

District heating: European perspective

4th District Heating Workshop,
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Province House, Antwerp



DHC Market Outlook 2023

Euroheat & Power partners with national DHC associations, research institutes and industry organisations to compile data on the sector. The report provides analysis and insights tailored to inform policymakers, industry leaders and stakeholders



Overview

Methodology & Scope

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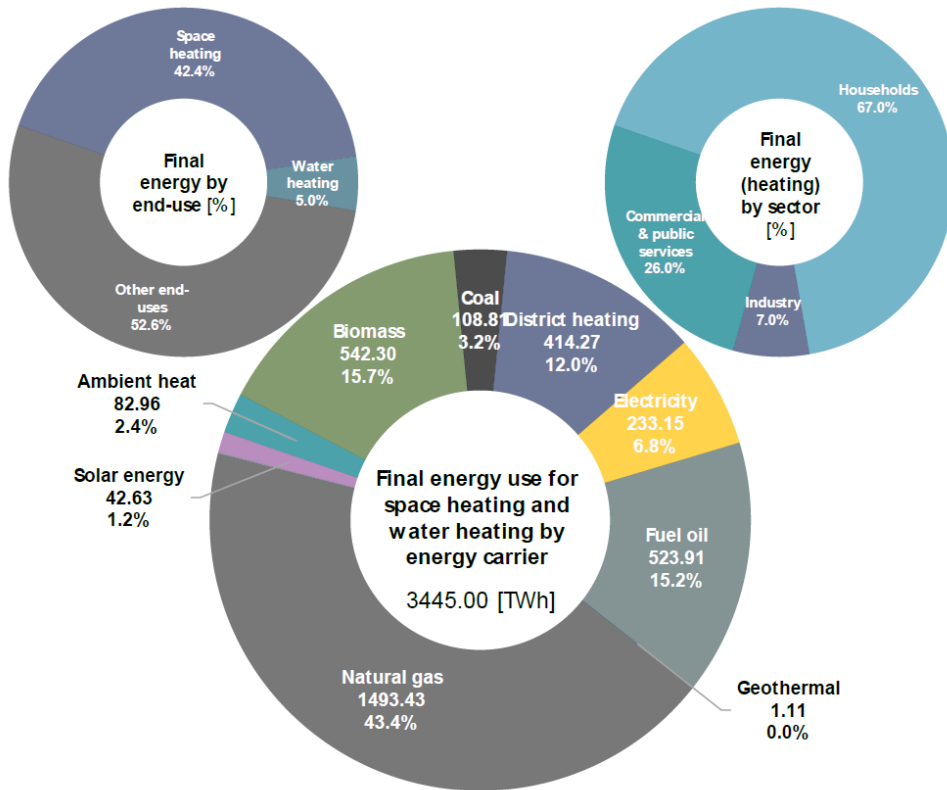
The war in Ukraine has exposed the dependence of Europe on fossil fuels and created a new impetus to decarbonise the heating sector. Space heating and hot water heating represent roughly half of Europe's final energy demand, with over 60% coming from fossil fuels.

The momentum for clean heat technologies has come, unleashing new opportunities for the District Heating and Cooling (DHC) sector. As an energy infrastructure DHC is a Swiss army knife for decarbonisation enabling the combined use of local renewable heat sources (e.g. sustainable bioenergy, geothermal, solar thermal), renewable electricity, and the recovery of excess heat from industrial and urban sources.

District Heating currently meets about 12% of final energy use for space and water heating for households, service and industry sectors. The Heat Roadmap Europe project highlighted the significant potential of District Heating to cut imported fossil fuels by using renewable energy and waste heat sources: the sector could grow to meet 50% of demands for space and water heating from the service and residential sectors!

DHC is also a critical infrastructure to provide energy storage enabling thereby the deployment of a greener and

Heat market: the challenge ahead



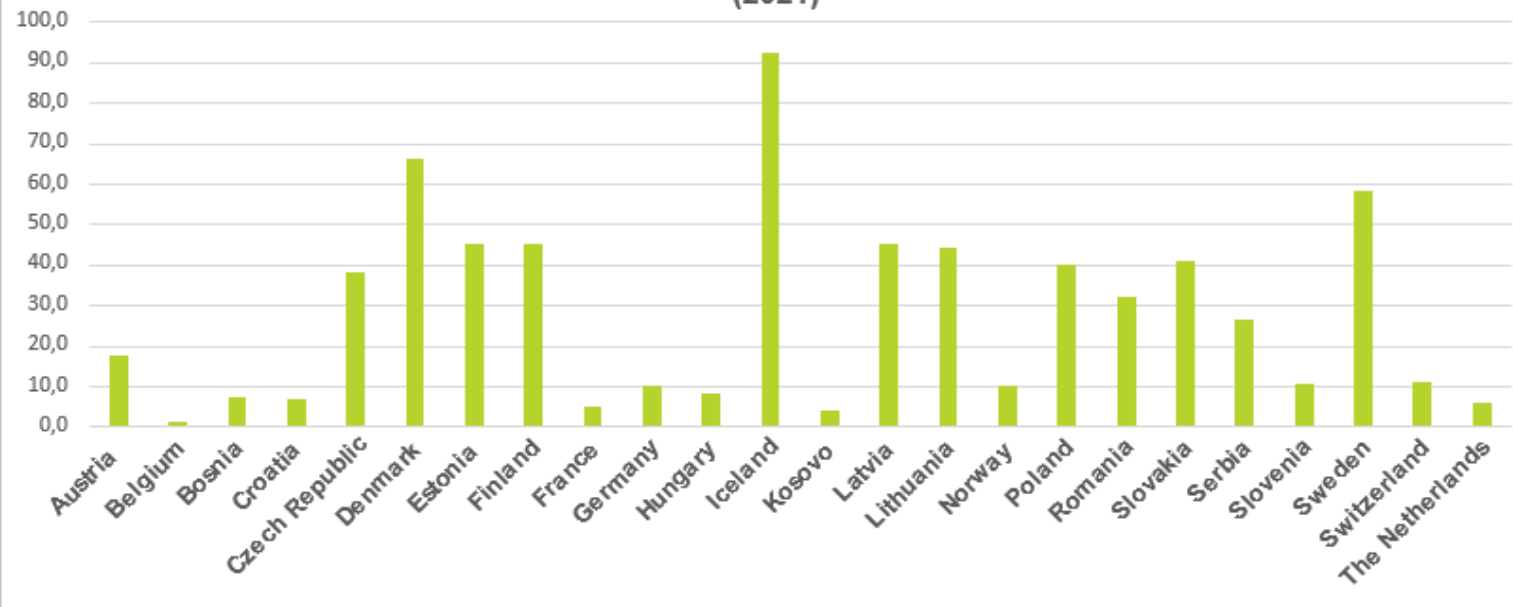
- Heating ≈ 50% of final energy consumption
- Large share of Direct Fossil
- Lack of diversified renewable heat sources
- Untapped potential for efficiency in building sector
- Gas imports feed the heat market
- Regulatory context:
 - REPowerEU to phase out (Russian) gas imports
 - European Green Deal = full heat market decarbonisation by 2050

Share of renewables in heating (primary energy) [%]



District Heating: a prominent European energy infrastructure

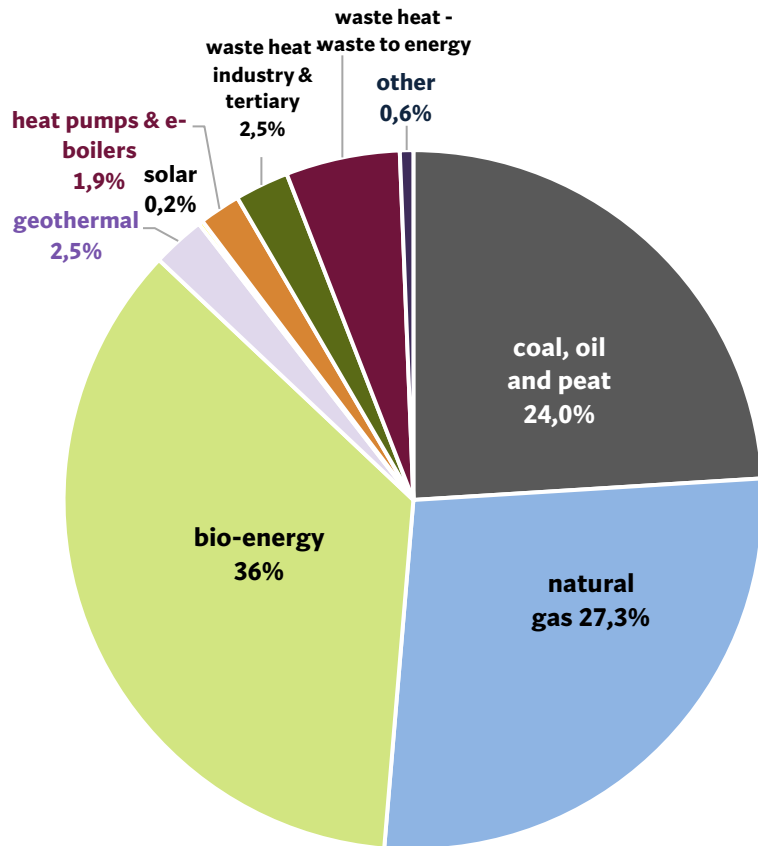
District Heating market share in heat demands from residential and service sectors
(2021)



- > 70 million citizens supplied in Europe
- 17 000 District Heating networks
- 187 000 kilometers of infrastructure (one-way)
- Capacity: >300 GWth*
- Heat sales: 500 TWh (2021)

*Austria, Bosnia Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Iceland, Italy, Latvia, Lithuania, Norway, Poland, Portugal, Romania, Serbia, Slovenia, Spain and Switzerland.

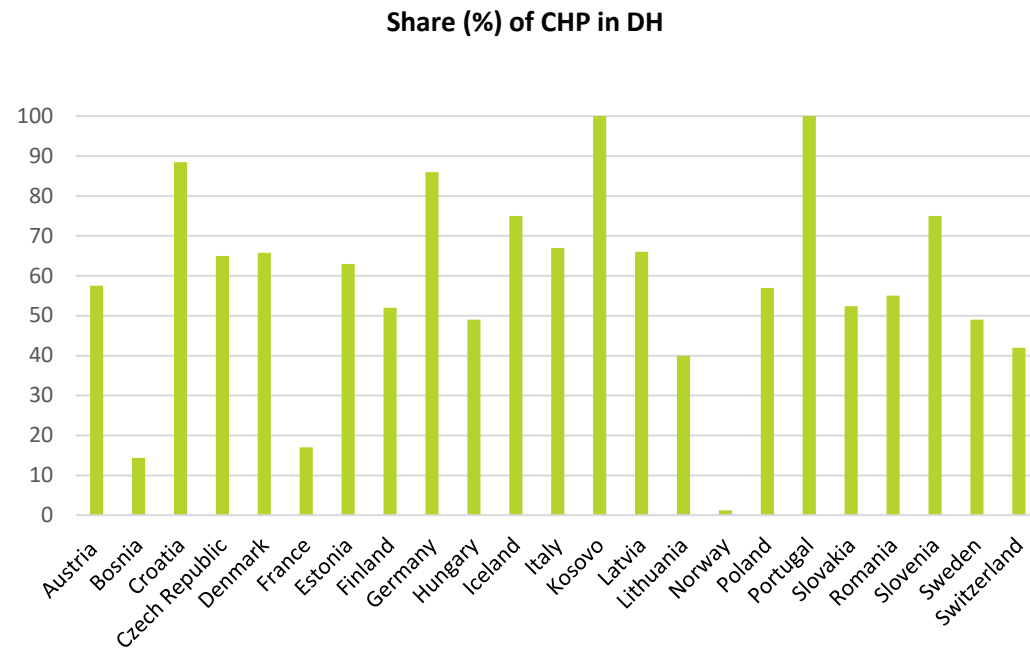
The EU DHC sector has already started its energy transition



- Renewable and waste heat: >40% of District Heat supply (2021)
- Robust diversification pathways - waste heat, renewable heat sources (geothermal, solar thermal, sustainable bioenergy)
- Key contribution of Combined Heat and Power (CHP) production

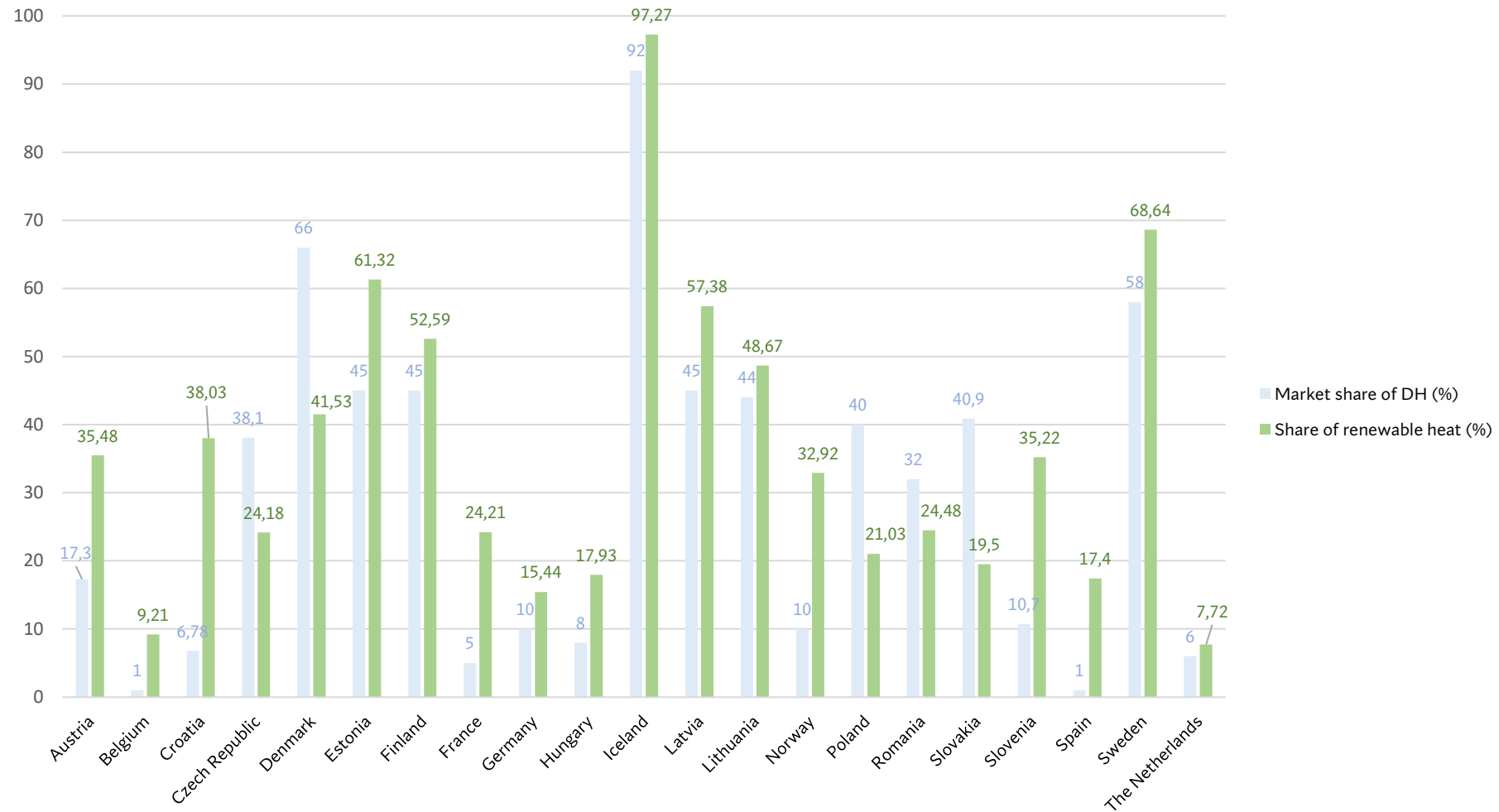
Fuel mix refers to the following countries: Austria, Bulgaria, Bosnia, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Iceland, Italy, Latvia, Lithuania, the Netherlands, Norway, Poland, Serbia, Slovenia and Sweden.

The key role of combined heat and power



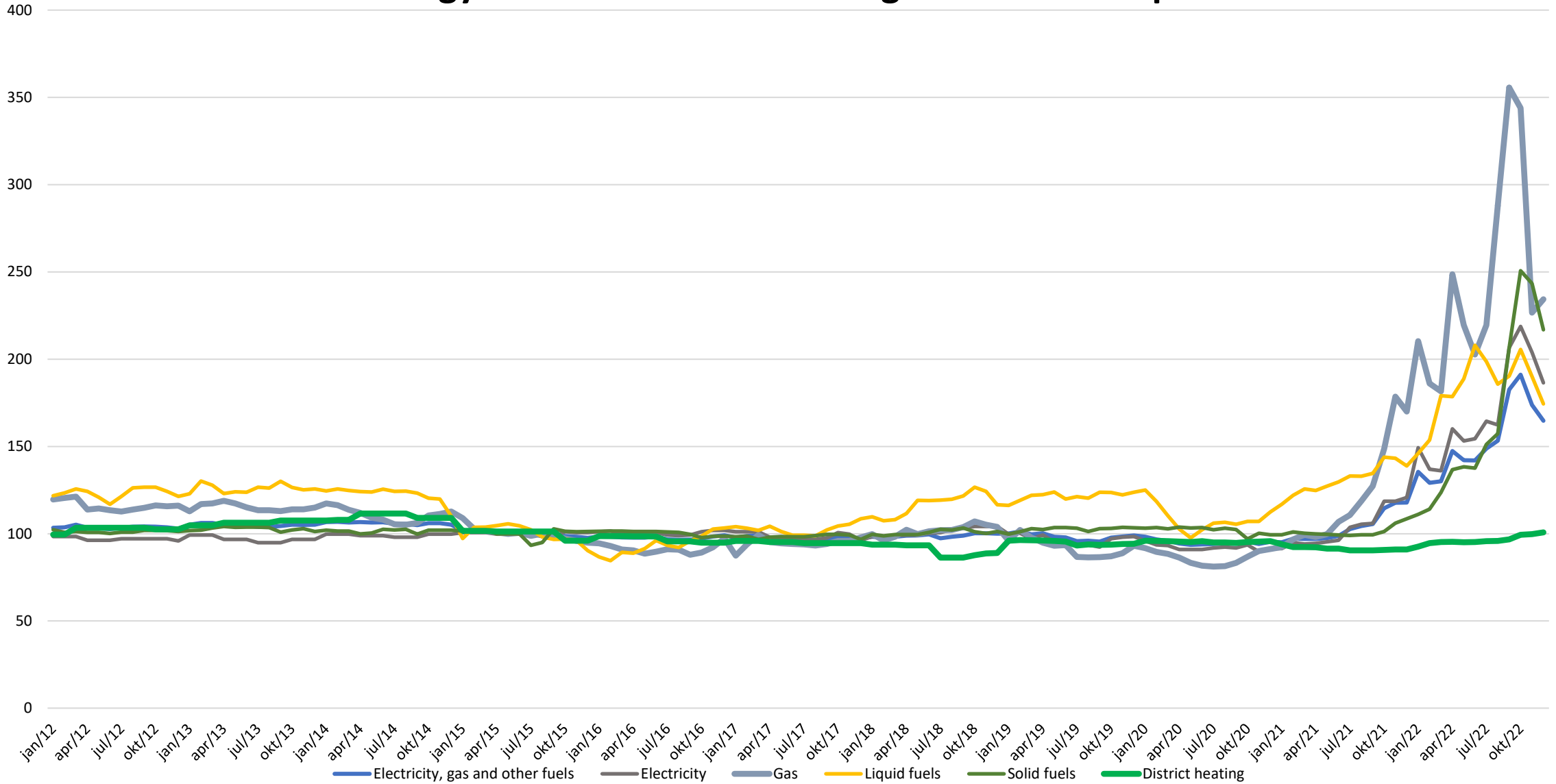
- Key role for CHP: 2/3 of DH supply for the top 6 DH markets
- A changing role in the context of a changing energy sector

District heating is instrumental to roll out renewable heat



Compared **market shares of district heating** (in energy sources to meet heating demands from residential/service sectors) **and shares of renewable energy in gross final consumption for heating and cooling** – source: Euroheat & Power and Eurostat (2021)

Energy crisis and district heating – Danish example



District heating: a growing solution in Europe

Countries	Expected growth (selected countries)	Source
France	+215k households/year	Estimate by the national association
Scotland	+ 650k households by 2030	Heat Network (Scotland) Act, (2021)
The Netherlands	+ 500k households by 2030	Climate agreement between government and sectors - Klimaatakkoord (2019)
Germany	+ between 300 and 600k households/year	Estimate by the national association
Denmark	+250/300k new households by 2028 (Phase out of 400k gas boilers to be replaced by District Heating and individual heat pumps)	Estimate by stakeholders
Austria	+ 350k new households	Forecast of Austrian Energy agency (2022)

- European context: Green Deal + REPowerEU
- As a response to the energy crisis, an increasing number of countries have developed ambitious strategies to deploy District heating & Cooling before 2030
- New measures in particular in countries with high share of natural gas heating (FR, DE, UK, NL..)
- > 6 million households to be connected by 2030
- European cities with at least one DH system represent a population of 140 million citizens = large potential for 'quick' expansion

[Link: Heat Roadmap Europe](#)

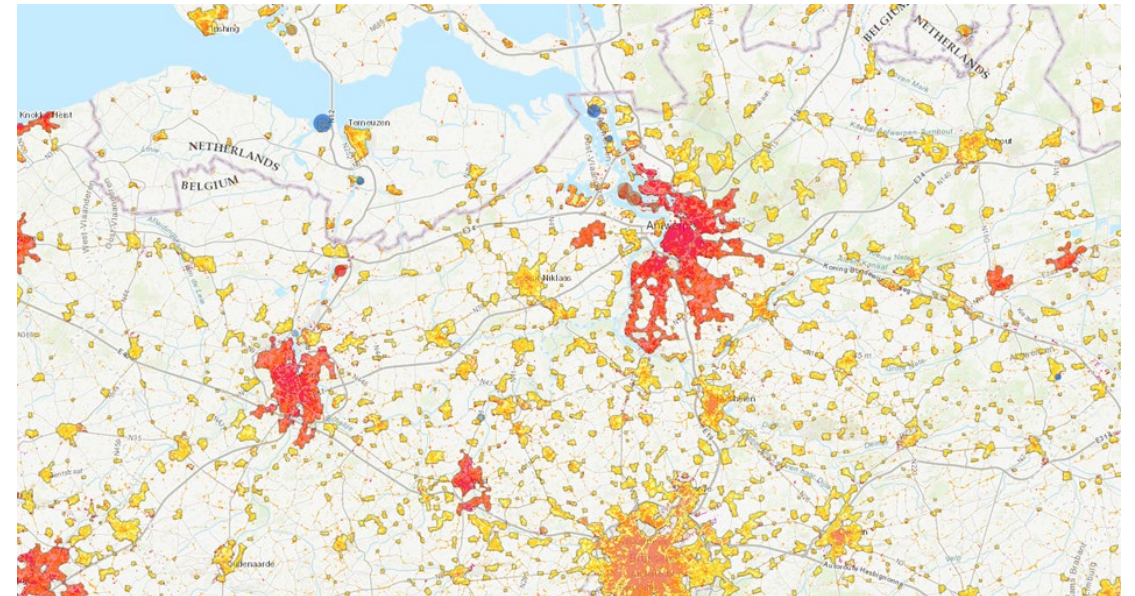
District heating pathways 2030-2050

- Greening of heat market goes hand in hand with increasing shares of DH on various markets
- Increasing shares of Renewable and Waste heat and District Heat Pumps (capacity + 100% by 2030)
- **New Aalborg study** points at 20% market share for DH by 2030 (against 12% today) and 48% by 2050
 - Renewed mix (geothermal, solar, waste heat sources)
 - EUR 144 billion investment by 2030 (infrastructure)



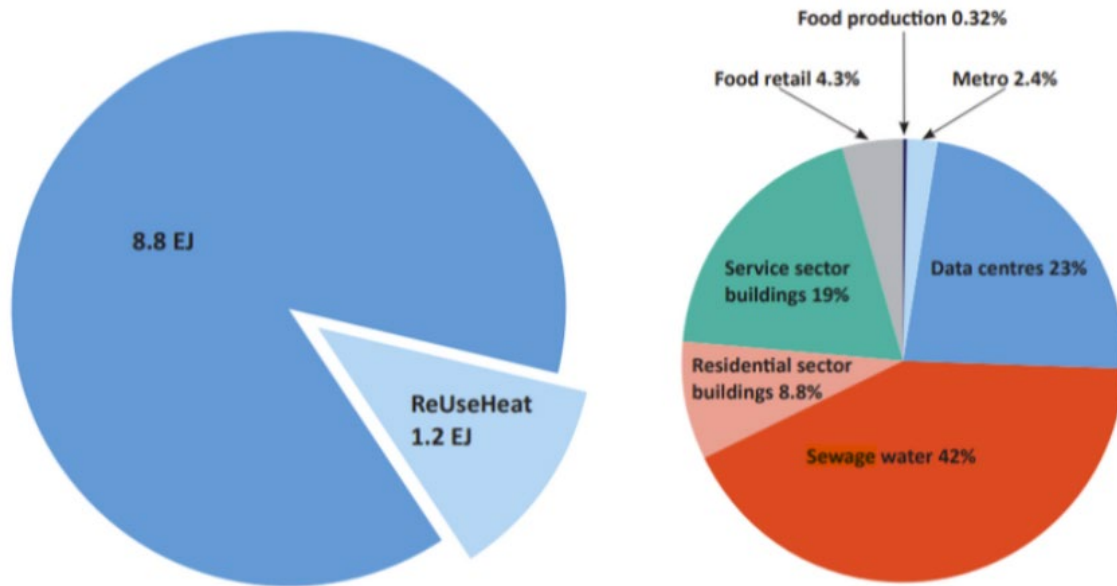
Industrial waste heat: optimizing synergies with industry efficiency

- Potential of (total) waste heat (2,860 TWh/y in EU) almost the size of demands for space and water heating from residential/service sectors buildings (Heat Roadmap Europe 2, 2013)
- Industrial waste heat key sectors: glass, cement, Iron & steel, aluminium, pulp & paper, chemical & refineries
- **High potential available: 64 TWh/y of excess heat (industrial installations)** could be used within a 10km range at a temperature of 95°C (>10% of EU 28 DH)
- With expansion of district Heating to cover new areas, almost all potential for this temperature range could be used (**415 PJ or 115 TWh/y at 95°C**)



[Link: sEEnergies Project \(2022\)](#)

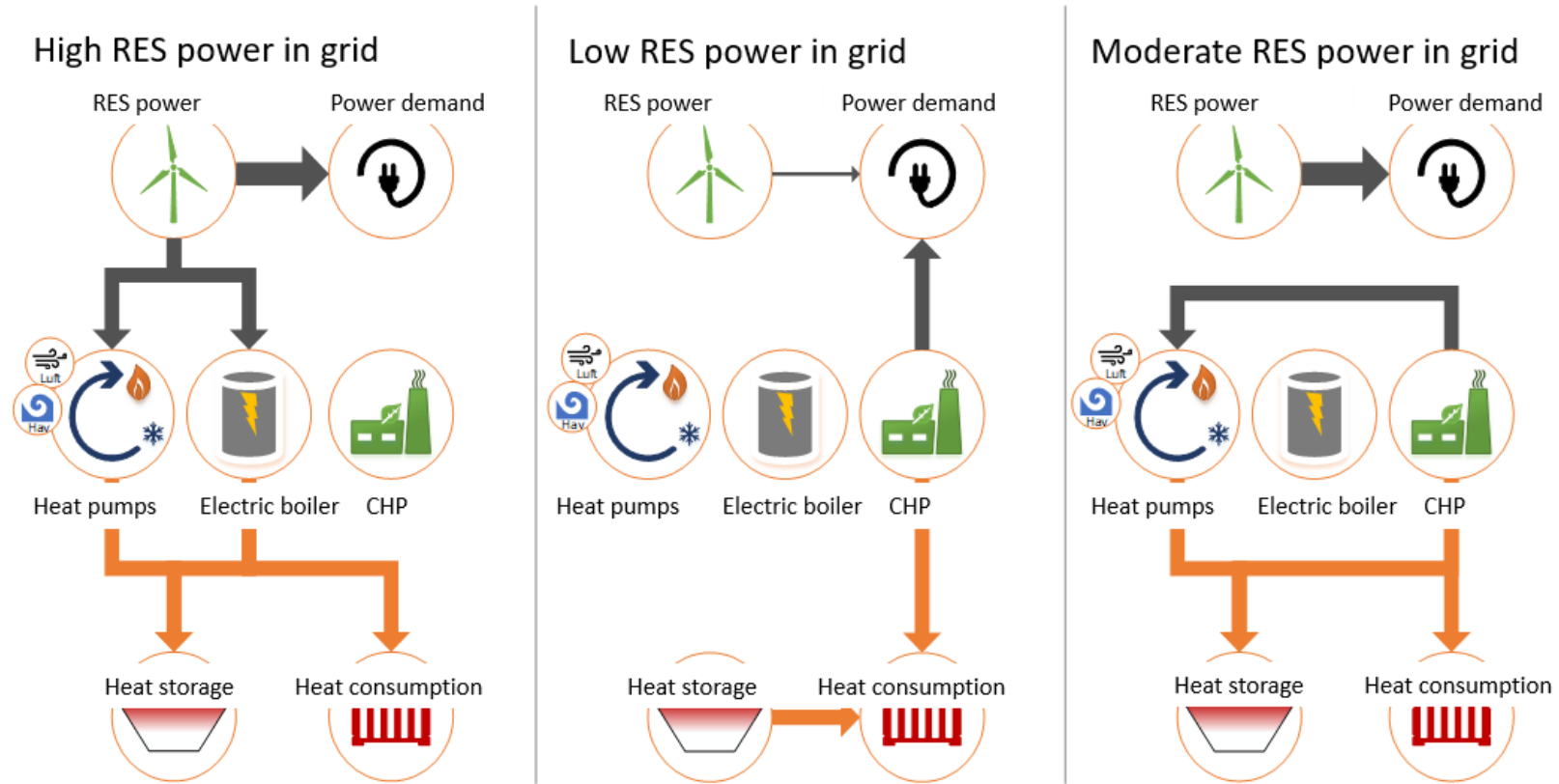
Urban waste heat : a potential still to realise!



- Key sectors: Data centers, metro stations, food production, food retail, service and residential sectors, waste water treatment
- Temperature levels below 50 °C
- ‘accessible’ sources of low-temperature waste heat located ‘inside or within 10 kilometres’ of existing District Heating areas could represent over >300 TWh/y

Danfoss White Paper and ReUseHeat (2023)

System integration: power-to-heat solutions key to realise energy transition



Growing Efficient and green District Heating : what triggers?

- **Implementation of Fit for 55 Package** = new opportunities
 - **Recognition of District Heating to support decarbonisation of heat market** – with adequate decarbonisation pathways
 - **Waste heat** recognised as strong option to decarbonise the heat market + new ‘coordination framework’ to organise discussion on waste heat projects at local level (Renewable Directive)
 - **Heat Planning** – *‘Member States shall ensure that regional and local authorities prepare local heating and cooling plans at least in municipalities having a total population higher than 45 000’* (Energy Efficiency Directive)
- **New State aid Framework** provides more possibility for aid to Efficient District Heating and transition from ‘non efficient’ to Efficient – State Aid Guidelines (2022) an GBER (2023)

Thank you!

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