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#18DEdays



2050

**Heat Roadmap Europe**  
A low-carbon heating and cooling strategy

# Heat Roadmap Europe: Role for District Heating Systems in Europe

Susana Paardekooper, Aalborg University

District Energy Days, Helsinki, 27 September 2018



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 695989.

[www.heatroadmap.eu](http://www.heatroadmap.eu)  
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# Our purpose in HRE4

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- Creating scientific **evidence** to support long-term energy strategies at local, national, and EU level and empower the transition to a **low-carbon** energy system
- By **quantifying** the impact of various alternatives for addressing the heating and cooling sectors



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# HRE1, 2, 3, 4

- Study 1 (2012): will **district heating** play a role in the decarbonisation of the European energy system?
- Study 2 (2013): what is the balance between **heat savings and heat supply** at an EU level?
- Study 3 (2015, STRATEGO WP2): low-carbon **heating and cooling strategies** for 5 member states
- Study 4 (2016-2019): integrated low-carbon **heating and cooling strategies** for 14 member states



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# Key findings for DE

## Everywhere

Deep energy savings

Combine savings and supply

~30-50% demand reduction

## Urban areas

District energy networks

High demand density areas

Supply ~50% of energy demand

## Rural areas

Mainly heat pumps

Low demand density areas

Remaining ~50% of the energy demand

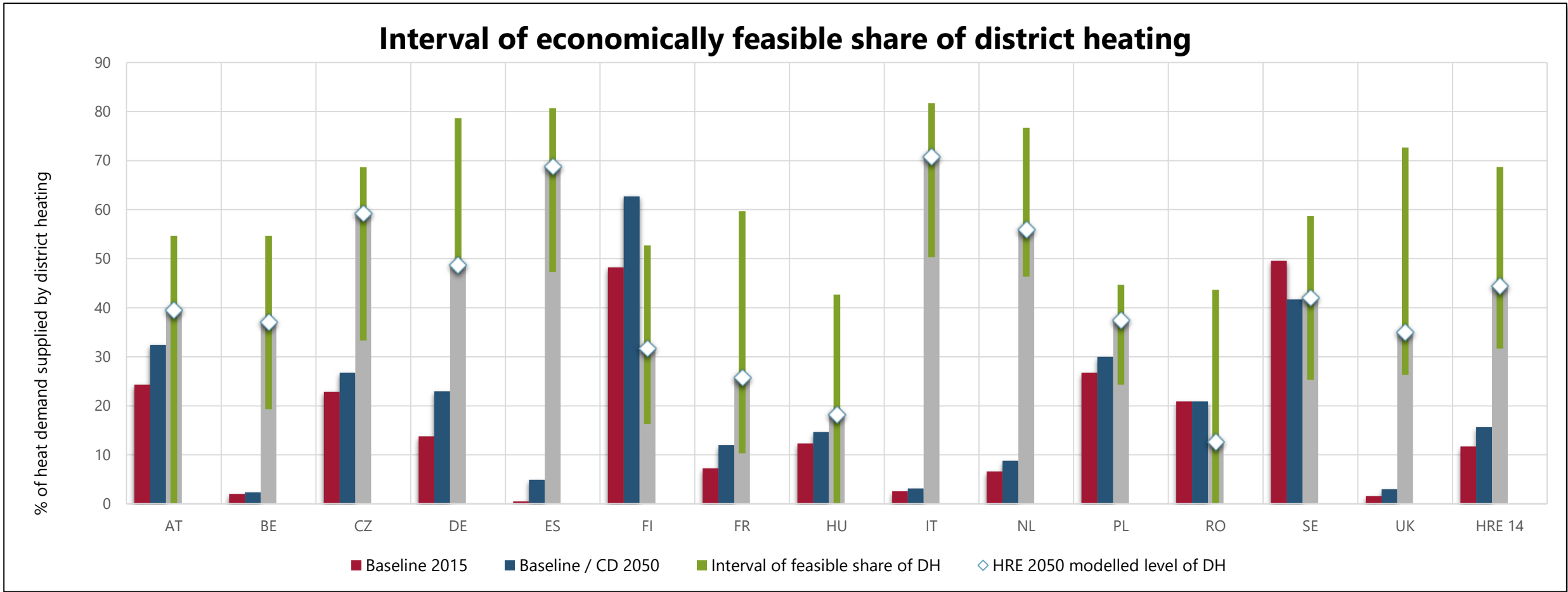


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# Share of district heating

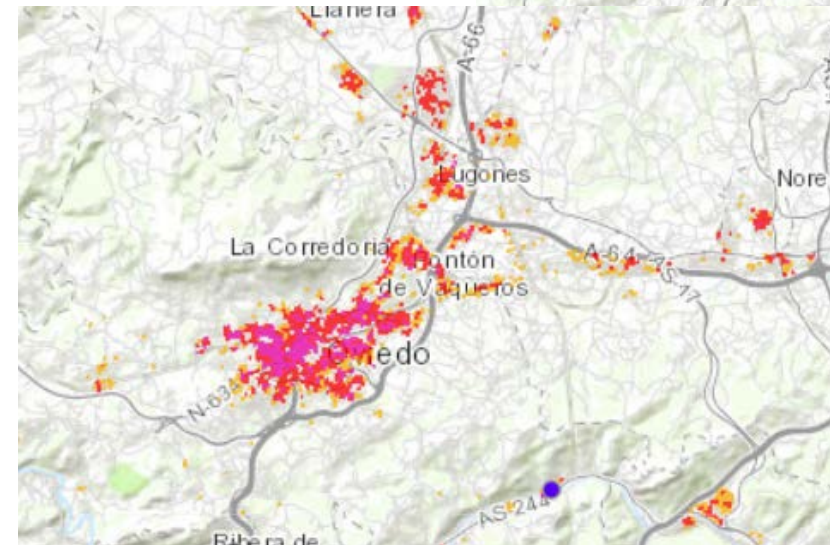
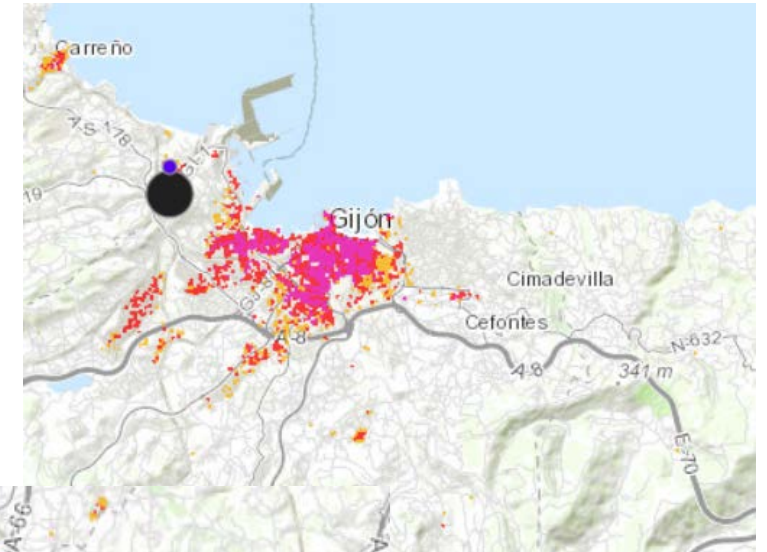


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# Role of renewables in DH

- Energy efficiency first principle!
- Understanding of temporality and spatial dimension are necessary here:
  - Variety of baseload sources
  - Geographic availability
  - Development of infrastructure
- Requires planning and strategic development



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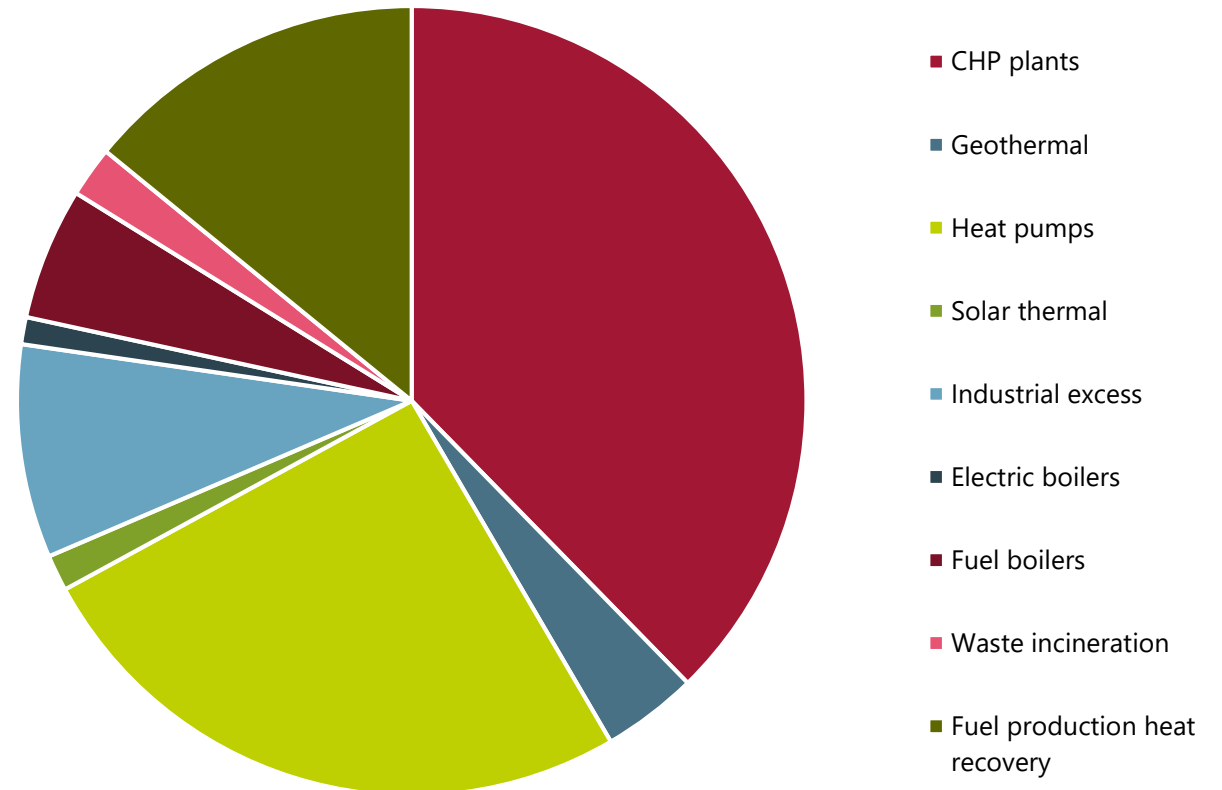
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# Heat supply

- Different types of waste heat start to play a large role
- CHPs operate to the electricity markets and 'pair' with large heat pumps
- Boilers are almost irrelevant
- For renewables, the constraints are mostly temporal and geographic

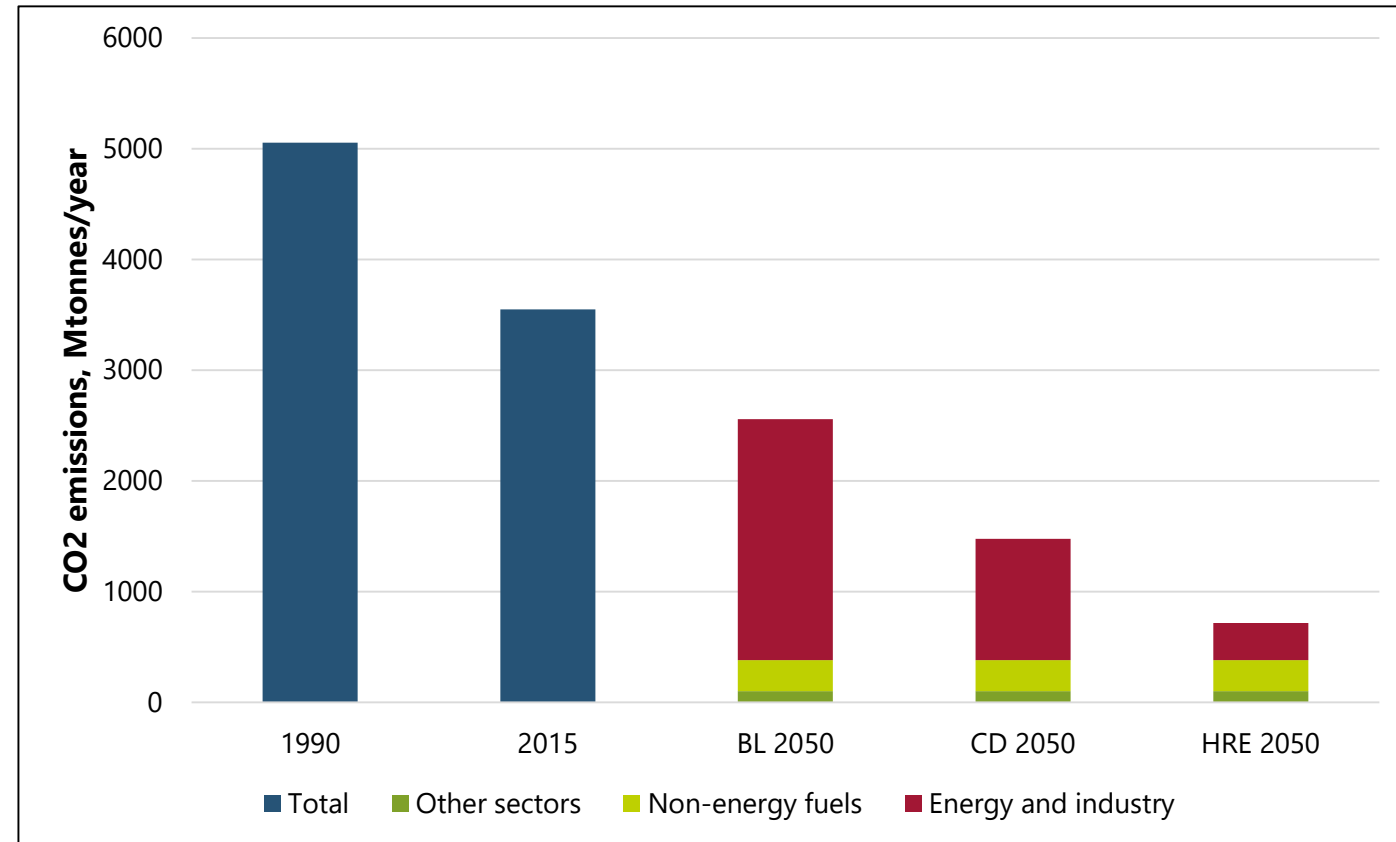
**District heating source shares in HRE 2050**





# Energy system effects

- Using energy otherwise wasted
  - Bioenergy constraints
- Use renewable energy capacity better:
  - Flexibility and storage
- Reducing pressure on the power sector (and costs):
  - Much more in peak capacity than in grid!



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# Key findings for DH

1

The heating and cooling sector can be fully decarbonised based on technologies and approaches which already exist, are market-ready and have successfully been implemented in Europe.

2

Energy efficiency on both the demand and the supply side are necessary to cost-effectively reach the decarbonisation goals.

4

In the vast majority of urban areas, district energy is technically and economically more viable than other network and individual based solutions, and can be 100% decarbonised through the use of renewables, large heat pumps, excess heat, and cogeneration.

7

The heating and cooling sector can play an important role by integrating the increasing shares of variable renewable energy and enhance the grid flexibility.

- Energy efficiency and district heating can drive affordable decarbonisation.
- District energy, if expanded, can use renewable resources otherwise not available.
- The interconnection with the energy sector leads to better renewable integration in the electricity sector



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# Thank you!

- Main and 14 specific Country Heat Roadmaps
- Maps; factsheets, background reports, downloadable datafiles, models, videos and more!



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Heat Roadmap Europe:  
[www.heatroadmap.eu](http://www.heatroadmap.eu)



Pan-European Thermal Atlas:  
[www.heatroadmap.eu/maps](http://www.heatroadmap.eu/maps)



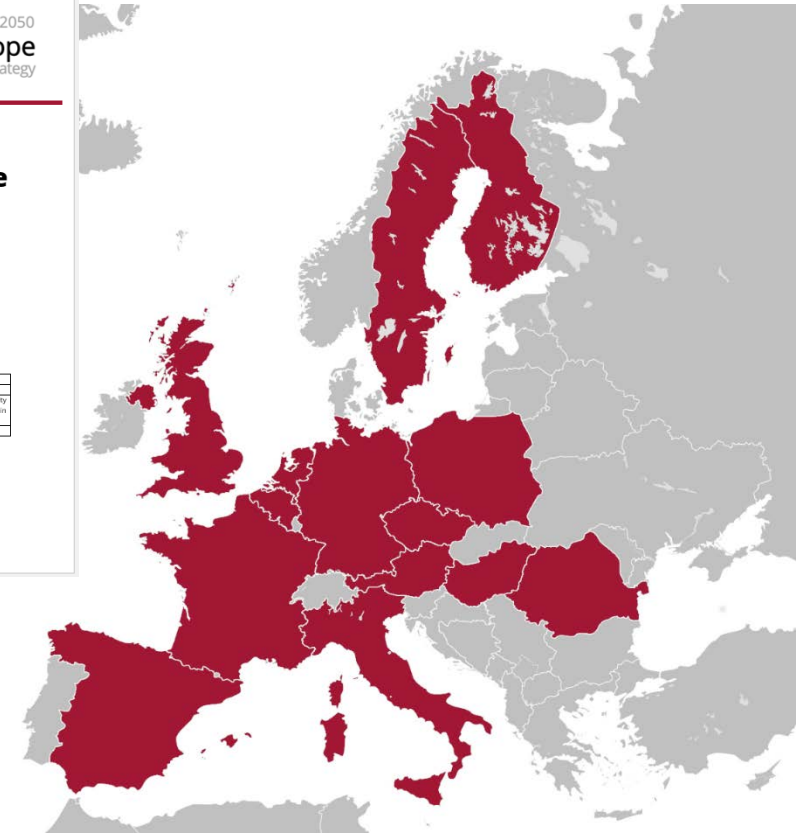
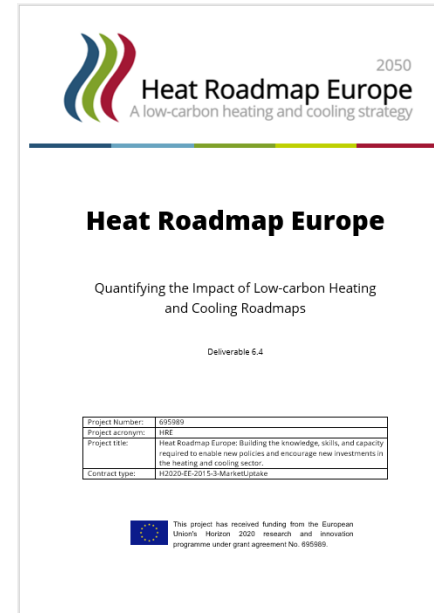
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# Key findings for DH

- Main and 14 specific Country Heat Roadmaps
- Pan-European Thermal Atlas
- Models, factsheets, background reports, downloadable datafiles, videos and more!



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