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# RENEWABLE H&C: BREAK-THROUGH NEEDS?

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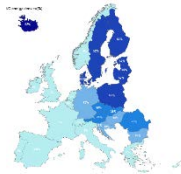
Brussels, 2017/10/17, EUFORES

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# Based on 3 EU H&C projects

## Mapping and analyses of the H/C fuel deployment



- EC tender study accomplished in 2016 (ENER&RTD)
- First full end-use H/C energy balance for EU 28 (+3)
- Technology analyses
- Scenarios until 2030



- Horizon 2020
- Online Pan European Thermal atlas (Peta)
- H/C profiles 2015
- Heat roadmap scenario until 2050 for 14 EU countries



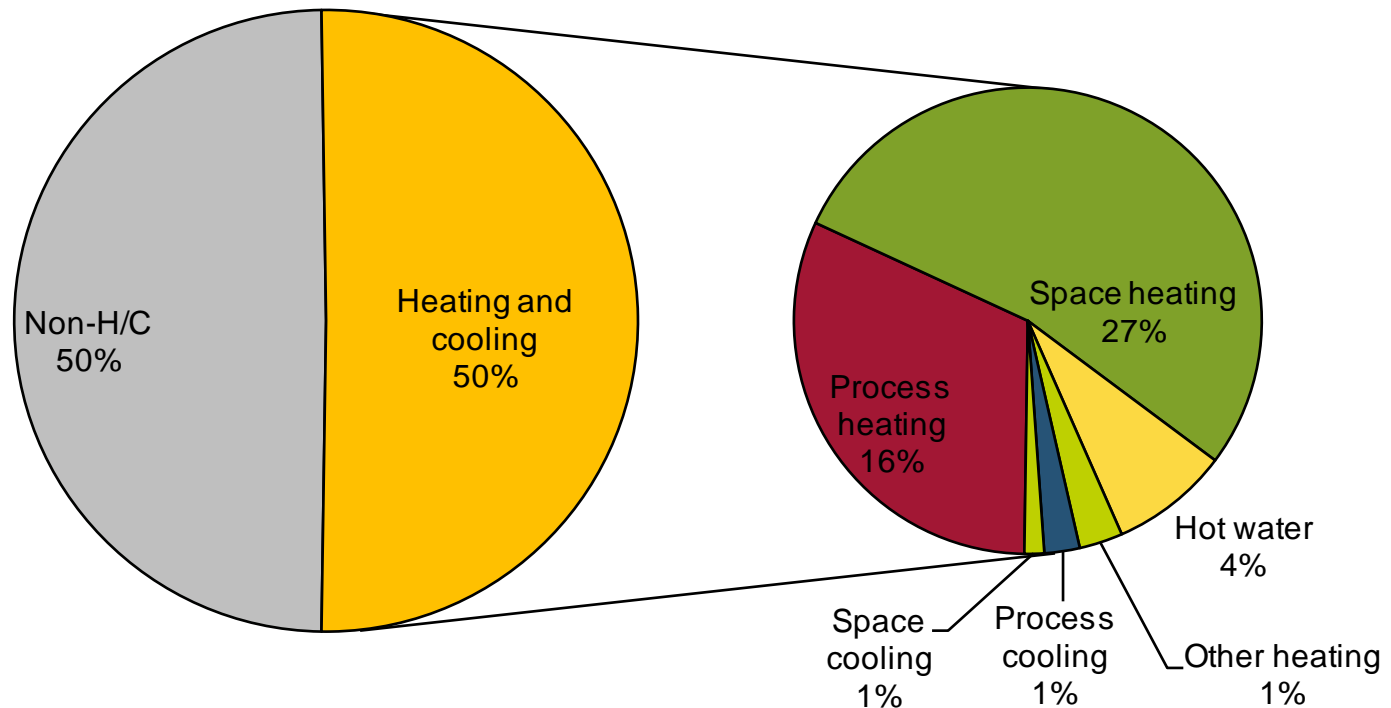
- Horizon 2020
- 6 country analyses and 6 city case studies
- Energy system models
- H/C policy recommendations and policy support

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# Where are we today?

# Final energy demand for H&C in the EU in 2015

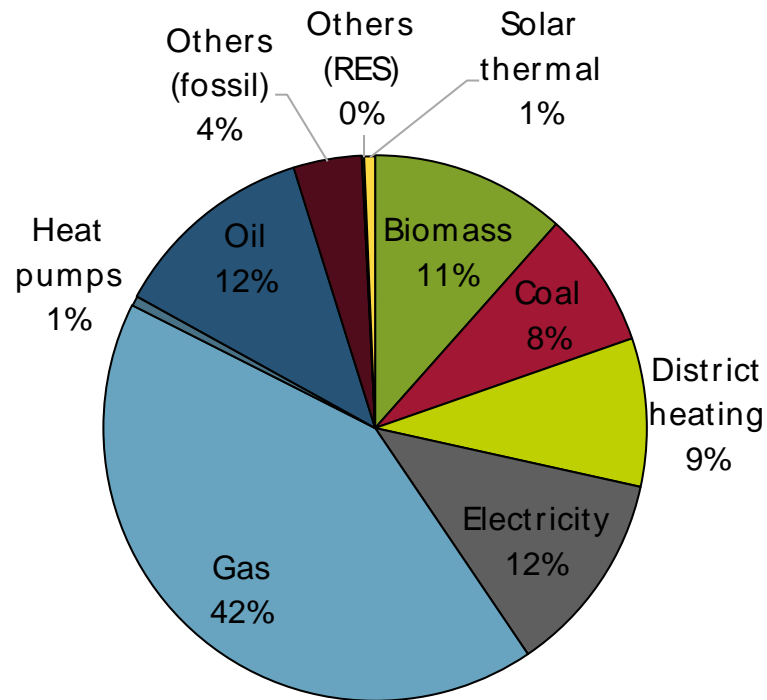
Source: Fraunhofer ISI et al. (2017) / Heat Roadmap Europe



H&C is about 50% of total final energy consumption in the EU

# Energy carrier use for heating and cooling in 2015

Source: Fraunhofer ISI et al. (2017) / Heat Roadmap Europe

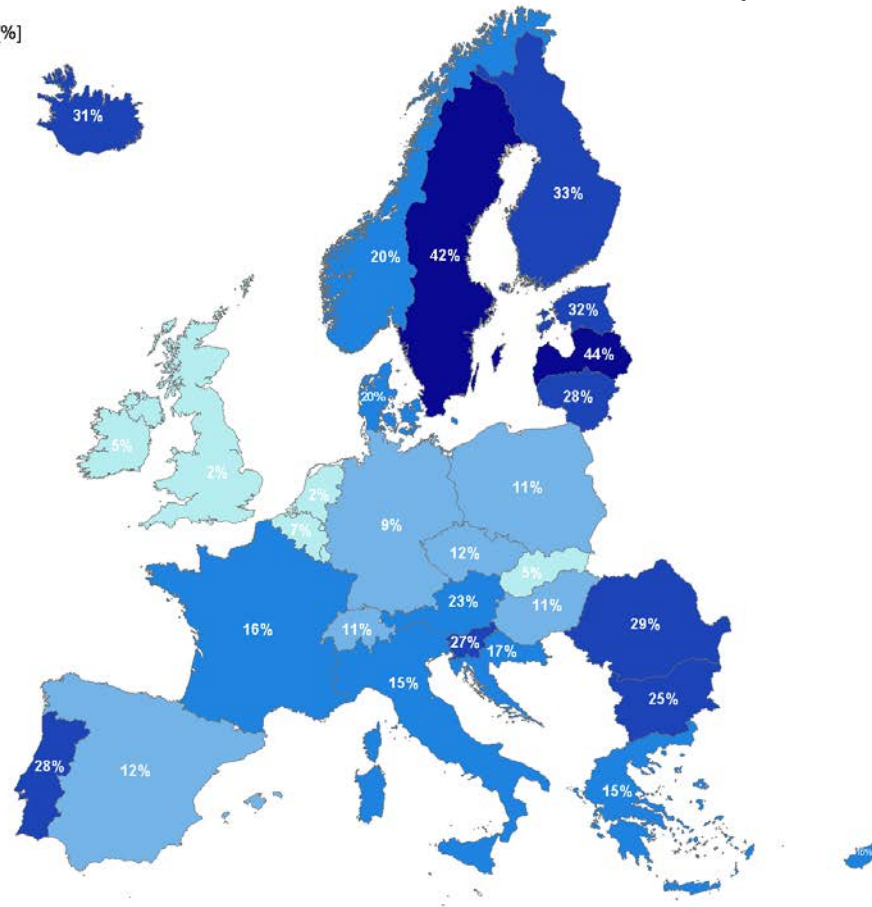
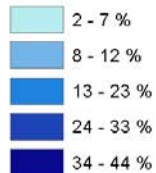


- 66 % fossil fuels
- 21 % electricity and district heating
- 13 % Renewables  
(Eurostat Shares: 17% based on different method)

# Share of RES in total H/C final energy in 2012

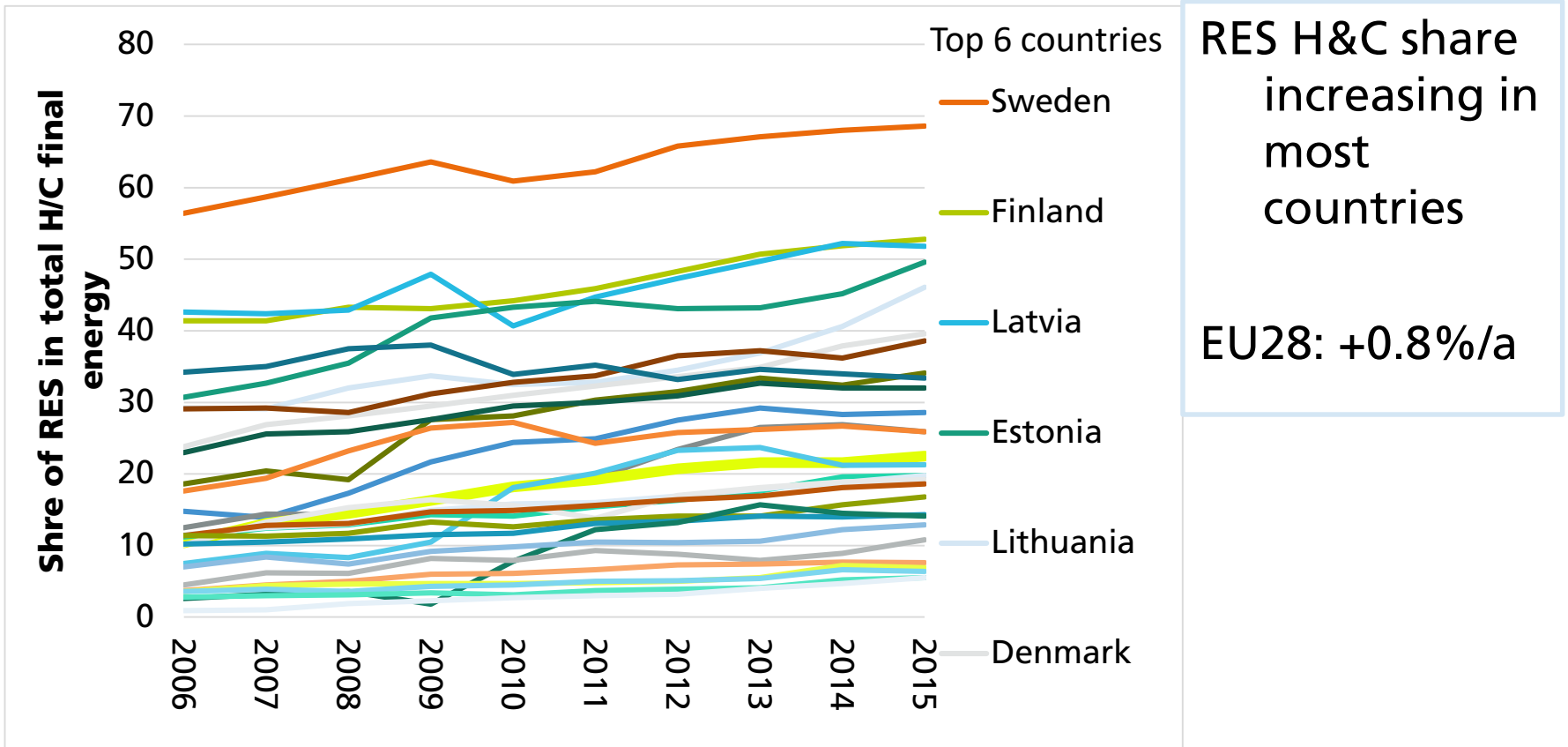
Quelle: Fraunhofer ISI et al. (20156)

Share of RES in total H/C demand [%]



# Slow increase in RES-H/C in EU countries observed

(Source: Eurostat SHARES project)



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# Where to go?



# How to decarbonise H/C supply?

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## Heating and cooling transition

Almost complete decarbonisation of H/C supply  
80-95 % reduction of CO<sub>2</sub> emissions by 2050 compared to 1990



Deploy RES supply technologies

Direct use of renewable energies

Energy efficiency

„Energy Efficiency First“

Sector coupling

Use of power-to-heat and district heat

Source: progRESsHEAT

# A least cost, low carbon H&C supply in 2050 – Heat Roadmap Europe

Heat Roadmaps	Heat Savings	District Heating	Individual Heating Technology	Renewable and Excess District Heat Supply*
	% of BAU 2050 Heat Demand	% of Total Heat Demand after Heat Savings (Today's)	Primary Technology	% of District Heat Production
<b>Czech Republic</b>	40%	40% (25%)	Heat Pumps	60%
<b>Croatia</b>	40%	40% (15%)	Heat Pumps	45%
<b>Italy</b>	30%	60% (>5%)	Heat Pumps	35%
<b>Romania</b>	50%	40% (20%)	Heat Pumps	45%
<b>United Kingdom</b>	40%	70% (>5%)	Heat Pumps	40%

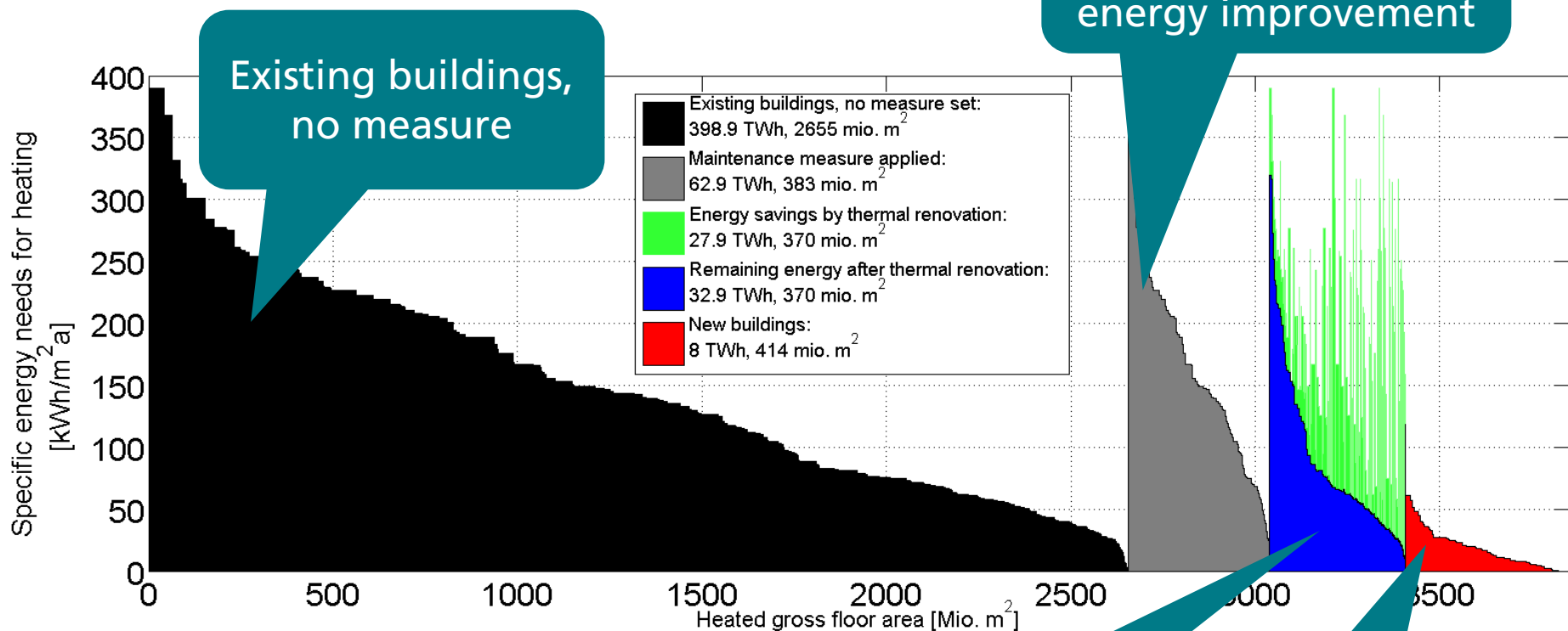
Source: Stratego / Heat Roadmap Europe

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# What are the breakthrough needs?

# Minimise building renovation without energetic improvement

France 2015-2030 – building stock in 2030

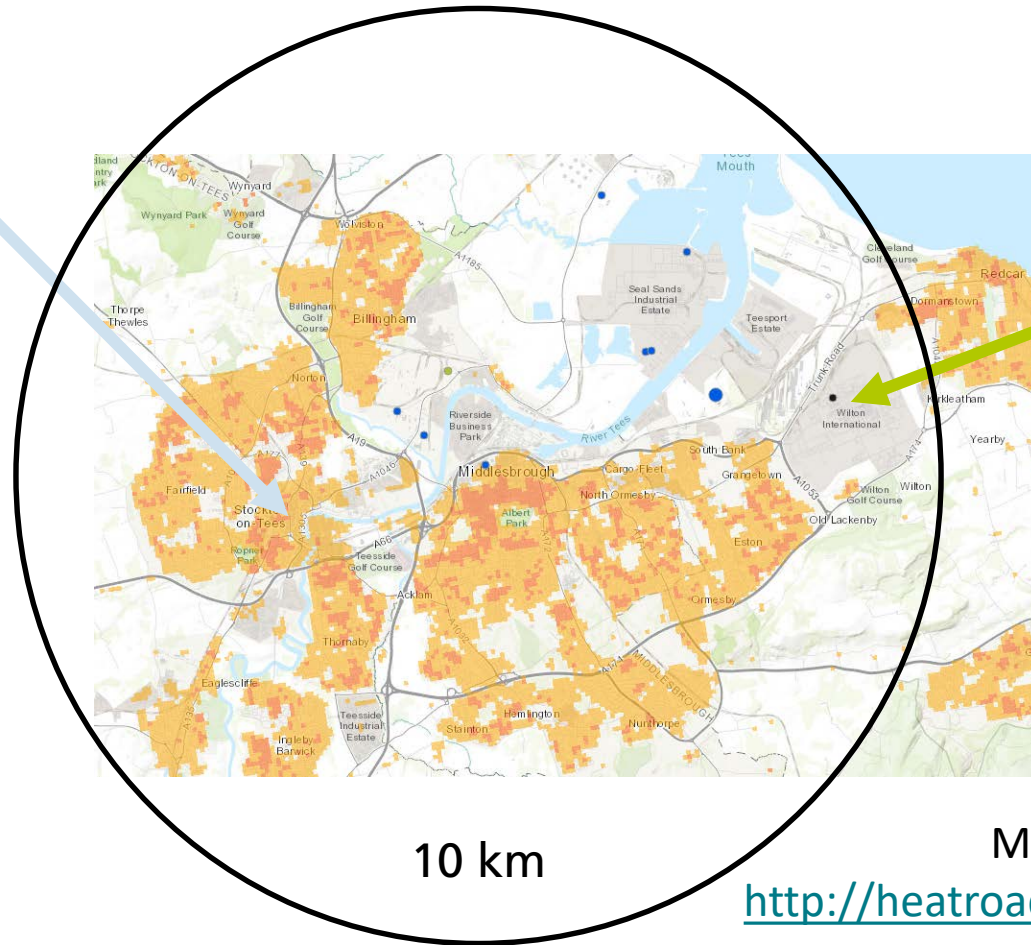


Quelle: TU Wien / Fraunhofer ISI et al. (2016)

# Exploit (and identify) excess heat potentials!

## Pan-European Thermal Atlas: Case Study: Middlesbrough, UK

Heat Demand  
Suitable for  
DH  
10 PJ/Year



Excess  
Heat  
35  
PJ/Year

 Europa-Universität  
Flensburg

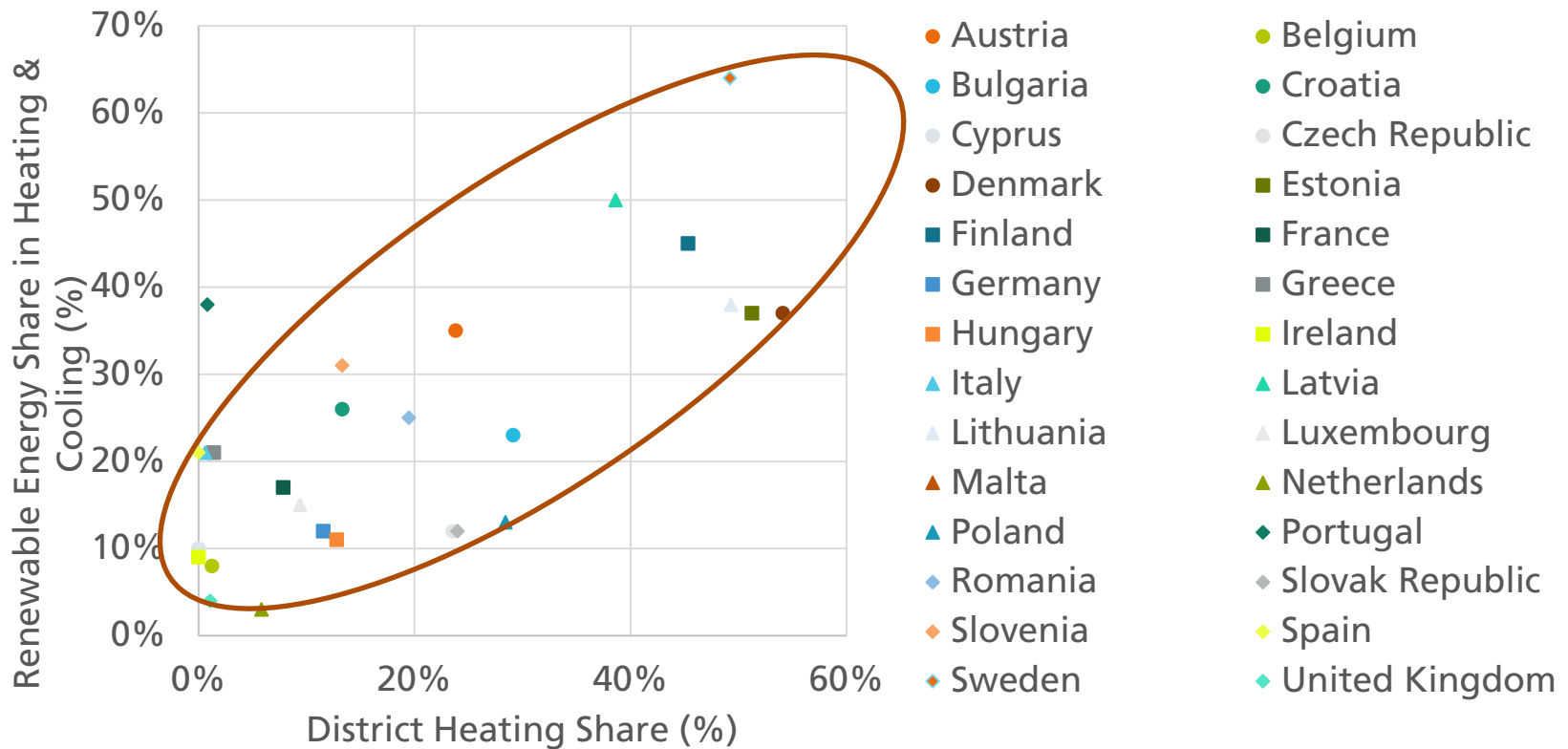
 HALMSTAD  
UNIVERSITY

  
AALBORG UNIVERSITY  
DENMARK

More on:

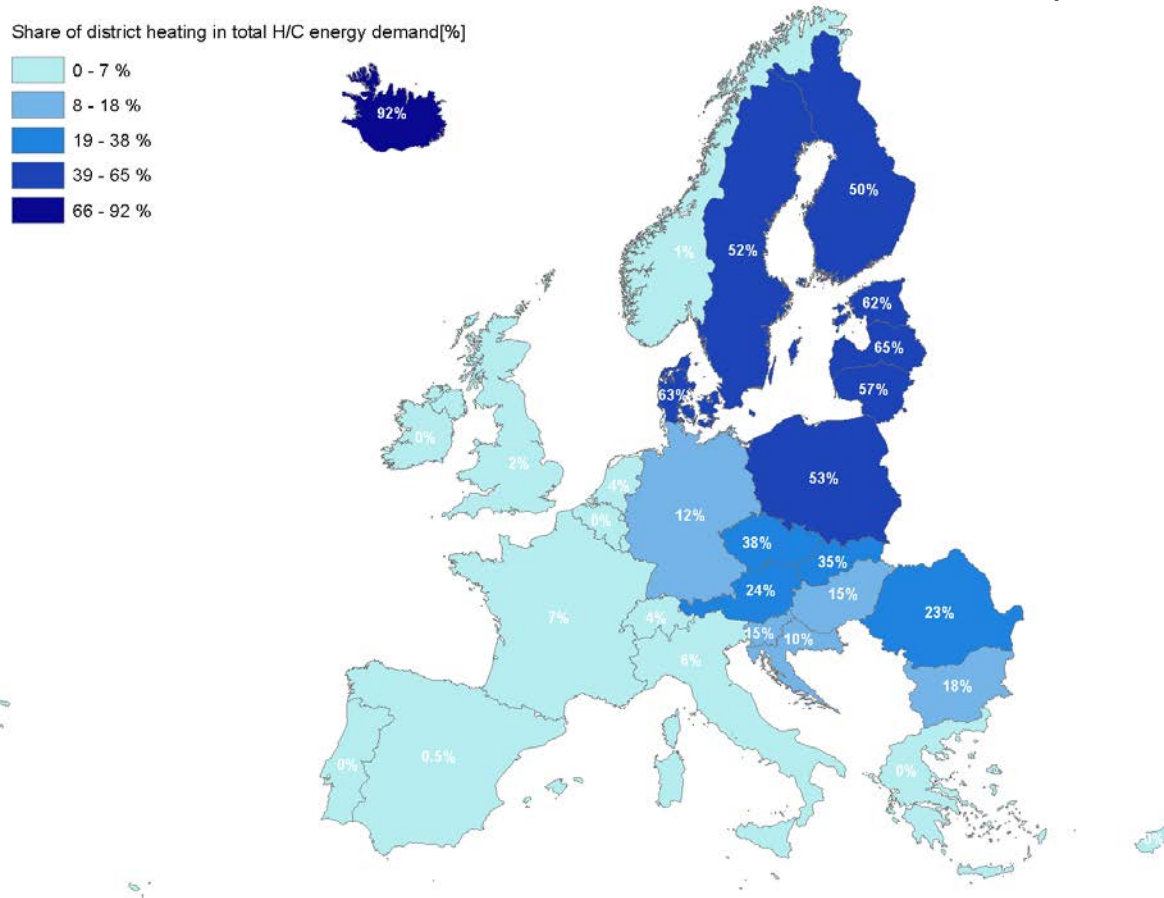
<http://heatroadmap.eu/Peta4.php>

# District heating can facilitate use of RES and excess heat

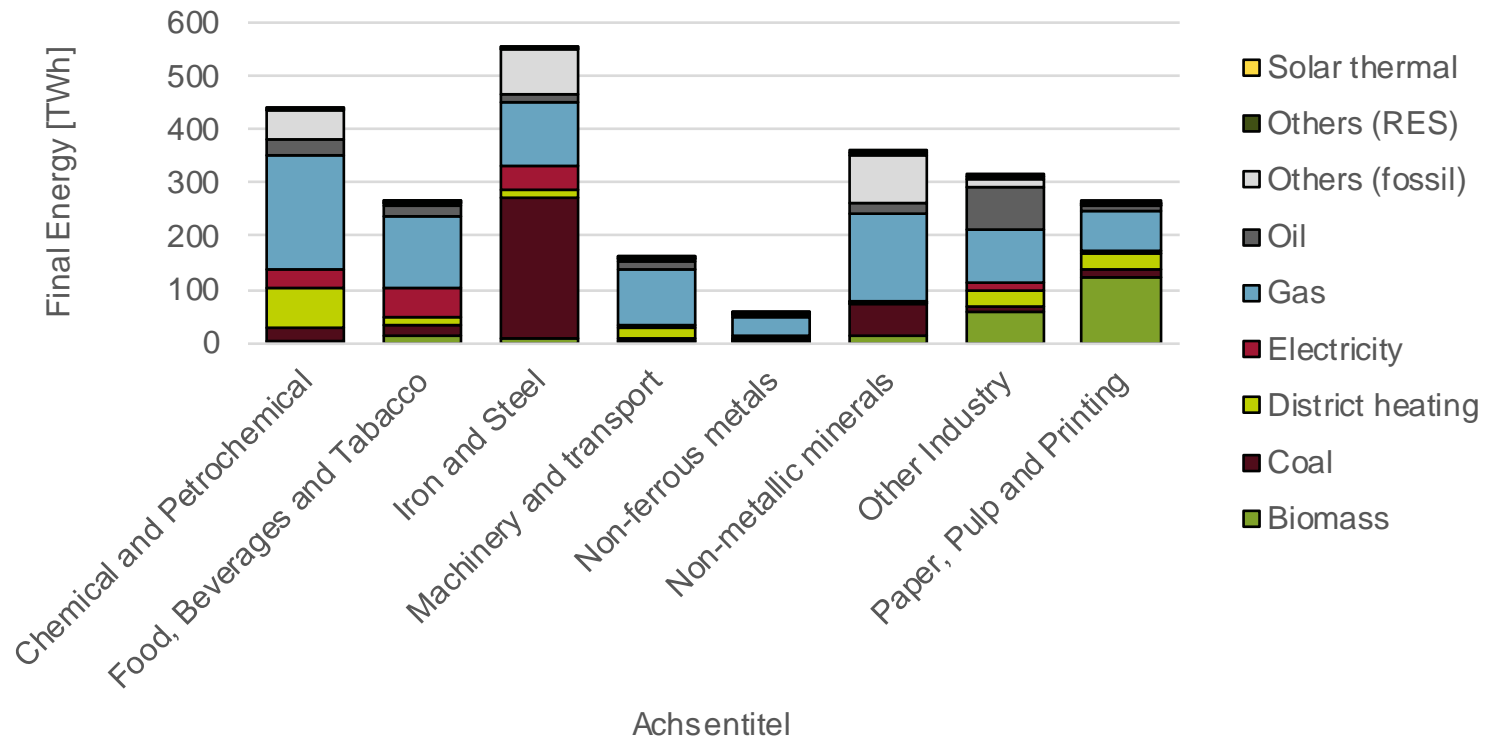


# Share of district heating in heat supply in 2012

Quelle: Fraunhofer ISI et al. (20156)



# Industry: Making RES and power-to-heat (cost-)competetive to natural gas



Source: Fraunhofer ISI / Heat Roadmap Europe



# Summary: (some) breakthrough needs

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## **Energy efficiency in buildings**

- Increase retrofit activity and avoid shallow renovations (lock-ins)
- Minimize building renovation without energetic improvements

## **District heating**

- Identify and exploit excess heat potentials EU wide
- Extend district heating – particularly in urban areas and where heat sources are available
- Integrate RES into district heating -> towards low temperature district heating and use of local RES

## **Industry**

- Industry: Switch from natural gas to RES and power-to-heat

## **Cross-cutting**

- Adjust economic framework to make RES cost-effective (ETS and non-ETS)
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# Thank you very much for your attention!



- **„Mapping and analyses of the current and future heating/cooling fuel deployment“**  
Download reports and data sheets:  
[http://www.isi.fraunhofer.de/isi-de/x/projekte/mapping-heating\\_331945.php](http://www.isi.fraunhofer.de/isi-de/x/projekte/mapping-heating_331945.php)
- **Heat Roadmap Europe IV**  
Download Brochure, reports, view online thermal atlas  
<http://heatroadmap.eu/publications.php>
- **progRESsHEAT**  
Download reports, review webinars:  
<http://www.progressheat.eu/Project.html>