

# HEATING AND COOLING

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## facts and figures

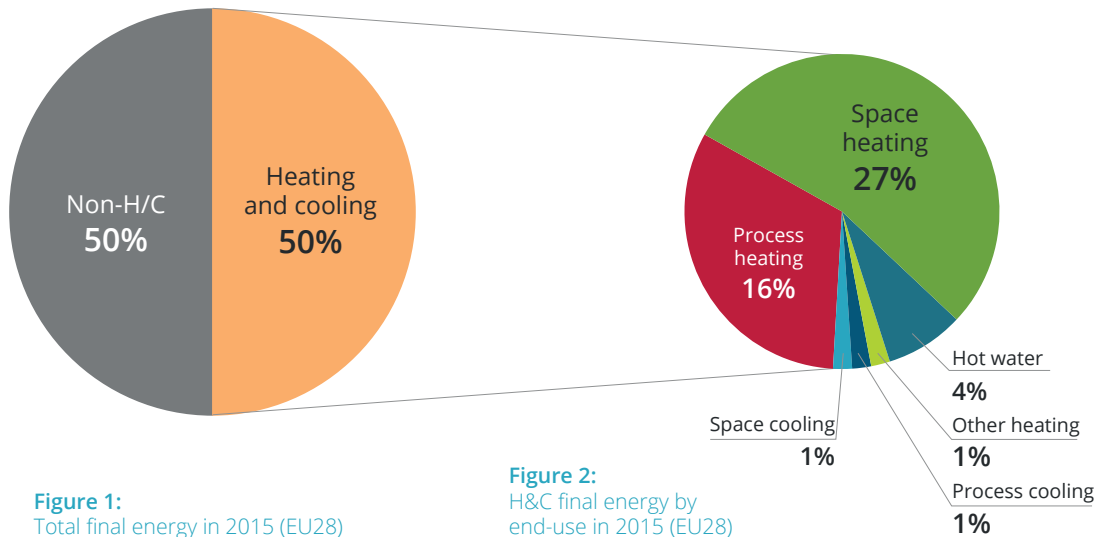
The transformation towards a  
low-carbon Heating & Cooling sector

LAST UPDATE: JUNE 2017

# HEATING & COOLING: 50% OF EU28 TOTAL FINAL ENERGY DEMAND

Europe consumes **half of its energy** for heating and cooling purposes.

Most of this thermal energy is used in buildings and industry.



Though **space heating** and **process heating** are very important in **all countries**, these two segments require very different policy approaches.

While the share of **cooling** is significantly lower at EU level, it remains very important in certain **southern countries**.

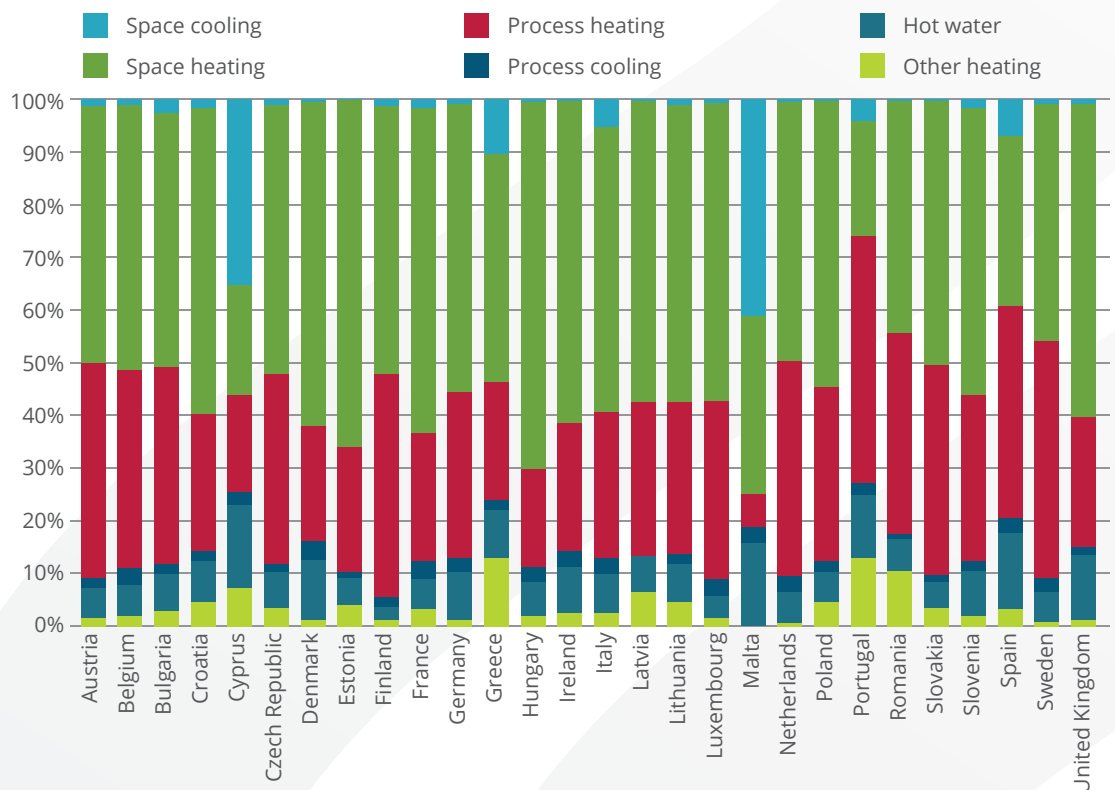
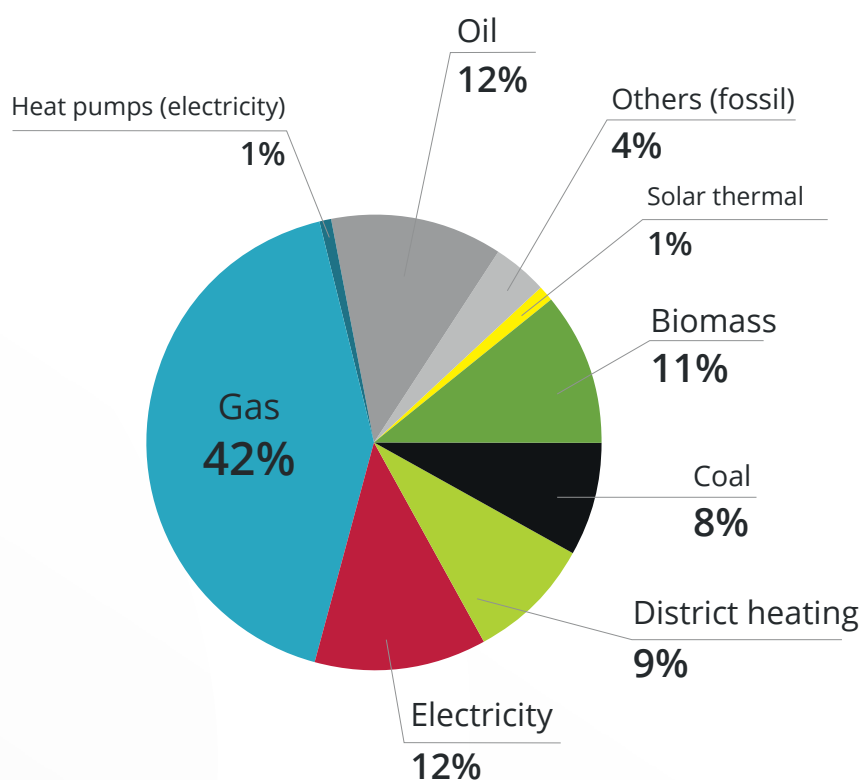


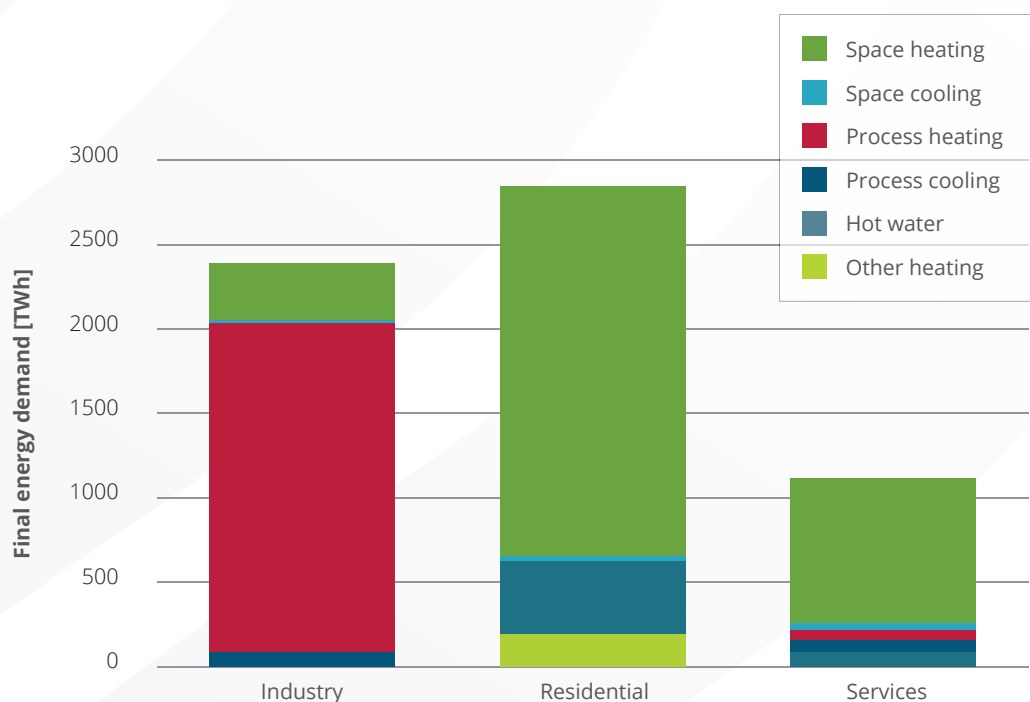
Figure 3: Country comparison of end-use (EU28, 2015)



Most of the thermal energy is produced from **fossil fuels (66%)** and **only 13%** comes from **renewable energies**. Electricity and district heat together supply 21% of heat, which may or may not be renewable, depending on local circumstances.

**Figure 4:**  
H&C final energy by energy carrier in 2015 (EU28)

Heating and cooling efficiency and decarbonisation in buildings and industry hold the key to Europe's energy transition towards a sustainable low carbon future.



**Figure 5:** Sectors: final energy demand overview (EU28, 2015)

# ZOOM INTO INDUSTRIAL SECTOR

Within industry, **process heating is most relevant**, as well as most challenging to decarbonise!

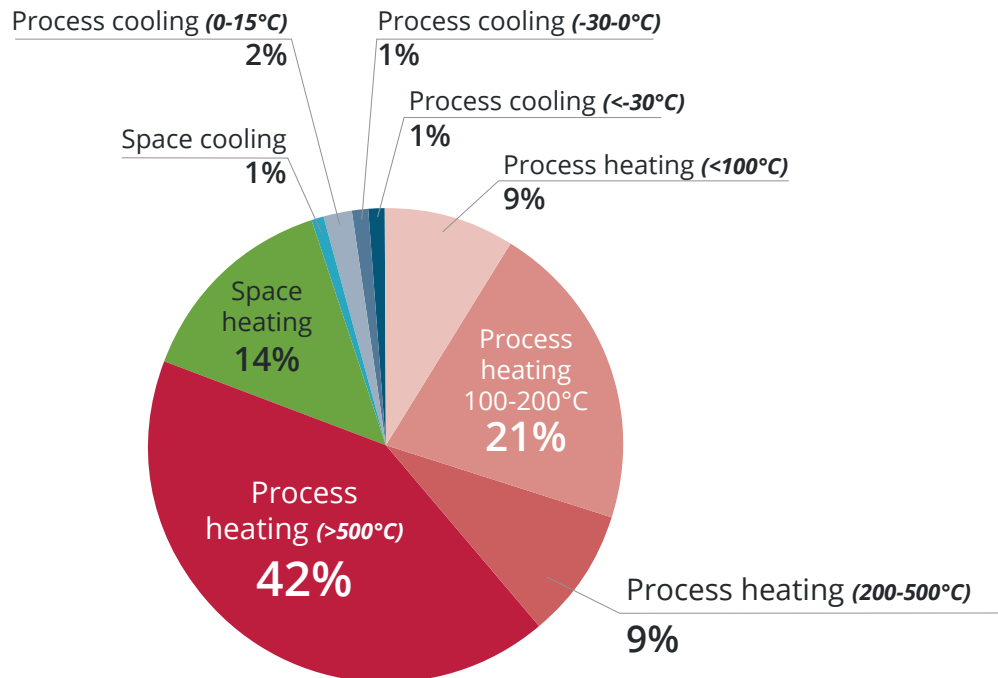


Figure 6: Industry final energy demand end-use (EU28, 2015)

Coal tends to be utilised for high-temperature process heating, while biomass is most used for steam, and district heating for low temperature processes.

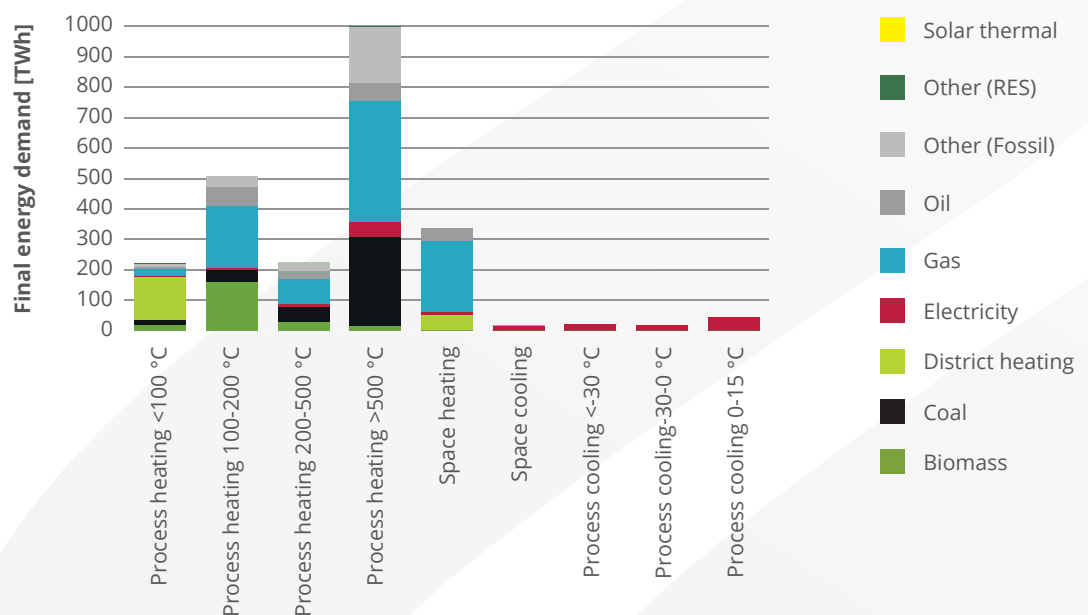
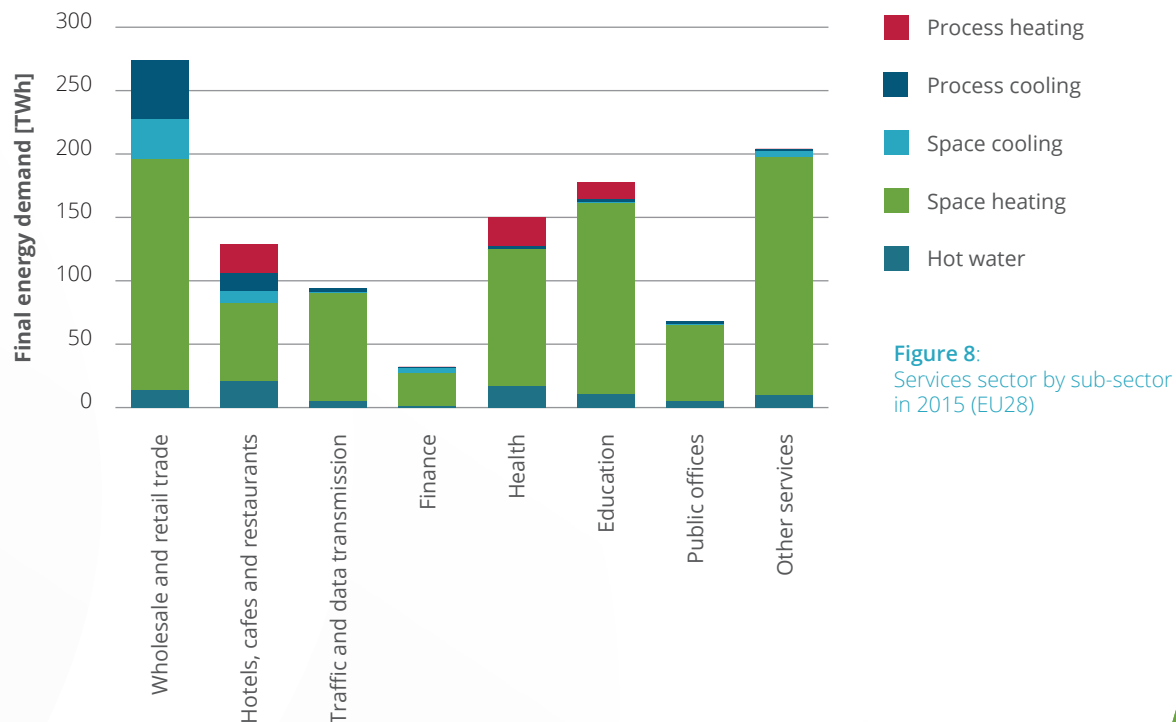


Figure 7: Industry end-use and energy carrier (EU28, 2015)

# ZOOM INTO SERVICES AND RESIDENTIAL SECTOR

Within the services sector, the **wholesale and retail sub-sector** has the highest energy demand.



**Single family houses** use **twice** as much energy for space heating as **multi-family houses**.

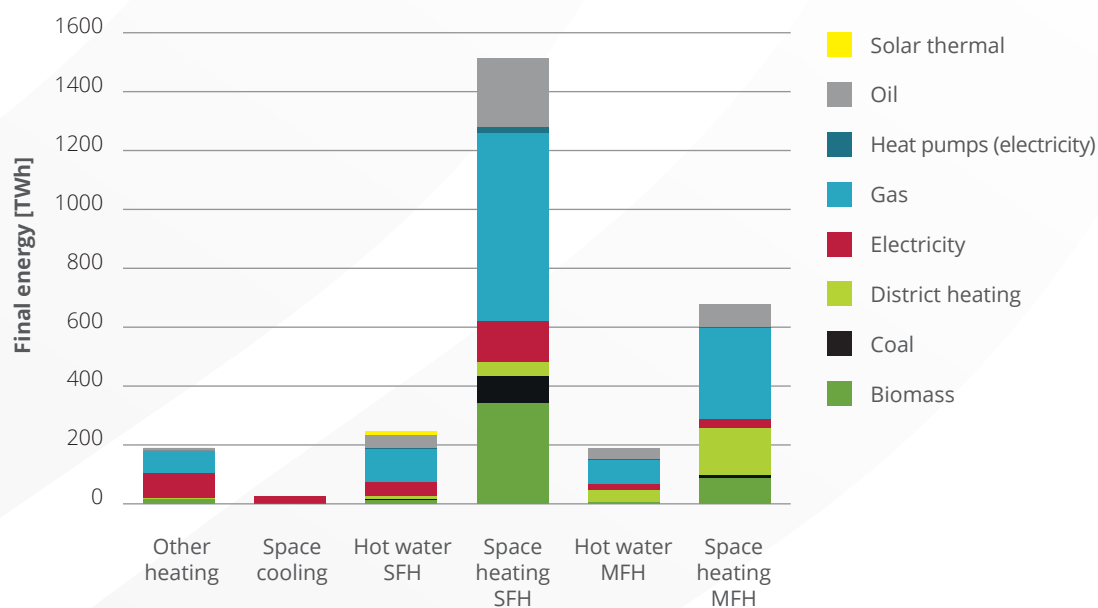


Figure 9: Residential sector by single/multi family house in 2015 (EU28)

# ZOOM INTO COOLING SECTOR

Energy use for space cooling is dominated by southern countries, mainly Italy and Spain.

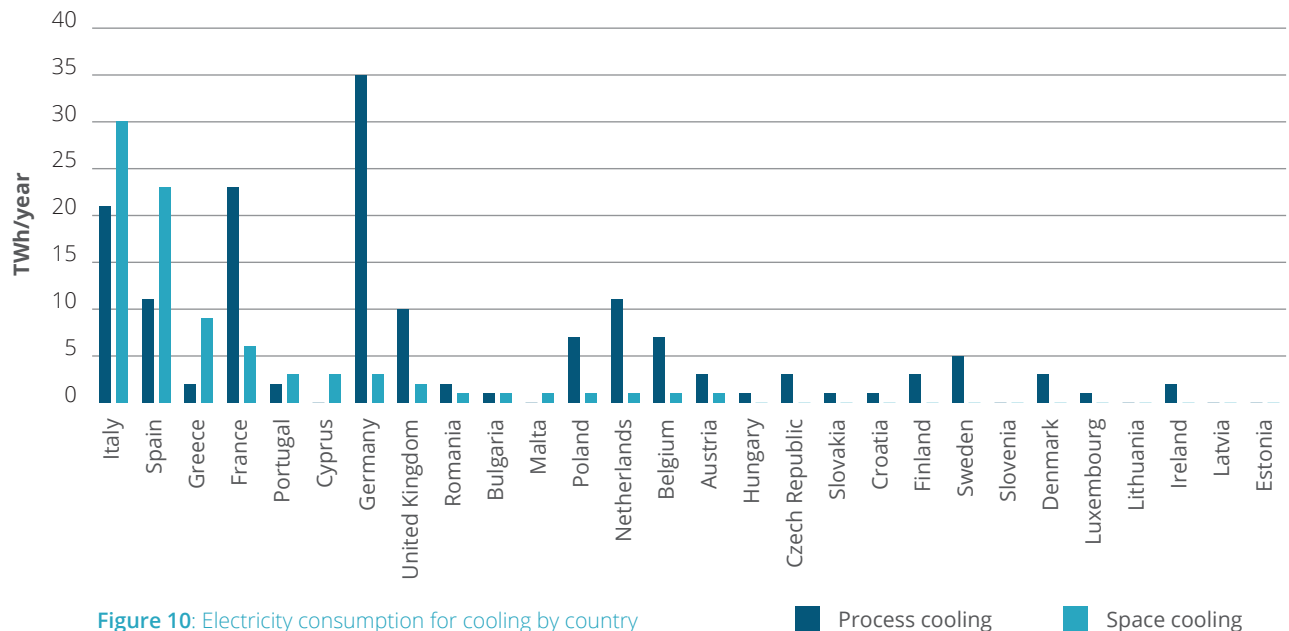


Figure 10: Electricity consumption for cooling by country

The share of total floor area cooled varies heavily by country, with southern countries reaching higher shares.

**Services sector buildings have higher shares of cooled areas,** while residential buildings, particularly in northern European countries, have negligible shares of cooled areas.

**However, substantial growth rates are expected** that will potentially increase space cooling demand and related electricity consumption.

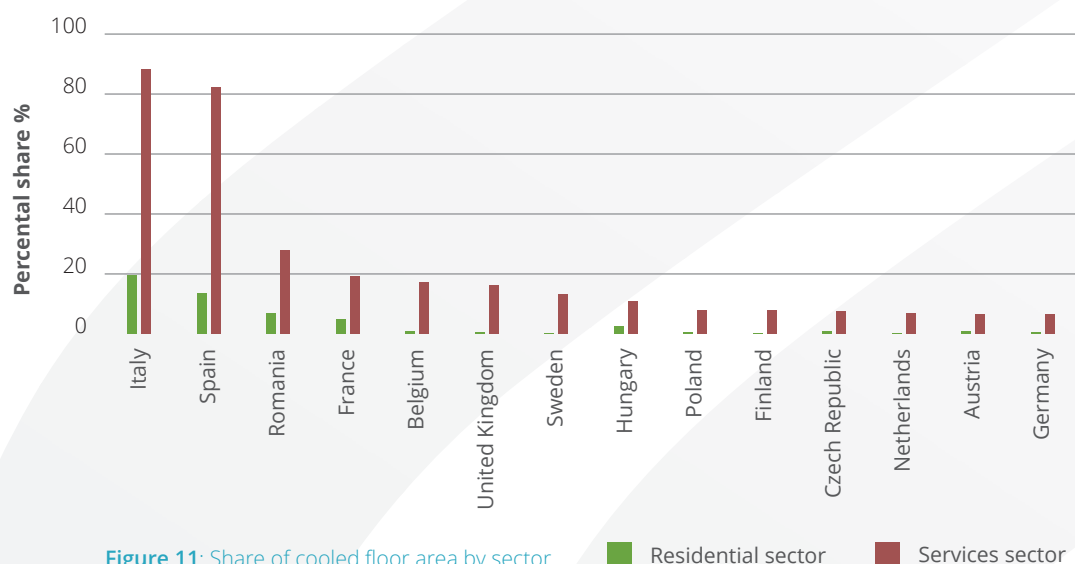


Figure 11: Share of cooled floor area by sector

Heating & cooling in buildings and industry account for about **50% OF TOTAL FINAL ENERGY DEMAND** in the EU28

Natural gas remains the dominant fuel, while

**ONLY**



of heating and cooling **COMES FROM RENEWABLES**

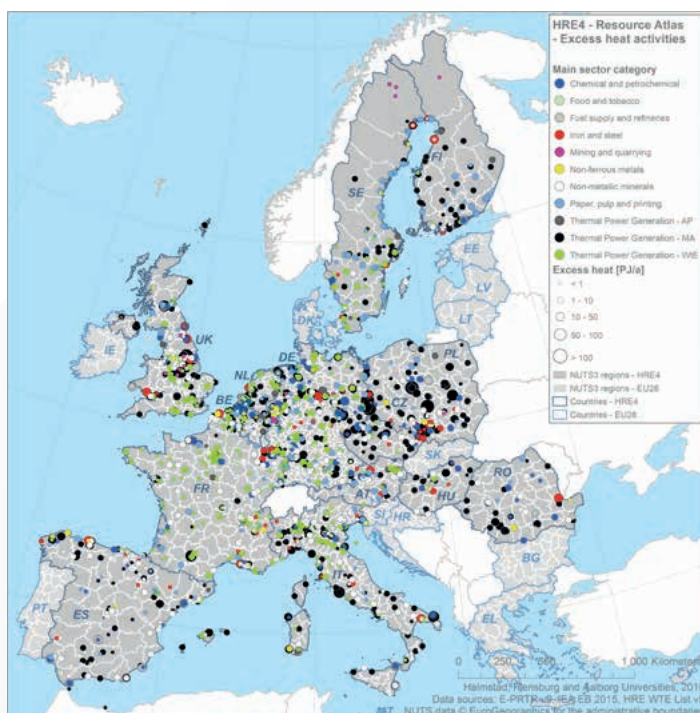


District heating can utilise very large amounts of

**EXCESS HEAT**

and

**HEAT FROM RENEWABLE RESOURCES**



There is a **MASSIVE UNTAPPED POTENTIAL**

of excess heat from industrial and commercial activities, which

**COULD MEET MOST OF EUROPE'S BUILDINGS HEAT DEMAND**

and bring immense efficiency gains



For the EU28, **COOLING** accounts for **ABOUT 3%** of the total **ENERGY DEMAND** for heating and cooling, but this share is **EXPECTED TO RISE!**

Heat Roadmap Europe 4 (HRE4) aims to develop low-carbon heating and cooling strategies, called Heat Roadmaps, by quantifying and implementing changes at the national level for 14 EU Member States.

This publication is based on the results from the work package 3 (which focused on profiling the heat demand in Europe), provided by the following HRE4 project partners:



Fraunhofer Institute for Systems and Innovation Research



Utrecht University, Copernicus Institute of Sustainable Development



TEP Energy, research and consultancy



ARMINES, Centre for Energy Efficiency of Systems

For more details on the profile of heating and cooling demand in 2015, please refer to the D3.1 report that will soon be published on the HRE4 website.

Additionally check the 4th Pan-European Thermal Atlas (Peta4) at <http://heatroadmap.eu/Peta4.php>



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Other HRE4 project partners:



Coordinator: Aalborg University, Sustainable Energy Planning Research Group



Joint Research Centre, Institute for Energy and Transport



Halmstad University, School of Business, Engineering and Science



Europa-Universität Flensburg, Department of Energy and Environmental Management



PlanEnergi, sustainable energy consulting



University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture



ICLEI, Local Governments for Sustainability



Euroheat & Power, International network for district energy



EHPA, European Heat Pump Association



BPIE, Buildings Performance Institute Europe