



2050

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

# Heat Roadmap Europe: Potential for Waste-to-Energy in District Heating Systems

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

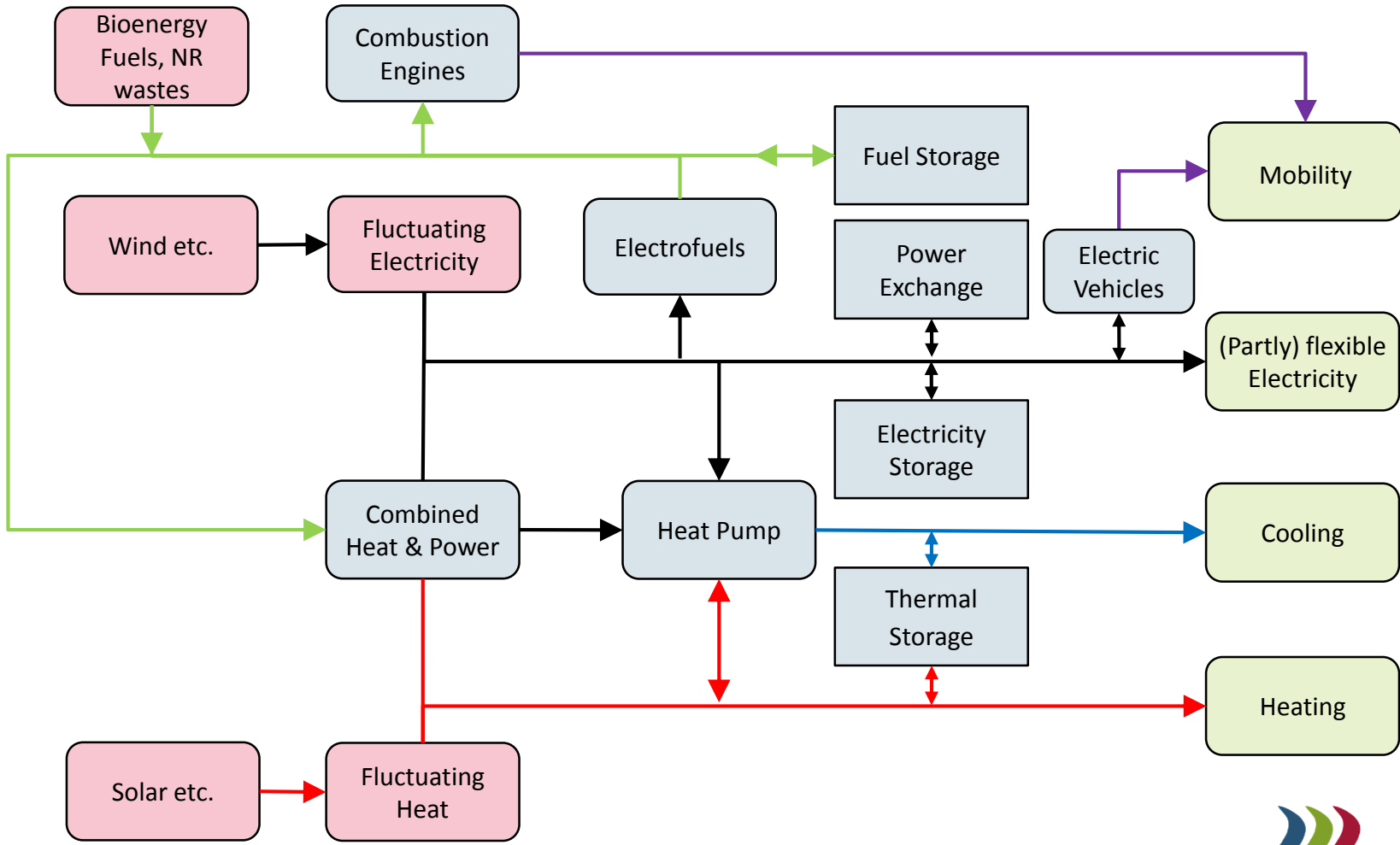
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# What do we do?

| Resources | Conversion | Demands |

- Technical and socio-economic analysis
- Hourly simulation of energy systems
- Scenario building for deeply decarbonised and 100% renewable energy systems



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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

## 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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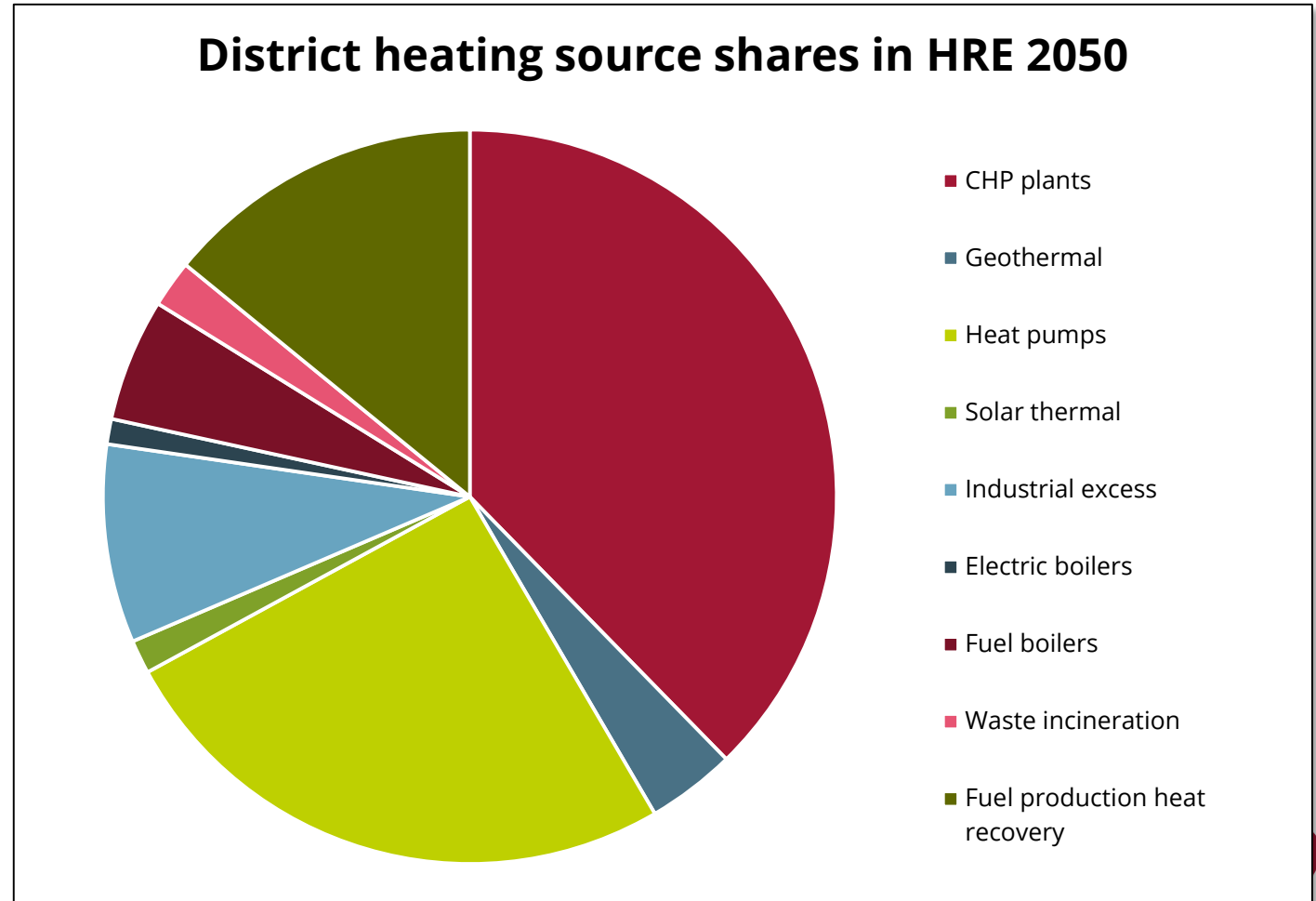
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# Key findings for WtE

- WtE can and should be used in district heating systems
- District heating needs to develop
- The constraints are mostly geographic and temporal
- Planning approaches can be aligned

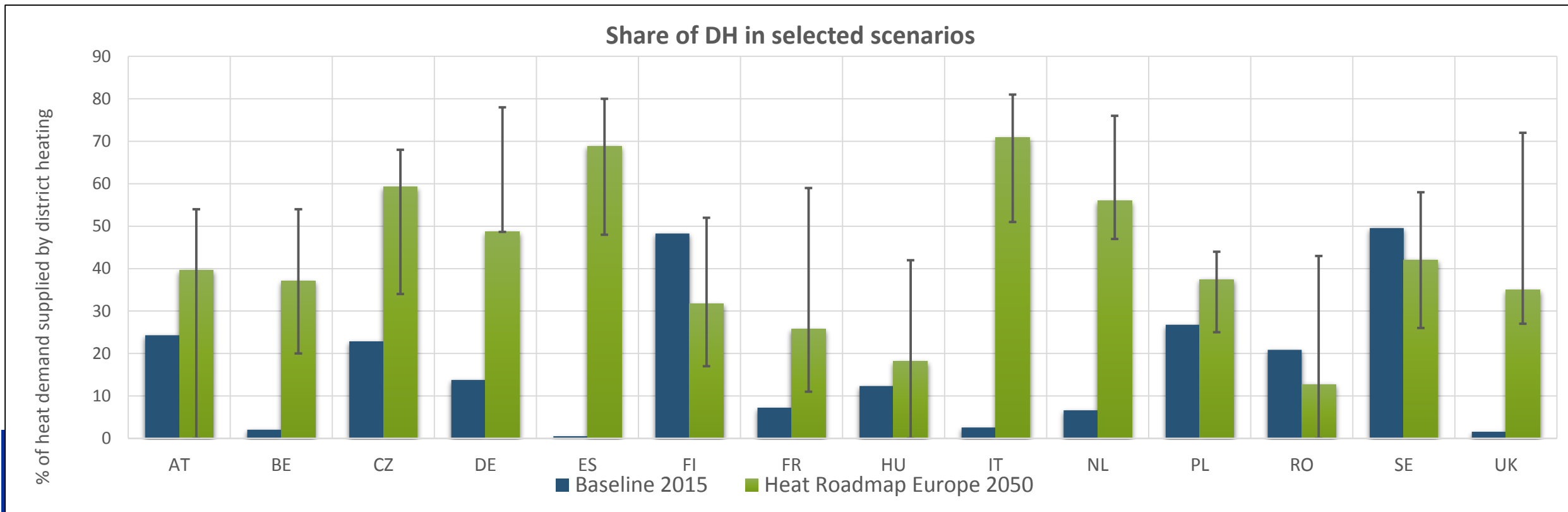


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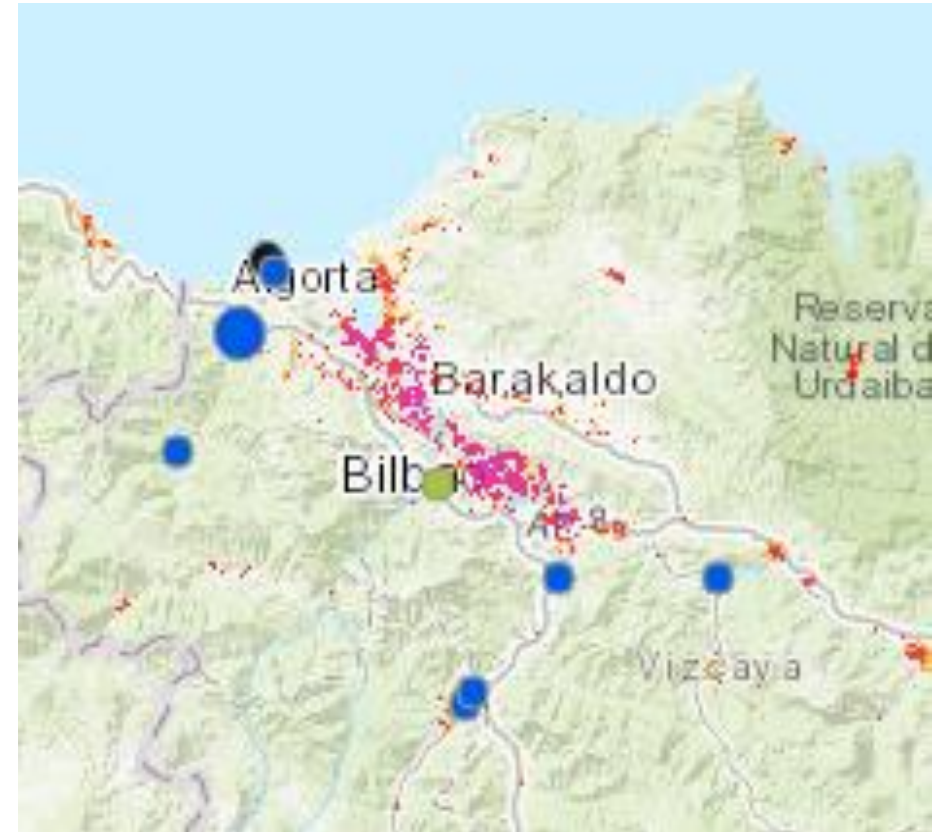
# 1. DH needs to develop

- Without a DH system in place it is not possible to use WtE as efficiently
- These potentials exist all over Europe – especially in Spain!



# 2. Spatial and temporal

- Spatially, heat is more local than eg. electricity
- Temporally, only so many baseload sources can be cost-effectively integrated
  - Better locations of eg. WtE could allow for higher levels of integration



Excess heat activities (HRE4)

Main excess heat category

- Industrial excess heat
- Cogeneration excess heat
- Waste-to-Energy excess heat

Heat Demand Densities 2015 (HRE4)

HD\_2015

- <math>< 50 \text{ TJ}/\text{km}^2</math>
- <math>50 - 120 \text{ TJ}/\text{km}^2</math>
- <math>120 - 300 \text{ TJ}/\text{km}^2</math>
- <math>> 300 \text{ TJ}/\text{km}^2</math>

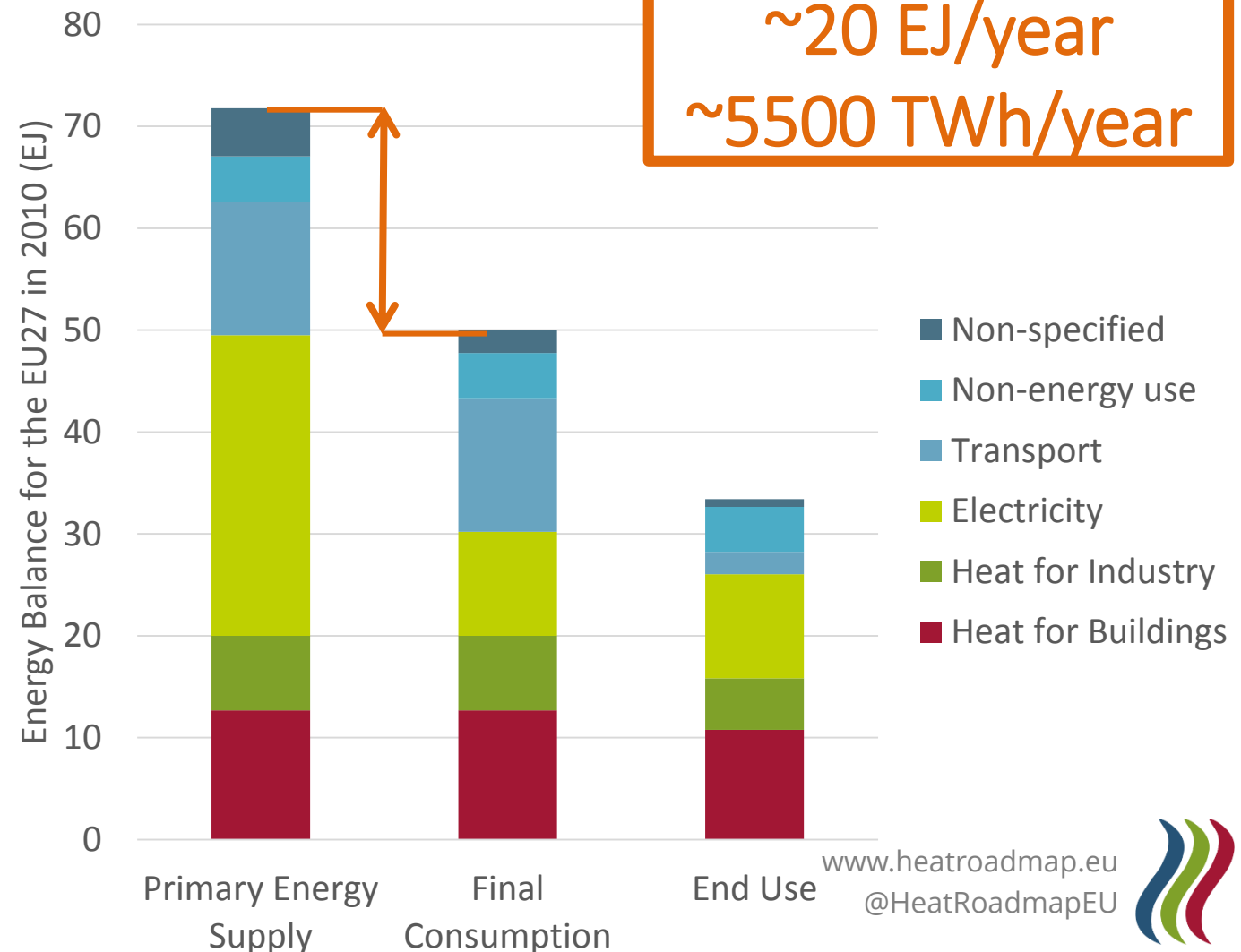


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# 3. Planning approaches align

- In terms of effecting change, WtE and district heating have high synergies
  - Efficient conversion and use of energy
  - Collective approaches
  - Part of municipality-led agency



# Conclusions and questions

There is potential to use WtE in district heating systems, as an a part of circular waste management

- District heating needs to develop
- The constraints are mostly geographic and temporal
- Planning approaches align



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