

# Strengthened EU policies in the heating and cooling domain, and key results from a new heat pump study

J. Carlsson, 20 April 2023

# Overview

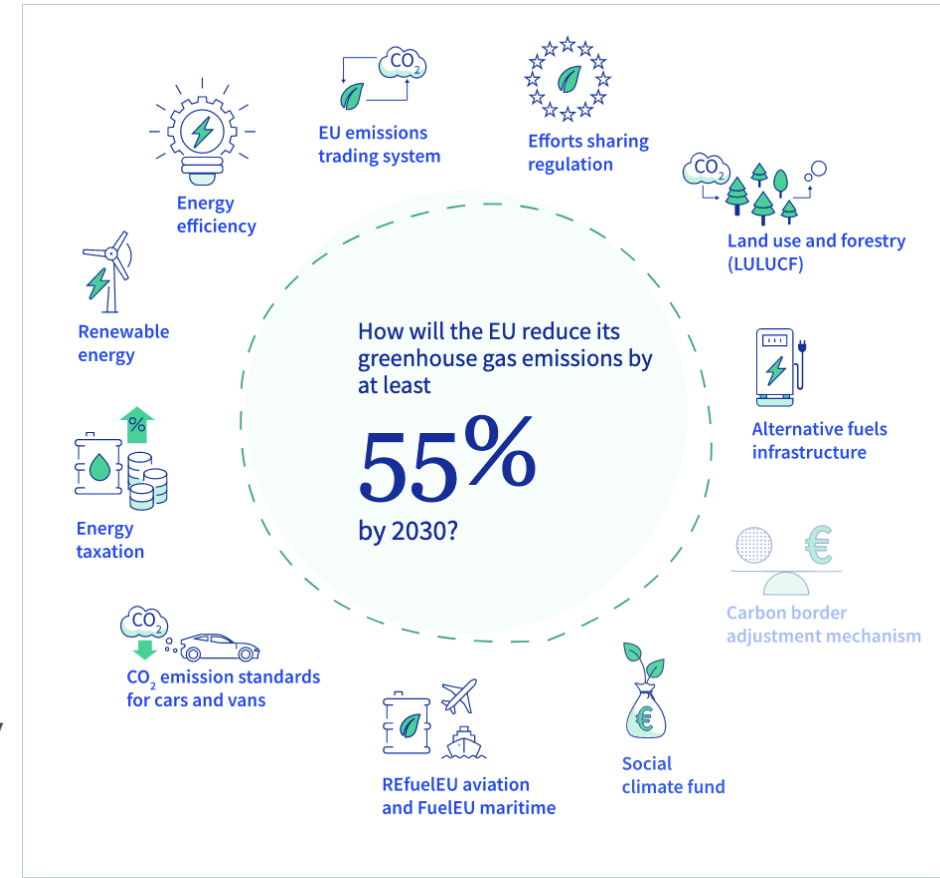
Strengthened energy policies in the EU

Current situation regarding heat pumps in the EU

Comprehensive JRC study on accelerated deployment of heat pumps in the framework of Fit-for-55 and REPowerEU

# Fit for 55 package

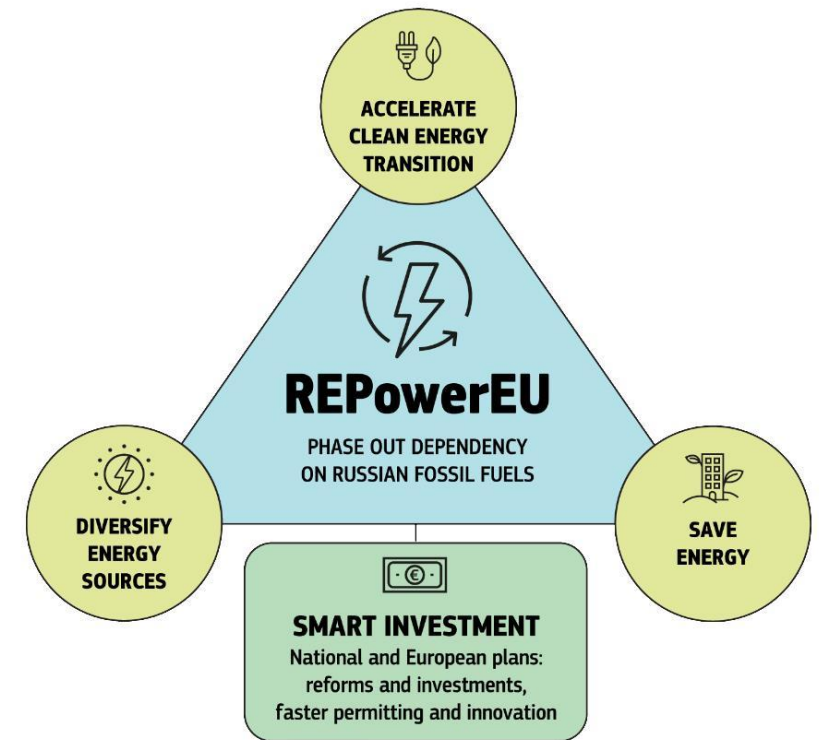
- Fit for 55 (FF55) - European climate law with goal of reducing emissions by at least 55% by 2030. Set of proposals to revise and update EU legislation.
  - At least 40% renewables in the overall energy mix
    - H&C – binding increase of RES by 0.8% annually until 2026 and 1.1% afterwards, and for DHC the annual required increase is 2.1% including waste heat
    - At least 49% renewable energy share in buildings by 2030
    - All new *public* buildings are zero emission buildings from 2028. All buildings from 2030.



# REPowerEU

REPowerEU aims at phasing out the dependence on Russian gas imports by:

- Diversifying energy supplies, increase RES target to 45% by 2030 and energy savings to 13%
- In the H&C domain e.g.:
  - 30 million heat pumps added by 2030
  - Develop and modernise DHC systems to replace fossil fuels
  - Update energy labelling requirements for heat pumps
  - EU ETS expanded to include buildings and transport



# Current situation reg. heat pumps in the EU

- 40% of FEC and 36% of GHG emissions stem from buildings
- 40% of buildings built before 1960 and 90% before 1990
- Renovation rates are at 1% annually, but should increase to 2% per year
- The share of heat pumps for space heating in the EU was 21.5% in 2021



# Heat pump study – opportunities and challenges

## *Holistic analysis*

- Decarbonising EU residential buildings with heat pumps for different building typologies and climates.
- Assumed that heat pumps replace fossil fuelled boilers exclusively.

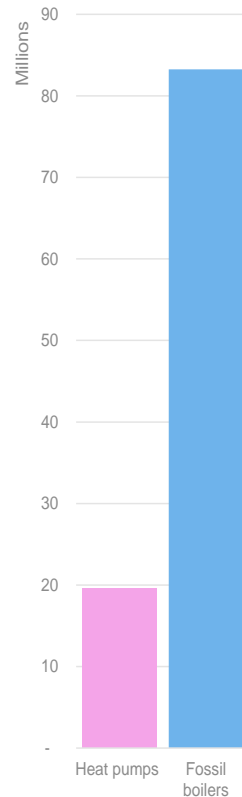
## *Outputs:*

- CO2 and energy savings, and costs
- Impact on the power system
- Potential bottlenecks, e.g., availability of skilled installers, supply chain shortages, financially vulnerable groups
- Competitive position of EU companies



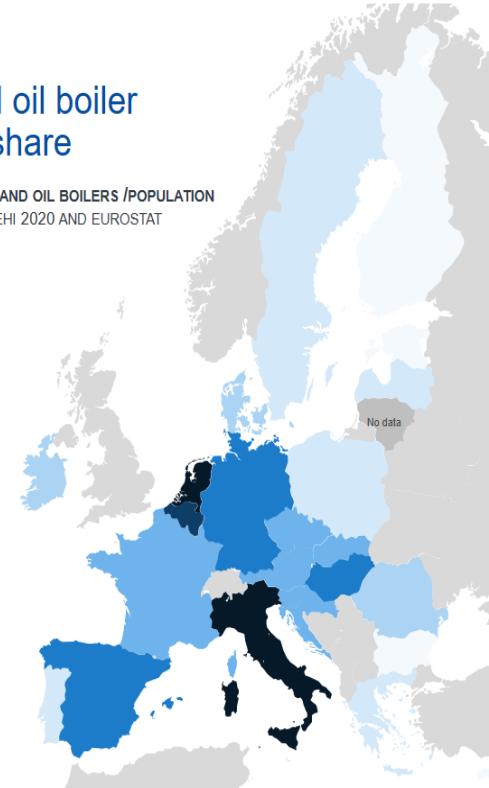
# Heat pump market share and growth

- Installed HPs grew on average by 11% annually from 2011 to 2020 (42% in 2022)
- 1.7 million hydronic HPs were sold in 2022
- REPowerEU: additional 30 million hydronic HPs by 2030
- ~17% of growth every year is needed to reach the target



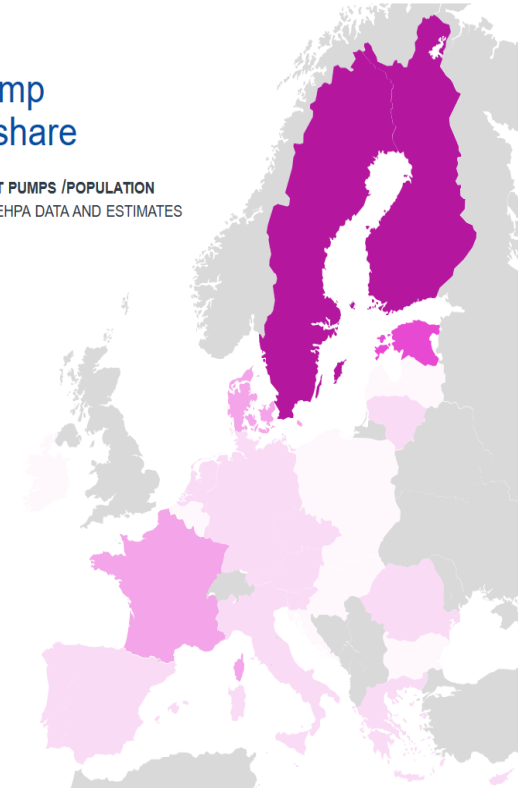
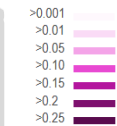
## Gas and oil boiler market share

NUMBER OF GAS AND OIL BOILERS / POPULATION  
HOTMAPS 2019, EHI 2020 AND EUROSTAT



## Heat pump market share

NUMBER OF HEAT PUMPS / POPULATION  
2020 BASED ON EHPA DATA AND ESTIMATES

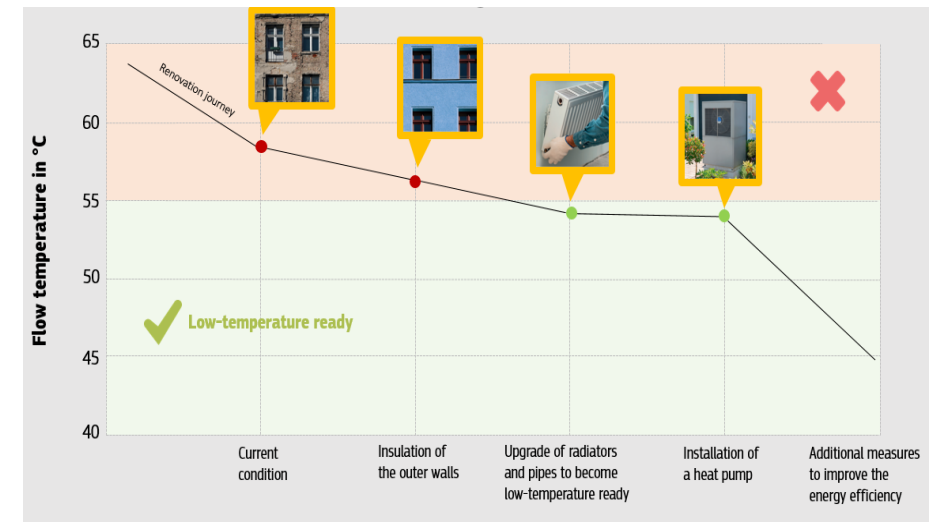
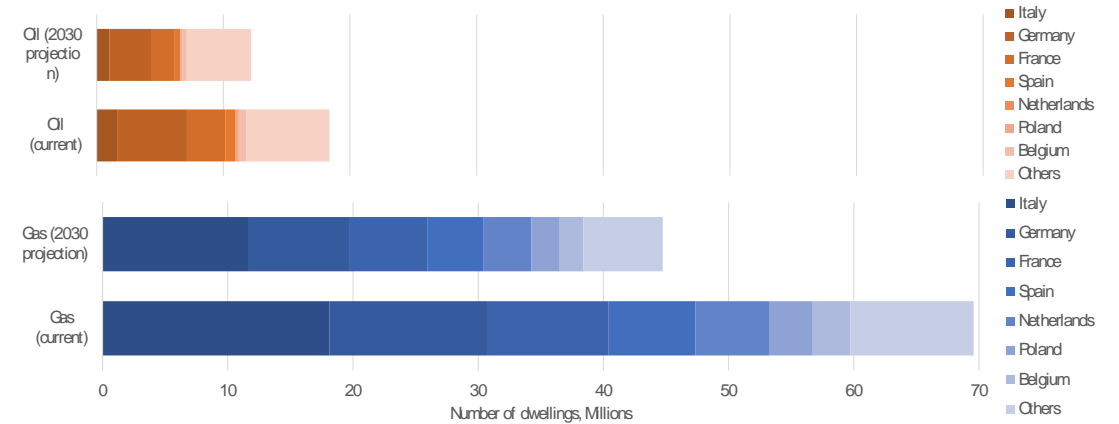


Source: EHI, 2020



# Reduction of gas and oil consumption

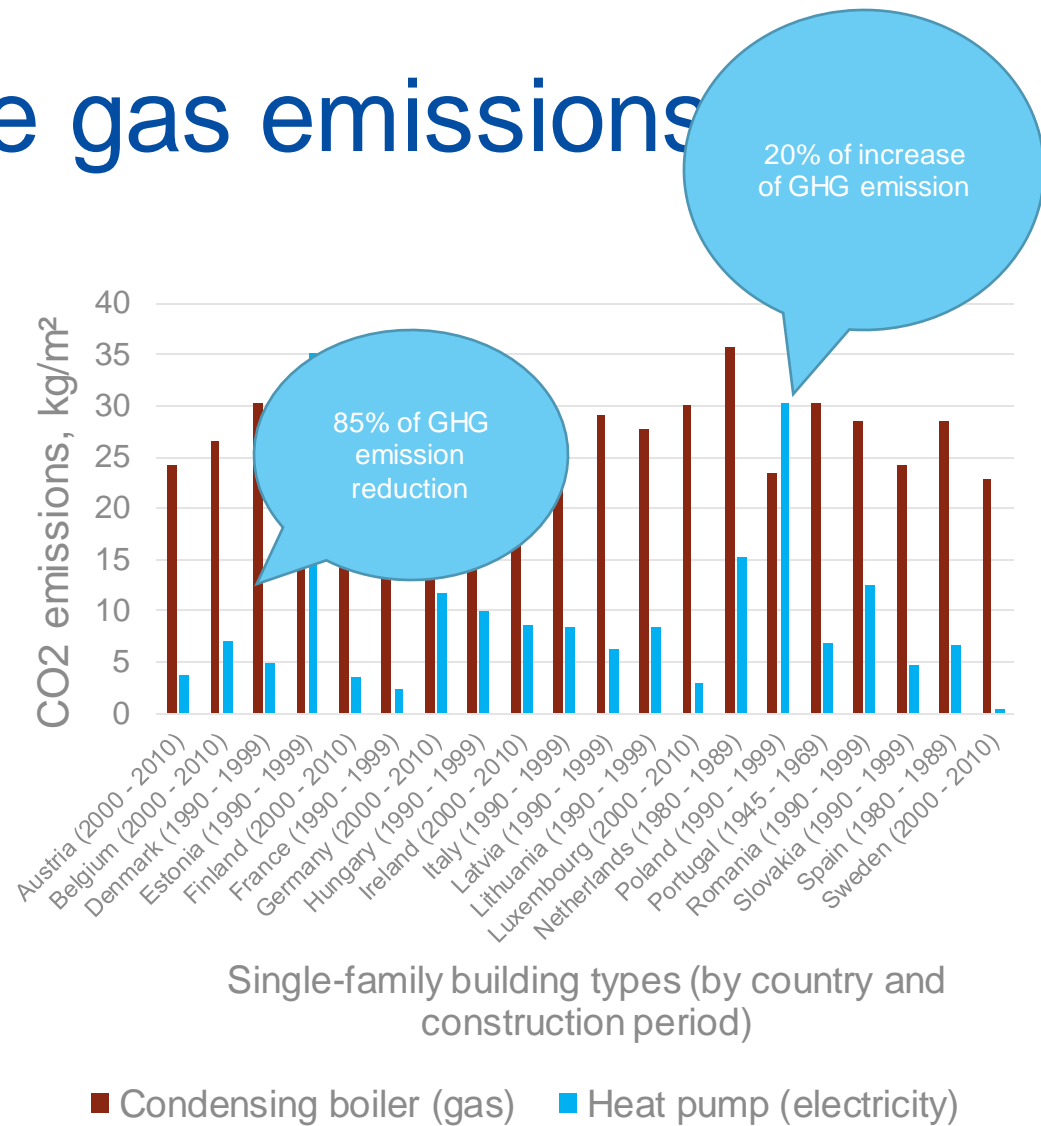
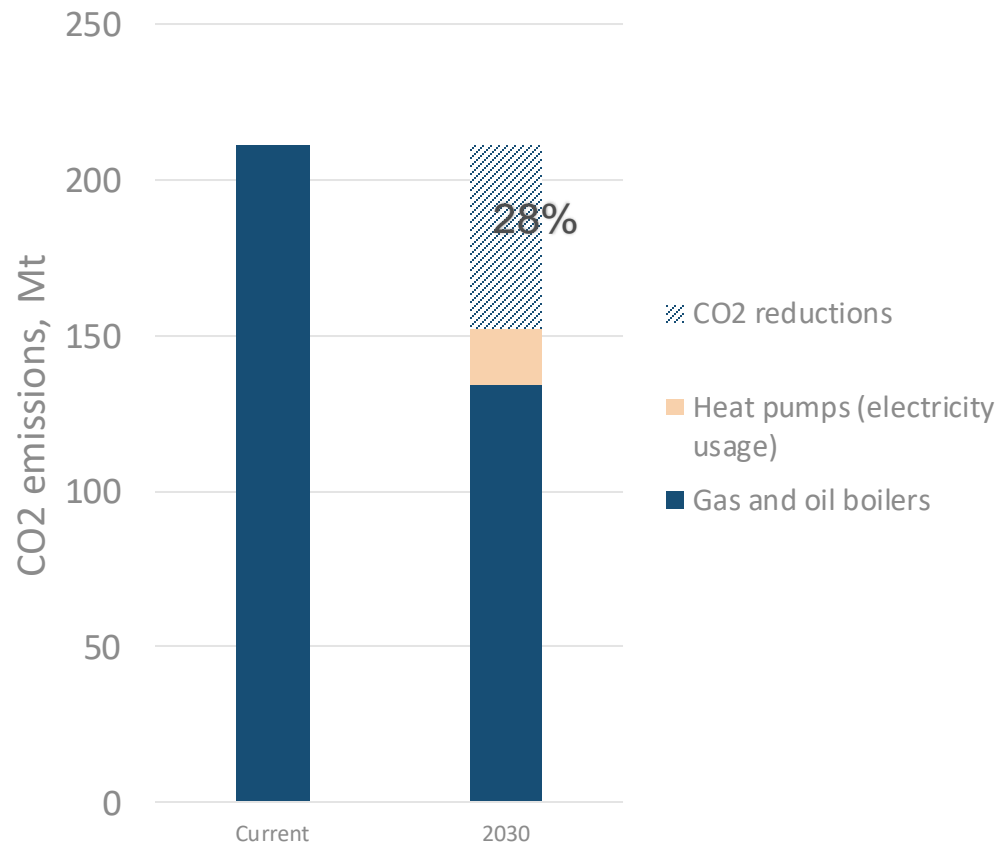
- Total FEC for space heating amounted to 1784 TWh in 2020
- Replacing 30 million existing gas and oil boilers with heat pumps by 2030 reduces
  - FEC for heating by oil and gas by 36%
  - 28 bcm of gas consumption in the EU



Source: own illustration partly based on ifeu 2021



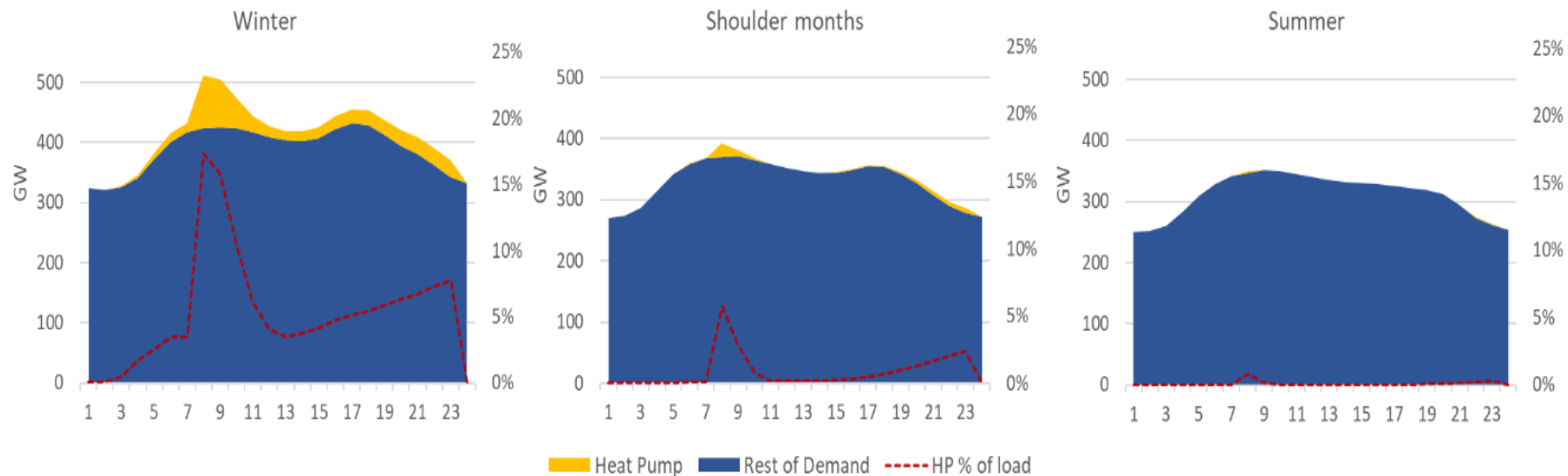
# Reduction of greenhouse gas emissions



# Impact on the power system

Highest electricity consumption in winter, the impact is milder during spring and autumn and almost absent in summertime

On a cold winter-day the total electricity consumption of EU Member States increases by 5-10%



# Key messages

New EU energy policies are introduced to accelerate the deployment of renewables, enhance energy savings and energy security

Heat pumps are identified as a key technology to decarbonise the heating and cooling sector

Large scale deployment of heat pumps in the EU by 2030 allows to reduce FEC for space heating by 36%, GHG emissions by 28%, and natural gas consumption by 28 bcm

# Thank you

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