



2050

## Heat Roadmap Europe

A low-carbon heating and cooling strategy

# 2015 Final Heating & Cooling Demand in Germany



Country presentation  
October 2017

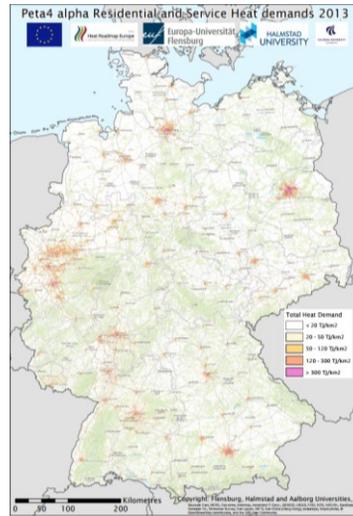
German context





## General context

- **Population [1]:**  
80.8 million
  - 15.9% of EU28
- **GDP [1]:**  
2,916 billion EUR
  - 22.3% of EU28
- **Heating degree days [2]:**  
2,908 HDDs/year
  - 13<sup>th</sup> coldest of EU28
  - 7<sup>th</sup> coldest among the 14 HRE countries



Heat Demand Atlas (major population centres are visible) [HRE4, 2013]

1. DG Energy's 2014 data from the [German datasheet](#) (2016)
2. Eurostat's 2015 data on [HDDs](#) in Germany (2016)

## General context – Energy intensity

- **Total final energy demand (FED)<sup>[3]</sup>:**  
2 467 TWh
  - 19.6% of EU28
  - The highest of EU28 and HRE14
- **FED per capita :**  
30.5 MWh/Capita
  - 7<sup>th</sup> highest of EU28
  - 6<sup>th</sup> highest of HRE14
- **Final energy from renewable sources [4] :**  
359.9 TWh
  - 14.6% of total FED
  - 18<sup>th</sup> highest share of EU28
  - 9<sup>th</sup> highest share of HRE14
- **Final energy from renewable sources for H&C [4]:**  
177.9 TWh
  - 12.9% of the total H&C
  - 22<sup>nd</sup> highest share of EU28
  - 11<sup>th</sup> highest share of HRE14



Heat Demand Atlas (major population centres are visible) [HRE4, 2013]

3. Eurostat's 2015 data on [annual energy quantities](#) in Germany
4. Eurostat's RES [Shares 2015 results](#)





## Climate and emissions

- Germany has committed to reduce GHG emissions by 40%<sup>[2]</sup> by 2020, compared to 1990

Carbon per capita [kg CO <sub>2</sub> /person]	Carbon per GDP [ton CO <sub>2</sub> /billion EUR]	Carbon Emission per tone of energy carrier (carbon intensity) [kg CO <sub>2</sub> /toe]
10,117	299	2,611
<i>The highest among the 14 HRE</i>	<i>5th highest among the 14 HRE</i>	<i>2<sup>nd</sup> highest among the 14 HRE</i>
2014 data <sup>[1]</sup>		

1. DG Energy's 2014 data from the [German datasheet](#) (2016)

5. German Federal Ministry for the Environmental, Nature Conservation, Building and Nuclear Safety (BMUB)

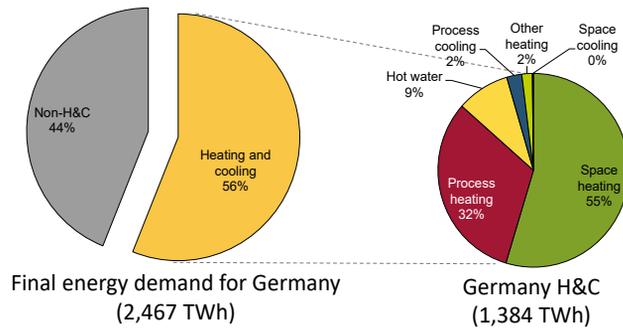
## National energy situation currently





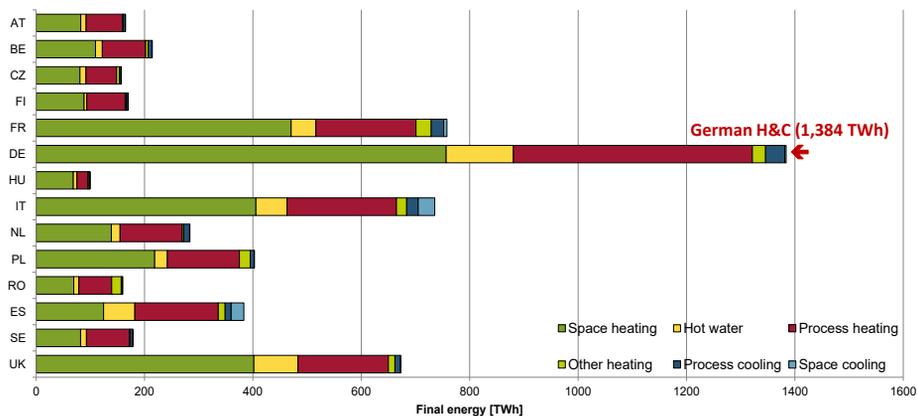
## Germany: H&C energy by purposes

- H&C comprises 56% of Germany's final energy demand.
- Very little cooling process needs, but very high need for space and process heating.



## 14 HRE: H&C energy by purposes

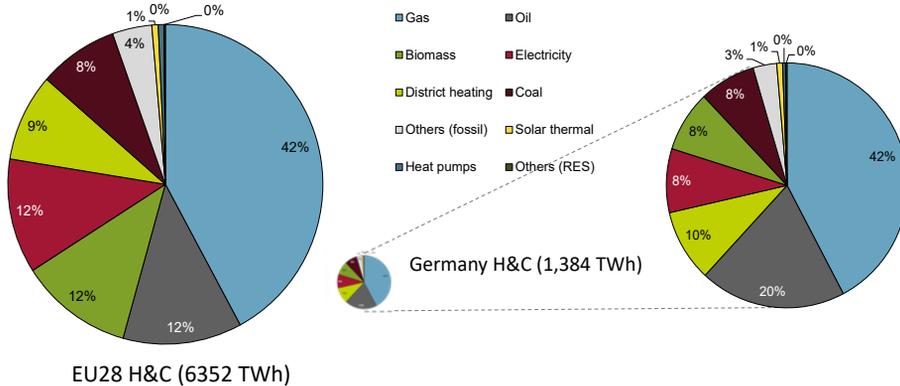
- Germany has the highest final energy demand for H&C among the 14 HRE countries.





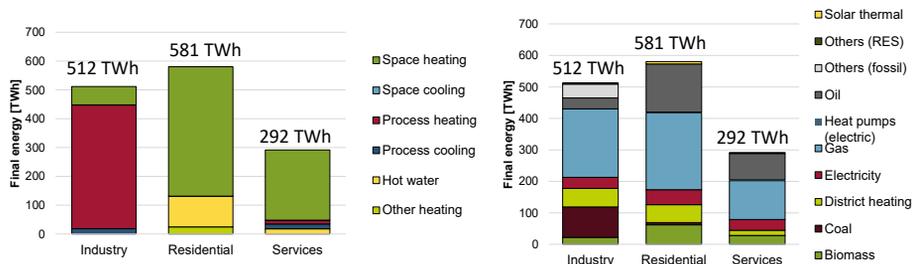
## H&C energy by energy carriers

- Germany accounts for 22% of the EU28's total delivered H&C demand.
- Compared to the EU28, it uses less biomass, less electricity and more oil for H&C.



## Sectors by purposes and energy carriers

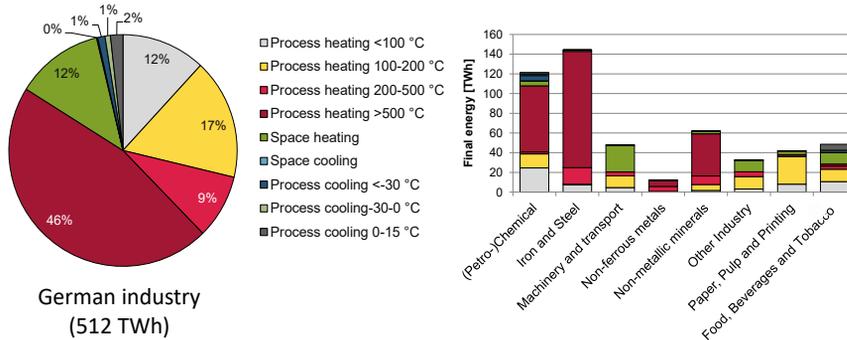
- German industries are overwhelmingly dominated by process heating, other sectors by space heating.
- All sectors rely much on fossil fuels, especially gas, while industry also relies on coal and the other sectors on oil.





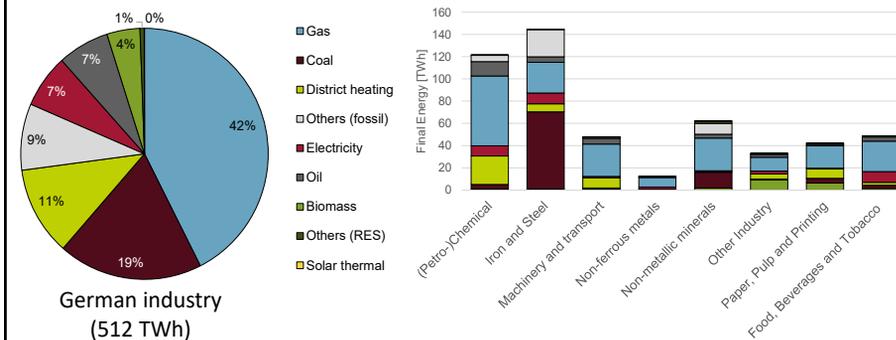
## Industry sub-sectors by H&C purposes

- German industry is dominated by higher temperature heating processes.
- Most of this is used for the metals industry, (petro-)chemicals and non-metallic minerals.



## Industry sub-sectors by energy carriers

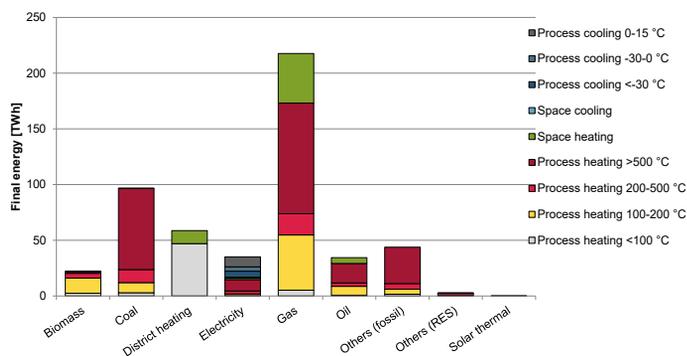
- To attain such high temperatures, German industry relies mostly on fossil fuels.
- The (Petro-)Chemical industry is the one that relies most on district heating
- Only the paper and “other” industries make significant use of biomass.





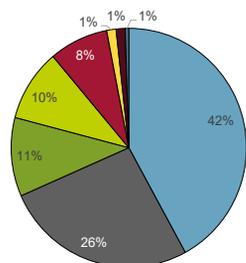
## Industry Space Heating

- German Industry uses mostly gas for space heating, although it uses some district heating and oil too

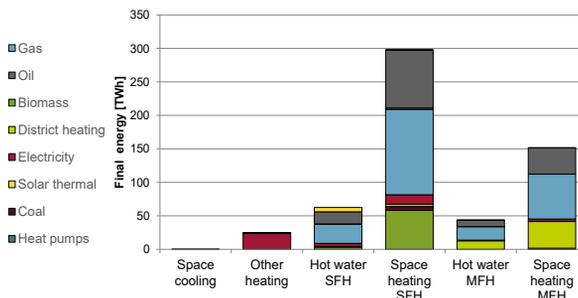


## Residential sub-sectors by energy carriers

- German households use mostly gas and coal for H&C
- Single-family homes lead the way in biomass and solar thermal (for hot water).
- Multi-family homes are the primary market for district heating.



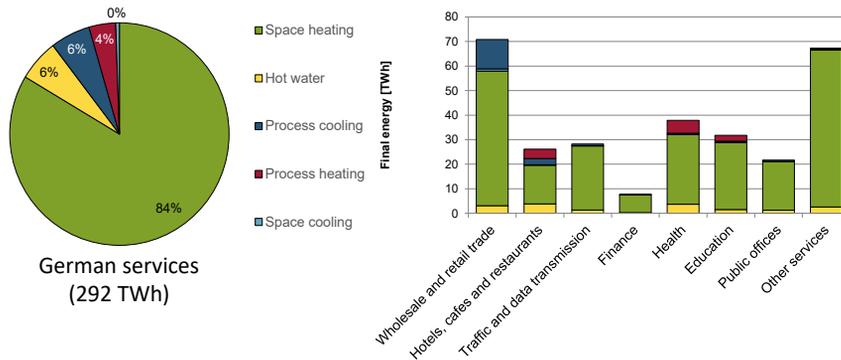
German households (581 TWh)





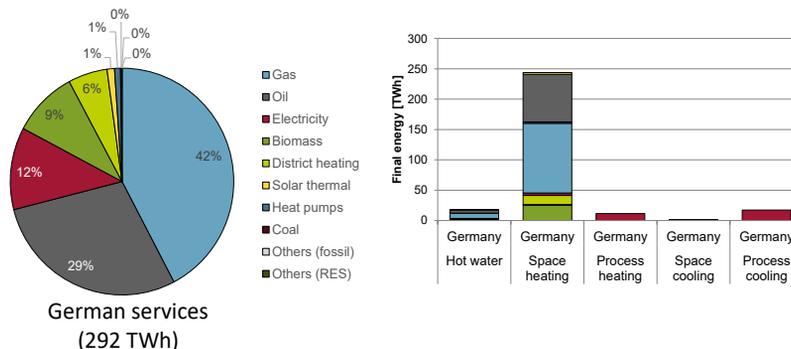
## Service sub-sectors by H&C purposes

- Space heating is definitely the main concern for Germany's service sector.
- Their only significant cooling needs are from wholesale/retail trade, and some from hospitality facilities.



## Service sectors by energy carriers

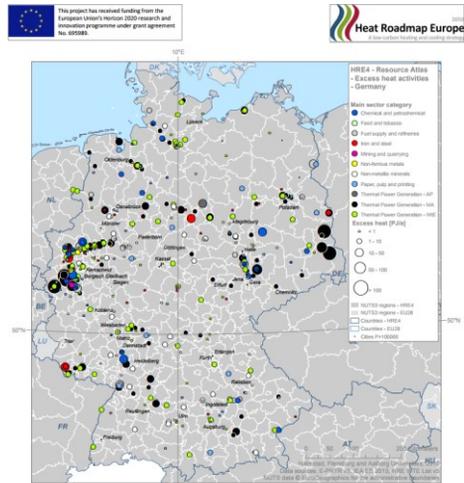
- Germany's service sector relies greatly on gas and oil, most of which goes to space heating.
- All cooling, and process heating, are powered by electricity only.





## Excess heat sources

- **Excess Heat:**
  - At least 686 Twh\*
    - Would cover 77% of the final energy demand for Space heating and Hot water in Germany
- The biggest concentrations of excess heat sources are located in the West and East regions of Germany.

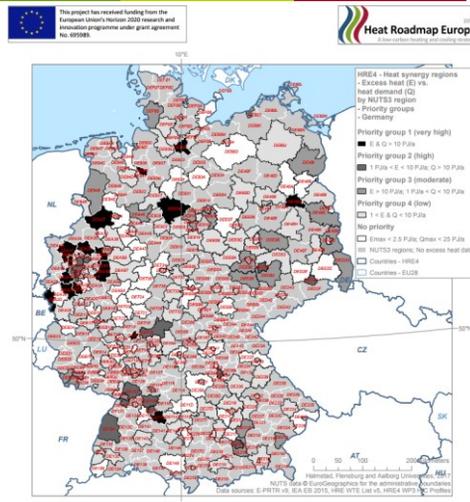


Excess Heat Atlas [HRE4, 2013]

\* Calculated from the 463 biggest facilities in Germany, using [Peta 4.2](#)

## Heat Synergy Regions

- 17 regions present a very high potential for district heating
- At least 10 other regions present a high potential for district heating



Excess Heat Atlas [HRE4, 2013]





## Main references cited

---

1. DG Energy's 2014 data from [German datasheet](#) (2016)
2. Eurostat's 2015 data on [HDDs](#) (2016)
3. Eurostat's 2015 data on [annual energy quantities](#)
4. Eurostat's RES [Shares 2015 results](#)
5. German Federal Ministry for the Environmental, Nature Conservation, Building and Nuclear Safety ([BMUB](#))