Support framework for grid infrastructure	<ul style="list-style-type: none"> District Heat Grids 4.0: Low-temperature district heating grids with a renewable and/or excess heat share > 50 % are eligible for support. The support scheme covers the cost both for feasibility studies for the implementation as well as the construction itself. Several restrictions are set with regards to size and cost efficiency. Under the KWKG, the development and construction of heating networks is supported in form of compensation payments.
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> Support for RES heating in buildings: In the framework of the Federal Promotion for Efficient Buildings (BEG), the Federal Office for Economic Affairs and Export Control (BAFA) provides investment support and loans for heat produced in buildings from solar, biomass and geothermal energy. The BEG replaced the existing programmes to promote energy efficiency and renewable energies in the building sector (replacement of EBS, MAP, APEE and HZO). It is divided into a basic structure with three sub-programmes: Residential Buildings (BEG WG), non-residential Buildings (BEG NWG) and individual Measures (BEG EM). RES-H building obligations: Owners of new buildings and buildings under renovation are obliged in form of a quota to use a particular share of heat and cooling produced from renewable energy (GEG - replacement of EEWärmeG, EnEG, EnEV). The obligation can be fulfilled by DHC as long as it is ensured that a minimum share of the delivered heat is made up of renewables, waste heat or CHP. Training programmes for Installers: Installers are trained to install renewable energy technologies in the framework of the craftsman training. Certification Programmes for RES installations: Plants have to comply with the technical requirements (certificates) depending on the particular technology in order to be connected to the grid.
Statutory provisions	<ul style="list-style-type: none"> EnWG (Energiewirtschaftsgesetz - Energy Industry Act) BImSchG (Bundes-Immissionsschutzgesetz- Immission Control Act) KWKG (Kraft-Wärme-Kopplungsgesetz - Combined Heat and Power Act) GEG (Gebäudeenergiegesetz - Building Energy Act) (previously EnEG, EnEV and EEWärmeG) GWB (Gesetz gegen Wettbewerbsbeschränkungen - Competition Act) AVBFernwärmeV (Verordnung über Allgemeine Bedingungen für die Versorgung mit Fernwärme - Ordinance on general conditions for the supply of District Heating) HeizkostenV (Verordnung über Heizkostenabrechnung - Ordinance on

¹³⁷<http://www.bundeskartellamt.de/SharedDocs/Publikation/DE/Sektoruntersuchungen/Sektoruntersuchung%20Fernwaerme%20-%20Abschlussbericht.pdf?blob=publicationFile&v=3>

District Heating and Cooling in the European Union

Overview of Markets and Regulatory Frameworks under the Revised Renewable Energy Directive

Regulatory framework, authorities and supervision, statistical reporting	
	<ul style="list-style-type: none"> • Heating Costs Accounts) • HwO (Handwerksordnung - Crafts Code) • Installateur HeizungsbauerMstrV (Installateur- und Heizungsbauer-Handwerk - Installer and Heating Fitter Craft) • SHKAMAAusbV (Verordnung über die Berufsausbildung zum Anlagenmechaniker für Sanitär-, Heizungs- und Klimatechnik und zur Anlagenmechanikerin für Sanitär-, Heizungs- und Klimatechnik - Regulation on vocational training for installation mechanics for sanitation, heating and airconditioning systems) • MsbG (Messstellenbetriebsgesetz - Act on Metering)
Relevant authorities and supervision	<ul style="list-style-type: none"> • While the electricity and gas sector is regulated by the regulator Bundesnetzagentur (BNetzA), supervision of DHC is under the responsibility of the Federal Cartel Office (Bundeskartellamt, BKartA) and the cartel Offices of the Bundesländer. • The main tasks of the BKartA are to enforce the ban on cartels, to carry out merger control and to exercise abuse control over market-dominant companies. • There is a Consumer advice centre, which is a contact address for questions about bills and price increases.
Statistical reporting methods and sources	<ul style="list-style-type: none"> • The Federal Statistical Office (Destatis) is a federal authority in Germany. It collects, compiles and analyses statistical information on the economy, society and the environment. Information on the methods can be found on the website of Destatis in the section "Methodenberichte und Analysen"¹³⁸. However, Destatis does not report on DHC. • The Energy efficiency association for heating, cooling and CHP (AGFW) publishes annual statistics¹³⁹ on DH in Germany
Sources	<ul style="list-style-type: none"> • Euroheat and Power, Country by Country 2019 Report, https://www.euroheat.org/publications/country-by-country/ • RES legal, http://www.res-legal.eu/ • JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/ki_na28630enn%281%29.pdf • BKartA, https://www.bundeskartellamt.de/ • Destatis, https://www.destatis.de/ • AGFW, https://www.agfw.de/ • BAFA, https://www.bafa.de/ • BMWi, https://www.bmwi.de/ • Consumer advice centre, https://www.verbraucherzentrale.de/

Table 52: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> • There is a consumer advice centre, which is a contact address for questions about bills and price increases (general centre, not specific for DHC).¹⁴⁰
Available information on consumer perception and satisfaction	<ul style="list-style-type: none"> • Zaunbrecher et al. (2016) investigate in their paper local DH network design preferences: first, a focus group on local DH systems from the users' perspective was run. Second, conjoint analysis was applied to analyse preferences for DH characteristics. Most relevant factors in the context of local DH systems were costs, source dependence, organizational issues, security of energy supply, environmental effects, and construction work. Results of the conjoint analysis showed that the

¹³⁸https://www.statistik.at/web_de/frageboegen/unternehmen/leistungs_und_strukturerhebung/methodenberichte_analysen/index.html#index1

¹³⁹ <https://www.agfw.de/zahlen-und-statistiken/agfw-hauptbericht/>

¹⁴⁰ <https://www.verbraucherzentrale.de/>

- energy source and its corresponding primary energy factor was the most important attribute for preferences, followed by network design. The preference for energy sources changed dramatically when introducing different prices for energy sources. Results further indicate that it is necessary to integrate users' requirements into local DH network planning processes and to improve communication about DH.¹⁴¹
- Krikser et al. (2020) show that district heating from renewables is the most preferred heating option for households in Germany followed by district heating from fossil fuels. Furthermore, the paper provides profound insight into the willingness-to-pay for different heating option.¹⁴²
 - According to the BDEW (2019), in the case of DH as an energy source, the simple and convenient handling, the high safety standards and the long-term secure supply are positively evaluated.¹⁴³

¹⁴¹ <https://doi.org/10.1016/j.erss.2016.01.008>

¹⁴² <https://www.mdpi.com/2071-1050/12/10/4129>

¹⁴³ https://www.bdew.de/media/documents/Pub_20191031_Wie-heizt-Deutschland-2019.pdf

Greece

There is no DC system.

Table 53: Size of the cities served by DH and geographical concentration

	DH
Geographical concentration of the DH systems (no DC in the country)	7 mid-size cities with DH <ul style="list-style-type: none"> ○ Ptolemaida ○ Kozani ○ Amyntaio ○ Mégalopoli ○ Serres ○ Florina ○ Alexandroupoli
Sources	Master's thesis Cogeneration and District Heating in Greece Opportunities and Barriers for Development (2017) Zaklin Dasyra ¹⁴⁴ Own survey with national stakeholders

Table 54: Ownership of the DH networks

	DH
Ownership description	All DH networks are under the responsibility of municipal companies, except a private DH company operating in Serres
Sources	Master's thesis Cogeneration and District Heating in Greece Opportunities and Barriers for Development (2017) Zaklin Dasyra Own survey with national stakeholders

Table 55: Main suppliers and level of competition

	DH
Main DH suppliers	PPC (Greek Public Power Corporation) operates the public networks while Thermie Serres operates the private network in Serres.
Sources	Own survey with national stakeholders

Table 56: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> • The operation of DHC is monitored by the Regulatory Authority for Energy (RAE). • DHC operators need a licence.¹⁴⁵
Regulation of prices for consumers	<ul style="list-style-type: none"> • There are no regulations regarding prices and no heat cost allocation rules defined.¹⁴⁶
Regulation of metering	<ul style="list-style-type: none"> • There is no regulations regarding metering.¹⁴⁷
Regulation regarding grid	<ul style="list-style-type: none"> • Grid access is based on individual contracts.¹⁴⁸

¹⁴⁴ https://projekter.aau.dk/projekter/files/213505353/Master_Thesis_Zaklin_Dasyra.pdf

¹⁴⁵ Source: Own survey with national DHC stakeholders

¹⁴⁶ <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf>

¹⁴⁷ Source: Own survey with national DHC stakeholders

¹⁴⁸ Source: Own survey with national DHC stakeholders

Regulatory framework, authorities and supervision, statistical reporting	
access and usage (supply perspective)	
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> There is no regulation regarding grid access of consumers.¹⁴⁹
Support framework for renewable heat	<ul style="list-style-type: none"> There is no specific support program for RES in DHC.
Support framework for CHP	<ul style="list-style-type: none"> Tax relief: The 2016 Development Law foresees support for CHP plants in a form of an income tax relief and a stabilisation of income tax coefficient. Subsidy: The 2016 Development Law foresees support for CHP plants in a form of subsidies, leasing subsidies, and subsidies for the creation of new jobs. A feed-in premium adder is awarded to CHP plants through tenders. Auctions are technology-specific and the Ministry of Environment and Energy issues decision specifying capacities to be auctioned for each eligible technology. Technologies : CHP
Support framework for grid infrastructure	<ul style="list-style-type: none"> Exemplary project funded by the EU: The Teleheating Florina project entails the development of a thermal energy-based district heating network to supply heat and hot water to 2 534 residential buildings in Florina, a city of 23 000 inhabitants in Greece's West Macedonia region. Funded by the EU, the project will replace the burning of fossil fuels with a clean source of energy.¹⁵⁰
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> Income tax relief: Law No. 2238/1994 provides an income tax relief for natural and legal persons who have performed an energy upgrading of their building either at their own expense or through participation in national programmes (e.g. Exoikonomo). Subsidy (combined with loan- "Energy Saving at Home II"): The Programme "Energy Saving at Home II" aims at improving the energy performance of residential buildings through the provision of interest-free loans and subsidies for the installation of RES plants and energy-saving measures. The total budget of the programme is € 292.43 million. The programme will be open until the funds are exhausted. RES-H Building obligations: For buildings for which a planning application was submitted to the relevant Planning authority after 01.01.2011, it is mandatory that hot water demand is partly covered by solar panels (min. percentage: 60% per annum). This requirement is waived where the hot water demand is covered by other energy supply systems based on RES, CHP, by district heating or heat pumps. Since 31.12.2019, all new buildings have to cover their entire primary energy consumption using the aforementioned technologies. Certification programmes for RES installations: A database of PV installers and RES professionals (including RES installers) was developed and updated by the Centre for Renewable Energy Sources (CRES).
Statutory provisions	<ul style="list-style-type: none"> Law No. 2238/1994 (Law on the Income Tax) Law No. 3468/2006 (Generation of Electricity Using Renewable Energy Sources and High-Efficiency CHP of Electricity and Heat and Miscellaneous Provisions) Law No. 4399/2016 (Institutional framework for the establishment of Private Investment support scheme for environmental regional and economic development of the country – Establishment of the Development Council and other provisions (Development Law)).

¹⁴⁹ Source: Own survey with national DHC stakeholders

¹⁵⁰ https://ec.europa.eu/regional_policy/en/projects/greece/district-heating-system-running-on-thermal-energy-to-serve-florina-northern-greece

Regulatory framework, authorities and supervision, statistical reporting	
	<ul style="list-style-type: none"> • Law No. 3661/2008 (Measures to Reduce Energy Consumption in Buildings) • KENAK (Energy Performance of Buildings Regulation) • Law No. 4122/2013 (Energy Performance of Buildings- Transposition of Directive 2010/31/EU) • Law No. 4342/2015 (Pension arrangements, transposition of EU Directive 2012/27/EU of the European Communities Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC, as it was amended by Council Directive 2013/12/EU of 13 May 2013 "adapting Directive 2012/27/EU of the European Parliament and of the Council on energy efficiency, by reason of the accession of the Republic of Croatia" and other provisions)
Relevant authorities and supervision	<ul style="list-style-type: none"> • The Hellenic Competition Commission (HCC) is an independent authority that enjoys administrative and financial autonomy. It promotes and defends competition in all markets, serving the consumer as well as businesses. • The Regulatory Authority for Energy (RAE) is an independent administrative authority, which enjoys, by the provisions of the law establishing it, financial and administrative independence. One of the main duties and responsibilities is monitoring the operation of all sectors of the energy market (Electricity, Natural Gas, Oil Products, Renewable Energy Sources, Cogeneration of Electricity and Heat etc.). • The Hellenic Association for the Cogeneration of Heat and Power (HACHP) monitors the local & international evolution regarding Cogeneration of Heat and Power, District Heating & Cooling and Sustainable Development.
Statistical reporting methods and sources	<ul style="list-style-type: none"> • The Hellenic Statistical Authority (ELSTAT) is the national statistical service of Greece. The purpose of ELSTAT is to produce, on a regular basis, official statistics, as well as to conduct statistical surveys. Information on their methods can be found on their website.¹⁵¹
Sources	<ul style="list-style-type: none"> • RES legal, http://www.res-legal.eu/ • JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/ki_na28630enn%281%29.pdf • IEA policy database, https://www.iea.org/policies • HCC, https://www.epant.gr/en/ • RAE, http://www.rae.gr/old/en/about/main.htm • ELSTAT, https://www.statistics.gr/en/home/ • HACHP, http://hacchp.gr/en/

Table 57: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> • The Ministry of Employment and Social Insurance through the General Secretariat of Consumer Affairs is responsible for EU and national legislation and policy protecting consumer economic interests, certain financial services and general product safety.¹⁵² • There are several other associations, like the consumers' protection centre KEPKA, the consumers' institute of Crea, INKA CRETA or the consumers' association "The Quality of Life" (EKPIZO).¹⁵³ • The General Directorate of Consumer Protection is responsible for the protection of consumers.¹⁵⁴

¹⁵¹ <https://www.statistics.gr/en/policies>¹⁵² <http://www.ypakp.gr/>¹⁵³ https://ec.europa.eu/info/sites/info/files/national-consumer-organisations_el_listing.pdf¹⁵⁴ <http://www.mindev.gov.gr/>

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Available information on consumer perception and satisfaction	<ul style="list-style-type: none">• No information about a DHC-specific association could be found.• No study on the perception or satisfaction of DHC consumers could be found.
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Hungary

District cooling is just at the beginning and not widespread in the country yet. No data was available.

Table 58: Size of the cities served by DHC and geographical concentration

	DH										
% of DH networks according to the number of inhabitants (2018)	<table border="1"> <thead> <tr> <th>Population Size Category</th><th>% of DH Networks</th></tr> </thead> <tbody> <tr> <td>< 20 000 inhabitants</td><td>45%</td></tr> <tr> <td>20 000 inhabitants < ... < 100 000 inhabitants</td><td>43%</td></tr> <tr> <td>100 000 inhabitants < ... < 500 000 inhabitants</td><td>11%</td></tr> <tr> <td>> 500 000 inhabitants</td><td>1%</td></tr> </tbody> </table>	Population Size Category	% of DH Networks	< 20 000 inhabitants	45%	20 000 inhabitants < ... < 100 000 inhabitants	43%	100 000 inhabitants < ... < 500 000 inhabitants	11%	> 500 000 inhabitants	1%
Population Size Category	% of DH Networks										
< 20 000 inhabitants	45%										
20 000 inhabitants < ... < 100 000 inhabitants	43%										
100 000 inhabitants < ... < 500 000 inhabitants	11%										
> 500 000 inhabitants	1%										
Geographical concentration of the DH systems	<ul style="list-style-type: none"> ○ There are over 200 DH systems in 94 municipalities spread over the country 										
Sources	<ul style="list-style-type: none"> ○ International Energy Agency, 2017 Hungary Review¹⁵⁵ ○ Statistics 2018, Association of Hungarian District Heating Enterprises (MaTáSzSz)¹⁵⁶ ○ Euroheat & power, Country by Country 2019 										

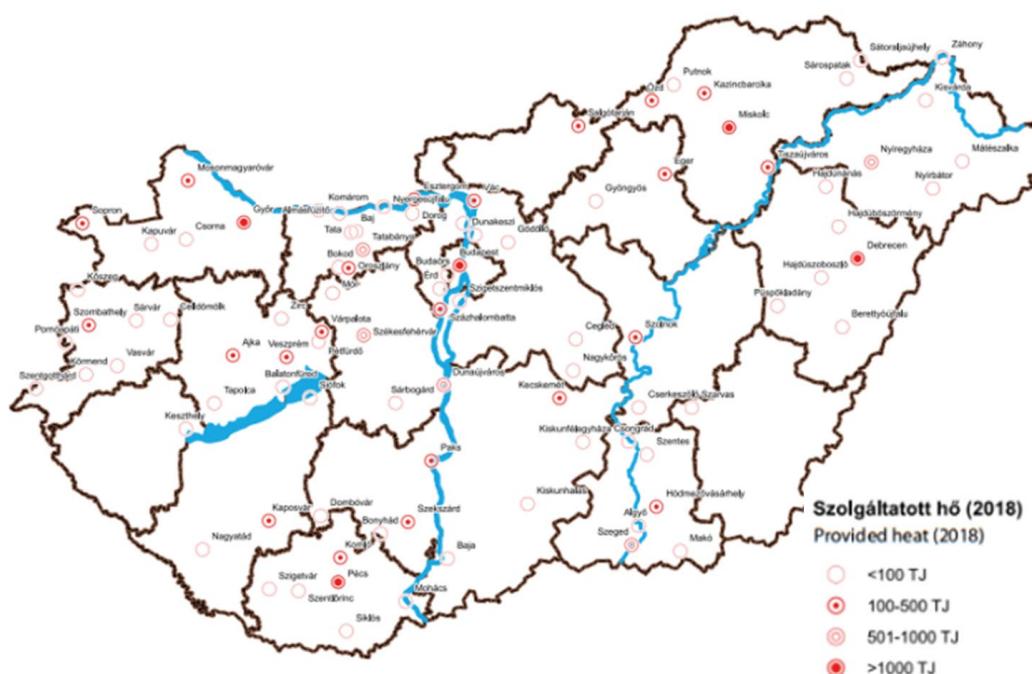


Figure 5: Cities supplied with DH (Statistics 2018, Association of Hungarian District Heating Enterprises)

¹⁵⁵ <https://webstore.iea.org/download/direct/289?fileName=EnergyPoliciesofIEACountriesHungary2017Review.pdf>

¹⁵⁶ http://tavho.org/uploads/statisztika/a_magyar_tavhoszektor_2018_evi_adatai.pdf

District Heating and Cooling in the European Union

Overview of Markets and Regulatory Frameworks under the Revised Renewable Energy Directive

Table 59: Ownership of the DHC networks

	DH
Ownership description	<ul style="list-style-type: none"> ○ DH systems are mostly public.
Sources	<ul style="list-style-type: none"> ○ District heating system ownership guide, dhccan project 2004

Table 60: Main suppliers and level of competition

	DH																										
	Main DH suppliers and market share in terms of energy sales <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Supplier</th> <th>Market Share (%)</th> </tr> </thead> <tbody> <tr><td>Other smaller suppliers</td><td>65%</td></tr> <tr><td>GYŐR-SZOL Zrt</td><td>4%</td></tr> <tr><td>FŐTÁV Zrt</td><td>3%</td></tr> <tr><td>Dunaújvárosi Víz-, Csatorna</td><td>3%</td></tr> <tr><td>T-Szol Zrt</td><td>3%</td></tr> <tr><td>SZÉPHÓ Zrt.</td><td>3%</td></tr> <tr><td>MIHŐ Kft</td><td>4%</td></tr> <tr><td>NYÍRTÁVHÓ Kft</td><td>3%</td></tr> <tr><td>Veolia Energia Magyarország Zrt</td><td>1%</td></tr> <tr><td>PÉTÁV Kft</td><td>4%</td></tr> <tr><td>SZETÁV Kft.</td><td>3%</td></tr> <tr><td>Debreceni Hőszolgáltató Zrt</td><td>4%</td></tr> </tbody> </table>	Supplier	Market Share (%)	Other smaller suppliers	65%	GYŐR-SZOL Zrt	4%	FŐTÁV Zrt	3%	Dunaújvárosi Víz-, Csatorna	3%	T-Szol Zrt	3%	SZÉPHÓ Zrt.	3%	MIHŐ Kft	4%	NYÍRTÁVHÓ Kft	3%	Veolia Energia Magyarország Zrt	1%	PÉTÁV Kft	4%	SZETÁV Kft.	3%	Debreceni Hőszolgáltató Zrt	4%
Supplier	Market Share (%)																										
Other smaller suppliers	65%																										
GYŐR-SZOL Zrt	4%																										
FŐTÁV Zrt	3%																										
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Veolia Energia Magyarország Zrt	1%																										
PÉTÁV Kft	4%																										
SZETÁV Kft.	3%																										
Debreceni Hőszolgáltató Zrt	4%																										
Main suppliers and market share in terms of energy sales (2018)																											
Number of DHC suppliers	<ul style="list-style-type: none"> ○ There are around 100 DH suppliers 																										
Sources	<ul style="list-style-type: none"> ○ International Energy Agency, 2017 Hungary Review ○ Statistics 2018, Association of Hungarian District Heating Enterprises (MaTáSzSz) 																										

Table 61: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> • District heating companies have to have licences to operate. The licensor is the Hungarian Energy Office.¹⁵⁷ • There is a specific law for district heating (Act XVIII of 2005)¹⁵⁸
Regulation of prices for consumers	<ul style="list-style-type: none"> • There is a limit for the profit of district heating production and supply.¹⁵⁹ • The regulation of prices is defined in the Act LXXXVII of 1990.
Regulation of metering	<ul style="list-style-type: none"> • Metering is regulated by the Act XLV of 1991. • The cost allocation is directly managed by the condominium owners assembly; when heat cost allocators are installed, at least 30% but maximum 50% of the consumed heat quantity shall be divided between the units on the basis of the volume of the unit, the remaining quantity shall be divided based on the information provided by heat cost allocators, taking also into account room orientation correction factors. If

¹⁵⁷ Source: Own survey with national DHC stakeholders

¹⁵⁸ http://tavho.org/uploads/statisztika/a_magyar_tavhoszektor_2018_evi_adatai.pdf

¹⁵⁹ Euroheat & Power, Country by Country Report 2019

Regulatory framework, authorities and supervision, statistical reporting	
	<p>the condominium decides to use heat cost allocators, but some owners do not allow mounting them in their flat or refusing readings, they are billed by factor 2.5 of the building average consumption. Installing the allocators in building common areas is not required; the owner assembly can decide how to distribute the heat cost for these areas.¹⁶⁰</p>
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> There is no regulation regarding grid access of third parties.¹⁶¹
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> The access of consumers is regulated. The district heating company specifies the technical and financial conditions of access.¹⁶²
Support framework for renewable heat	<ul style="list-style-type: none"> Under the support scheme of Environment and Energy Efficiency Operational Programme (EEEOP), calls for tenders are published continuously between 2014 and 2020. Amongst others, civil organisations, church institutions, companies and public institutions are eligible for subsidies. This scheme integrates 5 financing priorities: Adaptation to climate change, development of municipal water and sanitation infrastructure, waste management, environmental measures and development, enhancement of energy efficiency and the application of renewable energy sources Decision 1084/2016 determines the areas to be financed for the "enhancement of energy efficiency and the application of renewable energy sources". The Economic Development Investment Operational Programme (EDIOP) is intended to support economic development; nevertheless, calls for tenders have been published for energetic refurbishments combined with the use of RES. The Rural Development Programme (RDP) can also provide subsidies through tenders to foster investments into heating and cooling. The tender was opened in February 2018. Furthermore, favourable loans and grants are provided within the Central Competitive Hungary Operational Programme (CCHOP). Calls for tenders are open for the thermal refurbishment of business buildings as well as for thermal refurbishment of residential buildings with renewable energy sources. Within the Territorial and Settlement Operational Programme (TOP) investment grants should be allocated to thermal refurbishment projects for public buildings (with the use of renewable energy).
Support framework for CHP	<ul style="list-style-type: none"> Electricity generated from renewable energy sources and waste is promoted through feed-in tariffs if the plant's capacity is between 50 kW and 0.5 MW or in case of a demonstration project. The eligibility period and the maximum amount of eligible electricity are determined for each eligible electricity producer by the Hungarian Energy and Public Utility Regulatory Authority (HEA). Only electricity with a valid qualification related to the guarantee of origin according to Government Decree No. 309/2013 for electricity from renewable energy sources and CHP may benefit from feed-in tariffs
Support framework for grid infrastructure	<ul style="list-style-type: none"> The Environment and Energy Efficiency Operational Programme (EEEOP) refers to RES-H infrastructure development by the means of the tenders: EEEOP-5.3.1: Modernising the district heating sector (by utilizing renewable energy sources) EEEOP-5.3.2: Satisfying local heating and cooling demand with renewable

¹⁶⁰ <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf>

¹⁶¹ Source: Own survey with national DHC stakeholders

¹⁶² Source: Own survey with national DHC stakeholders

Regulatory framework, authorities and supervision, statistical reporting	
Support framework for other elements of the DHC systems	<p>energy sources</p> <ul style="list-style-type: none"> There is one official training programme for RES installers offered in the National Qualification Register so far. Furthermore, there are a number of vocational training programmes with some or limited relevance for the installation and maintenance of RES installations. According to the Hungarian Energy and Public Utility Regulatory Authority there is no standard defined for RES-H building obligations. However, Decree No. 7/2006 recommends the consideration of using renewable energy sources for decentralised energy supply in the planning process for new building projects. An obligation to meet at least 25% of the buildings' energy needs with RES will be introduced for buildings operationalised after 31 December 2020. Policies on certification programmes for RES installation, on the exemplary role of public authorities and on the support of RES-H infrastructure are in place within the frame of the current subsidy programmes Service providers and institutions of district heating are exempted from the high level of VAT (27%). Their services are subject to a lower VAT rate of 5%, as per the Act CXXVII of 2007 on Value Added Tax.
Statutory provisions	<ul style="list-style-type: none"> Act XVIII of 2005 Act LXXXVII of 1990 Act XLV of 1991 Act CLV of 1997 Decision on the Environment and Energy Efficiency Operative Programme 1084/2016 (II. 29.) Decision on the Economic Development Investment Operative Programme 1006/2016 (I.18.) Decision on the annual Budget for the Territorial and Settlement Operational Programme 1005/2016 (I.18) Decision on the annual Budget for the Competitive Central Hungary Operational Programme No. 1011/2016 (I. 20.) Decision on the annual Budget for the Rural Development Operational Programme No. 1011/2016 (I. 20.) Education Ministry Decree on the requirements for initiating vocational trainings as well as information points of regional integrated vocational training centres No. 8/2006. (III. 23.) Decree No. 315/2013 (VIII.28.) on the general exam rules and procedures for vocational trainings) Decree No. 7/2006 (V. 24.) on the determination of buildings' energy performance) Decree No. 20/2014 (III.7.) on the modification of the determination of buildings' energy performance Decree No. 27/2012 (VIII.27) on the exam rules for vocational training programmes falling under the authority of the Ministry of National Economy Decree No. 39/2015 (IX. 14.) on the MvM Hungarian Electricity Ltd. No. 39/2015 (IX. 14.) on the modification of the determination of buildings' energy performance Decree No. 55/2016. (XII. 21.) on the technical requirements for renewable energy installations benefitting from support for acquisition and maintenance Decision on the Environment and Energy Efficiency Operative Programme 1084/2016 (II. 29.)
Relevant authorities and supervision	<ul style="list-style-type: none"> The Hungarian Energy and Public Utility Regulatory Authority (HEA) is the regulatory body of the energy and public utility market, supervising the national economy's sectors of strategic importance. The Hungarian Competition Authority (Gazdasági Versenyhivatal - GVH) enforces competition rules for the benefit of the public in a way, which increases long-term consumer welfare and competitiveness at the same time. The enactment of the prohibition of anticompetitive behaviour and the setting up of the authority was motivated by the will of protecting the freedom and fairness of competition.

Regulatory framework, authorities and supervision, statistical reporting	
Statistical reporting methods and sources	<ul style="list-style-type: none"> The Hungarian Central Statistical Office (HCSO) is a professionally independent, self-managed government agency and the centre of the Official Statistical Service. One of the main objectives of the HCSO is the coordination of the Official Statistical Service's activity, publication of guidelines and recommendations relating to official statistical activities. Information on the methods can be found on their website.¹⁶³
Sources	<ul style="list-style-type: none"> Euroheat and Power, Country by Country 2019 Report, https://www.euroheat.org/publications/country-by-country/ RES legal, http://www.res-legal.eu/ JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/ki_na28630enn%281%29.pdf HEA, data of the Hungarian district heating sector 2018, http://tavho.org/uploads/statisztika/a_magyartavhoszektor_2018_evi_adatok.pdf IEA policy database, https://www.iea.org/policies HEA, http://www.mekh.hu/home GVH, https://www.qvh.hu/en HCSO, https://www.ksh.hu/?lang=en

Table 62: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> The Deputy State Secretariat for Consumer Protection of the Ministry of National Development has the overall responsibility for shaping and implementing consumer policy. The Hungarian Authority for Consumer Protection (HACP), as the main central administrative consumer protection authority, is entitled to carry out the basic and primary tasks related to consumer protection.¹⁶⁴ It manages all consumer complaints on accounting, billing, paying of charges or measuring. The Hungarian Energy and Public Utility Authority (HEA) regulates the energy and public utility market including DH. One of HEA's competences is consumer protection. Predecessor of HEA is the Hungarian Energy Office (HEO).¹⁶⁵ The HEO manages similar complaints as the HACP, but of non-residential consumers and all consumers on connection, accessibility and the appropriate availability of the network.¹⁶⁶
Available information on consumer perception and satisfaction	<ul style="list-style-type: none"> According to ClimateXChange (2018), the main reason that consumers have disconnected from the DH network is the high cost of heating. Additionally, consumers have disconnected due to the central operation of the network by the operator, with no end user control.¹⁶⁷

¹⁶³ https://www.ksh.hu/guidelines_reports_policies_tart¹⁶⁴ <https://fogyasztovedelem.kormany.hu/>¹⁶⁵ <http://www.mekh.hu/introduction>¹⁶⁶ https://www.ceer.eu/documents/104400/3740731/E09_NR_Hungary-EN.pdf/f312785b-7dca-c86d-66b4-cdfc0e3b750?version=1.0, p.35¹⁶⁷ <https://www.climateexchange.org.uk/media/3569/lessons-from-european-district-heating-regulation.pdf>

Ireland

There is no DC system.

Table 63: Size of the cities served by DH and geographical concentration

	DH
Geographical concentration of the DHC systems	<ul style="list-style-type: none"> ○ DH is not widely used in Ireland, with only a handful of communal or localised DH systems in use (no medium or large-scale neighbourhood, community or city scale systems). ○ The only municipal scale DH system is in Tralee Co. Kerry (20,000 inhabitants). Only the social housing owned by the local authority are connected to the network. A new DH system is under development in Dublin, expected to be commissioned by early 2025 at the latest.
Sources	<ul style="list-style-type: none"> ○ Euroheat and Power, Country by Country 2019 ○ Sustainable energy Authority of Ireland¹⁶⁸ ○ Irish District Energy Association (IrDEA)¹⁶⁹ ○ Codema, Dublin's energy Agency¹⁷⁰ ○ Own survey with national DHC stakeholders

Table 64: Ownership of the DHC networks

	DH
Ownership repartition in terms of number of networks	<ul style="list-style-type: none"> ○ The community DH scheme (described previously) is owned by the local municipality (Kerry County Council).
Sources	<ul style="list-style-type: none"> ○ Own survey with national DHC stakeholders

Table 65: Main suppliers and level of competition

	DH
Market description	<ul style="list-style-type: none"> ○ The level of competition is deemed low. ○ There are 3 main actors in the DH market <ul style="list-style-type: none"> ○ Veolia (targeting from small to bigger DH systems): in Ireland since 2001, still at a rather early stage of development; ○ Frontline Energy (local, mostly small DH systems): SME focused on small private projects; ○ Kaizen Energy (local, only small DH systems): SME focused on small private projects.
Sources	<ul style="list-style-type: none"> ○ Euroheat and Power, Country by Country 2019 ○ Sustainable energy Authority of Ireland ○ Irish District Energy Association (IrDEA) ○ Codema, Dublin's energy Agency

Table 66: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> • Pilot DH schemes in Dublin will show how DH can deliver many environmental, economical and societal benefits. The infrastructure will be installed by Dublin City Council. There are currently no legislations, regulations, laws for DH in Ireland.¹⁷¹

¹⁶⁸ <https://www.seai.ie/>

¹⁶⁹ <https://www.districtenergy.ie/>

¹⁷⁰ <https://www.codema.ie/projects/local-projects/dublin-district-heating-system-1/>

http://www.seai.ie/publications/2016_RDD_79_Guide_District_Heating_Irl_-_CODEMA.pdf

¹⁷¹ Euroheat and Power, Country 2019 Report

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of prices for consumers	<ul style="list-style-type: none"> There is no regulation regarding prices for consumer.
Regulation of metering	<ul style="list-style-type: none"> There is regulation regarding metering.¹⁷²
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> There is no regulation regarding grid access.¹⁷³
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> There is no regulation regarding grid access of consumers.¹⁷⁴
Support framework for renewable heat	<ul style="list-style-type: none"> Subsidy: The Support Scheme Renewable Heat (SSRH) offers subsidies for the purchase of heat pumps (up to 30%), while an operating support is expected to be introduced for biomass/biogas installations. Aero-, hydro- and geothermal heat pumps are eligible for a subsidy. Commercial, industrial, agricultural, district heating or other non-domestic heat users not in the Emission Trading System sector are eligible for the subsidy. Tax regulation mechanism: The Accelerated Capital Allowance (ACA) scheme aims to encourage investments in energy efficient equipment and allows companies to depreciate 100% of the purchase value of qualifying energy efficient equipment against their profit in the year of purchase. A list of the eligible equipment can be found at the Triple E Products Register at the Sustainable Energy Authority of Ireland (SEAI). The ACA currently covers 10 different equipment categories and 52 associated technologies (Schedule 4A TCA 1997).
Support framework for CHP	<ul style="list-style-type: none"> Heat Ongoing Operational Support: Operational support is provided for selected renewable energy technologies (CHP with biomass) by way of a multi-annual payment (for a period of up to 15 years), on the basis of prescribed tariffs. Each tariff will set the amount of support that the scheme participant will receive in respect of each unit of heat energy used for an eligible purpose. Payments are calculated on the basis of eligible heat use and the relevant tariff. The new Combined Heat and Power (CHP) Deployment Programme, managed by Sustainable Energy Authority of Ireland (SEAI), provides grant support to assist the deployment of small-scale (less than 1MWe) fossil fired CHP and biomass (anaerobic digestion (AD) and wood residue) CHP systems. The programme is open to industrial, commercial, services or public sector The Renewable Energy Feed-in Tariff (REFIT) schemes supported various renewable electricity generation technologies (CHP with biomass) until 31 December 2015. The entities entitled to the feed-in tariff were those suppliers that purchased electricity from renewable sources from generators with whom they had entered into a commercially negotiated REFIT Power Purchase Agreement (PPA). This regulatory system incentivised the generation of electricity from renewable sources.
Support framework for grid infrastructure	<ul style="list-style-type: none"> Climate Action Fund section of the Government's Dept. Communications, Climate Action and Environment. The fund is open to all climate action projects, including DHC. Grant up to 50% max and limited by EU GBER rules.¹⁷⁵

¹⁷² Source: Own survey with national DHC stakeholders¹⁷³ Source: Own survey with national DHC stakeholders¹⁷⁴ Source: Own survey with national DHC stakeholders¹⁷⁵ Source: Own survey with national DHC stakeholders

Regulatory framework, authorities and supervision, statistical reporting	
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> RD&D: The Sustainable Energy Authority of Ireland (SEAI) has published a call to support sustainable energy research into new market solutions. RES-H Building: New buildings are required to comply with renewable energy requirements of Part L of the Building Regulations, increasing the use of installations for sanitary hot water. Additionally, requirements in Part L shall be met by "providing energy efficient space and water heating systems with efficient heat sources and effective controls".
Statutory provisions	<ul style="list-style-type: none"> TCA 1997 (Taxes Consolidation Act 1997 (TCA) and its amending acts) S.I. 446/2016 (Taxes Consolidation Act 1997 (Allowances for Energy Efficient Equipment) (Amendment) (No. 2) Order 2016) S.I. 259/2011 (Statutory Instrument (S.I.) 259 of 2011: Building Regulations (Part L Amendments) Regulations 2011) SSRH Terms & Conditions (Support Scheme Renewable Heat Terms & Conditions) SSRH Operating Rules and Guidelines (Support Scheme Renewable Heat Operating Rules and Guidelines) S.I. 259/2008 - Building Regulations (Part L Amendment) Regulations 2008 S.I. 542/2009 - The European Communities (Energy End-use Efficiency and Energy Services) Regulations 2009 and its amending regulation S.I. 151/2011 S.I. 426/2014- European Communities (Energy End-Use Efficiency And Energy Services) Regulations 2014
Relevant authorities and supervision	<ul style="list-style-type: none"> The Competition and Consumer Protection Commission (CCPC) is an independent statutory body with a dual mandate to enforce competition and consumer protection law in Ireland. Their mission is to promote competition and enhance consumer welfare. Their vision is for open and competitive markets where consumers are protected and businesses actively compete. The Irish District Energy Association (IRDEA) was established to increase the knowledge and address barriers to DH in Ireland. IRDEA is the only trade organisation representing the DHC sector in Ireland. The Sustainable Energy Authority of Ireland (SEAI) as established as Ireland's national energy authority. SEAI's mission is to play a leading role in transforming Ireland into a society based on sustainable energy structures, technologies and practices.
Statistical reporting methods and sources	<ul style="list-style-type: none"> The Central Statistics Office (CSO) is Ireland's national statistical office and our purpose is to impartially collect, analyse and make available statistics about Ireland's people, society and economy. Information of their methods are on their Website.¹⁷⁶
Sources	<ul style="list-style-type: none"> Euroheat and Power, Country by Country 2019 Report RES legal, http://www.res-legal.eu/ JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf IEA policy database, https://www.iea.org/policies CCPC, https://www.ccpc.ie/ IRDEA, https://www.districtenergy.ie/ SEAI, https://www.seai.ie/ CSO, https://www.cso.ie/en/ Dublin DH System, https://www.codema.ie/images/uploads/docs/District_Heating_Brochure.pdf

¹⁷⁶ <https://www.cso.ie/en/methods/>

District Heating and Cooling in the European Union

Overview of Markets and Regulatory Frameworks under the Revised Renewable Energy Directive

Table 67: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> The Government Department responsible for consumer policy is the Department of Enterprise, Trade and Innovation.¹⁷⁷ The National Consumer Agency (NCA) is a statutory body charged with representing the voice of the consumer and the enforcement of consumer legislation.¹⁷⁸ The Consumers Association of Ireland (CAI) is an independent, non-profit organisation established in 1966. The aim of the CAI is to independently protect, promote and represent the interests of consumers.¹⁷⁹ The Competition and Consumer Protection Commission is an independent statutory body that enforces competition and consumer protection law in Ireland.¹⁸⁰ No information about a DHC-specific association could be found.
Available information on consumer perception and satisfaction	<ul style="list-style-type: none"> No study on the perception or satisfaction of DHC consumers could be found.

¹⁷⁷ <https://dbei.gov.ie/en/>

¹⁷⁸ <https://www.ccpc.ie/business/>

¹⁷⁹ https://ec.europa.eu/info/sites/info/files/national-consumer-organisations_ie_listing.pdf

¹⁸⁰ <https://www.ccpc.ie/consumers/about/about-us/>

Italy

Table 68: Size of the cities served by DHC and geographical concentration

	DH	DC
Maps: Geographical distribution of the delivered by DHC networks – Breakdown by main sector (2013)	<p>DH Maps Legend:</p> <ul style="list-style-type: none"> Residenziale <ul style="list-style-type: none"> fino a 3.000 3.001 - 30.000 30.001 - 300.000 oltre 300.000 Terziario <ul style="list-style-type: none"> fino a 3.000 3.001 - 30.000 30.001 - 300.000 oltre 300.000 Residenziale e Terziario <ul style="list-style-type: none"> fino a 3.000 3.001 - 30.000 30.001 - 300.000 oltre 300.000 	<p>DC Maps Legend:</p> <ul style="list-style-type: none"> Residenziale, terziario e industriale <ul style="list-style-type: none"> fino a 3.000 3.001 - 30.000 30.001 - 300.000 oltre 300.000
Geographical concentration of the DHC systems	<ul style="list-style-type: none"> Around 335 DH networks, most of them small and medium The 3 largest cities supplied with DH – Turin, Brescia and Milan – represent almost half of the total DH supply 213 municipalities with DH 	<ul style="list-style-type: none"> There are few district cooling networks in Italy: those few are located only in municipalities which already had district heating networks. Reggio Emilia has the biggest DC systems.
Sources	<ul style="list-style-type: none"> GSE, Assessment of the national and regional potential for the application of high-efficiency cogeneration and efficient district heating (2016)¹⁸¹ Own survey with national DHC stakeholders 	

Table 69: Ownership of the DHC networks

	DH	DC
Ownership description	<ul style="list-style-type: none"> Most of the systems were originally publicly owned. However, the newly developed systems are mostly privately owned and managed by the individual heat supply companies 3 large systems supplying Turin, Brescia and Milan are managed under public-private partnerships. 	Same ownership as DH systems
Sources	<ul style="list-style-type: none"> ARERA, ANNUAL REPORT 2019 GSE, Assessment of the national and regional potential for the application of high-efficiency cogeneration and efficient district heating (2016) Own survey with national DHC stakeholders 	

¹⁸¹ https://ec.europa.eu/energy/sites/ener/files/documents/ca_art.14_eed_ita_update_dec2016_en.pdf

District Heating and Cooling in the European Union

Overview of Markets and Regulatory Frameworks under the Revised Renewable Energy Directive

Table 70: Main suppliers and level of competition

	DH	DC																				
Main suppliers and market share (2016)	<p>Market shares of companies operating in the sector of district heating in Italy in 2016</p> <table border="1" style="margin-top: 10px; width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Company</th> <th>Market Share (%)</th> </tr> </thead> <tbody> <tr><td>Others</td><td>30%</td></tr> <tr><td>NET</td><td>2%</td></tr> <tr><td>SEI</td><td>2%</td></tr> <tr><td>EGEA Group</td><td>3%</td></tr> <tr><td>Linea Reti e Impiati</td><td>3%</td></tr> <tr><td>AGSM Energia</td><td>4%</td></tr> <tr><td>Hera</td><td>6%</td></tr> <tr><td>IREN Group</td><td>25%</td></tr> <tr><td>A2a Calore and Servizi</td><td>26%</td></tr> </tbody> </table>	Company	Market Share (%)	Others	30%	NET	2%	SEI	2%	EGEA Group	3%	Linea Reti e Impiati	3%	AGSM Energia	4%	Hera	6%	IREN Group	25%	A2a Calore and Servizi	26%	<p>Basically, the competitors' panel on DC operators is the same as for DH.</p>
Company	Market Share (%)																					
Others	30%																					
NET	2%																					
SEI	2%																					
EGEA Group	3%																					
Linea Reti e Impiati	3%																					
AGSM Energia	4%																					
Hera	6%																					
IREN Group	25%																					
A2a Calore and Servizi	26%																					
Market description <ul style="list-style-type: none"> ○ 276 companies operating in the district heating sector are currently registered within the Authority's registry of operators. ○ The 34 largest operators serve over 75% of users, corresponding to more than 85% of the thermal energy supplied. 																						
Sources <ul style="list-style-type: none"> ○ ARERA, ANNUAL REPORT 2019 ○ GSE, Assessment of the national and regional potential for the application of high-efficiency cogeneration and efficient district heating (2016) ○ Statista 																						

Table 71: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> • Companies, operating in the district heating sector, have to register by the Autorità di Regolazione per Energia Reti e Ambiente (Authority for Energy, Networks and Environment, ARERA): 276 companies are currently registered.¹⁸²
Regulation of prices for consumers	<ul style="list-style-type: none"> • The prices for the service are calculated by the companies or on the basis of a sustained cost criterion or based on the avoided cost, i.e. the cost that the user would have sustained using a different technology.¹⁸³ • There are potential issues in the transparency of prices, with operators that only publish such conditions on their website in 20% of cases. This obviously has implications in terms of competitive structure and sector efficiency and protection of the user and are the subject of interventions envisaged by Authority (regulation of transparency in 2020).¹⁸⁴
Regulation of metering	<ul style="list-style-type: none"> • According to the Legislative Decree n. 102/2014, where multi-apartment buildings are supplied from a common heating or cooling systems, the allocation of the cost of thermal or hot water consumption to each apartment shall be made on the basis of the National Standard UNI 1020041. According to this norm, space heating and hot water expenditures are divided on the basis of: "Voluntary consumption" (or "variable quota"), namely those due to voluntary actions of the user via temperature control systems (e.g. thermostatic valves or room thermostats) and "non-voluntary consumption" (or "fixed quota"), independent to user actions (e.g. heat losses of the distribution network

¹⁸² https://www.arera.it/allegati/relaz_ann/19/Report_Besseghini_2019.pdf

¹⁸³ https://www.arera.it/allegati/relaz_ann/19/Report_Besseghini_2019.pdf

¹⁸⁴ https://www.arera.it/allegati/relaz_ann/19/Report_Besseghini_2019.pdf

Regulatory framework, authorities and supervision, statistical reporting	
	<p>within the building). The cost of the "voluntary consumption" is allocated according to the consumption measured in each apartment (by heat meters, heat cost allocators or other), the "non-voluntary consumption" is distributed according to dwelling "useful thermal energy need" or "millesimi di fabbisogno di energia termica utile". Thus, the variable and the fixed quota shares (e.g. 70-30%) are not defined in the norm, but can vary in different buildings according to the specific building heating system heat losses. The updated Legislative Decree 141/2016 (released in July 2016), under certain circumstances, now permits to ignore the standard UNI 10200, but prescribes that the maximum share of the fixed costs has to be 30%.¹⁸⁵</p> <ul style="list-style-type: none"> Experimentation in the areas of gas, water, electricity, district heating and other public utilities of "multi-service smart meter" will start soon in nine major Italian cities for about 60,000 supply points involved.¹⁸⁶ Most enterprises do not yet use remotely read and remotely managed meters. The Authority intends to intervene on heat metering with a regulation that promotes the diffusion and favours the start of trials on bidirectional heat supply or demand side management.¹⁸⁷
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> Process of defining technical-economic conditions for grid access is still ongoing, part of strategic plan 2019-2021.¹⁸⁸
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> National legislation provides a framework with assured connection and reasonable connection fees (Arera resolution 24/2018/R/tlr).¹⁸⁹
Support framework for renewable heat	<ul style="list-style-type: none"> Price-based scheme: This scheme provides an incentive for small RES-H sources. The eligibility depends on the source and the type of installation. Tax regulation scheme: This scheme allows for a 50-75% tax deduction for expenses related to refurbishment of existing buildings and / or energetic requalification of buildings and / or installation of RES-H technologies
Support framework for CHP	<ul style="list-style-type: none"> No specific comprehensive CHP framework; Legislation holds several beneficial treatments for large CHP applications incl. fossil CHP: Eligibility for "white certificates", renewable CHP, in particular fuelled with biogas, can apply for beneficial tariffs, simplified grid access conditions
Support framework for grid infrastructure	<ul style="list-style-type: none"> There is no specific support program for DHC grid infrastructure.
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> DL 28/11, Art. 22, c. 3 provides an obligation for all municipalities above 50,000 inhabitants to establish, in cooperation with provincial authorities and coherently with the regional energy plans, development plans for district heating and cooling networks with the aim to increase usage of the energy produced also from RES. Municipalities below 50,000 inhabitants can also develop such plans; however, there is no obligation in place. RES-H building obligations: All new buildings and all buildings undergoing major refurbishment are obliged to integrate RES-E and RES-H. There are different obligations depending on the building type and size, and for public buildings, the obligations are increased by 10% (Art. 11, c. 1 DL 28/11). Regions can increase the above-mentioned obligations through a regional law.

¹⁸⁵ <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf>

¹⁸⁶ https://www.arera.it/it/inglese/press_releases/14/140908cs.htm

¹⁸⁷ https://www.arera.it/allegati/relaz_ann/19/Report_Bessegini_2019.pdf

¹⁸⁸ Source: Own survey with national DHC stakeholders

¹⁸⁹ Source: Own survey with national DHC stakeholders

Regulatory framework, authorities and supervision, statistical reporting	
	<ul style="list-style-type: none"> Training programmes for installers are regulated at central level but set up and managed at regional level. Each installer, after having installed a plant on any building, is required by law to release a certificate of compliance with a set of standards outlined in DM 37/08.
Statutory provisions	<ul style="list-style-type: none"> DL 28/11 (Decreto Legislativo 3 marzo 2011, n. 28. Attuazione della direttiva 2009/28/CE sulla promozione dell'uso dell'energia da fonti rinnovabili recante modifica e successiva abrogazione delle direttive 2001/77/CE e 2003/30/CE - Legislative Decree 3 March 2011, n. 28. Implementation of directive 2009/28/CE on Promotion of Use of Energy from Renewable Energy Sources modifying and repealing Directives 2001/77/CE and 2003/30/CE) L 205/2017 (LEGGE 27 dicembre 2017, n. 205 Bilancio di previsione dello Stato per l'anno finanziario 2018 e bilancio pluriennale per il triennio 2018-2020. Law 27 December 2017, n. 205: State budget for the 2018 financial year and multi-year budget for the three-year period 2018-2020.) L 220/10 (Legge 13 Dicembre 2010, n. 220. Disposizioni per la formazione del bilancio annuale e pluriennale dello Stato. Legge di stabilità 2011. - Act No. 220 of 13 December 2010. Provisions on the formation of the annual budget. Budget Act of 2011.) DI 16/02/2016 (Decreto Interministeriale 16 febbraio 2016. Aggiornamento Conto Termico. - Interministerial Decree 16 February 2016. Amendment to the Conto Termico.) L 232/16 (Bilancio di previsione dello Stato per l'anno finanziario 2017 e bilancio pluriennale per il triennio 2017-2019. State budget for the financial year 2017 and the multi-year budget for the three-year period 2017-2019.) L 205/17 (Legge 27 dicembre 2017, n. 205: Bilancio di previsione dello Stato per l'anno finanziario 2018 e bilancio pluriennale per il triennio 2018-2020. Law 27 December 2017, n. 205: State budget for the 2018 financial year and multi-year budget for the three-year period 2018-2020.) L 296/06 (Legge 27 Dicembre 2006, n. 296. Disposizioni per la formazione del bilancio annuale e pluriennale dello Stato. Legge finanziaria 2007 - Act No. 296 of 27 December 2006. Provisions on the formation of the annual budget. Budget Act of 2007) DL 4/6/2013 (Decreto Legislativo 4 Giugno 2013: Disposizioni urgenti per il recepimento della Direttiva 2010/31/UE del Parlamento europeo e del Consiglio del 19 maggio 2010, Legislative Decree 4 June 2013: Urgent dispositions for transposing Directive 2010/31/UE of the European Parliament and Council od 19 May 2010)
Relevant authorities and supervision	<ul style="list-style-type: none"> Autorità garante della concorrenza e del mercato (AGCM) is the national competition authority of Italy. Being an independent authority, it has the status of a public agency whose decisions are taken on the basis of the Act without any possibility of interference by the Government. Autorità di Regolazione per Energia Reti e Ambiente (ARERA) carries out regulatory and supervisory activities in the sectors of electricity, natural gas, water services, waste cycle and district heating. ARERA is responsible for defining the regulativ framework of DHC. Gestore Servizi Energetici (GSE) is the responsible authority for incentive mechanisms aimed at promoting the development of energy efficiency and renewable sources.¹⁹⁰
Statistical reporting methods and sources	<ul style="list-style-type: none"> The Italian National Institute of Statistics (Istat), a public research organisation, is the main producer of official statistics in the service of citizens and policy-makers. Information on the Methods can be found on the website of Istat.¹⁹¹ ARERA collects and provides statistical data on heat.

¹⁹⁰ <https://www.gse.it/en/what-we-do>¹⁹¹ <https://www.istat.it/en/methods-and-tools>

Regulatory framework, authorities and supervision, statistical reporting	
Sources	<ul style="list-style-type: none"> Euroheat and Power, Country by Country 2019 Report, https://www.euroheat.org/publications/country-by-country/ RES legal, http://www.res-legal.eu/ JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/ki_na28630enn%281%29.pdf ARERA, https://www.arera.it/index.htm ARERA, ANNUAL REPORT 2019, https://www.arera.it/allegati/relaz_ann/19/Report_Besseghini_2019.pdf AGCM, https://www.agcm.it/ Istat, https://www.istat.it/en/ GSE, https://www.gse.it/

Table 72: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> The Ministry responsible for consumer policies is the Ministry of Economic Development whose main task is to assure consumer protection in the fields of competition and market.¹⁹² Italian Competition Authority is entrusted to enforce consumer rights.¹⁹³
Available information on consumer perception and satisfaction	<ul style="list-style-type: none"> According to a study of the Italian Competition Authority, DH consumers complain about high prices of DH service.¹⁹⁴ A2A, a company that generates, distributes, and markets renewable energy, electricity, gas, integrated water supply, and waste management services, performed a survey in Brescia on a regular basis to assess its customers' satisfaction. Clients are satisfied with the quality of the DHC service. Some citizens still perceive DH and waste incineration as rather old and poorly performing technologies, which do not correspond to the reality.¹⁹⁵

¹⁹² <https://www.mise.gov.it/index.php/en/>¹⁹³ <https://iclg.com/practice-areas/consumer-protection-laws-and-regulations/italy>¹⁹⁴ https://turinschool.eu/files/turinschool/ISS14_Esposito.pdf, p. 2¹⁹⁵ https://www.euroheat.org/wp-content/uploads/2017/01/study-on-efficient-dhc-systems-in-the-eu-dec2016_final-public-report6.pdf, p. 91

Latvia

There is no DC system.

Table 73: Size of the cities served by DHC and geographical concentration

	DH
Geographical concentration of the DH systems	<ul style="list-style-type: none"> ○ 74 DH systems ○ Most of the DH consumers are located in Riga, and other 8 biggest Latvian cities, where population density is higher. ○ There are also a lot of small DH systems in smaller towns and municipalities. ○ Most of the heat generated in district heating systems is produced in Riga. In 2015, 3598 GWh of thermal energy or 50.9% of the total produced thermal energy were produced there and 991 GWh (14%) in the region surrounding Riga (Pieriga). Moreover, 698 GWh were produced in the Latgale region (9.9%), 684 GWh in Kurzeme region (9.7%), 612 GWh in Zemgale region (8.6%) and 489 GWh in Vidzeme region (6.9%).
Sources	<ul style="list-style-type: none"> ○ Euroheat & power, Country by Country 2019 ○ PWC 2016, Comprehensive assessment of the potential for the application of high-efficiency cogeneration and efficient district heating and cooling, and cost-benefit analysis in accordance with the requirements of Directive 2012/27/EU¹⁹⁶

Table 74: Ownership of the DHC networks

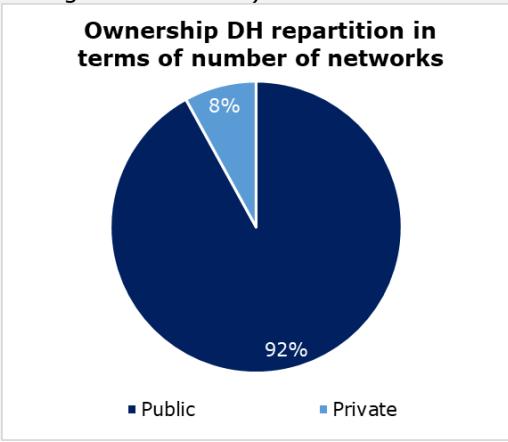
	DH						
Ownership in terms of energy sales (2008)	<p>Most of the DHC systems are owned by municipalities. The state-owned electric utility company owns half of Rigas Siltums network (Riga City owning the other half).</p>  <table border="1"> <caption>Ownership DH repartition in terms of number of networks</caption> <thead> <tr> <th>Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Public</td> <td>92%</td> </tr> <tr> <td>Private</td> <td>8%</td> </tr> </tbody> </table>	Category	Percentage	Public	92%	Private	8%
Category	Percentage						
Public	92%						
Private	8%						
Sources	<ul style="list-style-type: none"> ○ Latvian District Heating Association (data 2008)¹⁹⁷ ○ Own survey with national DHC stakeholders 						

Table 75: Main suppliers and level of competition

	DH
Market description	<ul style="list-style-type: none"> ○ Most of the DH operators are local and operate only one network.
Sources	<ul style="list-style-type: none"> ○ Euroheat & power, Country by Country 2019

¹⁹⁶ https://ec.europa.eu/energy/sites/ener/files/documents/Latvia_Art%202014_1assessment%20EN.pdf

¹⁹⁷ https://www.lsta.lt/files/seminarai/080911_Budapestas/Latviai.pdf

Table 76: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> • DH systems are highly regulated for:¹⁹⁸ <ul style="list-style-type: none"> - production, if installed capacity exceeds 1 MW and released heat in network exceeds 5000 MWh/year; - transmission/ distribution (network operator), if transmitted/ distributed heat amount exceeds 5000 MWh/year; - sales, if heat delivered by using DH network. • Currently approx. 240 entities are regulated in Latvia, which is around 93% of all heat supply market. Majority of them are heat producers. There are more than 58 heat supply operators to whom the end customer tariff is regulated and approved by Regulator. It can be assumed that most of the DH operators are small scale.¹⁹⁹ • Municipalities are responsible for heat supply in their administrative territory.²⁰⁰ Municipalities may elaborate development plans for the heat supply network and issue binding regulations at the regional level. Local municipalities are also given the right to set additional local binding regulations in terms of environmental protection, promotion of cogeneration and local energy resources, securement of heat supply and long-term marginal costs. Nevertheless such rules cannot constrain consumers' decision on heating solutions.²⁰¹
Regulation of prices for consumers	<ul style="list-style-type: none"> • The final heat price for consumers is set by the Public Utilities Commission based on the application made by the DH company.²⁰² • Prices are regulated by a cost-plus principle, and heat operators are not allowed to offer differentiated prices to different customers. Prices typically include only the energy component though it is possible to apply for 2-component price.²⁰³ • The Methodology for the Calculation of Heat Supply Service Tariffs prescribes the procedures by which a merchant shall calculate the tariff for the following regulated heat supply services: heat production, transmission and distribution of heat and trade of heat.²⁰⁴ • Law on Regulators of Public Utilities: The purpose of this Law is to ensure the possibility of receiving continuous, safe and qualitative public utilities whose tariffs (prices) conform to economically substantiated costs.
Regulation of metering	<ul style="list-style-type: none"> • Heat cost allocation rules are described in the Cabinet of Ministers Regulations No. 524 (15/9/2015). This law has eleven annexes, describing several different types of calculation methodologies, according to the presence in the buildings of heat meters and/or heat cost allocator. The apartment owners can decide and agree in their assembly which calculation rules to apply (e.g. heating costs allocated by flat m² or by metered consumption or a combination of both). Correction factors, taking into account intrinsic different heat losses of flats, may also be used. These factors are calculated for each building by an independent expert on energy performance of buildings.²⁰⁵
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> • The heating network operator is obliged to purchase thermal energy from all heat producers, including independent ones if offered heat price is lower than operator can produce by them-selves, there is enough heat demand and producer is able to meet technical requirements (§ 48 Energy Law).²⁰⁶ • According to § 49 (2) Energy Lay, a system operator entering into contracts regarding the purchase of heat from producers or refusing to

¹⁹⁸ Source: Own survey with national DHC stakeholders and Euroheat & Power, Country by Country 2019 Report

¹⁹⁹ Source: Own survey with national DHC stakeholders and Euroheat & Power, Country by Country 2019 Report

²⁰⁰ Source: Euroheat & Power, Country by Country 2019 Report

²⁰¹ Source: Own survey with national DHC stakeholders

²⁰² Source: Own survey with national DHC stakeholders and <http://www.lsua.lv/text.php?id=28>

²⁰³ Source: Own survey with national DHC stakeholders

²⁰⁴ Source: Own survey with national DHC stakeholders

²⁰⁵ Source: <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf>

²⁰⁶ Source: Own survey with national DHC stakeholders

Regulatory framework, authorities and supervision, statistical reporting	
	<p>enter into them shall act in accordance with the following criteria:</p> <ul style="list-style-type: none"> (1) the price of the heat offered and conditions for payment; (2) costs of heat transmission; (3) conformity of the heat regime to the consumption regime; (4) conformity of heat offered with the technical characteristics specified by the system operator.²⁰⁷ <ul style="list-style-type: none"> • There is no special legislation supporting the connection of RES heating devices to the heat transmission network at the national level.²⁰⁸
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> • Consumers have a free choice of their heating method.²⁰⁹ • There is no information available.
Support framework for renewable heat	<ul style="list-style-type: none"> • There is no support scheme for RES in DHC.²¹⁰
Support framework for CHP	<ul style="list-style-type: none"> • Regulations Regarding Electricity Production and Price Determination upon Production of Electricity in Cogeneration: Subsidies for electricity produced in CHP is available under a subsidy scheme in way of Feed-in tariff or Capacity payments. The public trader is obliged to purchase electricity generated in efficient cogeneration process, if the producer has received the allowance to participate in the mandatory procurement scheme and if he fulfils all efficiency, quality and other requirements set by regulations.²¹¹
Support framework for grid infrastructure	<ul style="list-style-type: none"> • There is no national support scheme for DHC infrastructure. • Investment grants are available under European Union Structural Funds and Cohesion Fund for the 2014-2020 planning period under specific target 4.3.1.²¹²
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> • Building obligation: The Law on the Energy Performance of Buildings obliges owners of new or renovated buildings to consider using RES heating and cooling systems. • The training programmes for RES installers: Natural persons must have a construction management certificate to offer services in the following construction fields: engineering research, design, expert examination of construction sites, construction works management and construction supervision (§ 13 Construction Law).
Statutory provisions	<ul style="list-style-type: none"> • Energy Law • Energy Efficiency Law • Law on the Energy Performance of Buildings • Law on Excise Duties (Par akcīzes nodokli) • Law on the Value Added Tax (Par pievienotās vērtības nodokli) • Law on Regulators of Public Utilities • Construction Law (Būvniecības likums) • Cabinet Regulation No. 21 of 21 October 2008 876 "Rules for the supply and use of heat" • Cabinet of Ministers, 26 July 2016 487 "Corporate Energy Audit Rules" • Cabinet Regulation No. 11 of 11 October 2016 668 "Standard Provisions for Energy Efficiency Monitoring and Applicable Energy Management System" • Cabinet Regulation No. 11 of 11 October 2016 669 Procedures for Concluding and Monitoring Voluntary Energy Efficiency Arrangements • Cabinet Regulation No. 221 of 10 March 2009, Regulations Regarding

²⁰⁷ Source: Own survey with national DHC stakeholders

²⁰⁸ Source: Own survey with national DHC stakeholders

²⁰⁹ Source: Own survey with national DHC stakeholders

²¹⁰ Source: Own survey with national DHC stakeholders

²¹¹ Source: Own survey with national DHC stakeholders and <https://www.iea.org/policies/5194-regulations-regarding-electricity-production-and-price-determination-upon-production-of-electricity-in-cogeneration?country=Latvia&qs=Lat§or=Heating%20and%20Cooling>

²¹² Source: Own survey with national DHC stakeholders

Regulatory framework, authorities and supervision, statistical reporting	
	<p>Electricity Production and Pricing in the Production of Electricity in Cogeneration</p> <ul style="list-style-type: none"> • Methodology for calculation of tariffs for heat supply services • Methodology for calculating cogeneration tariffs
Relevant authorities and supervision	<ul style="list-style-type: none"> • The Ministry of Economics is the responsible institution for energy sector. The Ministry of Economics develops, organizes and coordinates foreign economic, construction, energy, internal market, innovation development, business development, competitiveness development, housing, consumer protection, privatization, industry, standardization and tourism policy, as well as economic structural policy and other policies in regulatory enactments areas identified. • The Ministry of Environmental Protection and Regional Development of the Republic of Latvia is responsible for implementing policy in three areas - environment protection, regional development as well as digital transformation. • The Public Utilities Commission (PUC) is a multi-sector regulator overseeing electricity, natural gas, district heating, electronic communications and post, water supply and waste deposit. It is responsible for licensing/registration, tariffs, protecting consumer interests, promoting competition, resolving disputes and controlling quality. • The Competition Council of the Republic of Latvia: The main aim of the Competition Council is to ensure possibility to every market participant to perform his economic activities in free and fair competition environment as well as to promote competition development in all sectors of national economy for the benefit of all society. • The Latvian Heat Supply Association (LSUA) is a public professional organization, which brings together district heating companies, manufacturers and suppliers of heating equipment and equipment, as well as individual members - energy experts.
Statistical reporting methods and sources	<ul style="list-style-type: none"> • The Central Statistical Bureau of Latvia (CSB) is a direct administration body subordinated to the Ministry of Economics, and acting as the main performer and coordinator of the official statistical work in the country. The CSB is responsible for organisation of the statistical work and authenticity of the data it has produced by summarising the information obtained from respondents. Information on their methods are on their website.²¹³
Sources	<ul style="list-style-type: none"> • Euroheat and Power, Country by Country 2019 Report, https://www.euroheat.org/publications/country-by-country/ • RES legal, http://www.res-legal.eu/ • JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/ki_na28630enn%281%29.pdf • IEA policy database, https://www.iea.org/policies • Ministry of Economics, https://www.em.gov.lv/en • Ministry of Environmental Protection and Regional Development, https://www.varam.gov.lv/en • PUC, https://www.sprk.gov.lv/en • Competition Council, https://www.kp.gov.lv/en • LSUA, http://www.lsua.lv/layout.php?id=3&menu_id=1 • CSB, https://www.csb.gov.lv/en/sakums • PUC Annual Report, https://erranet.org/wp-content/uploads/2016/11/Latvia_PUC_Annual_Report_2018.pdf

²¹³ <https://www.csb.gov.lv/en/documents/official-statistics-system/quality-framework/documents>

Table 77: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> The Ministry of Economics is the main institution in Latvia responsible for consumer policy. The Internal Market Department with its Competition, Trade and Consumer Rights Division is responsible for the elaboration of consumer policy and consumer legislation.²¹⁴ The Consumer Rights Protection Centre participates in market surveillance activities and ensures it works fairly for all consumers and to receive and act on complaints from consumers about violation of their rights and enforce the relevant legislations. They are also responsible for protecting the economic interests of consumers and represent their interests in particular committees and networks and providing consumers with relevant information and education about their rights.²¹⁵ The Public Utilities Commission (PUC) is obliged as an out-of-court body to settle disputes between public service providers and users or between service providers about their rights and obligations. It also includes district heating.²¹⁶
Available information on consumer perception and satisfaction	<ul style="list-style-type: none"> In the annual report of the Public Utilities Commission complaints on heat supply issues were examined. Residents mainly complained about heat tariffs, heat metering and billing.²¹⁷

²¹⁴ <https://www.em.gov.lv/en/>²¹⁵ <https://www.ptac.gov.lv/>²¹⁶ <https://www.sprk.gov.lv/en>²¹⁷ https://erranet.org/wp-content/uploads/2016/11/Latvia_PUC_Annual_Report_2018.pdf, p.88

Lithuania

There is no district cooling in Lithuania.

Table 78: Size of the cities served by DHC and geographical concentration

	DH
Geographical concentration of the DH systems	<ul style="list-style-type: none"> ○ Lithuania has a well-developed district heating sector. DH systems are installed in all 60 cities and districts. ○ The share of DH in the overall heating sector has remained constant over the last years: in average, around 57% throughout the country and around 80% in cities
Sources	<ul style="list-style-type: none"> ○ National Energy Regulatory Council ○ Lithuanian District Heating Association, statistics 2008 ○ Own survey with national DHC stakeholders

Table 79: Ownership of the DH networks

	DH						
Ownership in terms of number of networks (2019)	<ul style="list-style-type: none"> ○ DH networks are in public ownership ○ In 2019, municipalities owned about 93% of DH companies, while 7% were leased to foreign and domestic investors. <div style="text-align: center; margin-top: 10px;"> <p>Ownership DH repartition in terms of number of networks</p> <table border="1"> <thead> <tr> <th>Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Public</td> <td>93%</td> </tr> <tr> <td>PPP</td> <td>7%</td> </tr> </tbody> </table> </div>	Category	Percentage	Public	93%	PPP	7%
Category	Percentage						
Public	93%						
PPP	7%						
Sources	<ul style="list-style-type: none"> ○ National Energy Regulatory Council ○ Own survey with national DHC stakeholders 						

Table 80: Main suppliers and level of competition

	DH														
Main suppliers and market share (2008)	<div style="text-align: center;"> <p>Main DH suppliers</p> <table border="1"> <thead> <tr> <th>Supplier</th> <th>Market share in terms of energy sales</th> </tr> </thead> <tbody> <tr> <td>AB Šiaulių energija</td> <td>7%</td> </tr> <tr> <td>AB Panevėžio energija</td> <td>9%</td> </tr> <tr> <td>Dalkia</td> <td>12%</td> </tr> <tr> <td>AB Klaipėdos</td> <td>13%</td> </tr> <tr> <td>AB Kauno Energija</td> <td>24%</td> </tr> <tr> <td>AB Vilnius silumos tinklai</td> <td>38%</td> </tr> </tbody> </table> <p>■ Market share in terms of energy sales</p> </div>	Supplier	Market share in terms of energy sales	AB Šiaulių energija	7%	AB Panevėžio energija	9%	Dalkia	12%	AB Klaipėdos	13%	AB Kauno Energija	24%	AB Vilnius silumos tinklai	38%
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AB Šiaulių energija	7%														
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Dalkia	12%														
AB Klaipėdos	13%														
AB Kauno Energija	24%														
AB Vilnius silumos tinklai	38%														
Market description	<ul style="list-style-type: none"> ○ DH market is dominated by 6 companies. 														
Sources	<ul style="list-style-type: none"> ○ Lithuanian District Heating Association, statistics 2008 														

Table 81: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> DHC companies need to have a license. There were 52 licensed heat supply companies in 2020.²¹⁸ The activity of the companies is regulated by the National Commission for Energy Control and Prices (NCECP). State regulation of DH sector is very deep. DH companies follow more than 100 laws and 1000 post laws in their daily activity. The Heat Law regulates the state management of the heat sector, the activities of heat sector entities, their relations with heat consumers, their interrelationship and responsibility.²¹⁹
Regulation of prices for consumers	<ul style="list-style-type: none"> The regulatory pricing methods are applied by the NCECP. According to the rules of reparation and application of the methods of distribution (allocation) of the heat energy quantity for consumers, NCECP has presented ten methods for the allocation of the heat energy quantity consumed in a building. These methods can be used, according to the type of measurement device used, and the heating and hot water systems types installed.²²⁰
Regulation of metering	<ul style="list-style-type: none"> According to Art. 16 Law on Heat Sector, heat meters are mandatory 3 cases: Heat distribution is based on building heat meter readings (for apartments and common areas); Heat distribution is based on building heat meter readings (for common areas) and individual heat indicators (for apartments); Heat distribution is based on: building heat meter readings (for common areas) and individual heat meters (for apartments).²²¹ Smart heat meters are mandatory.²²²
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> The heat supplier is obliged to connect all RES heating devices of independent heat producers that were installed to replace plants fired by fossil fuels. RES heating devices are connected to the heat transmission network at the technically suitable point which is closest to the heating device to be connected, unless there is a more technically and economically suitable connection point. The connection costs are covered by the independent heat producer.²²³ Priority purchase of heat from renewable sources: The state promotes the purchase of heat produced from renewable energy sources. Heat suppliers are obliged to purchase all heat from renewables generated by independent producers which is cheaper than the heat produced by the heat supplier himself and which satisfies environmental and quality requirements as well as standards for the security of supply. This obligation shall not apply when renewable heat generated by independent producers exceeds demand for heat by heat consumers.²²⁴ Significant changes in regulation and pricing were made in 2018 by the new Procedure of Heat Purchase from Independent Heat Producers (IHP) adopted by National Energy Regulatory Council. The new regulation legalized competition in production at "full cost", meaning that the boiler-houses that operates in that month gets all the revenues and the rest receives no income, respectively. The amount of heat purchased from independent heat producers and/or produced by DH companies is determined by means of a heat auction organized by the operator of the Energy Exchange.²²⁵

²¹⁸ <https://www.vert.lt/en/Pages/licensing.aspx>

²¹⁹ Euroheat & Power, Country by Country Report 2019

²²⁰ Euroheat & Power, Country by Country Report 2019

²²¹ <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf>

²²² Source: Own survey with national DHC stakeholders

²²³ Euroheat & Power, Country by Country Report 2019

²²⁴ Euroheat & Power, Country by Country Report 2019

²²⁵ Source: Own survey with national DHC stakeholders

Regulatory framework, authorities and supervision, statistical reporting	
	<ul style="list-style-type: none"> In 2019, there were 12 DH companies where part of heat was purchased from independent heat producers. The market share of independent heat producers is around 34%.²²⁶
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> Mandatory connection of all consumers in the territory defined by the license according to Art. 3 Law on Heat Sector.²²⁷
Support framework for renewable heat	<ul style="list-style-type: none"> The Law on Heat promotes generation of heat from various renewable energy sources. Authorities of national and local levels are obliged to promote, support and implement these technologies. Climate Change Special Programme: The Climate Change Special Programme supports projects aiming to reduce greenhouse gas emissions, including renewable energy projects. This fund provides support in the form of loans and subsidies. Environmental Pollution Tax exemption: Natural and legal persons using biogas, solid and liquid biomass for heating purposes shall be released from environmental pollution tax liability for all stationary source emissions resulting from the use of biogas, solid and liquid biomass. In general, all renewable energy technologies used for the generation of heat are eligible for at least one support scheme.
Support framework for CHP	<ul style="list-style-type: none"> The Law on Heat promotes cogeneration of heat and electricity. Authorities of national and local levels are obliged to promote, support and implement these technologies. In Lithuania, electricity from renewable sources (CHP with biomass) is mainly promoted through a sliding feed-in premium. Tariff rates for RES plants with a generating capacity of up to 10 kW are set by the National Commission for Energy Control and Prices. RES plants with the installed capacity exceeding 10 kW acquire the guaranteed tariff rate by participating in tenders. However, a new support scheme for renewable technologies is planned to be introduced from 2019 - technology neutral tenders in combination with a fixed feed-in premium. Climate Change Special Programme: The Climate Change Special Programme supports projects aiming to reduce greenhouse gas emissions. All technologies used for renewable electricity generation are eligible for this scheme. This fund provides support in the form of loans and subsidies. Net-Metering: Eligible for net-metering are solar, wind and biomass power installations operated by natural persons, including farmers whose annual income from agricultural activities accounts for less than 50% of all income received (≤ 10 kW), and legal persons, including farmers whose annual income from agricultural activities accounts for more than 50% of the received income (≤ 100 kW). Exemption from Excise Duty: In Lithuania, electricity from renewable sources (CHP with biomass) is exempt from Excise Duty.
Support framework for grid infrastructure	<ul style="list-style-type: none"> The Lithuanian Business Support Agency provides grants for the modernization of pipelines (support intensity 50 %) to DH companies.²²⁸
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> In 2016, the Law on Improvement of Energy Efficiency of the Republic of Lithuania was approved with the aim of transposing the provisions of the Energy Efficiency Directive 2012/27/ES. However, the Ministry of Energy has only commissioned electricity and gas transmission and distribution system operators to implement energy saving measures. Heat suppliers have the only obligation to conclude agreements with the Ministry of Energy on consumer education and dissemination, providing consumers

²²⁶ Source: Own survey with national DHC stakeholders

²²⁷ Source: Own survey with national DHC stakeholders

²²⁸ Source: Own survey with national DHC stakeholders

Regulatory framework, authorities and supervision, statistical reporting	
	<p>with information on ways to improve energy efficiency. Reports are provided annually.</p> <ul style="list-style-type: none"> • Training programmes for installers: Engineers need to be certified to be able to install (1) biomass boilers and non-brick furnaces, (2) photovoltaic and solar thermal energy production equipment, and (3) geothermal plants and heat pumps. For the certification, installers of the above listed renewable technologies are trained in special training courses. • RES-H building obligation: As of 31 December 2014, all new buildings and existing buildings subject to major renovation have to meet the renewable energy requirements for buildings. Compliance with these requirements may also be achieved by using district heating and cooling energy which was largely generated from renewable energy sources. • Certification: There are no national certification programmes. Currently, in order to be eligible for national support schemes, heat pumps and solar energy installations require certification in accordance with existing European Union standards. Certain conditions for biomass conversion technologies for heating and cooling have been established by national laws.
Statutory provisions	<ul style="list-style-type: none"> • Law on Energy from Renewable Sources (Atsinaujinančių išteklių energetikos įstatymas) • Law on Environmental Pollution Taxes (Mokesčio už aplinkos teršimą įstatymas) • Law on State Environmental Control (Aplinkos apsaugos valstybinės kontrolės įstatymas) • Law on Heat Sector (Šilumos ūkio įstatymas) • Law on Financial Instruments for Climate Change Management (Klimato kaitos valdymo finansinių instrumentų įstatymas) • Order No. D1-275/2010 (Klimato kaitos specialiosios programos lėšų naudojimo tvarkos aprašas -Guidelines for the Use of the Funds of the Climate Change Special Programme) • Second Document of Order No. D1-370/1K-230 (Mokesčio už aplinkos teršimą iš stacionarių taršos šaltinių apskaičiavimo ir mokėjimo tvarkos aprašas - Description of the Procedure of Calculation and Payment of Environmental Pollution Taxes for Stationary Sources) • Order No. D1-259/2014 (Taršos leidimų išdavimo, pakeitimo ir galiojimo panaikinimo taisyklės - Rules on the Issue, Amendment and Withdrawal of Pollution Permits) • Resolution No. O3-74/2013 (Šilumos supirkimo iš nepriklausomų šilumos gamintojų tvarkos ir salygų aprašas - Description of the Procedure and the Conditions for the Purchase of Heat from Independent Producers) • Resolution No. O3-437/2013 (Nepriklausomų šilumos gamintojų pripažinimo nereguliuojamais tvarkos aprašas - Description of the Procedure for the Recognition of Independent Heat Producers as Unregulated Heat Producers) • Resolution No. O3-96/2009 (Šilumos kainų nustatymo metodika - Heat Pricing Methodology) Resolution No. O3-396/2016 (Dėl biodujų supirkimo į gamtinių dujų sistemas tarifų nustatymo 2017 metams - Tariff rates for 2017 for the purchase of biogas into the natural gas systems) • Preparation and Application of the Methods of Distribution (Allocation) of the Heat Energy Quantity for Consumers.
Relevant authorities and supervision	<ul style="list-style-type: none"> • The National Commission for Energy Control and Prices (NCECP; Lithuanian: Valstybinė energetikos regu²²⁹liavimo taryba (VERT)) is an independent national regulatory authority regulating activities of entities in the field of energy and carrying out the supervision of state energy sector. The NERC performs a variety of activities in District Heating sector.²³⁰ • State Consumer Rights Protection Authority coordinates state institutions'

²²⁹ www.vartotojoteises.lt²³⁰ <https://www.regula.lt/en/Pages/Activities/district-heating-sector.aspx>

District Heating and Cooling in the European Union

Overview of Markets and Regulatory Frameworks under the Revised Renewable Energy Directive

Regulatory framework, authorities and supervision, statistical reporting	
Statistical reporting methods and sources	<p>activities on protection of consumers.</p> <ul style="list-style-type: none"> The Lithuanian Department of Statistics (Statistics Lithuania) is a public authority coordinating official statistics. Information of their methods are on their website.²³¹
Sources	<ul style="list-style-type: none"> Euroheat and Power, Country by Country 2019 Report, https://www.euroheat.org/publications/country-by-country/ RES legal, http://www.res-legal.eu/ JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kina28630enn%281%29.pdf IEA policy database, https://www.iea.org/policies NCECP, https://www.regula.lt/en/Pages/updates.aspx State Consumer Rights Protection Authority, www.vartotojoteises.lt Statistics Lithuania, https://www.stat.gov.lt/web/lst/ Heating and hot water consumption metering and billing in Lithuania, https://www.ca-eed.eu/content/download/4175/file/Heating%20and%20Hot%20Water%20Consumption%20metering%20and%20billing%20in%20Lithuania.pdf/attachment

Table 82: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> The State Consumer Rights Protection Authority operates under the Ministry of Justice. It implements the national consumer protection policy and ensures protection of consumer rights.²³² There are 18 various institutions which protect consumer rights and interests in certain areas of consumption. The State Energy Inspectorate under the Ministry of Economy of the Republic of Lithuania is responsible for consumer protection regarding water, gas, electricity and heating supply services.²³³ The National Commission for Energy Control and Prices (NCC) is an independent national regulatory authority (in the European Union law's sense) regulating activities of entities in the field of energy and carrying out the supervision of state energy sector. The NCC examines DH consumer complaints.²³⁴
Available information on consumer perception and satisfaction	<ul style="list-style-type: none"> In the annual report 2018 of the National Energy Regulatory Council (NERC), 194 statements were received for the heating sector. Consumers complained mainly about the obligation to pay for the quantity of heat for general use and the correctness of the calculation of this quantity, as well as the appropriateness of the payment for the unallocated quantity of hot water. There are also relevant problems concerning the installation/replacement of hot water meters and the billing of hot water where the consumer does not allow the hot water supplier's representatives to install/replace the hot water meter in his home and the appropriateness of the maintenance fee for the hot water temperature.²³⁵

²³¹ https://www.stat.gov.lt/en_GB/kokybes-vadyba

²³² <http://www.vvtat.lt/en>

²³³ https://ec.europa.eu/info/sites/info/files/national-consumer-organisations_lt_listing.pdf

²³⁴ <https://www.regula.lt/en/Pages/default.aspx>

²³⁵ https://www.regula.lt/SiteAssets/veikla/VKEKK_2018_m_%20veiklos%20ataskaita_R5-25.pdf, p.104

Luxembourg

No consolidated information could be found on DHC networks in Luxembourg for the 3 following tables.

Table 83: Size of the cities served by DHC and geographical concentration

	DH	DC
Geographical concentration of the DHC systems	A few DHC networks could be found in the literature in Luxembourg. It is usually small networks with a few buildings connected.	
Sources	Websites: Engie Cofely ²³⁶ , Jean Schmit Engineering ²³⁷ , Luxenergie ²³⁸	

Table 84: Ownership of the DHC networks

	DH	DC
Ownership repartition	In general, the municipalities own the networks which are operated by a few suppliers	
Sources	Websites: Engie Cofely, Jean Schmit Engineering, Luxenergie	

Table 85: Main suppliers and level of competition

	DH	DC
Main DHC suppliers	Only 3 suppliers have been identified: Engie Cofely, Jean Schmit Engineering and Luxenergie	
Sources	Websites: Engie Cofely, Jean Schmit Engineering, Luxenergie	

Table 86: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> There is no information available.
Regulation of prices for consumers	<ul style="list-style-type: none"> According to the information available, no heat cost allocation rules are defined.²³⁹ There is no further information available.
Regulation of metering	<ul style="list-style-type: none"> There is no information available.
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> There is no information available.
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> There is no information available.

²³⁶ www.engie-cofely.lu/solutions-innovantes/reseau-de-chaleur

²³⁷ http://www.jse.lu/fr/projects_category/centrales-denergie/

²³⁸ <https://www.luxenergie.lu/fr/service/reseau-de-chaleur/>

²³⁹ <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf>

Regulatory framework, authorities and supervision, statistical reporting	
Support framework for renewable heat	<ul style="list-style-type: none"> PRIMe House: Within the framework 'PRIMe House', which supports efficient energy use and renewable energy, the state subsidises aerothermal and geothermal heat pumps as well as renewable energy plants generating heat from solar thermal energy or various types of biomass. All technologies are eligible, except hydrothermal and biogas plants. Régime d'aide à la protection de l'environnement et à l'utilisation rationnelle des ressources naturelles: In order to encourage environmental protection and efficient energy use, companies investing in renewable energy plants are eligible for investment grants, with the exception of aerothermal and hydrothermal energy. All renewable energy technologies used for the production of heat, except aerothermal technologies, are eligible.
Support framework for CHP	<ul style="list-style-type: none"> Régime d'aide en faveur des classes moyennes: In order to support companies regarding environmental protection and the rational use of natural resources, the state of Luxembourg grants subsidies for companies investing in renewable energies for the production of heat or for the combined production of heat and power (CHP). Premium tariff (Prime de marché) for CHP with biomass/biogas: In case of the direct sale of electricity produced from renewable energy sources, plant operators receive a variable bonus on top of the market price (Art. 27bis, RGD du 23 juillet 2016).
Support framework for grid infrastructure	<ul style="list-style-type: none"> Support of RES-H infrastructure I: The construction of a district heating network supplying at least two residential buildings can benefit from an investment grant amounting to 30% of the eligible investment costs, without exceeding a maximum support of €7,500. Moreover, the connection of a residential building to a district heating network can receive a subsidy amounting to €50 per kW in an individual house and €15 per kW in an apartment (Art. 11, RGD du 12 décembre 2012). The subsidies can only be granted provided that the heating network uses at least 75% of heat from renewable energies (Art. 11, Annex II, RGD du 12 décembre 2012). Support of RES-H infrastructure II: The Law of 31 May 1999 has introduced the creation of a fund for the support of Luxembourg municipalities in their investments for environmental protection. The fund is managed by a committee composed of delegates of the Ministry of Environment, the Ministry of Budget and the Ministry of the Interior (Art.6, Loi du 31 mai 1999). The construction of a district heating network can be supported to 40% of the whole investments costs, including equipment and installation costs (Circulaire n°3178).
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> Fonds pour la protection de l'environnement: The Law of 31 May 1999 has introduced the creation of a fund bound to support Luxembourg municipalities in their investments for environmental protection. The training programmes for installers of RES-systems: No trainings for the installation of renewable energy devices are proposed in 2012. As far as the RES-H building obligations are concerned, the government introduced in 2012 a schedule of due dates in 2012 in order to reach the objectives defined in the European directive 2010/31/UE regarding energetic performance of buildings. The regulation takes into consideration renewable energies. Concerning Research, Development and Demonstration Programmes: There are no policies in Luxembourg especially devoted to the promotion of research and development in the field of renewable energies. However, the Law of 5 June 2009 provides for a general support scheme for companies willing to develop research and development activities.
Statutory provisions	<ul style="list-style-type: none"> Circulaire n° 3178 (Circulaire n° 3178 du 8 août 2014 - Bill no. 3178 of 8 August 2014) Loi du 15 décembre 2017 (Loi du 15 décembre 2017 relative à un régime d'aides à la protection de l'environnement- Act of 15 December 2017 establishing a support system for environmental protection and efficient energy use) Loi du 23 décembre 2016 concernant le budget des recettes et des

Regulatory framework, authorities and supervision, statistical reporting	
	<p>dépenses de l'État pour l'exercice 2017</p> <ul style="list-style-type: none"> • Loi du 30 juin 2004 (Loi du 30 juin 2004 portant création d'un cadre général des régimes d'aides en faveur du secteur des classes moyennes - Act of 30 June 2004 establishing a general support framework in favour of the small business sector) • Loi du 31 mai 1999 (Loi du 31 mai 1999 portant institution d'un fonds pour la protection de l'environnement - Law of 31 May 1999 establishing a fund for the protection of the environment) • Loi du 5 juin 2009 (Loi du 5 juin 2009 ayant pour objet 1. la promotion de la recherche, du développement et de l'innovation 2. les missions de l'Agence nationale pour la promotion de l'innovation et de la recherche 3. la création d'un Fonds spécial pour la promotion de la recherche, du développement et de l'innovation - Law of 5 June 2009 regarding the promotion of research, development and innovation) • RGD du 12 décembre 2012 (Règlement grand-ducal du 12 décembre 2012 instituant un régime d'aides pour la promotion de l'utilisation rationnelle de l'énergie et la mise en valeur des énergies renouvelables dans le domaine du logement - Grand-Ducal Regulation of 12 December 2012 establishing a support system for efficient energy use and renewable energy in residential buildings) • RGD du 23 décembre 2016 (Règlement grand-ducal du 23 décembre 2016 fixant les mesures d'exécution de la loi du 23 décembre 2016 concernant la collecte, la saisie et le contrôle des dossiers d'aides relatives au logement- Grand-Ducal Regulation of 23 December 2016 implementing measures for the collection, seizure and control of housing financial support, called 'PRIMe house support') • RGD du 23 juillet 2016 (Règlement grand-ducal du 23 juillet 2016 - Grand-Ducal decree of 23 July 2016) • RGD du 24 novembre 2005 (Règlement grand-ducal du 24 novembre 2005 portant exécution de l'article 4 de la loi du 30 juin 2004 - Grand-Ducal Regulation of 24 November 2005 implementing article 4 of the law of 30 June 2004)
Relevant authorities and supervision	<ul style="list-style-type: none"> • The Competition Council is an independent administrative authority whose role is to guarantee free competition and ensure the proper functioning of markets. It must ensure compliance with national and European competition rules. As part of its functions, the Council seeks to protect the interests of consumers but also the interests of businesses against anti-competitive behavior by competing businesses which could have the effect of restricting competition. • The Institut Luxembourgeois de Régulation (Luxemburger Regulatory Institute) was created to oversee the opening of former state monopolies to competition. The Institute's mission therefore consists in ensuring that competition is real and fair and that all consumers have access to services on reasonable terms. The ILR is not a competition authority, which sanctions behavior qualified as anti-competitive, but which must prevent abuse and set up an environment with fair conditions for all players.
Statistical reporting methods and sources	<ul style="list-style-type: none"> • STATEC (National Institute of Statistics and Economic Studies of the Grand Duchy of Luxembourg) is an administration under the authority of the Ministry of Economics. Nevertheless, it is scientifically and professionally independent, i.e. that STATEC sets its work plan in conformity to the national and European statistical legislation, and generates and disseminates its data in complete neutrality. Its missions are to provide public and private decision-makers, along with the citizens, a high-quality statistical information service. STATEC is committed to producing statistics, analyses and studies mirroring a detailed, reliable and objective image of the Luxembourg society. Information on their methods can be found on their website.²⁴⁰

²⁴⁰ <https://statistiques.public.lu/en/methodology/index.html>

Regulatory framework, authorities and supervision, statistical reporting	
Sources	<ul style="list-style-type: none"> RES legal, http://www.res-legal.eu/ JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/ki_na28630enn%281%29.pdf IEA policy database, https://www.iea.org/policies Conseil de la concurrence, https://concurrence.public.lu/fr.html Luxemburger Regulatory Institute, https://web.ilr.lu/FR/ILR STATEC, https://statistiques.public.lu/en/actors/statec/index.html

Table 87: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> The Ministry of Consumer Protection is responsible for the protection of consumers.²⁴¹ The Luxembourg Consumer Protection Association, Union Luxembourgeoise des Consommateurs (ULC) is an association for the protection of consumers in Luxembourg.²⁴² No DH-specific association found.
Available information on consumer perception and satisfaction	<ul style="list-style-type: none"> No study on the perception or satisfaction of DHC consumers could be found.

²⁴¹ https://quichet.public.lu/en/organismes/organismes_citoyens/ministere-protection-consommateurs.html²⁴² https://quichet.public.lu/en/organismes/organismes_citoyens/union-luxembourgeoise-consommateurs.html

Malta

Table 88: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> There is no DHC infrastructure in Malta. The results of the comprehensive assessment show that it is not cost-effective because of the low heating demand reflecting the mild climate. As such, no large meaningful application of 'waste' low-temperature heat is possible.
Regulation of prices for consumers	<ul style="list-style-type: none"> According to Energy Efficiency and Cogeneration Regulations, in Malta allocation rules are foreseen but not fully defined.
Regulation of metering	<ul style="list-style-type: none"> There is no information available.
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> There is no specific regulation on third party access (TPA) to DHC networks.
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> There is no specific regulation regarding grid access and usage of customers.
Support framework for renewable heat	<ul style="list-style-type: none"> There are no support measures for RES-H.
Support framework for CHP	<ul style="list-style-type: none"> Electricity Production from waste treatment plant: The new Sant' Antn Waste Treatment Plant includes a biological treatment plant for the production of biogas through the anaerobic digestion of biodegradable municipal solid waste. The biogas produced is to be used for the generation of electricity by combustion in a CHP plant, and any excess electricity will be fed to the grid.
Support framework for grid infrastructure	<ul style="list-style-type: none"> There are no support measures for infrastructure.
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> Certification Programmes for RES installations: RES installations (solar water heaters, solar collectors and photovoltaic installations) must be registered with the Malta Resources Authority in order to be eligible for support schemes for the domestic sector in Malta. Sellers and retailers are required to provide a minimum guarantee of five years on RES plants (§ 2 vi GN 52/2010). Training programmes for installers: To promote the use of energy from renewable sources pursuant to the Promotion of Energy from Renewable Sources regulations and to encourage the efficient use of energy pursuant to the Energy Efficiency and Cogeneration regulations, the Malta has issued a scheme for the registration of training courses leading to the certification of Renewable Energy Systems (RES) installers, providers of energy services, energy auditors and energy managers (GN 1302/2014).
Statutory provisions	<ul style="list-style-type: none"> GN 52/2010 (Registration of Solar Water Heaters, Solar Collectors and Photovoltaic Systems - Registrazzjoni ta'Solar Water Heaters, Solar Collectors u Sistemi Fotovoltajiċi) GN 1302/2014 (Scheme for the Registration of Training Courses Leading to the Certification of Renewable Energy Systems Installers, Providers of Energy Services, Energy Auditors and Energy Managers)
Relevant authorities and supervision	<ul style="list-style-type: none"> The Regulator for Energy & Water Services (REWS) regulates and monitors the efficient production and use of water and energy to guarantee a safe, secure and sustainable service for the benefit and welfare of the consumer.
Statistical	<ul style="list-style-type: none"> The National Statistics Office (NSO) is the executive arm of the Malta

Regulatory framework, authorities and supervision, statistical reporting	
reporting methods and sources	Statistics Authority and draws its mandate from the Malta Statistics Authority Act, Cap. 422 of the Laws of Malta. It produces high-quality statistics and analysis for better decision making in Malta. Information on their methods can be found on their website. ²⁴³
Sources	<ul style="list-style-type: none"> RES legal, http://www.res-legal.eu/ JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/ki_na28630enn%281%29.pdf IEA policy database, https://www.iea.org/policies REWS, https://www.rews.org.mt/#/en/home NSO, https://nso.gov.mt/en/Pages/NSO-Home.aspx Malta's National Energy Efficiency Action Plan (2017), https://ec.europa.eu/energy/sites/ener/files/documents/mt_neeap_2017.pdf

Table 89: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> The Ministry for Social Dialogue, Consumer Affairs and Civil Liberties is responsible for consumer policy and consumer affairs.²⁴⁴ The Malta Competition and Consumer Affairs Authority (MCCA) promotes, maintains and encourages competition, safeguards the interests of consumers and enhances their welfare.²⁴⁵ The Malta Consumers' Association is a voluntary organisation and is financed through membership fees. The association is acting as a representative for the local consumers.²⁴⁶ Another consumer association set up in Malta is the Association for Consumer Rights.²⁴⁷ The Regulator for Energy and Water Services (REWS) is a sector specific specialised public authority that also deals with consumer issues relating to the respective sector. Its schemes involve Electricity from RES/CHP yet DHC is not mentioned specifically.²⁴⁸
Available information on consumer perception and satisfaction	<ul style="list-style-type: none"> As there is no DHC in Malta, there aren't any studies on consumer perception or satisfaction available.

²⁴³ <https://nso.gov.mt/metadata/>²⁴⁴ <https://meae.gov.mt/en/Pages/PublicConsultations.aspx>²⁴⁵ <http://www.mccaa.org.mt/>²⁴⁶ <http://www.camalta.org/>²⁴⁷ <https://acrmalta.weebly.com/>²⁴⁸ <https://www.rews.org.mt/#/en/fa/17>

Netherlands

Table 90: Size of the cities served by DHC and geographical concentration

	DH	DC										
% of DH networks according to the number of inhabitants (2018)	<p>% of DH networks according to the number of inhabitants</p> <table border="1"> <thead> <tr> <th>City Size Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>< 20 000 inhabitants</td> <td>11%</td> </tr> <tr> <td>20 000 inhabitants < ... < 100 000 inhabitants</td> <td>51%</td> </tr> <tr> <td>100 000 inhabitants < ... < 500 000 inhabitants</td> <td>25%</td> </tr> <tr> <td>> 500 000 inhabitants</td> <td>13%</td> </tr> </tbody> </table>	City Size Category	Percentage	< 20 000 inhabitants	11%	20 000 inhabitants < ... < 100 000 inhabitants	51%	100 000 inhabitants < ... < 500 000 inhabitants	25%	> 500 000 inhabitants	13%	-
City Size Category	Percentage											
< 20 000 inhabitants	11%											
20 000 inhabitants < ... < 100 000 inhabitants	51%											
100 000 inhabitants < ... < 500 000 inhabitants	25%											
> 500 000 inhabitants	13%											
Geographical concentration of the DHC systems	<ul style="list-style-type: none"> ○ Large DH systems are present in the biggest cities. ○ DH networks can also be found in smaller towns 	<ul style="list-style-type: none"> ○ There are only a few DC systems mainly in Amsterdam and Rotterdam. The largest grid is in Amsterdam. 										
Sources	<ul style="list-style-type: none"> ○ Developments of Heat Distribution Networks in the Netherlands, R. Niessink & H. Rösler, 2015²⁴⁹ ○ Own survey with national DHC stakeholders ○ Warmtemonitor 2019 											

Table 91: Ownership of the DHC networks

	DH	DC								
Ownership repartition in terms of number of networks (2016)	<p>Ownership DH repartition in terms of number of networks</p> <table border="1"> <thead> <tr> <th>Ownership Type</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Public</td> <td>5%</td> </tr> <tr> <td>Customers cooperative</td> <td>52%</td> </tr> <tr> <td>Private</td> <td>43%</td> </tr> </tbody> </table>	Ownership Type	Percentage	Public	5%	Customers cooperative	52%	Private	43%	DC networks are mainly private
Ownership Type	Percentage									
Public	5%									
Customers cooperative	52%									
Private	43%									
Sources	<ul style="list-style-type: none"> ○ Developments of Heat Distribution Networks in the Netherlands, R. Niessink & H. Rösler, 2015 ○ Own survey with national DHC stakeholders 									

²⁴⁹ <https://publicaties.ecn.nl/PdfFetch.aspx?nr=ECN-E--15-069>

District Heating and Cooling in the European Union

Overview of Markets and Regulatory Frameworks under the Revised Renewable Energy Directive

Table 92: Main suppliers and level of competition

	DH	DC														
Main suppliers and market share in terms of consumers (2016)	Main DH suppliers <table border="1" style="margin-top: 10px; width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Supplier</th> <th>Market Share (%)</th> </tr> </thead> <tbody> <tr> <td>Other suppliers</td> <td>59%</td> </tr> <tr> <td>HVC</td> <td>1%</td> </tr> <tr> <td>SV Purmerend</td> <td>3%</td> </tr> <tr> <td>Ennatuurlijk</td> <td>8%</td> </tr> <tr> <td>Nuon</td> <td>14%</td> </tr> <tr> <td>Eneco</td> <td>15%</td> </tr> </tbody> </table>	Supplier	Market Share (%)	Other suppliers	59%	HVC	1%	SV Purmerend	3%	Ennatuurlijk	8%	Nuon	14%	Eneco	15%	The large DC grid in Amsterdam is operated by Nuon.
Supplier	Market Share (%)															
Other suppliers	59%															
HVC	1%															
SV Purmerend	3%															
Ennatuurlijk	8%															
Nuon	14%															
Eneco	15%															
Market description	<ul style="list-style-type: none"> ○ There are 5 major suppliers, all being private ones (see graph above) 	n.a.														
Sources	<ul style="list-style-type: none"> ○ Haffner et al., 2016 ○ Own survey with national DHC stakeholders 															

Table 93: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> • The distribution of heat is generally carried out by energy companies, which are also active in the retail and wholesale markets for gas and electricity. These district heating companies, therefore, also own the transport and distribution infrastructure. Most of the heat is produced by four generation companies, two of which also sell and distribute their heat. Several DH companies also run their own CHP plants, and the number of small-scale innovative, renewable projects (heat pumps, geothermal units, small-scale biomass generation, etc.) is growing. The DH companies are members of Energie-Nederland, the Association of Energy Producers, Traders and Retailers in the Netherlands.²⁵⁰ • Larger operators need a licence and are controlled by the Authority for Consumers and Markets (ACM).²⁵¹
Regulation of prices for consumers	<ul style="list-style-type: none"> • Consumer protection is regulated through the Dutch Heat Act. The Act protects small-scale consumers by regulating the price they pay for heat, setting a reasonable maximum price. The ACM sets tariffs each year based on the price of natural gas.²⁵²
Regulation of metering	<ul style="list-style-type: none"> • According to the heat act a supplier has the task of ensuring that within a reasonable period of time an individual meter is made available to consumers and for each unit by means of a rental that can display the current heat consumption and that can provide information about the time in which it was used for actual consumption. • Smart meters are now about 1% and are required to be in place before 2027.²⁵³
Regulation regarding grid access and usage (supply)	<ul style="list-style-type: none"> • Negotiation on grid access of third parties is required.²⁵⁴

²⁵⁰ Euroheat and Power, Country by Country Report 2019

²⁵¹ Source: Own survey with national DHC stakeholders; see <https://wetten.overheid.nl/BWBR0033729/2020-01-01>

²⁵² Euroheat and Power, Country by Country Report 2019

²⁵³ Source: Own survey with national DHC stakeholders

²⁵⁴ Source: Own survey with national DHC stakeholders; see <https://wetten.overheid.nl/BWBR33729/22-1-1>

District Heating and Cooling in the European Union

Overview of Markets and Regulatory Frameworks under the Revised Renewable Energy Directive

Regulatory framework, authorities and supervision, statistical reporting	
perspective) Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> Some cities have a mandatory consumer connection to existing DH grids.²⁵⁵
Support framework for renewable heat	<ul style="list-style-type: none"> Premium tariff: The Netherlands have introduced a premium tariff (bonuses on top of the wholesale price) to promote the generation of heat from renewable sources. Tax regulation mechanisms: Enterprises are eligible for a tax credit (EIA) for investments in specific types of renewable heating systems. Loans: Investors in RES H&C projects (excluding biomass and biogas) are eligible for a reduction of the interest rate on the basis of a Green project declaration. Innovation in renewable energy techniques is supported through innovation contracts between private companies, universities, R&D institutes, for 7 top class sectors among which the RES technologies offshore wind, solar energy (PV), and bio-based economy.
Support framework for CHP	<ul style="list-style-type: none"> Premium tariff: The Netherlands has introduced a premium tariff (premiums on top of the wholesale price) to promote the generation of electricity from renewable energy sources (CHP with biomass and biogas). Tax regulation mechanisms: Generators of electricity from renewable energy sources that use the electricity they consume (own consumption clause) may be exempt from the tax levied on electricity consumption (Energy tax). Moreover, enterprises are eligible for a tax credit (EIA - Energy Investment Allowance) for investments in renewable energy plants.
Support framework for grid infrastructure	<ul style="list-style-type: none"> Support of RES-H infrastructure: The EIA describes eligible investments for the EIA scheme, among which a heat exchanger or a heat transport system used to provide excess heat from power plants (energy efficiency) and renewable energy conversion, including energy advice.
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> Certification Programmes for RES installations: Certification of heat pumps and solar boilers is governed through Komo, an independent accredited certifying body.
Statutory provisions	<ul style="list-style-type: none"> Energy List 2018 (Energielijst 2018) Heat Act Heat Generation Act RAC 2018 (Regulation designating sustainable energy production categories) RGP 2016 (Regulation Green Projects 2016) RISEP (Regulation implementing sustainable energy production) SDE + (Renewable Energy Production Incentive Scheme 2007) Warmtebesluit Wamteregeling Wamtwet Wet IB 2001 (Income Tax Act)
Relevant authorities and supervision	<ul style="list-style-type: none"> The Netherlands Authority for Consumers and Markets (ACM) is an independent regulator that champions the rights of consumers and businesses. ACM is charged with competition oversight, sector-specific regulation of several sectors, and enforcement of consumer protection laws. The ultimate goal is to create a level playing field, where all businesses play by the rules, and where well-informed consumers exercise their rights. The Ministry of Economic Affairs and Climate stands for a sustainable and entrepreneurial Netherlands. Together with its partners, the Ministry of Economic Affairs and Climate is working on the prosperity of all Dutch

²⁵⁵ Source: Own survey with national DHC stakeholders; see <https://www.internetconsultatie.nl/warmtewet2>

District Heating and Cooling in the European Union

Overview of Markets and Regulatory Frameworks under the Revised Renewable Energy Directive

Regulatory framework, authorities and supervision, statistical reporting	
	<p>people, now and later.</p> <ul style="list-style-type: none"> Energie-Nederland is the Association of Energy Producers, Traders and Retailers in the Netherlands. In the year 2019, about 60 members are members of the organization, and the association thus represents 80% of the market.
Statistical reporting methods and sources	<ul style="list-style-type: none"> As the national statistical office, Statistics Netherlands (CBS) provides reliable statistical information and data to produce insight into social issues, thus supporting the public debate, policy development and decision-making while contributing to prosperity, well-being and democracy. Information on their methods can be found on their website.²⁵⁶
Sources	<ul style="list-style-type: none"> RES legal, http://www.res-legal.eu/ JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf IEA policy database, https://www.iea.org/policies ACM, https://www.acm.nl/en Ministry of Economic Affairs and Climate, https://www.rijksoverheid.nl/ministeries/ministerie-van-economische-zaken-en-klimaat Energie-Nederland, https://www.energie-nederland.nl/ CBS, https://www.cbs.nl/en-gb

Table 94: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> The Ministry of Economic Affairs and Climate Policy is responsible for the general consumer policy as well as some specific sectors as energy and telecommunications. Other aspects are dealt with by the Ministry of Security and Justice, the Ministry of Health, Welfare and Sport and the Ministry of Finance.²⁵⁷ The Consumentenbond (Consumers' League) is the biggest consumer organisation. The bond gives information about consumer law and product/services tests, publishes several magazines and gives opinions to new consumer policy, on national and European level.²⁵⁸ The Dutch Foundation for Consumer Complaints Boards (Stichting Geschillen Commissies) aims to resolve disputes resulting from complaints by consumers concerning goods and services purchased from suppliers.²⁵⁹ The Netherlands Authority for Consumers and Markets (ACM) is a public enforcement Agency. ACM is charged with competition oversight, sector-specific regulation of several sectors, and enforcement of consumer protection laws.²⁶⁰ There is no DH-specific consumer protection association.
Available information on consumer perception and satisfaction	<ul style="list-style-type: none"> According to an exploration of ClimateXChange in 2016, consumers' complaints relate to excessive prices and being worse off than with gas fired boilers. There is a strain of public perception that the Heat Act is not effective in protecting consumers. Consumers also complain that they are not protected against sudden price increases. Many consumer complaints

²⁵⁶ <https://www.cbs.nl/en-gb/our-services/methods>

²⁵⁷ https://ec.europa.eu/info/sites/info/files/national-consumer-organisations_nl_listing.pdf

²⁵⁸ <https://www.consumentenbond.nl/>

²⁵⁹ https://ec.europa.eu/info/sites/info/files/national-consumer-organisations_nl_listing.pdf

²⁶⁰ <https://www.acm.nl/en/about-acm/our-organization/the-netherlands-authority-for-consumers-and-markets>

- concern price, in particular a lack of transparency and clarity on how exactly pricing is determined.²⁶¹
- In an overview notification to the Dutch association of homeowners (Vereniging Eigen Huis) consumers of DH systems report positively about comfort among the many complaints in the other areas (including price and trust).²⁶²

²⁶¹ <https://www.climateexchange.org.uk/media/3569/lessons-from-european-district-heating-regulation.pdf>, p.26

²⁶² [https://research.hanze.nl/ws/portalfiles/portal/16162028/Research note Attractiveness of DH to consumers.pdf](https://research.hanze.nl/ws/portalfiles/portal/16162028/Research_note_Attractiveness_of_DH_to_consumers.pdf)

Poland

No data was available for DC systems.

Table 95: Size of the cities served by DH and geographical concentration

	DH
Map: Efficient and inefficient district heating in Poland (2016)	 <p style="text-align: right;">Source: Polish District Heating Chamber of Commerce</p> <ul style="list-style-type: none"> ● Efficient district heating system ● Inefficient district heating system
Geographical concentration of the DHC systems	<ul style="list-style-type: none"> ○ The sizes of cities served by DH vary from small cities to big agglomerations.
Sources	<ul style="list-style-type: none"> ○ Polish District heating Chamber of Commerce ○ Own survey with national DHC stakeholders

Table 96: Ownership of the DH networks

	DH
Ownership description	<ul style="list-style-type: none"> ○ Nearly 50% of district heating companies in Poland are controlled by public operators. ○ The municipalities own 60% of the networks in Poland but it concerns mainly heating systems in smaller towns ○ As a result of privatization processes, the majority of heating systems in large Polish cities is controlled by the private sector
Sources	<ul style="list-style-type: none"> ○ Polish District heating Chamber of Commerce ○ Euroheat and Power, Country by Country 2019 ○ Own survey with national DHC stakeholders

Table 97: Main suppliers and level of competition

	DH
Market description	<ul style="list-style-type: none"> ○ 8 suppliers have an installed capacity over 1GW (Dalkia, EDF, CEZ and Fortum for international companies, Termika, PGE, Tauron and ECO for Polish companies). They control nearly 30% of the market.
Sources	<ul style="list-style-type: none"> ○ Polish District heating Chamber of Commerce ○ Euroheat and Power, Country by Country 2019

Table 98: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> • DHC networks are owned and managed by district heating companies which are operating on the basis of concessions issued by the Energy Regulatory Office (ERO) (Art. 32 of the Energy Law). A concession is required for both heat generation and transport.²⁶³
Regulation of prices for	<ul style="list-style-type: none"> • DHC companies prepare tariffs and ERO accepts or rejects them. Heat prices are set individually for every company operating in the heating

²⁶³ <https://www.ure.gov.pl/pl/biznes/jak-uzyskac-koncesje/ciepl>

Regulatory framework, authorities and supervision, statistical reporting	
consumers	sector as a function of justified costs and plans of investments. For several years because of Polish Energy law all heating companies were deprived functioning with profit. As a consequence, the President ERO did not allow to include profits in heat tariffs (Energy Law). ²⁶⁴
Regulation of metering	<ul style="list-style-type: none"> According to the Energy Law heat can only be sold on the basis of heat meters.²⁶⁵ Energy Efficiency Law sets only general principles for the allocation of heat costs in multi-apartment buildings giving to the owners and administrators some flexibility in choosing the heat cost allocation methods. In general, the costs for heating the common parts of multi-apartment buildings are divided in proportion to the floor space of occupied units. In modern residential units, meters are often on the radiators to measure heat consumption.²⁶⁶
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> Heat-trading entities or vertical heat utilities are obliged to priority purchase of heat generated from renewable energy sources provided it is offered at a price no higher than the average price of heat from other sources supplying the network, increased by the average annual price index of consumer goods and services. In general, all technologies but geothermal energy are eligible for support. Pursuant to RES-Act, Art. 116.3, the Order of 18/05/2017 determines the conditions and technical specifications of connecting renewable energy installations to heating networks. Upon fulfilling all criteria under Art. 5 of the Order of 18/05/2017, the operator of the installations submits an application for grid connection.²⁶⁷
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> The grid access of consumers is regulated in the Energy Law. Detailed conditions for the operation of heating systems are defined.²⁶⁸ Art. 7 and 7a of the Energy Law regulates the general rules for connecting to energy networks, including district heating networks. Energy enterprises have an obligation to conclude grid connection agreement with entities requesting connection to the grid, on terms of equal treatment, if it is technically and economically feasible. Consumers must fulfill technical and maintenance conditions to get connected.
Support framework for renewable heat	<ul style="list-style-type: none"> Loan (National Fund for Environmental Protection and Water Management - Stork): The National Fund for Environmental Protection and Water Management grants low interests loans to support the purchase and installation of RES installations (7.1 Priority Programme RES Stork). The duration of the scheme is 2015-2023, with loans granted until 2020 (4 Priority Programme RES Stork). All RES are eligible. Maximum loan is PLN 40 million (€ 9.31 m), not more than 85% of eligible costs.
Support framework for CHP	<ul style="list-style-type: none"> Support system for electricity from CHP with a premium; there is an auction system for the premium. Subsidy (Thermal rehabilitation grants): The thermal rehabilitation grant scheme supports building renovations, which increase energy efficiency or the use of renewable energy sources for heating purposes. Lenders may receive grants to pay off part of the loan taken out to implement such measures. Eligible measures shall reduce a building's annual energy demand, annual energy losses or annual costs of heat production or replace existing heat generation plants with renewable or high-efficiency CHP plants (Art. 3 Act on Thermal Rehabilitation). Red Certificate System: These acts guarantee the origins of electricity produced by high efficiency cogeneration. Since 1 July 2007, these acts have obliged companies which supply electricity to end users to obtain certificates of origin of electricity produced by high efficiency cogeneration.

²⁶⁴ https://www.ista.lt/files/seminarai/080911_Budapestas/Poland.pdf

²⁶⁵ Source: Own survey with national DHC stakeholders

²⁶⁶ <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf>

²⁶⁷ <http://www.res-legal.eu/search-by-country/poland/tools-list/c/poland/s/res-hc/t/gridaccess/sum/176/lpid/175/>

²⁶⁸ Source: Own survey with national DHC stakeholders

Regulatory framework, authorities and supervision, statistical reporting	
Support framework for grid infrastructure	<ul style="list-style-type: none"> The National Fund for Environmental Protection and Water Management provides subsidies and low-interest loans for DH companies, municipal government and other companies.²⁶⁹
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> White Certificates: The Polish government introduced an energy efficiency obligation which targets energy savings of 2 645 Mtoe between 2016 and 2020. The obligation covers all sectors except transport. Electricity, gas and district heating are the fuel targets. Obligated parties include electricity, natural gas and district heating companies selling to final consumers, members of a commodities exchange and commodity brokerage houses. Loan (National Fund for Environmental Protection and Water Management – “Efficient Heating and Cooling”): Part 3 of the priority programme earmarks funds for loans to support projects increasing the efficiency of heating and cooling systems in existing enterprises, including construction or modernisation of generating units as well as connection to the heat distribution or transmission network. The duration of the scheme is 2016-2023, whereas new support will be granted to 2022. Clean Air program: It is a comprehensive program aimed at reducing or avoiding the emitting of dust and other pollutants into the atmosphere, by single-family houses. The program focuses on the replacement of old solid fuel stoves and boilers, as well as thermo-modernization of single-family houses to effectively manage energy consumption. Connecting residents of multi-family buildings to a collective hot water installation also plays an important role. These measures have been implemented in Cracow, Wroclaw and other towns.
Statutory provisions	<ul style="list-style-type: none"> Energy Law Environmental Protection Act Act on Thermal Rehabilitation Renewable Energy Sources Act Priority Programme RES “Stork” (Priority program. Distributed, renewable energy) “Prosumer” (SYSTEM, cz. 3) - Financing for purchase and installation of micro-installations of renewable energy sources) – application period closed Priority Programme Priority Programme „Efficient heating and cooling systems” (Support for low-emission and resource-efficient economy, Part 3: Efficient heating and cooling systems) Order of 18/05/2017 (Order of the Polish Minister of Energy on specific scope of the obligation and technical conditions of purchase of heat from renewable energy sources and on conditions of connecting installations to the grid)
Relevant authorities and supervision	<ul style="list-style-type: none"> The Energy Regulatory Office (ERO) (Urząd Regulacji Energetyki) is an independent regulatory authority and in charge of coordinating the energy sector. It is responsible for licensing enterprises in the gas, electricity, district heating and liquid fuels sectors, tariff approval, establishing quality of service standards, consumer rights protection, promoting competition, issuing and redeeming certificates of origin for electricity generated from RES and CHP and energy efficiency. The Office for Competition and Consumer Protection (Urząd Ochrony Konkurencji i Konsumentów, UOKiK)
Statistical reporting methods and sources	<ul style="list-style-type: none"> Statistics Poland is a central institution of the state administration in Poland. The authority is responsible for collecting statistical data on both public and private life. They collect and publish statistics on district heating, e.g. capacity of DH. Information on the methods can be found on the website.²⁷⁰
Sources	<ul style="list-style-type: none"> Euroheat and Power, Country by Country 2019 Report,

²⁶⁹ Source: Own survey with national DHC stakeholders

²⁷⁰ <https://stat.gov.pl/en/metainformations/>

Regulatory framework, authorities and supervision, statistical reporting

- RES legal, <http://www.res-legal.eu/>
- JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/ki_na28630enn%281%29.pdf
- DH Poland, <https://dbdh.dk/wp-content/uploads/2019/01/District-heating-in-Poland-2019.docx.pdf>
- District heating in Poland, https://www.lsta.lt/files/seminarai/080911_Budapestas/Poland.pdf
- Energy Regulatory Office, <https://www.ure.gov.pl/en>
- UOKiK, <https://www.uokik.gov.pl/home.php>
- Statistics Poland, <https://stat.gov.pl/en/>

Table 99: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> • The Energy Regulatory Office is responsible for licensing enterprises in the gas, electricity, district heating and liquid fuels sectors, tariff approval, establishing quality of service standards, consumer rights protection, promoting competition, issuing and redeeming certificates of origin for electricity generated from RES and CHP and energy efficiency.²⁷¹
Available information on consumer perception and satisfaction	<ul style="list-style-type: none"> • According to ClimateXChange (2018), one stakeholder reported that consumers are generally satisfied with prices and service quality. In addition, innovative network controls are helping to manage supply so that interruptions are rare.²⁷²

²⁷¹ <https://www.ure.gov.pl/en/>²⁷² <https://www.climateexchange.org.uk/media/3569/lessons-from-european-district-heating-regulation.pdf>, p.

Portugal

Table 100: Size of the cities served by DHC and geographical concentration

	DH	DC
Geographical concentration of the DHC systems	<ul style="list-style-type: none"> o There are only 2 DHC systems. One is located in the district of <i>Parque das Nações</i> in Lisbon and represent 95% of the sales. The other is in the city of Oeiras, close to Lisbon. 	
Sources	<ul style="list-style-type: none"> o Euroheat & power, Country by Country 2019 	

Table 101: Ownership of the DHC networks

	DH	DC						
Ownership repartition in terms of energy sales (2019)	<p>The biggest system in <i>Parque das Nações</i> is owned by a PPP organisation and the smaller one in the city of Oeiras is owned by a private company.</p> <p style="text-align: center;">Ownership DHC repartition in terms of energy sales</p> <table border="1"> <caption>Ownership DHC repartition in terms of energy sales</caption> <thead> <tr> <th>Owner Type</th> <th>Share (%)</th> </tr> </thead> <tbody> <tr> <td>PPP</td> <td>95%</td> </tr> <tr> <td>Private</td> <td>5%</td> </tr> </tbody> </table>	Owner Type	Share (%)	PPP	95%	Private	5%	
Owner Type	Share (%)							
PPP	95%							
Private	5%							
Sources	<ul style="list-style-type: none"> o Euroheat & power, Country by Country 2019 o Engie communication 							

Table 102: Main suppliers and level of competition

	DH	DC						
Main suppliers and market share in terms of energy sales (2019)	<p style="text-align: center;">Main DHC suppliers and market share in terms of energy sales</p> <table border="1"> <caption>Main DHC suppliers and market share in terms of energy sales</caption> <thead> <tr> <th>Supplier</th> <th>Market Share (%)</th> </tr> </thead> <tbody> <tr> <td>Climaespaço (ENGIE Group)</td> <td>95%</td> </tr> <tr> <td>Private science park (Taguspark)</td> <td>5%</td> </tr> </tbody> </table>	Supplier	Market Share (%)	Climaespaço (ENGIE Group)	95%	Private science park (Taguspark)	5%	
Supplier	Market Share (%)							
Climaespaço (ENGIE Group)	95%							
Private science park (Taguspark)	5%							
Sources	<ul style="list-style-type: none"> o Euroheat & power, Country by Country 2019 o Engie communication 							

Table 103: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> There is no legislation regarding ownership, according to the available information. <p>There is no legislative framework for DH.²⁷³</p>
Regulation of prices for consumers	<ul style="list-style-type: none"> There is no specific regulation on prices for consumers and no heat cost allocation rules are defined in Portugal.²⁷⁴
Regulation of metering	<ul style="list-style-type: none"> There is no specific regulation regarding metering.²⁷⁵
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> There is no specific regulation regarding the access of third parties.²⁷⁶
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> There is no specific regulation regarding the access of consumers.²⁷⁷
Support framework for renewable heat	<ul style="list-style-type: none"> There is no direct support scheme for RES in the heating sector currently in place.
Support framework for CHP	<ul style="list-style-type: none"> Feed-in tariff: Electricity from biomass, generated in CHP plant, can get a feed-in tariff. The feed-in tariff consisted of two elements: a guaranteed payment rate and an amount calculated by a statutorily set formula. For new small production installations, a remuneration regime came into force in 2015. This remuneration regime is based on a bidding model in which producers offer discounts to a reference tariff.
Support framework for grid infrastructure	<ul style="list-style-type: none"> There is no direct support scheme for grid infrastructure currently in place.
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> R&D policies: There are incentives for research and projects on innovation and technological development in the field of renewable energy. RES-H building obligations: There is the obligation to use solar thermal collectors for heating water in new buildings and buildings undergoing major interventions. Other forms of RES can be used as an alternative to solar thermal collectors, as well as for other purposes if they are more efficient or convenient. Training programs for installers: Many institutions offer professional training for installers of solar thermal installations. Additionally, within the scope of the National Qualification System, there is the professional course of technician for renewable energy which focus on the installation of solar thermal and photovoltaic installations as well as wind energy and bioenergy plants. Certification of RES installations: Where solar thermal installations are used, the performance and durability of the installation and its components must be certified by an accredited entity.
Statutory provisions	<ul style="list-style-type: none"> DL 118/2013 (Decreto-Lei n.º 118/2013 de 20 de Agosto – Decree-Law No. 118/2013 of 20 August), which transposes Directive 2010/31/EU into

²⁷³ Euroheat & Power, Country by Country Report 2019

²⁷⁴ Source: Own survey with national DHC stakeholders and

<https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf>

²⁷⁵ Source: Own survey with national DHC stakeholders

²⁷⁶ Source: Own survey with national DHC stakeholders

²⁷⁷ Source: Own survey with national DHC stakeholders

Regulatory framework, authorities and supervision, statistical reporting	
	<ul style="list-style-type: none"> • a national law. • Ordinance 32276-A/2008 (Despacho n.º 32276-A/2008 de 17 de Dezembro - Ordinance No. 32276-A/2008 of 17 December) on the Fund to Support Innovation (FAI). • Ordinance 394/2004 (Portaria n.º 394/2004 de 19 de Abril - Ordinance No. 394/2004 of 19 April) on the rules for the implementation of the MAPE (Measure to Support the Harnessing of Energy Potential and Rationalisation of Consumption). • Ordinance 944/2005 (Portaria n.º 944/2005 de 28 de Setembro - Ordinance No. 944/2005 of 28 September) on the professional course of technician of renewable energy. • Ordinance 13415/2010 (Despacho n.º 13415/2010 de 19 de Agosto - Ordinance No. 13415/2010 of 19 August) on energy efficiency programmes under the Fund to Support Innovation (FAI). • Ordinance 5727/2013 (Despacho n.º 5727/2013 de 2 de maio - Ordinance No. 5727/2013 of 2 May), which suspends the evaluation of renewable projects to be applied for the Fund to Support Innovation (FAI). • Ordinance 3156/2016 (Despacho n.º 3156/2016 de 1 de marco - Ordinance No. 3156/2016 of 1 March) on the replacement of the programme that calculates the amount of energy produced by solar thermal systems and solar photovoltaic panels, under the Energy Certification System for Buildings (SCE), as amended by Ordinance No. 10346/2018. • DL 78/2016 (Decreto-Lei n.º 78/2006), which approves the Energy Certification and Indoor Air Quality National System.
Relevant authorities and supervision	<ul style="list-style-type: none"> • Autoridade da Concorrência (AdC): The Competition Authority's mission is to ensure compliance with the competition rules in Portugal. The Authority follows the most recent principles on creating European anti-trust regulatory institutions and has substantial independence with regard to the government and other state bodies.
Statistical reporting methods and sources	<ul style="list-style-type: none"> • Instituto Nacional de Estatística (INE) is the Portuguese statistical institute. Information on their methods are on their website²⁷⁸ • PORDATA embodies one of the priorities of the Foundation: the collection, compilation, systematization and dissemination of data on multiple areas of society, for Portugal and its municipalities, and for the European countries. But they do not report on DHC.
Sources	<ul style="list-style-type: none"> • Euroheat and power, Country by Country 2019 Report, https://www.euroheat.org/publications/country-by-country/ • RES legal, http://www.res-legal.eu/ • JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/ki_na28630enn%281%29.pdf • Pordata, https://www.pordata.pt/en/Home • AdC, http://www.concorrencia.pt/vEN/Pages/Homepage-AdC-vEN.aspx • INE, https://www.ine.pt/xportal/xmain?xpid=ine_main&xpid=INE • COGEN Portugal, https://www.cogenportugal.com • DGEG, http://www.dgeg.gov.pt/ • Portugal Energia, https://www.portugalenergia.pt/

Table 104: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for	<ul style="list-style-type: none"> • The Secretary of State for Trade, Services and Consumer Protection, within the Ministry of the Economy, Innovation and Development, is

²⁷⁸ https://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_sobre_o_ine&xlang=en

consumer protection	<p>responsible for consumer policy, consumer protection and consumer affairs.²⁷⁹</p> <ul style="list-style-type: none">• The Consumer Directorate-General contributes to the drafting, the definition and implementation of consumer policy in Portugal, aiming to ensure a high level of protection.²⁸⁰• There is no DHC-specific association or authority.
Available information on consumer perception and satisfaction	<ul style="list-style-type: none">• No study on the perception or satisfaction of DHC consumers could be found.

²⁷⁹ https://ec.europa.eu/info/sites/info/files/national-consumer-organisations_pt_listing.pdf and <http://www.min-economia.pt/>

²⁸⁰ <https://www.consumidor.gov.pt/>

Romania

There is no district cooling in Romania.

Table 105: Size of the cities served by DHC and geographical concentration

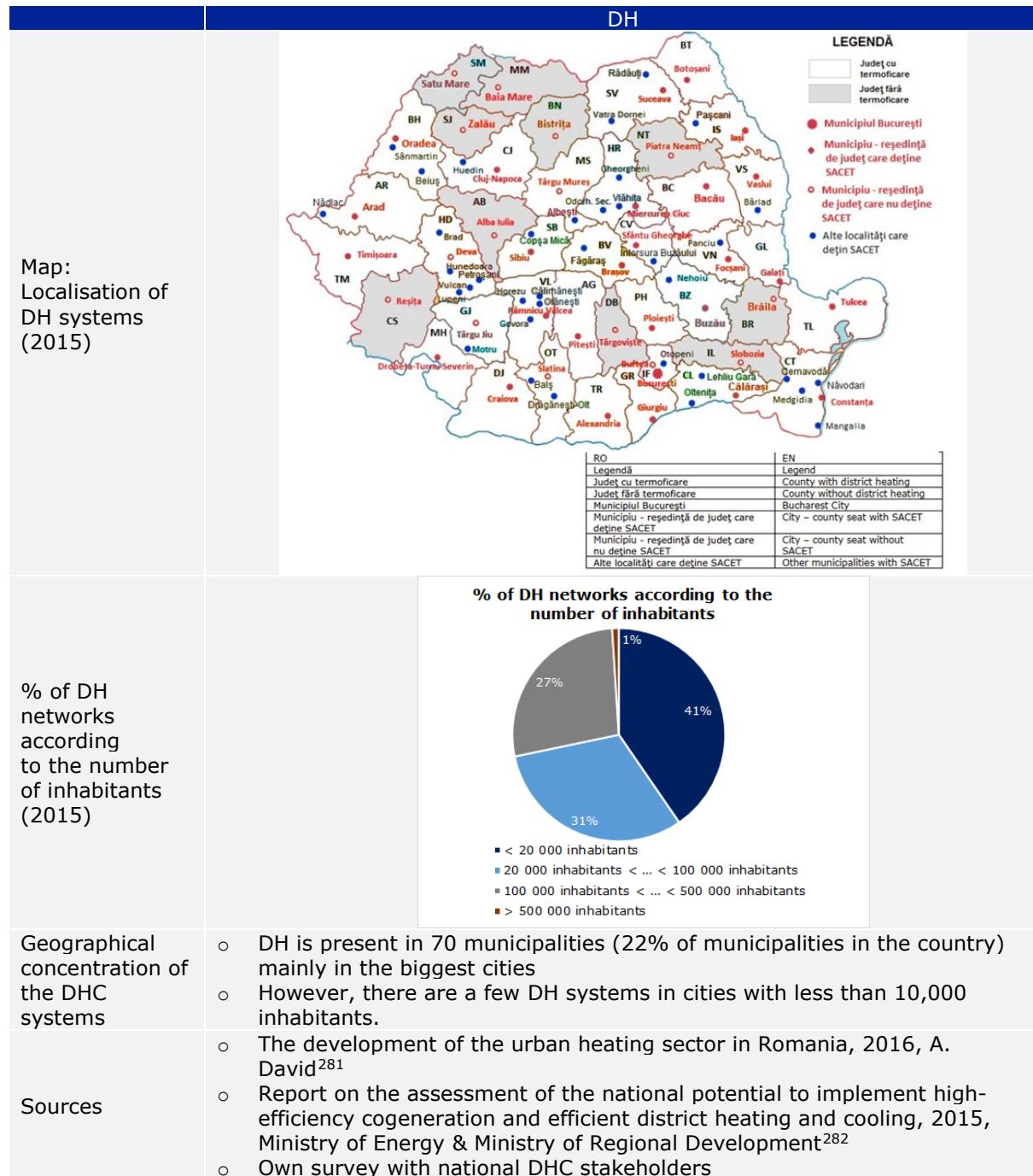


Table 106: Ownership of the DH networks

DH	
Ownership repartition in	○ DH networks are in public ownership

²⁸¹ https://projekter.aau.dk/projekter/files/239538001/Master_thesis_final.pdf

²⁸² https://ec.europa.eu/energy/sites/ener/files/documents/Art%202014%20Report%20EN_Romania.pdf

District Heating and Cooling in the European Union

Overview of Markets and Regulatory Frameworks under the Revised Renewable Energy Directive

terms of energy sales	
Sources	<ul style="list-style-type: none"> ○ The development of the urban heating sector in Romania, 2016, A. David

Table 107: Main suppliers and level of competition

Main suppliers and market share in terms of energy sales and consumers (2015)	DH																																							
	Main DH suppliers																																							
	<table border="1" style="margin-top: 10px; width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Supplier</th> <th style="text-align: right;">Market share in terms of energy sales (%)</th> <th style="text-align: right;">Market share in terms of consumers (%)</th> </tr> </thead> <tbody> <tr> <td>Other smaller suppliers</td> <td style="text-align: right;">11%</td> <td style="text-align: right;">14%</td> </tr> <tr> <td>Termo Calor Confort</td> <td style="text-align: right;">2%</td> <td style="text-align: right;">2%</td> </tr> <tr> <td>Drobeta Turnu Severin...</td> <td style="text-align: right;">2%</td> <td style="text-align: right;">3%</td> </tr> <tr> <td>C.E.T. Hidrocarburii</td> <td style="text-align: right;">3%</td> <td style="text-align: right;">3%</td> </tr> <tr> <td>C.E.T. Govora</td> <td style="text-align: right;">3%</td> <td style="text-align: right;">3%</td> </tr> <tr> <td>Calorgal</td> <td style="text-align: right;">3%</td> <td style="text-align: right;">3%</td> </tr> <tr> <td>Thermo Craiova</td> <td style="text-align: right;">4%</td> <td style="text-align: right;">4%</td> </tr> <tr> <td>U.A.T.A.A.</td> <td style="text-align: right;">4%</td> <td style="text-align: right;">1%</td> </tr> <tr> <td>Colterm</td> <td style="text-align: right;">5%</td> <td style="text-align: right;">7%</td> </tr> <tr> <td>Veolia Energie</td> <td style="text-align: right;">7%</td> <td style="text-align: right;">9%</td> </tr> <tr> <td>THERMOCARE</td> <td style="text-align: right;">8%</td> <td style="text-align: right;">10%</td> </tr> <tr> <td>R.A.D.E.T.</td> <td style="text-align: right;">44%</td> <td style="text-align: right;">48%</td> </tr> </tbody> </table>	Supplier	Market share in terms of energy sales (%)	Market share in terms of consumers (%)	Other smaller suppliers	11%	14%	Termo Calor Confort	2%	2%	Drobeta Turnu Severin...	2%	3%	C.E.T. Hidrocarburii	3%	3%	C.E.T. Govora	3%	3%	Calorgal	3%	3%	Thermo Craiova	4%	4%	U.A.T.A.A.	4%	1%	Colterm	5%	7%	Veolia Energie	7%	9%	THERMOCARE	8%	10%	R.A.D.E.T.	44%	48%
Supplier	Market share in terms of energy sales (%)	Market share in terms of consumers (%)																																						
Other smaller suppliers	11%	14%																																						
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Calorgal	3%	3%																																						
Thermo Craiova	4%	4%																																						
U.A.T.A.A.	4%	1%																																						
Colterm	5%	7%																																						
Veolia Energie	7%	9%																																						
THERMOCARE	8%	10%																																						
R.A.D.E.T.	44%	48%																																						
Market description	<ul style="list-style-type: none"> ○ There are around 50 suppliers. The main supplier, R.A.D.E.T., is a State-owned company operating the DH network of Bucharest. 																																							
Sources	<ul style="list-style-type: none"> ○ Report on the assessment of the national potential to implement high-efficiency cogeneration and efficient district heating and cooling, 2015, Ministry of Energy & Ministry of Regional Development 																																							

Table 108: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> • District heating systems are mainly operated by public entities. Veolia is the biggest private operator which is present in Ploiesti, Otopeni and Iasi. The municipalities gave the local DHC networks in concession to operators, which administrate the entire system.²⁸³ • Law 325/2006 on the public heat supply service is a specific law for DH.
Regulation of prices for consumers	<ul style="list-style-type: none"> • Prices are regulated; there is ex-ante price control in place.²⁸⁴
Regulation of metering	<ul style="list-style-type: none"> • According to the Energy efficiency Law no.121/2014, in Romania it is mandatory to install meters for heating/cooling and domestic hot water in each individual flat in multi-unit buildings supplied by centralized heating systems. • The cost allocation rules for space heating and hot domestic water are defined in a technical norm (Ordinance 343/2010). In Romania at present there are several problems with the current cost allocation framework: e.g. only a small fraction of flats is equipped with heat cost allocators/heat meters; thousands of families close all the radiators in

²⁸³ Euroheat & Power, Country by Country Report 2019

²⁸⁴ Source: Own survey with national DHC stakeholders.

Regulatory framework, authorities and supervision, statistical reporting	
Regulation regarding grid access and usage (supply perspective)	<p>order to reduce the bill and/or use "alternative illegal heating systems"; presence of mould and dampness in rooms etc.²⁸⁵</p> <ul style="list-style-type: none"> Grid access is regulated.²⁸⁶
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> Grid access is regulated.²⁸⁷
Support framework for renewable heat	<ul style="list-style-type: none"> There is no specific support program for RES in DHC.
Support framework for CHP	<ul style="list-style-type: none"> There is no specific support program for CHP.
Support framework for grid infrastructure	<ul style="list-style-type: none"> There is no specific support program for DHC grid infrastructure.
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> RES-H technologies may be supported by subsidies from the National Rural Development Programme for own consumption. There are a number of specific training programmes for RES installers.
Statutory provisions	<ul style="list-style-type: none"> Law no.51/2006 on public services, addressing public services of lighting, waste, heat and water; Law no.325/2006 on the heating sector is the specific law for district heating; Law no.123/2012 on electricity and gas (also addressing cogeneration); Law no.121/2014 on energy efficiency (transposing Directive 2012/27/CE); Law no.225/2016 modifying Law no.51/2006 on public services, addressing public services of lighting, waste, heat and water; Law on the Environmental Fund (Ordonanta de urgență nr. 196/2005 privind Fondul pentru mediu - Emergency Ordinance No. 196/2005 on the Environmental Fund) GD (Government Decision) no.1215/2009 on cogeneration support scheme (bonus), modified by GD no.925/2016. Government Decision no. 216/2017 (Government Decision no. 216/2017 approving a state aid scheme for investments promoting energy production from less exploited renewable energy resources, namely biomass, biogas and geothermal energy) Regulation from 05/06/2012 (Regulation on the implementation of the program "Termoficare 2006-2015 warmth and comfort", regarding the component for rehabilitation of the district heating infrastructure)
Relevant authorities and supervision	<ul style="list-style-type: none"> The Autoritatea Națională de Reglementare (ANRE) is an autonomous administrative body under Parliamentary control, entirely self-financed and independent as regards its decision-making process, organisation and functioning, whose scope of activity is to issue, approve and monitor the implementation of the national-wide binding regulatory framework required for the proper functioning of the electricity, heat and natural gas sectors and markets in terms of efficiency, competition, transparency and consumer protection. The Competition Council is an autonomous administrative body aimed at

²⁸⁵ <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf>

²⁸⁶ Source: Own survey with national DHC stakeholders

²⁸⁷ Source: Own survey with national DHC stakeholders

Regulatory framework, authorities and supervision, statistical reporting	
	<p>protecting and stimulating competition in order to ensure a normal competitive environment, with a view towards the consumers' interests. Competition Council's role has two major dimensions: a corrective dimension – restoring and maintaining a normal competitive environment and a preventive dimension – monitoring markets and observing the behaviour of the actors participating in such markets.</p> <ul style="list-style-type: none"> • ARPEE is the first professional association signatory of European Code of Conduct for Energy Performance Contracting (July 2014), supports its use when implementing EPC projects.
Statistical reporting methods and sources	<ul style="list-style-type: none"> • The Institutul Național de Statistică (National Institute of Statistics, NIS), as the main producer of official statistical data, is responsible for the coordination of all activities at national level regarding the development, development and dissemination of European statistics. Information on their methods can be found on their website.²⁸⁸
Sources	<ul style="list-style-type: none"> • Euroheat and Power, Country by Country 2019 Report, https://www.euroheat.org/publications/country-by-country/ • RES legal, http://www.res-legal.eu/ • JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf • IEA policy database, https://www.iea.org/policies • ANRE, https://www.anre.ro/en/ • Competition Council, http://www.consiliulconcurrentei.ro/en/about-us.html • NIS, https://inss.ro/cms/en • ARPEE, http://arpee.org.ro/en/

Table 109: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> • The National Authority for Consumer Protection coordinates and realizes the strategy and policy of the Romanian Government with regard to the enforcement of consumer protection in the country.²⁸⁹ • The Association for Consumers Protection from Romania is a non-governmental, apolitical and non-profit organization, which develops actions for consumers' education and information, and ensure the representation of consumers' interests.²⁹⁰ • The Romanian Energy Regulatory Authority (ANRE) is an autonomous administrative body under Parliamentary control, whose scope of activity is to issue, approve and monitor the implementation of the national-wide binding regulatory framework required for the proper functioning of the electricity, heat and natural gas sectors and markets in terms of efficiency, competition, transparency and consumer protection.²⁹¹
Available information on consumer perception and satisfaction	<p>Between 2013 and 2014 focus group discussions were held to examine households' experiences with and attitudes to energy tariff reforms:</p> <ul style="list-style-type: none"> • District heating users describe disconnecting from the network and switching to lower-cost heating sources as a way to save and to have more control over energy consumption. However, this option entails an up-front cost that is often too high for the poorest people. And they even find their heating costs increasing as better-off neighbours disconnect from the district heating network. • Payment delays are more common among district heating users during

²⁸⁸ <https://inss.ro/cms/en/content/quality-national-statistical-system>²⁸⁹ https://ec.europa.eu/info/sites/info/files/national-consumer-organisations_ro_listing.pdf and <https://anpc.ro/>²⁹⁰ https://ec.europa.eu/info/sites/info/files/national-consumer-organisations_ro_listing.pdf²⁹¹ <https://www.anre.ro/download.php?f=hq2Dgw%3D%3D&t=vdeyut7dlcecrLbbvbY%3D>, p.1

- heating season.
- Complaints include: (i) heat losses in the network that raise the cost relative to the quantity of heat consumed; (ii) not enough heating in colder fall and spring months, which requires some households to use additional electrical heating appliances; and (iii) the fact that hot water temperature is low when it is first turned on and that the water needs to be run for a long time for the temperature to be right, which forces customers to pay for larger quantities of hot water.²⁹²

²⁹² <https://openknowledge.worldbank.org/handle/10986/22083>, p.102-107

Slovakia

There is no DC system.

Table 110: Size of the cities served by DHC and geographical concentration

	DH
Geographical concentration of the DH systems	<ul style="list-style-type: none"> ○ DH supplies 1.8 million citizens (one-third of the population) in 335 municipalities
Sources	<ul style="list-style-type: none"> ○ Euroheat & power, Country by Country 2019

Table 111: Ownership of the DHC networks

	DH
Ownership description	<ul style="list-style-type: none"> ○ The state owns and operates large DH plants in six cities (Bratislava, Košice, Žilina, Trnava, Zvolen and Martin). ○ Except for these networks, DH networks belong to important private players.
Sources	<ul style="list-style-type: none"> ○ ANTIMONOPOLY OFFICE OF THE SLOVAK REPUBLIC, functioning of heat energy sector in Slovakia focusing on DH systems from the AMO point of view²⁹³

Table 112: Main suppliers and level of competition

	DH																						
Main heat suppliers and market share in terms of energy sales (2018)	<p style="text-align: center;">Major heat suppliers - market share in terms of GWh</p>  <table border="1" style="margin-top: 10px; width: 100%;"> <thead> <tr> <th>Supplier</th> <th>Market Share (GWh)</th> </tr> </thead> <tbody> <tr><td>Zvalenska teplarenska</td><td>~120</td></tr> <tr><td>Nitrianska teplarenska spoločnosť</td><td>~150</td></tr> <tr><td>STEFFE Banska Bystrica</td><td>~180</td></tr> <tr><td>SPRAVBYKOMFORT Presov</td><td>~200</td></tr> <tr><td>Martinska teplarenska</td><td>~250</td></tr> <tr><td>Trnavska teplarenska</td><td>~230</td></tr> <tr><td>Veolia Energia Slavenska</td><td>~400</td></tr> <tr><td>Zilinska teplarenska</td><td>~450</td></tr> <tr><td>Teplaren Kosice</td><td>~780</td></tr> <tr><td>Bratislava teplarenska</td><td>~820</td></tr> </tbody> </table>	Supplier	Market Share (GWh)	Zvalenska teplarenska	~120	Nitrianska teplarenska spoločnosť	~150	STEFFE Banska Bystrica	~180	SPRAVBYKOMFORT Presov	~200	Martinska teplarenska	~250	Trnavska teplarenska	~230	Veolia Energia Slavenska	~400	Zilinska teplarenska	~450	Teplaren Kosice	~780	Bratislava teplarenska	~820
Supplier	Market Share (GWh)																						
Zvalenska teplarenska	~120																						
Nitrianska teplarenska spoločnosť	~150																						
STEFFE Banska Bystrica	~180																						
SPRAVBYKOMFORT Presov	~200																						
Martinska teplarenska	~250																						
Trnavska teplarenska	~230																						
Veolia Energia Slavenska	~400																						
Zilinska teplarenska	~450																						
Teplaren Kosice	~780																						
Bratislava teplarenska	~820																						
Market description	<ul style="list-style-type: none"> ○ In 2018, 347 heat suppliers were active in heat generation, distribution and supply in Slovakia. ○ 87% of the suppliers were heat producers as well as distributors, and 13% of the suppliers provided only heat distribution, purchasing heat from other producers. ○ Most of these suppliers are small DH companies that operate in a single municipality, but some large national and international companies are also present in the market. 																						
Sources	<ul style="list-style-type: none"> ○ ANTIMONOPOLY OFFICE OF THE SLOVAK REPUBLIC, functioning of heat energy sector in Slovakia focusing on DH systems from the AMO point of view ○ VÝROČNÁ SPRÁVA ANNUAL REPORT 2018 																						

²⁹³ <https://www.antimon.gov.sk/data/att/1556.pdf>

Table 113: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> Heat installation systems (installations for heat production, distribution and consumption) that were originally owned by the state became in 1991 the ownership of municipalities and cities free of charge. Since that time, cities have operated them by means of own trading companies or they have rented or sold them to private trading companies.²⁹⁴ Heat generation and distribution for the purpose of sale is subject to a license. These requirements are stipulated by Slovak Act 657/24 Coll. on the heating sector. In order to receive a license, the requestor must demonstrate an ownership or operatorship relationship.²⁹⁵
Regulation of prices for consumers	<ul style="list-style-type: none"> The price regulation of thermal energy is governed by a decree issued by the Regulatory Office. The prices are regulated by the application of a method of calculating the maximum heat price, which is based on the calculation of economically eligible costs and a fair profit as defined in the relevant Decree. The Regulatory Office sets up the price caps for fuels (natural gas, biomass, coal) that the district heating supplier is eligible to include in the heat price. The heat produced from RES is not subject to any subvention.²⁹⁶
Regulation of metering	<ul style="list-style-type: none"> Heat consumption must be metered. This obligation is specified in Act 657/24 Coll. on the heating sector.²⁹⁷ The heat allocation rules in Slovakia are defined in the Heat Energy Act and its related secondary regulation. According to the rules described in the Regulation of the Ministry of Economy of the Slovak Republic No. 240/2016, the total heating cost is divided in two components: Heating basic component is allocated over the floor area of apartments and non-apartment space; typically it is set to 60% of total heat, but agreement to other ratio is also possible; Variable component is allocated according to the amount of heat supplied to each apartment and measured by heat meters or estimated by heat cost allocators; typically it is set to 40%, but agreement to other ratio is allowed. The same general cost allocation scheme is applied to the domestic hot water preparation, with a basic component set to 20% and a variable component to 80%.²⁹⁸ Smart meters are not mandatory and are used more than in pilot projects (about 5 % of heat volume).²⁹⁹
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> The No 657/2004 on thermal engineering sets up conditions for mandatory off-take of heat (third party access).³⁰⁰
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> According to the Act 657/4, consumers above 3 MWh must be connected to effective district heating system if they meet technical requirements and the installed capacity is sufficient.³⁰¹
Support framework for renewable heat	<ul style="list-style-type: none"> Subsidies: RES-H plant operators may receive subsidies for the support of renewable heat from the Operational Programme Quality of Environment funded by the ERDF. Eligible technologies are biomass, biogas, aerothermal, hydrothermal, solar thermal or geothermal plants (2.4.2.2 OP KŽP). Mandatory quantity of RES in DH systems.³⁰²

²⁹⁴ Euroheat & Power, Country by Country Report 2019

²⁹⁵ Source: Own survey with national DHC stakeholders/interview

²⁹⁶ <https://www.antimon.gov.sk/data/att/1556.pdf>

²⁹⁷ Source: Own survey with national DHC stakeholders/interview

²⁹⁸ <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf>

²⁹⁹ Source: Own survey with national DHC stakeholders/interview

³⁰⁰ Euroheat & Power, Country by Country Report 2019

³⁰¹ Source: Own survey with national DHC stakeholders/interview

Regulatory framework, authorities and supervision, statistical reporting	
Support framework for CHP	<ul style="list-style-type: none"> The producer of the electricity from RES or highly efficient cogeneration is eligible for: Purchase of electricity for the electricity price for losses by the operator of the regional distribution network; Supplementary payment, i.e. the difference between the determined fixed price (feed-in-tariff rate) and the electricity price for losses. This is applicable to all electricity produced through high-efficiency cogeneration in facilities with a total installed output of up to 5 MW and up to 125 MW or 200 MW if the share of useful heat delivered for technological purposes is not more than 40% of the utilised heat.
Support framework for grid infrastructure	<ul style="list-style-type: none"> The Slovak Innovation and Energy Agency (SIEA) provides grants for DH grid operators.³⁰³
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> Training programmes for Installers: The certification of RES installers applies to installers of boilers and furnaces for biomass, PV and solar thermal installations, shallow geothermal plants and heat pumps. The certificate can be acquired through the recognition of professional experience and the successful completion of an exam. RES-H building obligations (Energy Performance of Buildings): The Act No. 555/2005 Coll. on Energy Performance of Buildings is the main instrument to reduce GHG emissions from buildings. It provided a regulation on Energy Performance Certificates (EPC) for buildings.
Statutory provisions	<ul style="list-style-type: none"> Act 251/2012 Coll. on Energy as amended, adopted on 31 July 2012 Act No. 309/2009 Coll. (Act the Support of Renewable Energy Sources) Act No. 555/2005 Coll. (Act on Energy Performance of Buildings) Act no. 657/2004 Coll. (Heat Energy Act) Decree No. 133/2012 Coll. (Decree Regulating the Training and Certification of Installers) Decree No. 311/2009 Coll. (Decree Calculation of the Energy Performance of Buildings and the Content of Energy Certificate) Operational Programme Quality of Environment for the period 2014-2020 Regulation of the Ministry of Economy of the Slovak Republic No. 240/2016 Coll.
Relevant authorities and supervision	<ul style="list-style-type: none"> The Regulatory Office for Network Industries, as a state authority in network industries where there is no competition, strikes a balance between the interests of investors and consumers. It protects the interests of consumers, as well as the interests of investors. The Regulatory Office for Network Industries pursues its mission based on Act No. 250/2012 Coll. on Regulation in Network Industries, and in particular, by setting tariffs and terms of their application in network industries, and terms of carrying out the regulated activities. The Antimonopoly Office of the Slovak Republic is an independent central body of state administration of the Slovak Republic for the protection of competition. The Office intervenes in cases of cartels, abuse of a dominant position, vertical agreements; it controls mergers that meet the notification criteria; assesses actions of state and local administration authorities if they restrict competition and ensures the protection of competition in the area of state aid.
Statistical reporting methods and sources	<ul style="list-style-type: none"> The Statistical Office of the Slovak Republic is central body of state administration of the Slovak Republic for the branch of statistics. Information on their methods can be found on their website.³⁰⁴
Sources	<ul style="list-style-type: none"> Euroheat and Power, Country by Country 2019 Report, https://www.euroheat.org/publications/country-by-country/ RES legal, http://www.res-legal.eu/ JRC, Analysis of Member States' rules for allocating heating, cooling and

³⁰² https://ec.europa.eu/energy/sites/ener/files/sk_final_necp_main_en.pdf, p. 96

³⁰³ Source: Own survey with national DHC stakeholders/interview

³⁰⁴ <https://slovak.statistics.sk/wps/portal/ext/metadata/>

Regulatory framework, authorities and supervision, statistical reporting
<p>hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/ki_na28630enn%281%29.pdf</p> <ul style="list-style-type: none"> NECP, https://ec.europa.eu/energy/sites/ener/files/sk_final_netc_main_en.pdf IEA policy database, https://www.iea.org/policies Regulatory Office for Network Industries, http://www.urso.gov.sk/?language=en Antimonopoly Office, https://www.antimon.gov.sk/antimonopoly-office-slovak-republic/ Statistical Office, https://slovak.statistics.sk Functioning of heat energy sector in Slovakia focusing on DH systems from the Antimonopoly Office point of view (2013), https://www.antimon.gov.sk/data/att/1556.pdf

Table 114: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> The Ministry of Economy and Construction of the Slovak Republic represents the central authority of the state administration responsible for consumer protection.³⁰⁵ There are multiple non-governmental consumer organisations like the Association of Slovak Consumers (ZSS), the Association of Slovak Consumer Entities (A3S) or the Association of Consumers in Slovak Republic.³⁰⁶ The Regulatory Office for Network Industries ensures competition with consideration for consumer protection in the fields of electricity, natural gas, water and district heating.³⁰⁷
Available information on consumer perception and satisfaction	<ul style="list-style-type: none"> According to the Antimonopoly office of the Slovak Republic, complainants usually underline inefficiencies in functioning of local DH systems resulting in excessive annual price increase or mistakes in the process of invoicing and accounting within the heat and hot water payments. Completing the process of disconnection can take several months, sometimes even years due to formalities.³⁰⁸

³⁰⁵ https://ec.europa.eu/info/sites/info/files/national-consumer-organisations_sk_listing_en.pdf and <https://www.economy.gov.sk/>

³⁰⁶ https://ec.europa.eu/info/sites/info/files/national-consumer-organisations_sk_listing_en.pdf

³⁰⁷ <http://www.urso.gov.sk/?language=en>

³⁰⁸ <https://www.antimon.gov.sk/data/att/1556.pdf>, p. 19, 21

Slovenia

Table 115: Size of the cities served by DHC and geographical concentration

	DH	DC
Geographical concentration of the DHC systems	<ul style="list-style-type: none"> ○ In 2019, the service of heat distribution was carried out by 100 DH systems, set in 66 out of 212 Slovenian municipalities. ○ DH systems are not only located in big urban areas. 	Only two large DC systems were operating: in the Municipality of Velenje, and in a former industrial complex of the company Iskra Labor in the Municipality of Kranj.
Sources	<ul style="list-style-type: none"> ○ National Energy Report 2019³⁰⁹ ○ Euroheat & power, Country by Country 2019 ○ Own survey with national DHC stakeholders 	

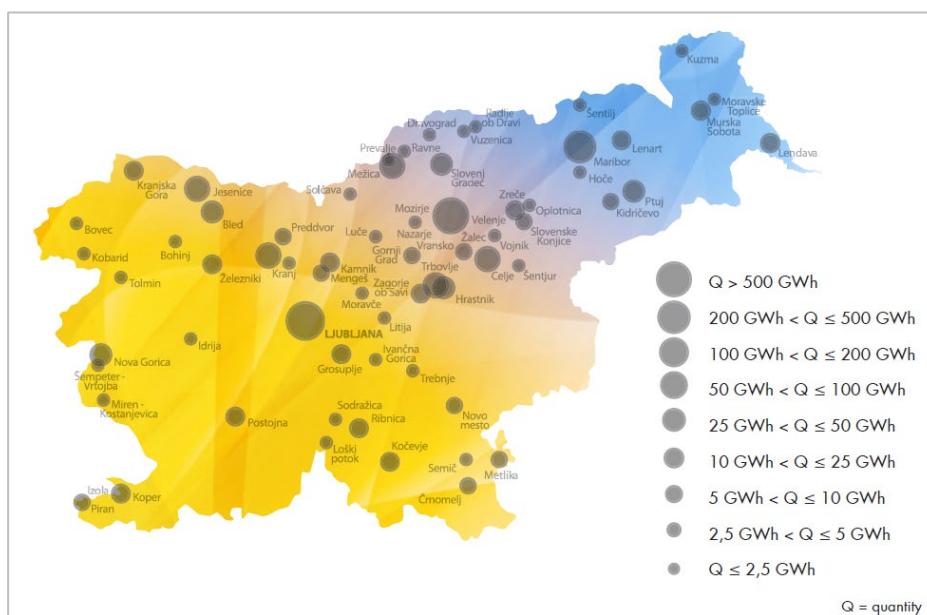


Figure 6: DH systems location in Slovenia and DH sales (National Energy Report 2019)

Table 116: Ownership of the DHC networks

	DH	DC				
Ownership repartition in terms of number of networks (2019)	<p>Out from 100 distribution systems: 62 as a service of general economic interest, 12 commercial distributions, and 26 private distribution systems</p> <div style="text-align: center;"> <p>Ownership repartition in terms of number of networks</p> <table border="1"> <caption>Pie Chart Data: Ownership repartition in terms of number of networks</caption> <tr><td>Public</td><td>26%</td></tr> <tr><td>Private</td><td>74%</td></tr> </table> </div>	Public	26%	Private	74%	<ul style="list-style-type: none"> ○ The DC network in Velenje is in public ownership. ○ The DC system in Kranj is in private ownership
Public	26%					
Private	74%					
Sources	<ul style="list-style-type: none"> ○ National Energy Report 2019 ○ Own survey with national DHC stakeholders 					

³⁰⁹ <https://www.agen-rs.si/documents/54870/68629/Report-on-the-energy-sector-in-Slovenia-for-2019/ce1c3cd8-489a-401d-9a1a-502a7c5715e4>

District Heating and Cooling in the European Union

Overview of Markets and Regulatory Frameworks under the Revised Renewable Energy Directive

Table 117: Main suppliers and level of competition

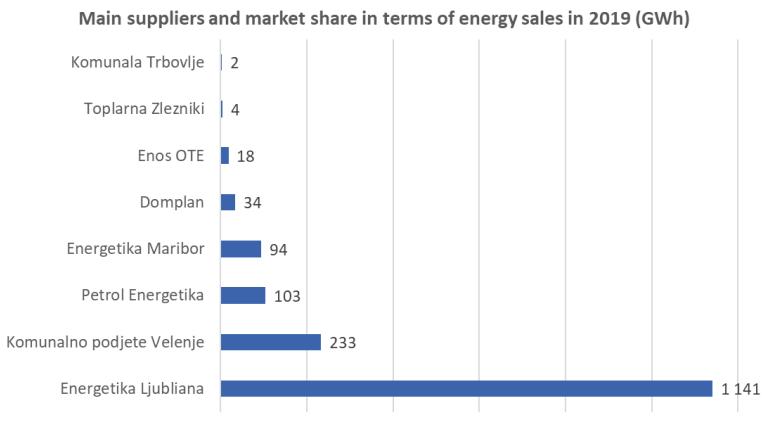
	DH	DC																		
Market share in terms of energy sales (2017)	Main suppliers and market share in terms of energy sales in 2019 (GWh)  <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Supplier</th> <th>Market Share (GWh)</th> </tr> </thead> <tbody> <tr><td>Komunala Trbovlje</td><td>2</td></tr> <tr><td>Toplarna Zlezniki</td><td>4</td></tr> <tr><td>Enos OTE</td><td>18</td></tr> <tr><td>Domplan</td><td>34</td></tr> <tr><td>Energetika Maribor</td><td>94</td></tr> <tr><td>Petrol Energetika</td><td>103</td></tr> <tr><td>Komunalno podjete Velenje</td><td>233</td></tr> <tr><td>Energetika Ljubljana</td><td>1141</td></tr> </tbody> </table>	Supplier	Market Share (GWh)	Komunala Trbovlje	2	Toplarna Zlezniki	4	Enos OTE	18	Domplan	34	Energetika Maribor	94	Petrol Energetika	103	Komunalno podjete Velenje	233	Energetika Ljubljana	1141	The municipal DHC utility Komunala Velenje operates the DC system in Velenje
Supplier	Market Share (GWh)																			
Komunala Trbovlje	2																			
Toplarna Zlezniki	4																			
Enos OTE	18																			
Domplan	34																			
Energetika Maribor	94																			
Petrol Energetika	103																			
Komunalno podjete Velenje	233																			
Energetika Ljubljana	1141																			
Market description	<ul style="list-style-type: none"> ○ 55 DH suppliers ○ The first six largest suppliers supplied more 80% of all energy delivered to final consumers in 2017. 																			
Sources	<ul style="list-style-type: none"> ○ National Energy Report 2019 ○ Own survey with national DHC stakeholders 																			

Table 118: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> • The Energy Law 17/14 (EZ-1) sets out the main legislative framework for DHC. DHC are defined as local optional public services or market commercial activity. It includes the distribution and supply of heating or cooling through distribution networks. • The Energy Act abolished the obligation to obtain an energy permit for all energy facilities including district heating systems, with the exception of power plants with a power exceeding 1 MW.³¹⁰ • Before system operator of the distribution network start their services, the providers have to notify the Energy Agency.
Regulation of prices for consumers	<ul style="list-style-type: none"> • The Energy Agency has a regulatory role for the district heat distribution system. They also regulate the price, which charged for heat production. • The currently valid system of regulation in Slovenia is a methodology of price limitation based on the cost-plus principle (or rate of return regulation). The deviation from this principle can be seen in part in the consideration of regulated return on capital. The regulation was enforced by the Energy Agency for electricity and natural gas distribution. In the case of regulated heat producers and heat distributors, the Agency decided to include only profit for the provision of legal reserves on the basis of the Companies Act. In practice, this is reflected in the fact that companies in the production and distribution of district heating in Slovenia operate with zero profit and consequently, a zero rate of return on assets.³¹¹
Regulation of metering	<ul style="list-style-type: none"> • Heat metering is regulated in the Energy Efficiency Act.³¹² • There are cost allocation rules for space heating and hot water with min. 50% - max. 80% of total costs being distributed based on measured consumption. The remaining 20% - 50% of space heating costs (heating of common areas, etc.) are distributed in proportion to dwelling size,

³¹⁰ https://ec.europa.eu/energy/topics/renewable-energy/progress-reports_en?redir=1

³¹¹ Source: Own survey with national DHC stakeholders, see also: <https://www.uradni-list.si/glasilo-uradni-list-rs/vsebina?urlid=20172&objava=54>

³¹² Source: Own survey with national DHC stakeholders

Regulatory framework, authorities and supervision, statistical reporting	
	<p>whereas the remaining amount for hot water costs split according to the number of unit residents. Correction factors, e.g. to compensate for the disadvantage of the location of the apartment, are calculated for each building by an independent expert. To address the issue of passive heating and therefore excessive additional costs, a minimum (40% of the average heating costs) and maximum (300% of the average heating costs) limit to the share of costs have been introduced.³¹³</p>
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> There is no regulation regarding grid access of third parties.³¹⁴
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> Act on the mandatory content of system operating instructions for the heat distribution system defines the scope of regulation. The purpose the act is to ensure that the system operating instructions are designed to be transparent, objective and non-discriminatory for all users of the distribution system.³¹⁵
Support framework for renewable heat	<ul style="list-style-type: none"> All DH systems must archive a share of heat produced from renewables. Distributors of heat must ensure that heat is provided from at least one of the following sources at an annual level: (i) at least 50 % of heat to be produced from renewable energy sources, (ii) at least 50 % from surplus heat, (iii) at least 75 % of heat from the high-efficiency cogeneration of heat and power or (iv) at least 75 % from a combination of heat sources referred to in the first three indents. Distributors have until 31 December 2020 to comply with this obligation.³¹⁶ Soft Loan of the Eco Fund: The Environmental Fund of the Republic of Slovenia (Eko Sklad) awards low-interest loans to renewable energy projects (§ 7 Statute of the Eco Fund) through tendering (chapter II § 2 Terms and Conditions of the Eco Fund). Currently 3 public calls are open. The Call No. 59OB17 supports investments in RES heating facilities of citizens, the Call No. 56PO16 targets corporations and Call no. 60LS17 targets investments of local communities/municipalities. In general, the public calls are open for all technologies with the exception of biogas. Financial Incentives of the Eco Fund: The Eco Fund (Eko Sklad, Slovenian Ecological Fund) provides funding for investments in RES-H through public calls. New rounds of tenders and public calls are usually open at the beginning of the year and, based on the experiences from the past, they follow the same structure (following mostly the general administrative procedure defined in the ZUP). Currently there are 2 public calls open offering non-refundable financial incentives for RES technologies Call No. 54SUB-OB17 and Call No. 59SUB-SOCOB17. In general, the public calls are open for all technologies with the exception of biogas. Certification scheme: The certification scheme is governed in the Energy Act and is foreseen for all types of power plants – hence also for RES power plants. Producers of energy from RES may request an issue of a declaration, with which they prove that the energy produced comes from an installation using RES. The declaration is issued on request to a power plant operator, which proves that the power plant operates within the prescribed parameters for RES power plant.
Support framework for CHP	<ul style="list-style-type: none"> Feed-in support scheme for the RES and CHP: The level of the CHP support depends on the type of fuel, unit's capacity and number of working hours. Power plant owners have the option of choosing between two types of support: "guaranteed purchase" or "operating premium".

³¹³ <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf>

³¹⁴ Source: Own survey with national DHC stakeholders, see also http://www.pisrs.si/Pis.web/preglejPredpisa?id=AKT_935

³¹⁵ Source: Own survey with national DHC stakeholders, see also http://www.pisrs.si/Pis.web/preglejPredpisa?id=AKT_935

³¹⁶ https://ec.europa.eu/energy/topics/renewable-energy/progress-reports_en?redir=1

Regulatory framework, authorities and supervision, statistical reporting	
	<p>The feed-in system is based on the guarantees of origin. All producers included in the scheme must issue and transfer guarantees of origin as proof of the CHP production.³¹⁷</p>
Support framework for grid infrastructure	<ul style="list-style-type: none"> There is no specific support program for DHC grid infrastructure.
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> There is a training programme for installers of RES-installations, which is offered as a course for any interested installers on some schools in Slovenia either as part of the normal curriculum for installers or a special course. The RES-H building obligation obliges owners of new or renovated buildings to build energy efficient buildings and also to use RES as their main source of energy.
Statutory provisions	<ul style="list-style-type: none"> Call No. 54SUB-OB17 (Public Call for applications of grants by the Eco Fund for individuals for new investments in renewable energy sources and improved energy efficiency of residential buildings – Gazette No. 56/17) Call No. 56PO16 (Call for applications for loans granted by the Eco Fund for environmental investments – Gazette No. 39/18) Call No. 59OB17 (Public Call for Applications for Loans for Environmental Investments by Residents – Gazette No. 44/17) Call No. 59SUB-SOCOB17 (Call for applications for non-refundable financial incentives by the Eco Fund for socially weak citizens to replace old boilers using solid fuels with new combustion plants using wood biomass in residential buildings in the municipalities with an adopted Ordinance on air quality plan – Gazette No. 66/17) Call No. 60LS17 (Call for applications for loans granted by the Eco Fund for environmental investments by local communities – Gazette No. 75/17) Decision no. 430-26/2014/2 (Methodology for determining the electricity price and reference costs of electricity generating plants) EZ-1 (Energy Act – Gazette No. 17/2014) Regulation on Support for Energy Efficiency and the Use of Renewable Energy – Gazette No. 89/2008 RS 20/2013 (Rules on expert training and examination of knowledge for installers of devices using renewable energies) RS 46/2015 (Decree on the Calculation and Payment of the Support for High-Efficiency CHP Generation and Renewable Energy Generation) RS 50/2007 (Regulation on the Allocation of the Budget) RS 52/2010 (Rules on thermal insulation and efficient energy use in buildings) RS 57/2004 (Resolution on the National Energy Program) RS 74/2016 (Decree on support for electricity generated from renewable energy sources and from high-efficiency cogeneration) RS 89/2008 (Resolution on Promoting Energy Efficiency and the Use of Renewable Energy) Statute of The Eco Fund – Gazette No. 112/2009 Terms and Conditions of the Eco Fund – Gazette No. 117/2005 ZUP (Administrative Procedures Act – Official Gazette of the Republic of Slovenia, No. 80/99)
Relevant authorities and supervision	<ul style="list-style-type: none"> The Energy Agency is an independent regulatory authority, which directs and supervises electricity and gas energy operators. It also carries out tasks regulating energy operators' activities in the field of heating. The regulator's task is providing the circumstances for development of competitiveness and ensuring its operation by taking into account the requirements for sustainable, reliable and high-quality supply. The Slovenian Competition Protection Agency (CPA) is an authority with

³¹⁷ http://www.code2-project.eu/wp-content/uploads/CODE2-D5.2_Roadmap_SI_20141223.pdf

Regulatory framework, authorities and supervision, statistical reporting	
	<p>the powers of enforcing competition rules. The CPA assesses alleged restrictive agreements and abuses of a dominant position.</p> <ul style="list-style-type: none"> The Ministry of Infrastructure ensures continuous improvements to Slovenian transport and energy infrastructure. They maintain, plan, regulate, and improve the field of rail, road, air, cableway, and maritime transport as well as inland waterway transport. They also ensure that energy supply is reliable and set the foundations for transitioning into a society which uses energy products more effectively and generates energy mainly from renewable sources.
Statistical reporting methods and sources	<ul style="list-style-type: none"> The Statistical Office of the Republic of Slovenia (SURS) is the main producer and coordinator of national statistics. It cooperates in working groups and committees of Eurostat, the Statistical Office of the European Union, and in technical and infrastructural projects coordinated by Eurostat. Information of their methods can be found on their website.³¹⁸
Sources	<ul style="list-style-type: none"> Euroheat and Power, Country by Country 2019 Report, https://www.euroheat.org/publications/country-by-country/ RES legal, http://www.res-legal.eu/ JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf IEA policy database, https://www.iea.org/policies Member state progress report, https://ec.europa.eu/energy/topics/renewable-energy/progress-reports_en?redir=1 Energy Agency, https://www.agen-rs.si/web/en CPA, http://www.varstvo-konkurenca.si/en/ Ministry of Infrastructure, https://www.gov.si/en/state-authorities/ministries/ministry-of-infrastructure/ SURS, https://www.stat.si/StatWeb/en

Table 119: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> The Ministry of the Economy is responsible for consumer policy, consumer protection and consumer affairs.³¹⁹ There is an Expert Advisory Council, comprising of representatives of competent national authorities, non-government consumer organizations, business chamber, craft chamber and academic experts in consumer protection.³²⁰ The Slovenian Energy Agency is the regulator for its energy market, including DHC. One of its tasks is consumer protection.³²¹
Available information on consumer perception and satisfaction	<ul style="list-style-type: none"> According to the annual report of the Energy Agency in 2017, the number of consumers increased by 5.4%. This is the result of reliable and cost-effective supply, which among other things enable consumers to lower the costs of regular maintenance of their own heating system.³²²

³¹⁸ <https://www.stat.si/StatWeb/en/Methods/ClassificationsQuestionnairesMethods>³¹⁹ https://ec.europa.eu/info/sites/info/files/national-consumer-organisations_sl_listing.pdf and <https://www.gov.si/drzavni-organji/ministrstva/ministrstvo-za-gospodarski-razvoj-in-tehnologijo/>³²⁰ https://ec.europa.eu/info/sites/info/files/national-consumer-organisations_sl_listing.pdf³²¹ <https://www.agen-rs.si/documents/54870/68629/a/78f74b68-dbfc-415e-ab88-882652558d94>, p. 157³²² <https://www.agen-rs.si/documents/54870/68629/a/78f74b68-dbfc-415e-ab88-882652558d94>, p. 177

Spain

Table 120: Size of the cities served by DHC and geographical concentration

	DH	DC																																																																						
Maps: Location of DHC systems (2019)	<p>Number of networks</p> <table border="1"> <thead> <tr> <th>Network Size Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>< 20 000 inhabitants</td> <td>32,4%</td> </tr> <tr> <td>20 000 inhabitants < ... < 100 000 inhabitants</td> <td>15,0%</td> </tr> <tr> <td>100 000 inhabitants < ... < 500 000 inhabitants</td> <td>8,7%</td> </tr> <tr> <td>> 500 000 inhabitants</td> <td>9,7%</td> </tr> <tr> <td>100 000 inhabitants < ... < 20 000 inhabitants</td> <td>4,3%</td> </tr> <tr> <td>200 000 inhabitants < ... < 300 000 inhabitants</td> <td>2,4%</td> </tr> <tr> <td>300 000 inhabitants < ... < 400 000 inhabitants</td> <td>2,2%</td> </tr> <tr> <td>400 000 inhabitants < ... < 500 000 inhabitants</td> <td>2,7%</td> </tr> <tr> <td>500 000 inhabitants < ... < 600 000 inhabitants</td> <td>1,7%</td> </tr> <tr> <td>600 000 inhabitants < ... < 700 000 inhabitants</td> <td>1,9%</td> </tr> <tr> <td>700 000 inhabitants < ... < 800 000 inhabitants</td> <td>1,7%</td> </tr> <tr> <td>800 000 inhabitants < ... < 900 000 inhabitants</td> <td>0,5%</td> </tr> <tr> <td>900 000 inhabitants < ... < 1 000 000 inhabitants</td> <td>0,2%</td> </tr> <tr> <td>1 000 000 inhabitants < ... < 1 100 000 inhabitants</td> <td>0,2%</td> </tr> <tr> <td>1 100 000 inhabitants < ... < 1 200 000 inhabitants</td> <td>1,2%</td> </tr> </tbody> </table>	Network Size Category	Percentage	< 20 000 inhabitants	32,4%	20 000 inhabitants < ... < 100 000 inhabitants	15,0%	100 000 inhabitants < ... < 500 000 inhabitants	8,7%	> 500 000 inhabitants	9,7%	100 000 inhabitants < ... < 20 000 inhabitants	4,3%	200 000 inhabitants < ... < 300 000 inhabitants	2,4%	300 000 inhabitants < ... < 400 000 inhabitants	2,2%	400 000 inhabitants < ... < 500 000 inhabitants	2,7%	500 000 inhabitants < ... < 600 000 inhabitants	1,7%	600 000 inhabitants < ... < 700 000 inhabitants	1,9%	700 000 inhabitants < ... < 800 000 inhabitants	1,7%	800 000 inhabitants < ... < 900 000 inhabitants	0,5%	900 000 inhabitants < ... < 1 000 000 inhabitants	0,2%	1 000 000 inhabitants < ... < 1 100 000 inhabitants	0,2%	1 100 000 inhabitants < ... < 1 200 000 inhabitants	1,2%	<p>Installed capacity</p> <table border="1"> <thead> <tr> <th>Network Size Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>< 20 000 inhabitants</td> <td>31,1%</td> </tr> <tr> <td>20 000 inhabitants < ... < 100 000 inhabitants</td> <td>11,5%</td> </tr> <tr> <td>100 000 inhabitants < ... < 500 000 inhabitants</td> <td>5,5%</td> </tr> <tr> <td>> 500 000 inhabitants</td> <td>0,1%</td> </tr> <tr> <td>100 000 inhabitants < ... < 20 000 inhabitants</td> <td>12,1%</td> </tr> <tr> <td>200 000 inhabitants < ... < 300 000 inhabitants</td> <td>25,5%</td> </tr> <tr> <td>300 000 inhabitants < ... < 400 000 inhabitants</td> <td>0,9%</td> </tr> <tr> <td>400 000 inhabitants < ... < 500 000 inhabitants</td> <td>0,8%</td> </tr> <tr> <td>500 000 inhabitants < ... < 600 000 inhabitants</td> <td>0,3%</td> </tr> <tr> <td>600 000 inhabitants < ... < 700 000 inhabitants</td> <td>0,1%</td> </tr> <tr> <td>700 000 inhabitants < ... < 800 000 inhabitants</td> <td>1,8%</td> </tr> <tr> <td>800 000 inhabitants < ... < 900 000 inhabitants</td> <td>3,7%</td> </tr> <tr> <td>900 000 inhabitants < ... < 1 000 000 inhabitants</td> <td>0,2%</td> </tr> <tr> <td>1 000 000 inhabitants < ... < 1 100 000 inhabitants</td> <td>0,3%</td> </tr> <tr> <td>1 100 000 inhabitants < ... < 1 200 000 inhabitants</td> <td>1,1%</td> </tr> <tr> <td>1 200 000 inhabitants < ... < 1 300 000 inhabitants</td> <td>0,3%</td> </tr> <tr> <td>1 300 000 inhabitants < ... < 1 400 000 inhabitants</td> <td>0,1%</td> </tr> <tr> <td>1 400 000 inhabitants < ... < 1 500 000 inhabitants</td> <td>0,1%</td> </tr> </tbody> </table>	Network Size Category	Percentage	< 20 000 inhabitants	31,1%	20 000 inhabitants < ... < 100 000 inhabitants	11,5%	100 000 inhabitants < ... < 500 000 inhabitants	5,5%	> 500 000 inhabitants	0,1%	100 000 inhabitants < ... < 20 000 inhabitants	12,1%	200 000 inhabitants < ... < 300 000 inhabitants	25,5%	300 000 inhabitants < ... < 400 000 inhabitants	0,9%	400 000 inhabitants < ... < 500 000 inhabitants	0,8%	500 000 inhabitants < ... < 600 000 inhabitants	0,3%	600 000 inhabitants < ... < 700 000 inhabitants	0,1%	700 000 inhabitants < ... < 800 000 inhabitants	1,8%	800 000 inhabitants < ... < 900 000 inhabitants	3,7%	900 000 inhabitants < ... < 1 000 000 inhabitants	0,2%	1 000 000 inhabitants < ... < 1 100 000 inhabitants	0,3%	1 100 000 inhabitants < ... < 1 200 000 inhabitants	1,1%	1 200 000 inhabitants < ... < 1 300 000 inhabitants	0,3%	1 300 000 inhabitants < ... < 1 400 000 inhabitants	0,1%	1 400 000 inhabitants < ... < 1 500 000 inhabitants	0,1%
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Geographical concentration of the DHC systems	<ul style="list-style-type: none"> Catalonia is the Autonomous Community where the largest number of networks are located, followed by Castilla y León and Navarra DH supply is concentrated in the 15 biggest networks located in large urban centers and representing 51% of the total capacity. However, there are also smaller networks in all regions, fueled mainly by biomass. 	<ul style="list-style-type: none"> There are very few DC networks, and 4 networks supplying only cold located in Ibiza, Teguise, Illescas and Madrid. The 36 other DC systems are combined with DH systems in the center of big cities, mainly supplying hotels and universities. 																																																																						
Sources	<ul style="list-style-type: none"> Euroheat & power, Country by Country 2019 adhac, Censo de redes de calor y frío 2019, Statistics 2019³²³ Own survey with national DHC stakeholders 																																																																							

³²³ http://www.adhac.es/Priv/ClientsImages/AsociacionPerso8_1573032822.pdf

Table 121: Ownership of the DHC networks

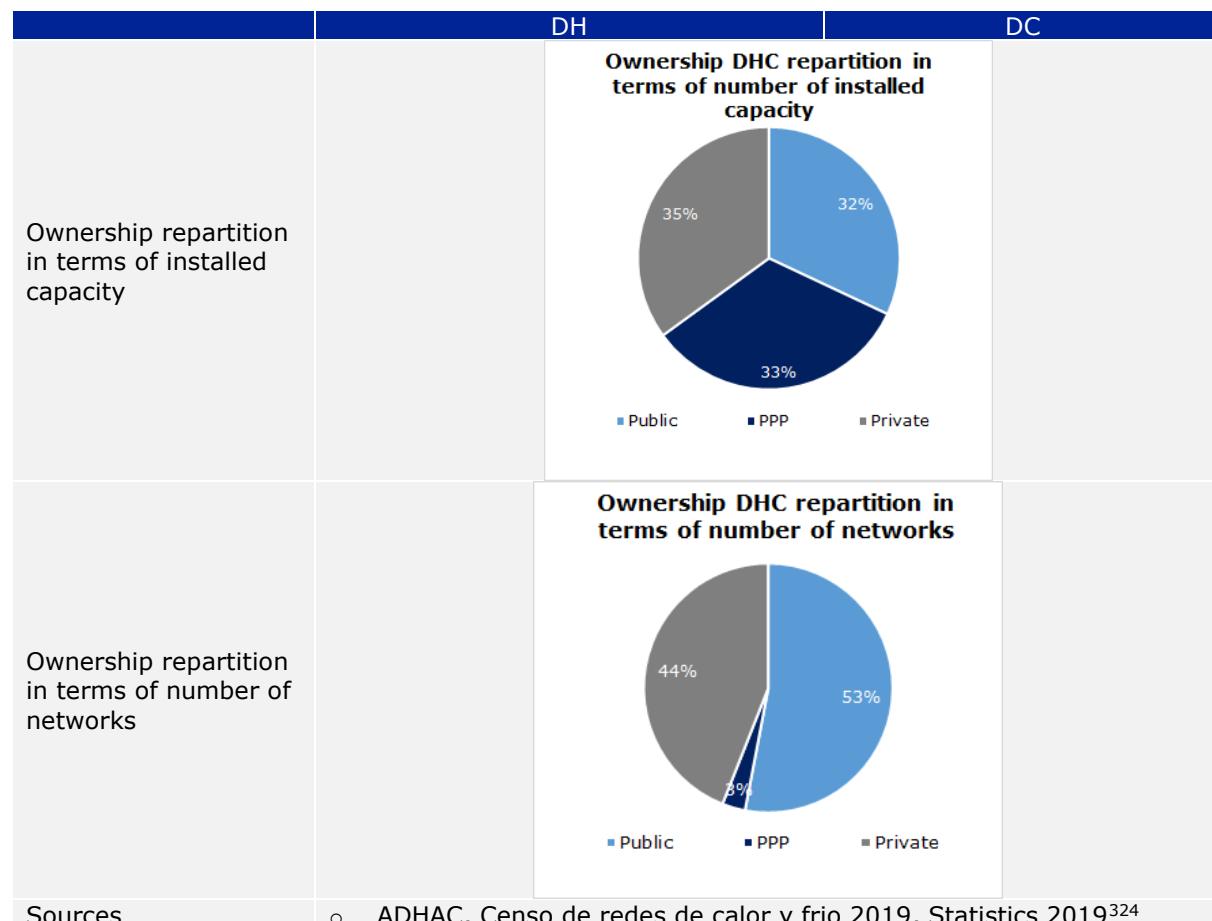


Table 122: Main suppliers and level of competition

	DH	DC
Market description	<ul style="list-style-type: none"> o DHC systems are mainly operated (but not necessarily owned) by private companies o Among the main suppliers are Veolia, Engie Cofely, Rebi and San José 	
Sources	<ul style="list-style-type: none"> o ADHAC o Own survey with national DHC stakeholders 	

Table 123: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> • Administrative authorization is required for the construction and operation of the networks, whether they are operated under an administrative concession or if the network is operated by a private party that has a license for it.³²⁵
Regulation of prices for consumers	<ul style="list-style-type: none"> • In the case of networks that are developed under a concession regime, the maximum price of energy for which energy can be sold is set in the concession. In the case of private networks, prices are not regulated. In the event that the networks are developed under a concession regime,

³²⁴ http://www.adhac.es/Priv/ClientsImages/AsociacionPerso8_1571841467.pdf

³²⁵ Source: Own survey with national DHC stakeholders

Regulatory framework, authorities and supervision, statistical reporting	
	the way in which the energy sales price updates must be carried out are set in the concession. Additionally, the concessionaire must provide annually to the concession regulator, information on the energy sold to end customers, final price, and rates applied by each end customer. ³²⁶
Regulation of metering	<ul style="list-style-type: none"> In the case of networks that are developed under concession, the measurement system is regulated within the technical specifications of the public tender. In the case of private networks, the measurement system is included in the network project. The Thermal Installations Regulation establishes the rules regarding the regulation and control necessary so that the design conditions provided for in air-conditioned premises can be maintained, adjusting, at the same time, energy consumption to variations in thermal demand, as well as interrupt service.³²⁷
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> In the case of networks that are developed under a concession regime, the operation of the network will be decided based on the best proposal submitted by the different bidders within the public tender. In the case of networks that are developed under a concession regime, any promoter can access the public tender.³²⁸
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> In the case of networks that are developed under the concession regime, any user within the perimeter / scope of the concession can request connection to the network by submitting a form with the most relevant data (supply address, power to contract, use of the property, etc.). In the case of networks that are developed by private developers, access will depend on being within the area where the network will be developed.³²⁹
Support framework for renewable heat	<ul style="list-style-type: none"> Call for grants for investment in thermal energy production facilities with renewable energy sources, which can be co-financed with funds from the European Union within the framework of the provisions of Order TED/765/2020, of 3 August.³³⁰
Support framework for CHP	<ul style="list-style-type: none"> Currently no support schemes for CHP are in place. The financial support for new installations that produce electricity from renewable energy sources or waste, or for new CHP installations, is temporarily abolished (Royal Decree 1/2012). Regulation of Guarantees of Origin (GOs) of electricity produced from RES and high efficiency CHP generation plants (Ministerial Order ITC/2914/2011).
Support framework for grid infrastructure	<ul style="list-style-type: none"> The Spanish government is obligated to take the necessary measures to develop an urban heating and/or cooling infrastructure in those areas where potential for highly efficient CHP is identified. Contractors developing industrial plants or DH networks with a capacity higher than 20MW have the obligation of conducting a cost / benefit analysis of high-efficiency CHP solutions (Article 13, Royal Decree 56/2016). PREE program approved by the Council of Ministers, at the proposal of the Ministry for the Ecological Transition and the Demographic Challenge, on August 4 through Royal Decree 737/2020, which regulates the aid program for energy rehabilitation actions in existing buildings and the direct granting of aid from this program to the autonomous communities and cities of Ceuta and Melilla is regulated, which includes aid to district networks with biomass and / or geothermal energy³³¹
Support	<ul style="list-style-type: none"> UNE Standard 21701 for the Classification of Energy Services Providers.

³²⁶ Source: Own survey with national DHC stakeholders³²⁷ Source: Own survey with national DHC stakeholders³²⁸ Source: Own survey with national DHC stakeholders³²⁹ Source: Own survey with national DHC stakeholders³³⁰ Source: Own survey with national DHC stakeholders, see also

<https://sede.idae.gob.es/lang/modulo/?refbol=tramites-servicios&refsec=ayudas-inversion-instalaciones-produccion-energia-termica&refsec=ayudas-inversion-instalaciones-produccion-energia-termica&idarticulo=146896>

³³¹ Source: Own survey with national DHC stakeholders, see also

<https://www.idae.es/ayudas-y-financiacion/para-la-rehabilitacion-de-edificios/programa-pree-rehabilitacion-energetica-de>

Regulatory framework, authorities and supervision, statistical reporting	
framework for other elements of the DHC systems	<ul style="list-style-type: none"> Royal Decree 1027/2007, of July 20, which approves the Regulation of Thermal Installations in Buildings (under revision). Heating systems for new buildings over 1.000 m² require a technical analysis that justifies its election regarding energy efficiency. This analysis must include the comparison with alternative heating systems depending on the characteristics of the building and its environment, which includes the possibility of connecting the new building to a DH network (IT 1.2.3 Royal Decree 1027/2007)
Statutory provisions	<ul style="list-style-type: none"> Royal Decree 56/2016 Royal Decree 1027/2007 Royal Decree 8/2014 Royal Decree 1751/1998 Royal Decree 1618/1980 Royal Decree 1/2012 Ministerial Order ITC/2914/2011 UNE Standard 21701
Relevant authorities and supervision	<ul style="list-style-type: none"> The National Commission on Markets and Competition (La Comisión Nacional de los Mercados y la Competencia, CNMC) is an entity that promotes and defends proper functioning of all markets, in the interest of consumers and businesses.
Statistical reporting methods and sources	<ul style="list-style-type: none"> The National Statistics Institute (Instituto Nacional de Estadística, INE) is the official agency in Spain that collects statistics about demography, economy, and Spanish society. Information on the methods can be found on the Website of INE³³²
Sources	<ul style="list-style-type: none"> Euroheat and Power, Country by Country 2019 Report, https://www.euroheat.org/publications/country-by-country/ RES legal, http://www.res-legal.eu/ JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/ki_na28630enn%281%29.pdf IEA policy database, https://www.iea.org/policies Heat Roadmap Spain, https://vbn.aau.dk/ws/portalfiles/portal/287932746/Country_Roadmap_Spain_20181005.pdf CNMC, https://www.cnmc.es/ INE, https://www.ine.es/en/welcome.shtml

Table 124: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> Consumer protection policy is a shared competence between the State through the Ministry of Health, Social Affairs and Equality and the regional governments of the Autonomous Communities.³³³ The Spanish Agency for Consumer Affairs, Food Safety and Nutrition is the Public Body directly responsible for the promotion of the consumer's protection policy and strategy.³³⁴ The National Commission on Markets and Competition is an independent body that supervises and regulates several markets of Spain, including the Energy Market.³³⁵
Available info. on consumer perception and satisfaction	<ul style="list-style-type: none"> No study on the perception or satisfaction of DHC consumers could be found.

³³² https://www.ine.es/ss/Satellite?L=en_GB&c=Page&cid=1254735839296&p=1254735839296&pagename=MetodologiaYEstandares%2FINELayout

³³³ https://ec.europa.eu/info/sites/info/files/national-consumer-organisations_es_listing_0.pdf

³³⁴ https://ec.europa.eu/info/sites/info/files/national-consumer-organisations_es_listing_0.pdf

³³⁵ <https://globaledge.msu.edu/global-resources/resource/60502>

Sweden

Table 125: Size of the cities served by DHC and geographical concentration

	DH	DC
Geographical concentration of the DHC systems	<ul style="list-style-type: none"> ○ Practically all cities in Sweden have a DH system, regardless of their size ○ In each municipality, the DH networks are generally concentrated in densely populated areas. 	<ul style="list-style-type: none"> ○ 36 cities have DC networks, mainly large cities ○ An expansion to smaller cities is planned for 2030. ○ Stockholm is the largest DC system and represents 50% of total DC sales in Sweden.
Sources	<ul style="list-style-type: none"> ○ Euroheat & power, Country by Country 2019 ○ International Energy Agency, 2019 Sweden Review³³⁶ ○ Own survey with national DHC stakeholders 	

Table 126: Ownership of the DHC networks

	DH	DC								
Ownership repartition (2019)	<p>Ownership repartition in terms of number of networks</p> <table border="1"> <tr> <td>Public</td> <td>35%</td> </tr> <tr> <td>Private or state-owned</td> <td>65%</td> </tr> </table>	Public	35%	Private or state-owned	65%	<p>Ownership repartition in terms of number of networks</p> <table border="1"> <tr> <td>Public</td> <td>90%</td> </tr> <tr> <td>Private or state-owned</td> <td>10%</td> </tr> </table>	Public	90%	Private or state-owned	10%
Public	35%									
Private or state-owned	65%									
Public	90%									
Private or state-owned	10%									
Sources	<ul style="list-style-type: none"> ○ International Energy Agency, 2019 Sweden Review ○ Own survey with national DHC stakeholders 									

Table 127: Main suppliers and level of competition

	DH	DC																						
Main suppliers and market share in terms of energy sales and number of networks (2016)	<p>Main DH suppliers</p> <table border="1"> <tr> <td>Other smaller suppliers</td> <td>49%</td> </tr> <tr> <td>Södertörns...</td> <td>2%</td> </tr> <tr> <td>Norrenergi</td> <td>2%</td> </tr> <tr> <td>Värmevärden</td> <td>2%</td> </tr> <tr> <td>Öresundskraft</td> <td>2%</td> </tr> <tr> <td>Mälarenergi</td> <td>3%</td> </tr> <tr> <td>Tekniska verken i...</td> <td>3%</td> </tr> <tr> <td>Vattenfall</td> <td>5%</td> </tr> <tr> <td>Göteborg Energi</td> <td>7%</td> </tr> <tr> <td>E.ON</td> <td>10%</td> </tr> <tr> <td>Fortum Värme</td> <td>15%</td> </tr> </table> <p>■ Market share in terms of number of networks ■ Market share in terms of energy sales</p>	Other smaller suppliers	49%	Södertörns...	2%	Norrenergi	2%	Värmevärden	2%	Öresundskraft	2%	Mälarenergi	3%	Tekniska verken i...	3%	Vattenfall	5%	Göteborg Energi	7%	E.ON	10%	Fortum Värme	15%	<ul style="list-style-type: none"> ○ Among the main DC suppliers is Fortum Värme which represent 26% of DC energy sales. ○ DC suppliers are also DH suppliers in general
Other smaller suppliers	49%																							
Södertörns...	2%																							
Norrenergi	2%																							
Värmevärden	2%																							
Öresundskraft	2%																							
Mälarenergi	3%																							
Tekniska verken i...	3%																							
Vattenfall	5%																							
Göteborg Energi	7%																							
E.ON	10%																							
Fortum Värme	15%																							
Market description	<ul style="list-style-type: none"> ○ There are around 200 DH companies. 																							

³³⁶[https://www.connaissanceesenergies.org/sites/default/files/pdf-actualites/Energy Policies of IEA Countries Sweden 2019 Review.pdf](https://www.connaissanceesenergies.org/sites/default/files/pdf-actualites/Energy%20Policies%20of%20IEA%20Countries%20Sweden%202019%20Review.pdf)

	DH	DC
Sources	<ul style="list-style-type: none"> o International Energy Agency, 2019 Sweden Review o Nordic Heating and Cooling 2017, Nordic Council of Ministers, Statistics 2016 o Fortum communication 	

Table 128: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> • The Act on DH (Act No. 28:263) defines what is to be regarded as a district heating operation. • The act also covers annual transparency reporting to the Energy Market Inspectorate and customer protection rules, but there is no permitting procedures for the DH operation.³³⁷ • There are rules in the Act on separate accounting of district heating business in relation to other activities that shall be submitted in an annual report that should be examined by an auditor.³³⁸
Regulation of prices for consumers	<ul style="list-style-type: none"> • Competition monitoring is carried out by the Federal Cartel Office (see authorities and supervision below). This protects consumers from operators exploiting their monopoly position (e.g. on prices). • Since 1 January 2015, the Act on DH has also been amended with provisions on billing the actual district heating use. The Act on DH defines, that the price information must be correct and clear. A DH company must ensure that information on the district heating company's prices for district heating and connection to the district heating business and on pricing is readily available to district heating customers and the general public (para. 5 Act No. 2008:263).
Regulation of metering	<ul style="list-style-type: none"> • Since 1 January 2015, the Act on DH has also been amended with provisions on metering the actual district heating use. According to the Act on DH, a district heating company is obliged to measure the amount of heat energy supplied and its distribution over time (para. 6a Act No. 2008:263). Unless otherwise agreed with the district heating customer, the district heating company shall report the measurement results to the customer once a month. • The government or the authority designated by the government shall issue detailed rules on measurement and reporting (see Lag (2011: 934)).
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> • The Act on DH obliges companies operating a DH network to negotiate terms with the operator of a heat generation plant prior to connecting the plant to the network (§ 37 Act No. 2008:263). • If no agreement concerning connection to the district heating grid can be met, the operator of the district heating network shall grant the heat generating plant a regulated grid access. • However, if the company operating a district heating network can demonstrate that the connection of the heat generating plant would present a risk to the network, the obligation does not apply (§ 37a Act No. 2008:263). • The agreement on regulated access shall be valid for 10 years (§ 37c Act No. 2008:263). • The operator of a heat generation plant has to bear the costs of the connection (§ 37c Act No. 2008:263).
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> • The Act on DH states the conditions under which district heating suppliers can unilaterally change the terms of district heating contracts. Changes must be announced 60 days in advance and customers must be informed of their rights, which include the right to negotiate with their supplier, the right to apply for mediation to the National District Heating Board and

³³⁷ Source: Own survey with national DHC stakeholders

³³⁸ Source: Own survey with national DHC stakeholders

Regulatory framework, authorities and supervision, statistical reporting	
Support framework for renewable heat	<p>as a last resort, the right to terminate their contract with the supplier.</p> <ul style="list-style-type: none"> Tax reductions for households: Act No. 2009:194 sets rules for the tax-deduction of RES-related installation works in households. The installation of renewable energy devices and the replacement of conventional heating sources with renewable ones may be deducted from tax. Energy and carbon dioxide taxes: In Sweden, energy and carbon dioxide taxes are levied on the supply, import and production of fossil fuels for heating purposes. Renewable energy sources are exempt from these taxes. Nitrous oxide tax: The producers of heat are obliged to pay a tax according to their nitrous oxide emissions. Heat producers using renewable energy sources are exempt from this obligation. All renewable energy technologies are exempt from the tax obligations. Support for solar heating investments: In 2009, the Swedish government introduced an investment support scheme for solar heating for all applicants, from private individuals to companies. The scheme ended in 2011. The program was evaluated in 2012. The overall assessment was that it was cost-efficient.
Support framework for CHP	<ul style="list-style-type: none"> Sweden does not have any direct support specifically for cogeneration, but the electricity certificate scheme encourages cogeneration, particularly with bio energy. Energy and CO2 taxation have also had an indirect impact on the development of cogeneration.
Support framework for grid infrastructure	<ul style="list-style-type: none"> The Swedish Environmental Protection Agency ("Klimatklivet") provides grants to DH companies.³³⁹
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> Between 2006 and 2010, owners of residential properties and related premises could receive a grant covering up to 30% of the cost of materials and labour up to a maximum per household for conversion from direct electric heating to systems using district heating, biofuels or a geothermal/ground/lake heat pump.
Statutory provisions	<ul style="list-style-type: none"> Act No. 2008:263 (Act on District Heating) Act No. 2009:194 (Act on the Tax-Deduction Process for Installation Works in Households) Act No. 1994:1776 (Act on the Energy Tax) Act No. 1990:613 (Act on Environmental Charges on Nitrous Oxide Emissions from Energy Generation) Act No. 2010:598 (Act on sustainability criteria for biofuels and bioliquids) Act No. 2008 : 579 (Competition Act)
Relevant authorities and supervision	<ul style="list-style-type: none"> The Swedish Competition Authority is a state authority working to safeguard and increase competition and supervise public procurement in Sweden. The Swedish Energy Agency works towards transforming the Swedish energy system into an ecologically and economically sustainable system. This is done in collaboration with trade and industry, energy companies, municipalities and the research community. Next to encouraging use of new energy techniques and energy production, the Swedish Energy Agency maintains comprehensive research funding in order to make energy use more effective, particularly within industry. The agency also acts as a research policy advisory body and produces a number of evaluations, reports and comments on proposals circulated for considerations on assignment from the government and ministries. The Swedish District Heating Board is an independent organisational unit within the Energy Agency. The task of the District Heating Board is to act as a mediator during negotiations between district heating companies and their customers regarding the terms and conditions for district heating so that the Act on DH is complied with. The Board will also be

³³⁹ Source: Own survey with national DHC stakeholders

Regulatory framework, authorities and supervision, statistical reporting	
	responsible for mediation with district heating companies and those companies who want to gain access to the district heating networks. The Chairman of the Board, other members and experts are appointed by the Government.
Statistical reporting methods and sources	<ul style="list-style-type: none"> Statistics Sweden is responsible for official statistics and for other government statistics. This means they develop, produce and disseminate the statistics, including statistics for DHC. In addition, they coordinate the system for the official statistics in Sweden. Information on the methods can be found on their website³⁴⁰
Sources	<ul style="list-style-type: none"> Euroheat and Power, Country by Country 2019 Report, https://www.euroheat.org/publications/country-by-country/ RES legal, http://www.res-legal.eu/ JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kina28630enn%281%29.pdf Werner, Seven (2017): District heating and cooling in Sweden. In: Energy 126, p. 419-429, DOI: https://doi.org/10.1016/j.energy.2017.03.052 CODE2, Cogeneration Roadmap, Member State: Sweden, http://www.code2-project.eu/wp-content/uploads/CODE2-Non-pilot-SE-final-8.11.2014a.pdf Swedish Energy Agency, https://www.energimyndigheten.se/en/

Table 129: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> The Ministry responsible for consumer affairs is the Ministry of Finance.³⁴¹ The Swedish Consumer Agency is a state agency whose task is to safeguard consumer interests.³⁴² The Swedish Energy Markets Inspectorate (Ei) is an authority which is commissioned to strive for well-functioning energy markets. One of its targets is to strengthen the position of DH customers.³⁴³ The Swedish District Heating Association, the Swedish Association of Public Housing Companies (SABO) and Riksbyggen AB initiated a voluntary Price Dialogue ("Prisdiallogen") between customers and district heating companies in 2013. The price dialogue aims to discuss the fair principles for DH pricing and the envisaged price changes with the customers, thus increasing transparency and acceptance related to pricing towards customers. Besides the Price Dialogue, there is also a system for quality assurance of the relationship between a DH customer and a supplier that further increases the DH market transparency. The system is based on customer requirements and expectations. The DH company issues a number of public promises that can be tested by an independent third party – the Quality Board.³⁴⁴

³⁴⁰ <https://www.scb.se/en/documentation/statistical-methods/>³⁴¹ <https://www.government.se/government-policy/consumer-affairs/>³⁴² <https://www.government.se/government-agencies/swedish-consumer-agency-konsumentverket/>³⁴³ <https://ei.se/en/In-English/district-heating/>³⁴⁴ <https://www.diva-portal.org/smash/get/diva2:1098961/FULLTEXT01.pdf>, p. 37

Available information on consumer perception and satisfaction	<ul style="list-style-type: none">• Swedenergy, the non-profit industry and special interest organisation for companies that supply, distribute, sell, and store energy wrote in their 2009 report that the District Heating Board had 15 open cases concerning renegotiation of tariffs in housing cooperatives. The Swedish Competition Authority has two ongoing investigations concerning occurrence of excessive pricing. Only two customer complaints have been reported with the Quality Board.³⁴⁵• Mahapatra and Gustavsson (2009) conducted a survey and resurvey of homeowners who lived in the city of Östersund in houses with resistance heaters. In the resurvey the greater proportion of the respondents in Odensala adopted district heating and would recommend that system. This means that the respondents perceived the relative advantages of district heating to be greater than for the other heating systems with respect to the important factors they take into account when deciding on a new heating system. In Odensala, 78% of the homeowners of all age and income group adopted the district heating system due to the influence of the investment subsidy and marketing campaign. Before the two measures were implemented about 84% of the homeowners did not intend to install a new heating system.³⁴⁶• According to a report from the RES-H Policy project (2009) district heating has enjoyed a generally good reputation due to reliable supplies and competitive prices.³⁴⁷• ClimateXChange (2018) wrote that DH has had a good reputation in Sweden due to its lower environmental impacts. However, with shifting energy demands customers are starting to raise the question about the benefits of being 'locked in' to DH systems.³⁴⁸
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³⁴⁵ <https://energiforskmedia.blob.core.windows.net/media/1217/an-international-comparison-of-district-heating-markets-fjaerrsynsrapport-2009-27.pdf>, p. 95

³⁴⁶ <https://doi.org/10.1016/j.apenergy.2008.03.011>

³⁴⁷ https://ec.europa.eu/energy/intelligent/projects/sites/iee-projects/files/projects/documents/res-h_policy_introduction_and_development_of_swedish_dh_systems_en.pdf, p. 48

³⁴⁸ <https://energiforskmedia.blob.core.windows.net/media/1217/an-international-comparison-of-district-heating-markets-fjaerrsynsrapport-2009-27.pdf>, p. 95

United Kingdom

Table 130: Size of the cities served by DHC and geographical concentration

	DH	DC
Map: Localisation of DHC systems (2016)	<p>Existing DH schemes</p> <ul style="list-style-type: none"> Unknown Demand < 45000 MWh/year 1000 - 10000 MWh 10000 - 500000 MWh 	
Geographical concentration of the DHC systems	<ul style="list-style-type: none"> 91% of DH systems are located in England and 6% in Scotland They are concentrated in the big cities 	<ul style="list-style-type: none"> There are around 140 DC networks only supplying cold and ca. 1600 DHC systems.
Sources	<ul style="list-style-type: none"> Experimental Statistics on heat networks, BEIS, 2018³⁴⁹ UK spatial district heating analysis, Burohappold Engineering, 2016³⁵⁰ 	

Table 131: Ownership of the DHC networks

	DH	DC
Ownership description	<ul style="list-style-type: none"> PPP is the most common ownership in the UK 	
Sources	<ul style="list-style-type: none"> Tilia 	

Table 132: Main suppliers and level of competition

	DH	DC
Market description	<ul style="list-style-type: none"> Among the main DHC suppliers are Veolia, Engie Cofely, Vital Energi, E.ON and EDF Energy 	
Sources	<ul style="list-style-type: none"> Tilia 	

³⁴⁹https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/712370/Energy_Trends_article_on_heat_networks_revised.pdf

³⁵⁰<http://fes.nationalgrid.com/media/1215/160712-national-grid-dh-summary-report.pdf>

Table 133: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> The heat networks market is largely unregulated. There is no regulation regarding ownership and operatorship.³⁵¹
Regulation of prices for consumers	<ul style="list-style-type: none"> The industry has set up the Heat Trust, a voluntary consumer protection scheme for heat networks, which provides some level of protection to customers on heat networks. Heat Trust has grown to cover 10% of heat network consumers. The industry has also set up the Heat Networks Industry Council (HNIC), which will identify an 'ask' and an 'offer' of government on behalf of industry around 5 key themes: carbon, jobs, costs, consumer experience and smart, liveable cities.³⁵²
Regulation of metering	<ul style="list-style-type: none"> According to the Heat Network (Metering and Billing) Regulations (2014), where heating, cooling or hot water is supplied from a district heat network to a building occupied by more than one final customer, the heat supplier must ensure that meters are installed to measure that heating, cooling or hot water to that building.³⁵³ Existing buildings are covered by the Heat Regulations and must register the scheme and have mandatory building level meters, where there is a multi occupancy level building. The duty does not apply if justified technical infeasibility criteria apply to meters or the deployment is not cost effective. In the case of new buildings, sub-meters are mandated for billing under Part L building regulations. As new dwellings, these will be heat meters per apartment typically installed with individual apartment level Heat Interface Units.³⁵⁴ Heat Cost Allocators shall be used for pricing/billing if there is no metering.³⁵⁵
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> There are no specific regulations on the access of third parties.³⁵⁶
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> Due to a lack of regulation, the Association for Decentralised Energy has set up a non to profit organisation called Heat Trust that wants to hold the industry to account for the benefit of everyone involved. When a member, heat suppliers have to apply strict customer service standards³⁵⁷
Support framework for renewable heat	<ul style="list-style-type: none"> Price-based mechanisms (Non-Domestic Renewable Heat Incentive): The Non-Domestic Renewable Heat Incentive (RHI) is a scheme targeted at supporting non-domestic RES-H installations with a fixed amount per kWh produced which is payable for 20 years. The payment is provided to industry, businesses and public sector organisations. Aerothermal, Hydrothermal, Biomass, Geothermal and Solar thermal are eligible technologies provided they meet technology specific requirements. CHP plants are also eligible. More specifically, CHP that generate heat and power from solid biomass, biogas and deep geothermal energy. Price-based mechanisms (Domestic Renewable Heat Incentive): While the Non-Domestic RHI provides payments to industry, businesses and public sector organisations, is the Domestic RHI open to homeowners, private landlords, social landlords and self-builders.
Support	<ul style="list-style-type: none"> CHPQA is an energy efficiency best practice programme initiative. CHPQA

³⁵¹ Source: Own survey with national DHC stakeholders

³⁵² Euroheat and Power, Country by Country Report 2019

³⁵³ <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf>

³⁵⁴ <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf>

³⁵⁵ <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf>

³⁵⁶ Source: Own survey with national DHC stakeholders

³⁵⁷ <https://www.heattrust.org/>

Regulatory framework, authorities and supervision, statistical reporting	
framework for CHP	<p>aims to monitor, assess and improve the quality of CHP in the UK. In order to prove that a plant is a 'Good Quality' CHP plant, a QI of at least 105 must be at the design, specification, tendering and approval stages. The QI is a function of their heat efficiency and power efficiency.³⁵⁸</p> <ul style="list-style-type: none"> Operators of CHP schemes above 2MWe are exempt from the CPF for fuels that are used in CHPs to generate Good Quality electricity for self-supply or use 'on-site'. Carbon Price Floor: Made up of EU ETS carbon price and UK tax on fossil fuels used to generate electricity CHP schemes that are fully or partially certified as Good Quality CHP under CHPQA and have obtained a Secretary of State (CHP) Exemption Certificate are exempt from the main rates of CCL on: the fuel they utilise (assuming they meet a power efficiency threshold of 20% otherwise this exemption is scaled back); the direct and self-supplies of the power output generated (assuming the QI is met, otherwise the qualifying power output (QPO) is scaled back). [CCL: Climate Change Levy is charged on most non-domestic supplies of energy used as fuel for lighting, heating and power] Good Quality CHP plants are eligible to apply for Enhanced Capital Allowances (ECA), a fiscal benefit, which enable a business to write off 100% of investment in new CHP plants in the first year after investment. Good Quality CHP benefits also from a preferential business rates regime. Micro-CHP is eligible under the Green Deal, a financing mechanism for energy investments. The loan repayments are financed through a charge on the electricity meter. Furthermore, domestic micro-CHP installations benefit from a reduced VAT of 5% (down from 20%).
Support framework for grid infrastructure	<ul style="list-style-type: none"> The Heat Networks Investment Project provides £320m in capital grant and loan gap funding to public and private sector heat networks.³⁵⁹
Support framework for other elements of the DHC systems	<ul style="list-style-type: none">
Statutory provisions	<ul style="list-style-type: none"> S.I. 2014/3120 - The Heat Network (Metering and Billing) Regulations 2014 RHISR 2011 (The Renewable Heat Incentive Scheme Regulations 2011, No. 2860) Domestic RHISR 2014 (The Domestic Renewable Heat Incentive Scheme Regulations 2014, No. 928)
Relevant authorities and supervision	<ul style="list-style-type: none"> Department for Business, Energy & Industrial Strategy is responsible for a number of UK Government policy areas such as business and industrial strategy, science, innovation, energy and climate change. The Department is in charge of developing and delivering a comprehensive industrial strategy and leading the Government's relationships with businesses, along with securing affordable and clean energy supplies to the country. The Heat Networks Delivery Unit (HNDU) in BEIS was set up in 2013 specifically to support local authorities in England and Wales through the early stages of heat network project development.³⁶⁰ Association for Decentralised Energy (ADE) is setting the vision of a local, efficient, low carbon energy system which enables energy users to make the choices which work for them.
Statistical reporting methods and	<ul style="list-style-type: none"> UK Statistics Authority is an independent body at arm's length from government. They have a statutory objective of promoting and safeguarding the production and publication of official statistics that

³⁵⁸ https://consult.environment-agency.gov.uk/psc/la3-3rw-veolia-es-uk-limited/supporting_documents/Appendix%20F%20%20CHP%20Assessment.pdf

³⁵⁹ <https://www.gov.uk/government/publications/heat-networks-investment-project-hnip-scheme-overview>

³⁶⁰ <https://www.gov.uk/guidance/heat-networks-delivery-unit>

Regulatory framework, authorities and supervision, statistical reporting	
sources	<p>'serve the public good'. Information on their methods can be found on their website.³⁶¹</p> <ul style="list-style-type: none"> Office for National Statistics is the largest independent producer of official statistics and the recognised national statistical institute of the UK.
Sources	<ul style="list-style-type: none"> Euroheat and Power, Country by Country 2019 Report, https://www.euroheat.org/publications/country-by-country/ RES legal, http://www.res-legal.eu/ JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf IEA policy database, https://www.iea.org/policies Department for Business, Energy & Industrial Strategy, https://www.gov.uk/government/organisations/department-for-business-energy-and-industrial-strategy ADE, https://www.theade.co.uk/ UK Statistics Authority, https://www.statisticsauthority.gov.uk/ Office for National Statistics, https://www.ons.gov.uk/

Table 134: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> The Competition and Markets Authority (CMA) is a non-ministerial government department, responsible for strengthening business competition and preventing and reducing anti-competitive activities. One of its responsibilities is to enforce consumer protection legislation.³⁶² Currently, there are no sector specific protections for heat network consumers, unlike for people on other utilities.³⁶³ Due to a lack of regulation, the Association for Decentralised Energy has set up a non-profit organisation called Heat Trust that wants to hold the industry to account for the benefit of everyone involved. When a member, heat suppliers must apply strict customer service standards.³⁶⁴
Available information on consumer perception and satisfaction	<ul style="list-style-type: none"> One study, performed by Burlinson et al. (2018), questioned 784 households in Birmingham on the decision to connect to a district-heating system as a more energy efficient alternative. Nearly half of respondents indicated they were likely to adopt the technology, whereas less than 8% chose 'definitely likely'. Around 18% indicated that they were definitely unlikely to connect while 17% were unlikely. 8% were unsure.³⁶⁵ One survey on the communal heating scheme in London was conducted in October 2017 by Kantar TNS UK on behalf of the Greater London Authority, to collect feedback from consumers on their views on the quality and satisfaction of the scheme which provides space heating and hot water to their properties. Respondents were generally satisfied (82%) and main complaints were raised due to unplanned interruptions to domestic hot water. Some dissatisfaction was mentioned towards costs of heating and hot water system (21%).³⁶⁶ BEIS (2017) conducted an analysis on the experiences of consumers on heat networks (communal and district). Three quarters were satisfied or very satisfied with their system. More than a third of heat network

³⁶¹ <https://www.statisticsauthority.gov.uk/code-of-practice/guidance/guidance-and-resources-producing-official-statistics/>

³⁶² https://en.wikipedia.org/wiki/Competition_and_Markets_Authority

³⁶³ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/878072/heat-networks-building-market-framework-condoc.pdf

³⁶⁴ <https://heattrust.org/about>

³⁶⁵ <https://www.sciencedirect.com/science/article/abs/pii/S004873318301628>, p. 10

³⁶⁶ https://www.london.gov.uk/sites/default/files/communal_heating_consumer_survey_final.pdf, p. 2

Consumer perception and protection

- consumers report interruption/loss of heating within the last 12 months. 32% of consumers had raised a complaint.³⁶⁷
- In a survey from BEIS (2018) on the experiences of DH consumers and operators, telephone interviews with DH consumers, heat network providers and other actors involved in the delivery of DH were conducted. Periodic planned interruptions were accepted by consumers as a necessary part of network maintenance. Some consumers were frustrated with experiences of unplanned outages, especially where they felt their provider had not acted promptly and/or had not kept them updated. Some consumers felt being locked into buying their heat supply from a specific supplier. Most consumers had limited accurate awareness of their consumer rights. The ones that had tried to complain felt they had very limited rights and perceptions of operators as being unhelpful.³⁶⁸
 - The 2017 Heat Networks Consumer Survey from the Association for Decentralised Energy is a survey of consumers on heat networks in the UK, covering around 5,000 consumers, of which around 3,000 consumers are on a heat network and 2,000 consumers are on another heating system. The survey asked customers about their satisfaction with their heating system, price and transparency of billing, and customer service. Around 75% of consumers were either 'satisfied' or 'very satisfied' with their system. Heat network consumers paid on average around £100 less annually for their heat than consumers with individual gas boilers, even before the cost of a gas boiler had been taken into account.³⁶⁹
 - Citizens Advice UK³⁷⁰ said in 2019, that billing errors occur because customers are not charged at regular intervals. Consumers were confused about increasingly high standing charges and a lack of information about how their network operates, how their costs are calculated or where to turn to complain.³⁷¹

³⁶⁷https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/665447/HNCS_Results_Report_-_FINAL.pdf, p. 4, 6, 26

³⁶⁸<https://www.cse.org.uk/downloads/reports-and-publications/fuel-poverty/insulation-and-heating/energy-justice/building-performance/qualitative-research-with-consumers-and-operators-of-heat-networks-dec-2018.pdf>, p. 5-6

³⁶⁹https://www.theade.co.uk/assets/docs/resources/Heat%20Networks%20in%20the%20UK_v5%20web%20single%20pages.pdf, p.13

³⁷⁰ Network of 316 independent charities throughout the UK that give free, confidential information and advice to assist people with money, legal, consumer and other problems.

³⁷¹<https://www.breakingnews.ie/world/government-must-protect-consumers-during-decarbonisation-citizens-advice-936434.html>

Iceland

There is no DC system.

Table 135: Size of the cities served by DHC and geographical concentration

	DH
Map: Geothermal District Heating in Iceland (2015)	<p>The map shows the distribution of 61 geothermal district heating (DH) systems across Iceland. Major cities like Reykjavik, Akureyri, and Húsavík are connected to DH networks. The capacities of the systems are labeled next to their respective dots. The total installed power is 2,100 MW, energy supplied is 26,700 TJ, and the capacity factor is 0.41.</p> <p>Geothermal District Heating in Iceland 2015 Installed power 2 100 MW Energy 26 700 TJ/ Capacity factor 0.41</p>
Geographical concentration of the DH systems	<ul style="list-style-type: none"> ○ 61 DH systems in Iceland ○ DH networks are mainly located in or close to urban areas. In the last years the development of DH in rural areas has increased in close relation to better knowledge and technology. Some DH networks provide heat to both rural and urban areas. ○ Around 92% of the Icelandic population has access to district heating. ○ 89,7% of all space heating in 2019 was done through geothermal district heating
Sources	<ul style="list-style-type: none"> ○ Proleikur Johannesson-ESMAP-Global Geothermal Development Plan³⁷² ○ Euroheat & power, Country by Country 2019 ○ Own survey with national DHC stakeholders

Table 136: Ownership of the DHC networks

	DH
Ownership description	<ul style="list-style-type: none"> ○ Almost all district heating utilities are in public ownership ○ HS Veitur is the main exception: PPP with a public share of 66%
Sources	<ul style="list-style-type: none"> ○ Samorka web site³⁷³ ○ Nordic Council of Ministers, Nordic Heating and Cooling (data 2015) ³⁷⁴ ○ Own survey with national DHC stakeholders

³⁷² <https://www.esmap.org/sites/esmap.org/files/DocumentLibrary/2.%20District%20Heating%20and%20Cooling%20TJ-COMPR.pdf>

³⁷³ <https://www.samorka.is/en/about-samorka/>

³⁷⁴ <http://norden.diva-portal.org/smash/get/diva2:1098961/FULLTEXT01.pdf>

District Heating and Cooling in the European Union

Overview of Markets and Regulatory Frameworks under the Revised Renewable Energy Directive

Table 137: Main suppliers and level of competition

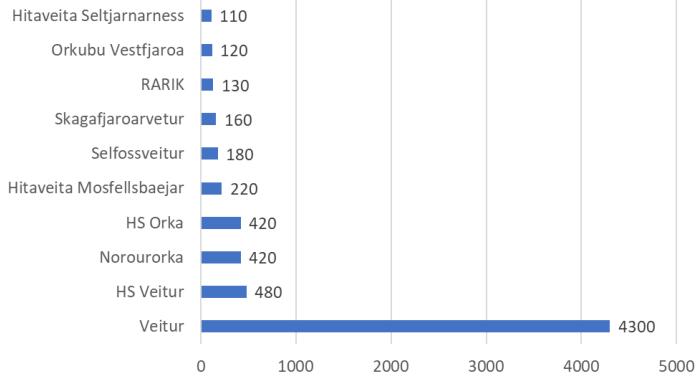
		DH																						
		Market shares of companies operating in the sector of district heating in Iceland in terms of energy sales (GWh) in 2015																						
Main suppliers and market share in terms of energy sales (2015)		 <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Company</th><th>Market Share (GWh)</th></tr> </thead> <tbody> <tr><td>Hitaveita Seltjarnarness</td><td>110</td></tr> <tr><td>Orkubu Vestfjara</td><td>120</td></tr> <tr><td>RARIK</td><td>130</td></tr> <tr><td>Skagafjaroarvetur</td><td>160</td></tr> <tr><td>Selfossveitur</td><td>180</td></tr> <tr><td>Hitaveita Mosfellsbaejar</td><td>220</td></tr> <tr><td>HS Orka</td><td>420</td></tr> <tr><td>Norourorka</td><td>420</td></tr> <tr><td>HS Veitur</td><td>480</td></tr> <tr><td>Veitur</td><td>4300</td></tr> </tbody> </table>	Company	Market Share (GWh)	Hitaveita Seltjarnarness	110	Orkubu Vestfjara	120	RARIK	130	Skagafjaroarvetur	160	Selfossveitur	180	Hitaveita Mosfellsbaejar	220	HS Orka	420	Norourorka	420	HS Veitur	480	Veitur	4300
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Hitaveita Mosfellsbaejar	220																							
HS Orka	420																							
Norourorka	420																							
HS Veitur	480																							
Veitur	4300																							
Market description		<ul style="list-style-type: none"> ○ The main DH supplier is the company Veitur. Its market share is close to 60% based on energy sales. 																						
Sources		<ul style="list-style-type: none"> ○ Nordic Council of Ministers, Nordic Heating and Cooling (data 2015) ○ Own survey with national DHC stakeholders 																						

Table 138: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> • There are only legal requirements on DH companies that operate with patent to distribute or sell hot water/steam for public use within certain area. Only the minister of industries and innovation can grant a DHC a patent. A patent can only be given to DH companies that are majority owned by municipalities or associations. DH companies with a patent are not allowed to operate in any other unrelated field. The DH company's board shall be independent from other companies that operate in the electrical field. A patent shall only be granted if the Minister considers, after obtaining the opinion of the National Energy Authority, that the drawings and plans are technically correct, that the district heating company will be a macro economically viable company, meet the area's heat demand and ensure normal and uninterrupted operation.³⁷⁵ • DH is regulated mainly by the Energy Law. District heating is considered to be monopoly business, and utilities receive monopoly licenses from the national regulator, and specific regulation applies to each license.³⁷⁶
Regulation of prices for consumers	<ul style="list-style-type: none"> • DH operators mostly bill based on the measured use of water. As the source of the heating is mainly the geothermal heat, there is variation in the temperature levels, and typically the higher temperature networks only measure and bill based on energy content. DH tariffs are regulated by the Ministry of Industry and Innovation. The tariffs vary, but the price of heat generally reflects the cost of production, distribution and sales.³⁷⁷ • All changes to tariffs have to be approved by the Minister of Industries and Innovation.³⁷⁸
Regulation of metering	<ul style="list-style-type: none"> • The metering is carried out on building level. Many district heating meters measure the volume of water. New meters are remotely readable.³⁷⁹

³⁷⁵ Source: Own survey with national DHC stakeholders, see also

<https://www.althingi.is/lagas/135b/1967058.html>

³⁷⁶ <https://norden.diva-portal.org/smash/get/diva2:1098961/FULLTEXT01.pdf>

³⁷⁷ <https://norden.diva-portal.org/smash/get/diva2:1098961/FULLTEXT01.pdf>

³⁷⁸ Source: Own survey with national DHC stakeholders, see also

<https://www.stjornartidindi.is/Advert.aspx?RecordID=23160251-f944-4335-bf88-5ef76d34d8e0>

Regulatory framework, authorities and supervision, statistical reporting	
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> There are no specific legal basis that deal directly with third parties, i.e. there are no laws or regulations that state that DH companies either have to or do not have to allow access of third parties. In order to keep a patent the DH companies have to ensure normal and uninterrupted operation.³⁸⁰
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> Connection can be mandatory, and disconnection is not always allowed. DH companies can deny new connections to their grids, e.g. if the company can prove that it doesn't have enough resources.³⁸¹
Support framework for renewable heat	<ul style="list-style-type: none"> Heat pumps are not utilised to significant amount in Iceland as the geothermal water for space heating has been commonly available and inexpensive. Subsidies of electrical and oil heating have also caused reluctance to invest in heat pumps. However, a recent legislation allows users of subsidized electrical heating to get a contribution to improve or convert their heating system. It is likely that heat pumps will become competitive in areas where water with temperature above 50°C is not found. In those areas heat pumps can be used to replace or reduce the use of direct electrical heating. The Icelandic government has encouraged the utilization of geothermal energy as far back as the 1940's. An Icelandic National Energy Fund has already since the 1960s offered loans to fund the initial cost of drilling and exploration of geothermal energy. If the initial drilling turns out to be unsuccessful, the loan defaults to the state. This policy promoted the expansion of geothermal energy. In more recent years space heating in residential buildings has been subsidized by the state in areas where district heating is not reachable. End-users living in areas where district heating is not available are encouraged (through subsidies) to invest in heat pumps.
Support framework for CHP	<ul style="list-style-type: none"> Producers of electricity compete in an open market in Iceland. Therefore, CHP power plants are obliged to keep separate accounts for heat and power production to prevent cross subsidisation of electricity. But no specific support scheme for CHP available.
Support framework for grid infrastructure	<ul style="list-style-type: none"> There is an ongoing support system in place which aims to increase even more the use of geothermal energy with new district heating plants, enlargement of older ones or heat pumps.
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> Space heating of residential buildings is subsidized by the state for those areas where geothermal based district heating systems are not reachable.
Statutory provisions	<ul style="list-style-type: none"> Act on Survey and Utilisation of Ground Resources, No. 57/1998 Electricity Act, No. 65/2003 Natur Conservation Act Planning and Building Act Energy Law
Relevant authorities and supervision	<ul style="list-style-type: none"> Orkustofnun - National Energy Authority (NEA) is a government agency under the Ministry of Industries and Innovation. Its main responsibilities are to advise the Government of Iceland on energy issues and related topics, license and monitor the development and exploitation of energy and mineral resources, regulate the operation of the electrical transmission and distribution system and promote energy research. The Iceland Geothermal Cluster contributes to increased competitiveness and increased value proposition in the geothermal industry. Samorka is the association of the Icelandic electricity industry, district heating, waterworks and sewage utilities.

³⁷⁹ <https://norden.diva-portal.org/smash/get/diva2:1098961/FULLTEXT01.pdf>

³⁸⁰ Source: Own survey with national DHC stakeholders

³⁸¹ Source: Own survey with national DHC stakeholders, see also

<https://www.althingi.is/laqas/135b/1967058.html>

District Heating and Cooling in the European Union

Overview of Markets and Regulatory Frameworks under the Revised Renewable Energy Directive

Regulatory framework, authorities and supervision, statistical reporting	
Statistical reporting methods and sources	<ul style="list-style-type: none"> Statistics Iceland is the National Statistical Institute of Iceland. Statistics Iceland is the centre for official statistics in Iceland and has the leading role in the organisation, coordination and conduct thereof. Information on their methods can be found on their website.³⁸²
Sources	<ul style="list-style-type: none"> Euroheat & Power, Country by Country Report 2019, https://www.euroheat.org/cbc_publications/cbc2019/iceland/ RES legal, http://www.res-legal.eu/ IEA policy database, https://www.iea.org/policies NEA, https://nea.is/ Iceland Geothermal Cluster, http://www.icelandgeothermal.is/ Samorka, https://www.samorka.is/en/ Patronen, J. et al. (2017): Nordic heating and cooling https://norden.diva-portal.org/smash/get/diva2:1098961/FULLTEXT01.pdf Legal Framework and National Policy for Geothermal Development in Iceland Ketilsson et al. (2015): https://pangea.stanford.edu/ERE/db/WGC/papers/WGC/2015/03019.pdf NECP, https://ec.europa.eu/energy/sites/ener/files/documents/dir_2009_0028_action_plan_iceland_nreap.pdf

Table 139: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> The Consumer Agency is one of the governmental agencies in Iceland which is entrusted with market surveillance of business operators, good functioning and transparency of the markets in respect to safety and consumers legal rights as well as enforcement of legislation adopted by the Icelandic Parliament for protection of consumers health, legal and economical rights.³⁸³ The Consumer Association of Iceland is an open association that works toward supporting a set of consumer-advocacy matters. These matters are determined independently by the organization and are not governed by any legislation. The association also operates a counselling and complaints service which is open to both members and non-members.³⁸⁴
Available information on consumer perception and satisfaction	<ul style="list-style-type: none"> Orkuveita Reykjavíkur Reykjavík Energy, an Icelandic energy and utility company said in their 2019 annual report that 96.5% of customers were satisfied (includes all subsidiaries, not only DHC) and reliability of the utilities was close to 100%.³⁸⁵

³⁸² <https://www.statice.is/about-statistics-iceland/quality-and-security-policy/>

³⁸³ <https://www.neytendastofa.is/>

³⁸⁴ https://verfur.island.is/en/consumer_issues/advises_complains_legal_assistace/consumer_advice/

³⁸⁵ <https://annualreport2019.or.is/society/>

Norway

Table 140: Size of the cities served by DHC and geographical concentration

	DH	DC
% of DHC networks according to the number of inhabitants (2018)	<p style="text-align: center;">% of DH networks according to the number of inhabitants</p> <ul style="list-style-type: none"> ■ < 20 000 inhabitants ■ 20 000 inhabitants < ... < 100 000 inhabitants ■ 100 000 inhabitants < ... < 500 000 inhabitants ■ > 500 000 inhabitants 	<p style="text-align: center;">% of DC networks according to the number of inhabitants</p> <ul style="list-style-type: none"> ■ < 20 000 inhabitants ■ 20 000 inhabitants < ... < 100 000 inhabitants ■ 100 000 inhabitants < ... < 500 000 inhabitants ■ > 500 000 inhabitants
Geographical concentration of the DHC systems	<ul style="list-style-type: none"> ○ All the major cities and many small and medium-sized towns have a DH network. ○ The region of Viken presents the highest number of DH networks 	<ul style="list-style-type: none"> ○ DC is available in a few large cities (Oslo, Kristiansand, Stavanger, Sandnes)
Sources	<ul style="list-style-type: none"> ○ Norsk Fkernvarme Statistics 2018 and 2019³⁸⁶ ○ Own survey with national DHC stakeholders 	

Table 141: Ownership of the DHC networks

	DH	DC
Ownership description	<ul style="list-style-type: none"> ○ Most DH networks are owned by energy companies and many energy companies are in public ownership ○ Therefore, DH systems are mainly owned by the public sector. Small systems can be owned by private investors. 	<ul style="list-style-type: none"> ○ DC networks are mainly private
Sources	<ul style="list-style-type: none"> ○ Own survey with national DHC stakeholders 	

Table 142: Main suppliers and level of competition

	DH	DC																																												
Main suppliers and market share in terms of energy sales (2018)	<p>Main DH suppliers in terms of energy sales</p> <table border="1"> <thead> <tr> <th>Supplier</th> <th>Share (%)</th> </tr> </thead> <tbody> <tr><td>Other smaller suppliers</td><td>21%</td></tr> <tr><td>Agder Energi/Varme</td><td>3%</td></tr> <tr><td>Nydalen Energi</td><td>0.40%</td></tr> <tr><td>Veolia Norge</td><td>0.40%</td></tr> <tr><td>Akerhus Energi/Varme</td><td>4%</td></tr> <tr><td>Oslofjord Varme</td><td>4%</td></tr> <tr><td>Lyse Neo</td><td>4%</td></tr> <tr><td>BKK Varme</td><td>6%</td></tr> <tr><td>Eidsiva Bioenergi</td><td>8%</td></tr> <tr><td>Statkraft Varme</td><td>17%</td></tr> <tr><td>Fortum Oslo Varme</td><td>32%</td></tr> </tbody> </table>	Supplier	Share (%)	Other smaller suppliers	21%	Agder Energi/Varme	3%	Nydalen Energi	0.40%	Veolia Norge	0.40%	Akerhus Energi/Varme	4%	Oslofjord Varme	4%	Lyse Neo	4%	BKK Varme	6%	Eidsiva Bioenergi	8%	Statkraft Varme	17%	Fortum Oslo Varme	32%	<p>Main DC suppliers in terms of energy sales</p> <table border="1"> <thead> <tr> <th>Supplier</th> <th>Share (%)</th> </tr> </thead> <tbody> <tr><td>Other smaller suppliers</td><td>1%</td></tr> <tr><td>Agder Energi/Varme</td><td>7%</td></tr> <tr><td>Nydalen Energi</td><td>8%</td></tr> <tr><td>Veolia Norge</td><td>27%</td></tr> <tr><td>Akerhus Energi/Varme</td><td>7%</td></tr> <tr><td>Oslofjord Varme</td><td>40%</td></tr> <tr><td>BKK Varme</td><td>0.10%</td></tr> <tr><td>Stakraft Varme</td><td>9%</td></tr> <tr><td>Fortum Oslo Varme</td><td>1%</td></tr> </tbody> </table>	Supplier	Share (%)	Other smaller suppliers	1%	Agder Energi/Varme	7%	Nydalen Energi	8%	Veolia Norge	27%	Akerhus Energi/Varme	7%	Oslofjord Varme	40%	BKK Varme	0.10%	Stakraft Varme	9%	Fortum Oslo Varme	1%
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Fortum Oslo Varme	1%																																													
Market description	<ul style="list-style-type: none"> ○ There are around 100 DH suppliers ○ By far the largest DH network is in Oslo, owned by Fortum Oslo Varme. ○ Fortum Oslo Varme, Stakraft Varme and Eidsiva have more than 50 % of all DH supply in Norway. 	<ul style="list-style-type: none"> ○ There are around 20 DC suppliers 																																												

³⁸⁶ <https://www.fjernkontrollen.no/arendal/>

	DH	DC
Sources	Norsk Fkernvarme Statistics 2018 and 2019	

Table 143: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> In accordance with the Energy Act, a general license is required for district heating plants with a total power output of more than 10 MW. Licences are granted based upon a rigorous socio-economic-environmental assessment that demonstrates that DH is the most viable option.³⁸⁷ There is also an option to apply for a license for smaller plants if the developer wants the municipal authority to impose compulsory connection to the district heating system on relevant customers.
Regulation of prices for consumers	<ul style="list-style-type: none"> The DH price cannot be higher than the alternative cost of other heating sources in the respective concession areas.³⁸⁸ If it is mandatory for the customer to be connected to the installation, it is possible to appeal to the NVE (The Norwegian Water Resources and Energy Directorate) regarding prices and other conditions. However, the customer is obliged to pay a connection fee and an annual fee, regardless of if the district heat is used or not.³⁸⁹
Regulation of metering	<ul style="list-style-type: none"> Metering of district heating and cooling for billing purposes (interface supplier/consumer) is not regulated.³⁹⁰ Metering of DH is most commonly carried out when the hot water reaches the building. Currently there is very limited amount of individual meters on flat level.³⁹¹
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> Regarding external heat delivery in district heating concession areas, a district heating concession does not grant the concession owner a monopoly on heat delivery within the concession areas. Thus, an end-user can enter into heat delivery contracts with other suppliers. Other suppliers however will not be allowed to construct district heating facilities with installed capacity \geq 10 MW unless they have a concession, and only one concession is granted for each area. TPA is regulated in the Energy Act: DH operators are obliged to negotiate with any third parties requesting access (both to deliver to the network or to the end-user). The operator may however refuse such request due to technical or other reasons. Arguments against TPA are connected to security of supply and the risk that uncoordinated TPA will reduce positive environmental aspects and not necessarily reduce prices for the end-users. Grid operators are obliged to connect renewable energy plants to their grids without discriminating against certain plant operators. This obligation also applies if the realisation of the new connection requires the development of the grid.
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> The municipal council can resolve to order compulsory connection to plants that have been awarded licenses. This means that buildings constructed within the licensing area must be connected to the district heating system (exceptions may be granted by the municipalities). Building owners with mandatory connection are not obliged to use district heating as heating source even if they are connected to the district heating network. As building owners are still required to take the

³⁸⁷ Source: Own survey with national DHC stakeholders, see also <https://norden.diva-portal.org/smash/get/diva2:1098961/FULLTEXT01.pdf>

³⁸⁸ Source: Own survey with national DHC stakeholders, see also <https://norden.diva-portal.org/smash/get/diva2:1098961/FULLTEXT01.pdf>

³⁸⁹ Source: Own survey with national DHC stakeholders, see also <https://norden.diva-portal.org/smash/get/diva2:1098961/FULLTEXT01.pdf>

³⁹⁰ Source: Own survey with national DHC stakeholders

³⁹¹ <https://norden.diva-portal.org/smash/get/diva2:1098961/FULLTEXT01.pdf>

Regulatory framework, authorities and supervision, statistical reporting	
	investment cost to ensure that they meet the technical requirements in order to connect and receive heat from the district heating network, the cost burden of mandatory connection makes district heating use economic for most building owners. ³⁹²
Support framework for renewable heat	<ul style="list-style-type: none"> Norway promotes renewable energy through a quota system including a certificate trading scheme. The main incentive for the use of renewable energy is a quota system in terms of quota obligations and a certificate trading system. The Electricity Certificates Act obliges electricity suppliers and certain electricity consumers to prove that a certain quota of the electricity supplied by them was generated from renewable sources. Such proof shall be provided by means of tradable certificates allocated to renewable energy producers. Sweden and Norway introduced a common electricity certificate market on 1 January 2012. Enova manages the state subsidies of the energy fund whose purpose is to promote a climate friendly restructuring of the energy sector – both consumption and production.
Support framework for CHP	<ul style="list-style-type: none"> Eligible for green certificates but no other explicit support frame for CHP.
Support framework for grid infrastructure	<ul style="list-style-type: none"> Enova offers investment support for developments in production and distribution of district heating from renewable energy sources. – Measures eligible for support by Enova: <ul style="list-style-type: none"> Establishment of power plants and infrastructure based on renewable energy sources Expansion and densification of already existing district heating and - cooling facilities Conversion from fossil fuel production to renewable energy production in existing power plants Enova also offers investment aid to households undertaking energy efficiency measures, measures aimed at decreasing energy consumption or conversion from heating sources based on fossil fuels or electricity to a renewable source. Enova offers investment aid to renewable heat production, which shall contribute to increased use of other energy carriers than electricity, natural gas and oil for heating. Enova has support program in place aimed at small heating plants and larger district heating plants and a support program directed towards industrial production of biogas. Tax deduction of the electricity tax for electricity used in DHC production, including el-boilers (the energy tax regulations).
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> There is an obligation to connect to district heating, covering waterborne systems in buildings located in DH areas. No taxation for district cooling District cooling: lower prices than for electricity End-user investments for air-to-water- and liquid-to-water heat pumps are subsidised
Statutory provisions	<ul style="list-style-type: none"> Energy Act: Chapter 5 regulates the licensing for district heating plants, mandatory connections and delivery, prices and shut downs of DH plants Olje- og energidepartementet 2015 [Forskrift om produksjon, omforming, overføring, omsetning, fordeling og bruk av energi m.m. (energilovforskriften)]: energy regulatory regarding specific conditions for licensing Det Kongelige Olje- og Energidepartement, 2016 [Meld. St. 25 (2015-2016) - Kraft til endring - Energipolitikken mot 2030]: Recommendation from the Ministry of Petroleum and Energy. It presents an energy policy towards 2030, where energy supply, climate challenges and business development are viewed in context. Electricity Certificate Act Planning and Building Act: rules regarding a building's connection to

³⁹² <https://norden.diva-portal.org/smash/get/diva2:1098961/FULLTEXT01.pdf>

District Heating and Cooling in the European Union

Overview of Markets and Regulatory Frameworks under the Revised Renewable Energy Directive

Regulatory framework, authorities and supervision, statistical reporting	
Relevant authorities and supervision	<p>infrastructure, including connection to district heating networks</p> <ul style="list-style-type: none"> • Enova is a public agency responsible for promoting environmentally friendly and efficient energy use, energy production and the development of renewable technologies; subordinate of Ministry of Oil and Energy • Norwegian Water and Energy Directorate (NVE) is responsible for handling and granting of district heating concessions, supervising authority for the district heating market (Subordinate agency to the Ministry of Oil and Energy) • Ministry of Local Government and Modernization is the legal and responsible authority regarding regulations on mandatory district heating connection for end-users • Ministry of Petroleum and Energy is the legal and responsible authority regarding The Energy Act and overall energy policy • Ministry of Climate and Environment is responsible for overall climate policies and emission targets affecting market players; not responsible for laws or regulations directly related to district heating market • Norsk Fjernvarme is the interest organization for market players in the district heating sector, main purpose is to ensure a good political and regulatory framework and to promote and provide information on the district heating sector
Statistical reporting methods and sources	<ul style="list-style-type: none"> • Statistikk Sentralbyra (Statistic Norway, SSB) is the national statistical institute of Norway and the main producer of official statistics. They are responsible for collecting, producing and communicating statistics related to the economy, population and society at national, regional and local levels. Information on their methods can be found on their website.³⁹³
Sources	<ul style="list-style-type: none"> • Euroheat & Power, Country by Country Report 2019, https://www.euroheat.org/publications/country-by-country/ • RES legal, http://www.res-legal.eu/ • JRC, Analysis of Member States' rules for allocating heating, cooling and hot water costs, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106729/kjna28630enn%281%29.pdf • IEA policy database, https://www.iea.org/policies • Patronen J. et al. (2017): Nordic heating and cooling, https://norden.diva-portal.org/smash/get/diva2:1098961/FULLTEXT01.pdf • Knudsen, K. (2014): Policy framework for the interaction between buildings and the energy system in Norway, https://www.sintef.no/globalassets/sintef-energi/interact/tr-a7453-policy-framework-for-the-interaction-between-buildings-and-the-energy-system-in-norway-2014.pdf • Enova, https://www.enova.no/ • NVE, https://www.nve.no/english/ • Norsk Fjernvarme, https://www.fjernvarme.no/

Table 144: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> • The Consumer Council of Norway (Forbrukerrådet) is a government agency and consumer protection organisation.³⁹⁴ • The Norwegian Water and Energy Directorate is dealing with complaints regarding mandatory DH connections.³⁹⁵
Available information on consumer	<ul style="list-style-type: none"> • According to ClimateXChange (2018), DH networks in Norway in some concession areas have been operational for decades and so DH is just assumed as 'the norm'. While consumer protection responsibilities are an

³⁹³ <https://www.ssb.no/en/omssb/om-oss/organisasjonskart/metodeutvikling-og-datainnsamling>

³⁹⁴ <https://www.forbrukerradet.no/contact-us/>

³⁹⁵ <https://norden.diva-portal.org/smash/get/diva2:1098961/FULLTEXT01.pdf>

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perception and satisfaction	aspect of licensing, this does not appear to be an area of great focus in Norway. In Nordic countries, inequality is not as pertinent an issue as in other parts of Europe. Annual customer complaints are low which is indicative of satisfaction with prices and service delivery in general. Only consumers of a licenced scheme can raise complaints through NVE. ³⁹⁶
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³⁹⁶ <https://www.climateexchange.org.uk/media/3569/lessons-from-european-district-heating-regulation.pdf>

Ukraine

There is no DC system.

Table 145: Size of the cities served by DH and geographical concentration

	DH
Geographical concentration of the DH systems	<ul style="list-style-type: none"> ○ Ukraine has a quite developed district heating (DH) infrastructure in all major urban settlements.
Sources	<ul style="list-style-type: none"> ○ Keep Warm, Improving the performance of District Heating Systems in Central and Eastern Europe³⁹⁷

Table 146: Ownership of the DHC networks

networks	DH
Ownership description	<ul style="list-style-type: none"> ○ District heating systems are managed by municipal district heating companies that provide heat to private and public clients under the supervision of either local municipalities or the National Commission for State Energy and Public Utilities Regulation
Sources	<ul style="list-style-type: none"> ○ Keep Warm, Improving the performance of District Heating Systems in Central and Eastern Europe

Table 147: Main suppliers and level of competition

	DH
Market description	<ul style="list-style-type: none"> ○ DH companies remain monopolies on heat supply and distribution in major urban settlements. ○ Limited competition results in sector's inefficiencies and prevents new players (and investment) from entering the sector.
Sources	<ul style="list-style-type: none"> ○ Keep Warm, Improving the performance of District Heating Systems in Central and Eastern Europe

Table 148: Factsheet on regulatory framework, competent authorities and supervision, statistical reporting methods and sources

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of ownership and operatorship of the DHC system	<ul style="list-style-type: none"> • The Ukrainian Law "On Natural Monopolies" recognises the transportation of heat as a natural monopoly activity, while heat generation and supply are the activities at adjacent markets. At the same time, heat generation, supply and transportation are all executed by the same companies, creating few, if any, market incentives to improve the quality and prices of the delivered services.³⁹⁸ • Heat producers must obtain license from NERC. Heat transportation and supply companies must obtain licenses from the Ministry of Construction and Housing and Communal Services.³⁹⁹
Regulation of prices for consumers	<ul style="list-style-type: none"> • On 21 March 2017 Draft Law No. 4334 "On amendments to Law of Ukraine 'On Heat Supply' on stimulation of heat energy production from alternative energy sources" was adopted. The Draft Law provides for additional powers by local self-government bodies to set heat energy tariffs; and sets tariffs for heat energy produced from alternative energy sources used by population and organization financed from state and municipal budgets at the level of 90% of the existing tariff for heat

³⁹⁷ <https://keepwarmeurope.eu/>

³⁹⁸ https://keepwarmeurope.eu/fileadmin/user_upload/country-pages/Ukraine/KeepWarm_DH_in_Ukraine.pdf

³⁹⁹ <https://case-ukraine.com.ua/content/uploads/2018/09/2.pdf>

Regulatory framework, authorities and supervision, statistical reporting	
Regulation of metering	<p>produced from natural gas for the abovementioned categories of customers.⁴⁰⁰</p> <ul style="list-style-type: none"> In 2017 a law on mandatory installation of heat and water meters in residential buildings came into force. The law on commercial metering of services for supply of thermal energy and water obliges operators of external engineering networks (heating networks, water canals) to equip 100 percent of residential houses with per house accounting nodes (heat energy, water) (equipping must be finished by August 2019).⁴⁰¹ The costs for equipment of houses with meters, incurred by the operator of external engineering networks, are to be reimbursed by consumers of the utilities in every building by paying a fee for establishing a house meter unit. In addition, in multi-apartment buildings and other buildings where there are more than one consumer, the law provides for mandatory installation of individual (residential) metering devices (or heat distribution devices) that are used to distribute the readings of the home metering device. The law prohibits connection to external engineering networks of constructed buildings that are not equipped with meters according to its requirements.⁴⁰²
Regulation regarding grid access and usage (supply perspective)	<ul style="list-style-type: none"> Introduction of heat market in the country based on the competitive access to the heat transportation grid shall provide significant impetus for DHS development and modernization. Draft legislation enabling a competitive heat market is already in the Ukrainian Parliament. Here the transport of heat within DHS may be executed by a municipal monopoly, while heat generation and supply could be covered by different market players.⁴⁰³
Regulation regarding grid access and usage (demand perspective)	<ul style="list-style-type: none"> The connection or disconnection of consumers is (most likely) approached individually by the system operator. No specific regulation could be found.
Support framework for renewable heat	<ul style="list-style-type: none"> No specific support program for RES plants could be found.
Support framework for CHP	<ul style="list-style-type: none"> No specific support program for CHP could be found.
Support framework for grid infrastructure	<ul style="list-style-type: none"> The Sweden-Ukraine District Heating Programme (SUDH) is managed by NEFCO. It is directed at financing and supporting environmentally sustainable, energy-efficient district heating investment projects all over Ukraine. The majority of the pipelines produced of black steel with poor insulation and has been in use for more than 25 years. Consequently, the district heating systems in Ukraine have high losses and, as a result and due to an overwhelming share of fossil fuels in the generation mix, very high CO2 and other emissions. In some extreme cases, the poor condition of the infrastructure leads to incidents that risk the integrity of the heat supply to the residents. THE SUDH aims to update the system to current technology.⁴⁰⁴ KeepWarm is an EU-funded project whose objective is to accelerate cost-effective investments in the modernisation of District Heating Systems (DHS). DH operators in many countries, including the Ukraine are being trained in understanding the opportunities of improved energy efficiency and transitioning to sustainable energy systems.⁴⁰⁵

⁴⁰⁰ https://www.asterslaw.com/press_center/publications/ukraine_promotes_heat_energy_production_from_alternative_energy_resources/

⁴⁰¹ <https://censor.net.ua/en/n450036>

⁴⁰² <https://censor.net.ua/en/n450036>

⁴⁰³ https://keepwarmeurope.eu/fileadmin/user_upload/country-pages/Ukraine/KeepWarm_DH_in_Ukraine.pdf

⁴⁰⁴ <https://www.nefco.org/news/sweden-ukraine-district-heating-programme-is-launched/>

⁴⁰⁵ https://keepwarmeurope.eu/fileadmin/user_upload/country-pages/Ukraine/KeepWarm_DH_in_Ukraine.pdf

Regulatory framework, authorities and supervision, statistical reporting	
Support framework for other elements of the DHC systems	<ul style="list-style-type: none"> Energy Efficiency Fund of Ukraine (EEFU) – targets energy efficiency improvements of multi-apartment buildings managed by homeowners associations.⁴⁰⁶
Statutory provisions	<ul style="list-style-type: none"> Draft Law 4334 on the promotion of heat production from alternative sources
Relevant authorities and supervision	<ul style="list-style-type: none"> National Commission for State Regulation in the Energy Sector and Utilities (NERC) is responsible for the state regulation in order to achieve a balance of interests of consumers, economic entities operating in the fields of energy and utilities, and the state, ensuring energy security, European integration of the electricity and natural gas markets of Ukraine (e.g. sets tariffs for heat and electricity). State Agency on Energy Efficiency and Energy Saving of Ukraine (SAEE) is responsible for developing and implementing energy efficiency and renewable energy government policy Ministry of Ecology and Natural Resources is a central executive authority activity of which is governed and coordinated by the Cabinet of Ministers of Ukraine (e.g. issues and revokes licensing of all natural resources at national and regional levels)
Statistical reporting methods and sources	<ul style="list-style-type: none"> State Statistics Service of Ukraine (Ukrstat) is the government agency responsible for the collection and dissemination of statistics in Ukraine.
Sources	<ul style="list-style-type: none"> IEA policy database, https://www.iea.org/policies NERC, http://www.nerc.gov.ua/ SAEE, http://saee.gov.ua/en/ Ministry of Ecology and Natural Resources, http://eng.menr.gov.ua/ Ukrstat, https://ukrstat.org/en

Table 149: Factsheet on consumer perception and protection

Consumer perception and protection	
Associations and authorities for consumer protection	<ul style="list-style-type: none"> Responsible for consumer protection is the Ministry of Economy, Trade and Agriculture.⁴⁰⁷ National Energy and Utilities Regulatory Commission (NEURC) regulates the Energy Sector including DHC.⁴⁰⁸
Available information on consumer perception and satisfaction	<p>Public consultations on social concerns and issues about DH services were conducted by the World Bank in 2012 in two representative cities: Lviv and Mykolaiv.⁴⁰⁹ Participants expressed a general mistrust of DH companies and Zheks (Municipally-Owned Building Management Company). Lack of trust stems from:</p> <ul style="list-style-type: none"> Unfair and non-transparent billing Poor quality of service. E.g. DH companies start the heating season later and stop heat supply prior to the established start/end date, while charging for the whole heating season or lack of routine maintenance. Affordability. Rise in heating costs.

⁴⁰⁶ <https://www.iea.org/policies> and <https://eefund.org.ua/en/about-us>⁴⁰⁷ <https://www.me.gov.ua/Documents/Detail?lang=en-GB&id=10693908-aae4-4fc7-8bc4-c73abd1f2d18&title=InformationInTheFieldOfConsumerRightsProtection>⁴⁰⁸ <http://www.nerc.gov.ua/>⁴⁰⁹ <https://dhinfrastructure.com/wp-content/uploads/2015/03/Ukraine-DH-report-Feb-ENG.pdf>, p. 6 - 8

Annex 2: List of regulatory authorities

Table 150: List of regulatory authorities and relevant associations

Country	Authorities and associations
Austria	<ul style="list-style-type: none"> E-Control, https://www.e-control.at/ Austrian Federal Competition Authority (BWB), https://www.bwb.gv.at/en Independent association of the Austrian gas and heating business (FGW), http://www.gaswaerme.at/ Conciliation body for consumer transactions, https://www.verbraucherschlichtung.at/
Belgium	<ul style="list-style-type: none"> Flemish Energy Agency, https://www.energiesparen.be/over_vea Belgian Competition Authority, https://www.belgiancompetition.be/en
Bulgaria	<ul style="list-style-type: none"> Energy and Water Regulatory Commission, http://www.dker.bg/en/home.html Commission for Protection of Competition, http://www.cpc.bg/Default.aspx
Croatia	<ul style="list-style-type: none"> Croatian Energy Regulatory Agency, https://www.hera.hr/en/html/index.html Croatian Competition Agency, http://www.aztn.hr/
Cyprus	<ul style="list-style-type: none"> Ministry of Energy, Commerce and Industry, http://www.mcit.gov.cy/mcit/mcit.nsf/index_el/index_el?OpenDocument Commission for the Protection of Competition, http://www.competition.gov.cy/competition/competition.nsf/index_en/index_en?OpenDocument
Czech Republic	<ul style="list-style-type: none"> Energy regulatory office, https://www.eru.cz/cs/ Association for the District Heating of the Czech Republic, http://www.tscr.cz/?lang=en The Office for the Protection of Competition, https://www.uohs.cz/en/homepage.html
Denmark	<ul style="list-style-type: none"> Danish Energy Agency, https://ens.dk/en
Estonia	<ul style="list-style-type: none"> Competition Authority, https://www.konkurentsiamet.ee/en Estonian Power and Heat Association, https://epha.ee/
Finland	<ul style="list-style-type: none"> Ministry of Economic Affairs and Employment (MEAE), https://tem.fi/en/frontpage Finnish Energy, https://energia.fi/en Finnish Competition and Consumer Authority, https://www.kkv.fi/en/
France	<ul style="list-style-type: none"> Agency of the Environment and the Control of Energy (ADEME), https://www.ademe.fr/en Autorité de la Concurrence, https://www.autoritedelaconcurrence.fr/fr Direction générale de la concurrence, de la consommation et de la répression des fraudes (DGCCRF), https://www.economie.gouv.fr/dgccrf/consommation La Fédération nationale des collectivités concédantes et régies, http://www.fnccr.asso.fr/ Uniclima, http://www.uniclima.fr/
Germany	<ul style="list-style-type: none"> Federal Cartel Office (Bundeskartellamt), https://www.bundeskartellamt.de/ Consumer advice centre, https://www.verbraucherzentrale.de/
Greece	<ul style="list-style-type: none"> Regulatory Authority for Energy (RAE), http://www.rae.gr/old/en/about/main.htm Hellenic Competition Commission (HCC), https://www.epant.gr/en/ Hellenic Association for the Cogeneration of Heat and Power (HACHP), http://hacchp.gr/en/
Hungary	<ul style="list-style-type: none"> Hungarian Energy and Public Utility Regulatory Authority (HEA), http://www.mekh.hu/home Hungarian Competition Authority (Gazdasági Versenyhivatal - GVH), https://www.qvh.hu/en
Ireland	<ul style="list-style-type: none"> Sustainable Energy Authority of Ireland (SEAI), https://www.seai.ie/ Competition and Consumer Protection Commission (CCPC), https://www.ccpc.ie/ Irish District Energy Association (IRDEA), https://www.districtenergy.ie/
Italy	<ul style="list-style-type: none"> Regulatory Authority for Energy, Networks and Environment (ARERA) https://www.arera.it/it/index.htm Competition Authority (AGCM), https://www.agcm.it/
Latvia	<ul style="list-style-type: none"> Public Utilities Commission (PUC), https://www.sprk.gov.lv/en Competition Council of the Republic of Latvia, https://www.kp.gov.lv/en

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Country	Authorities and associations
Lithuania	<ul style="list-style-type: none"> • Latvian Heat Supply Association (LSUA), http://www.lsua.lv/layout.php?id=3&menu_id=1 • National Commission for Energy Control and Prices (NCECP), https://www.regula.lt/en/Pages/updates.aspx • State Consumer Rights Protection Authority, www.vartotojoteises.lt
Luxembourg	<ul style="list-style-type: none"> • Competition Council, https://concurrence.public.lu/fr.html • Luxemburger Regulatory Institute, https://web.ilr.lu/FR/ILR
Malta	<ul style="list-style-type: none"> • Regulator for Energy & Water Services (REWS), https://www.rews.org.mt/#/en/home
The Netherlands	<ul style="list-style-type: none"> • Netherlands Authority for Consumers and Markets (ACM), https://www.acm.nl/en • Ministry of Economic Affairs and Climate Policy, https://www.rijksoverheid.nl/ministeries/ministerie-van-economische-zaken-en-klimaat • Energie-Nederland, https://www.energie-nederland.nl/
Poland	<ul style="list-style-type: none"> • Energy Regulatory Office (ERO), https://www.ure.gov.pl/en • Office for Competition and Consumer Protection (UOKiK), https://www.uokik.gov.pl/home.php
Portugal	<ul style="list-style-type: none"> • Competition Authority (Autoridade da Concorrência, AdC), http://www.concorrencia.pt/vEN/Pages/Homepage-AdC-vEN.aspx
Romania	<ul style="list-style-type: none"> • Autoritatea Națională de Reglementare (ANRE), https://www.anre.ro/en/ • Competition Council, http://www.consiliulconcurrentei.ro/en/about-us.html • Asociația Romana pentru Promovarea Eficientei Energetice (ARPEE), http://arpee.org.ro/en/
Slovakia	<ul style="list-style-type: none"> • Regulatory Office for Network Industries, http://www.urso.gov.sk/?language=en • Antimonopoly Office of the Slovak Republic, https://www.antimon.gov.sk/antimonopoly-office-slovak-republic/
Slovenia	<ul style="list-style-type: none"> • Energy Agency, https://www.agen-rs.si/web/en • Slovenian Competition Protection Agency (CPA), http://www.varstvo-konkurenca.si/en/ • Ministry of Infrastructure, https://www.gov.si/en/state-authorities/ministries/ministry-of-infrastructure/
Spain	<ul style="list-style-type: none"> • National Commission on Markets and Competition (La Comisión Nacional de los Mercados y la Competencia, CNMC), https://www.cnmc.es/
Sweden	<ul style="list-style-type: none"> • Swedish Energy Agency, https://www.energimyndigheten.se/en/ • Swedish District Heating Board (unit within the Energy Agency) • Swedish Competition Authority, http://www.konkurrensverket.se/en
UK	<ul style="list-style-type: none"> • Department for Business, Energy & Industrial Strategy, https://www.gov.uk/government/organisations/department-for-business-energy-and-industrial-strategy • Heat Networks Delivery Unit (HNDU), https://www.gov.uk/guidance/heat-networks-delivery-unit • Association for Decentralised Energy (ADE), https://www.theade.co.uk/
Iceland	<ul style="list-style-type: none"> • Orkustofnun - National Energy Authority (NEA), https://nea.is/ • Iceland Geothermal Cluster, http://www.icelandgeothermal.is/ • Samorka, https://www.samorka.is/en/
Norway	<ul style="list-style-type: none"> • Norwegian Water and Energy Directorate (NVE), https://www.nve.no/english/ • Ministry of Local Government and Modernization, https://www.regjeringen.no/en/dep/kmd/id504/ • Ministry of Petroleum and Energy, https://www.regjeringen.no/en/dep/oed/id750/ • Ministry of Climate and Environment, https://www.regjeringen.no/en/dep/kld/id668/ • Norsk Fjernvarme, https://www.fjernvarme.no/
Ukraine	<ul style="list-style-type: none"> • State Agency on Energy Efficiency and Energy Saving of Ukraine (SAEE), http://saee.gov.ua/en/ • National Commission for State Regulation in the Energy Sector and Utilities (NERC), http://www.nerc.gov.ua/ • Ministry of Ecology and Natural Resources, http://eng.menr.gov.ua/

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