

Cooling in Rotterdam



Municipality of Rotterdam- Marie-Emilie Ingen Housz



Gemeente
Rotterdam

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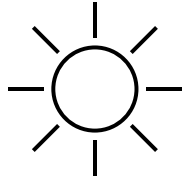
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Which aspects influence the cooling demand?

Climate



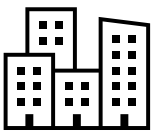
Temperatures on the hottest summer day in 2050 are expected to be 1.4°C to 3.3°C higher than today, and the number of summer days ($\geq 25^\circ\text{C}$) will increase from 21 days now to potentially 35 days in 2050.

Demographics



The share of people aged 65+ – a particularly vulnerable group to high temperatures – will increase by approximately 50% (by 2050), alongside population growth.

Urbanisation



Due to the urban heat island effect, temperature increases in cities can be up to twice as high as in rural areas.

Additionally...

- Strongly improved airtightness and thermal insulation → increasing internal heat load
- Higher comfort expectations due to habituation to air-conditioned environments

In other words! Cooling: from 'nice to have' to 'must have' (RVO, 2019)



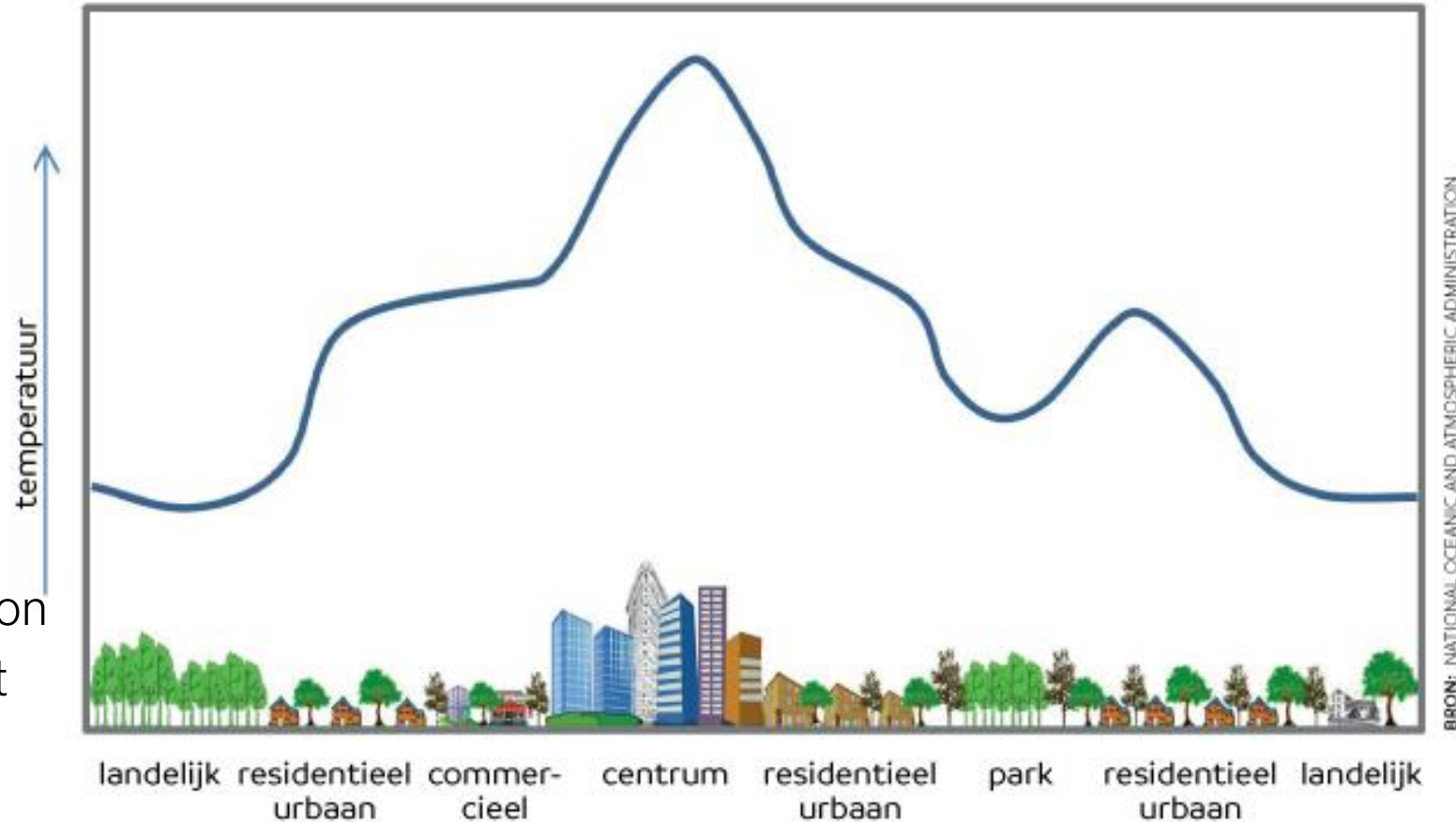
City vs rural area

Where will the largest clustered cooling demand occur?

"The urban heat island effect"

Amplifying factors:

- Buildings absorb more radiation
- Paved surfaces and less vegetation
- Human activity (industry, exhaust emissions, etc.)

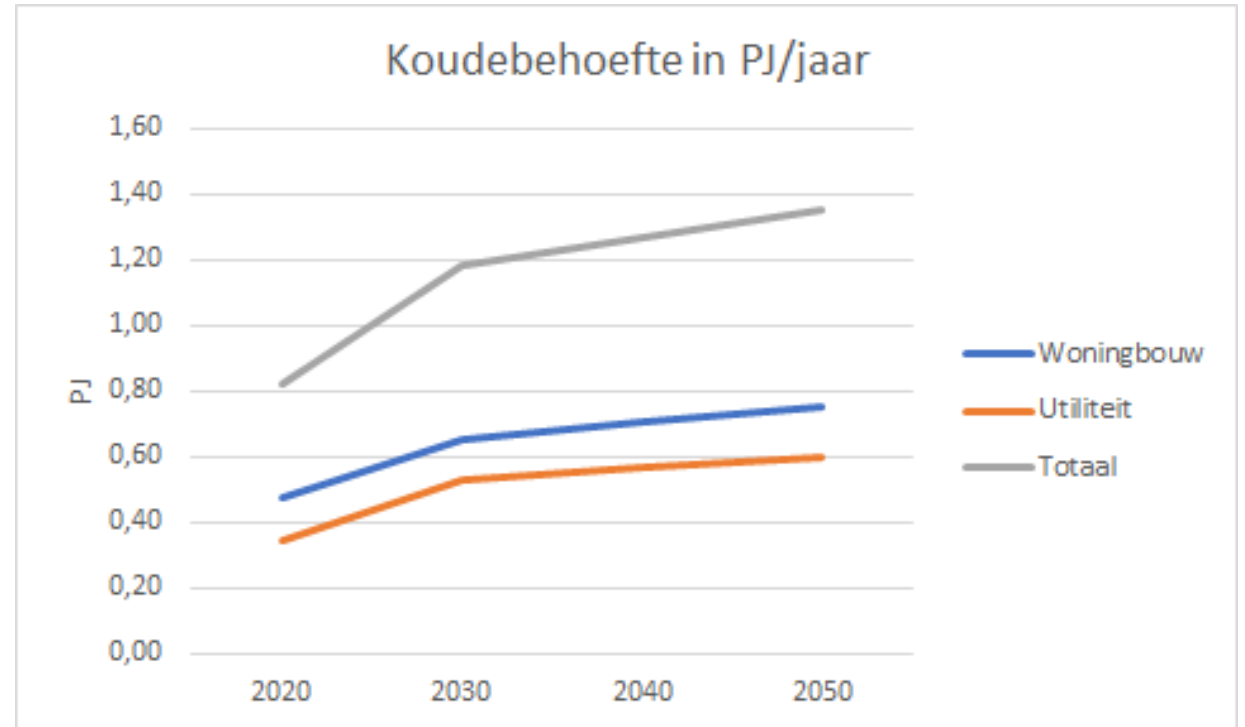


Cooling demand growth

- Cooling demand increases for both residential and commercial buildings:
- Increase in housing (2020–2050) = 47%
- Increase in commercial buildings (2020–2050) = 51%

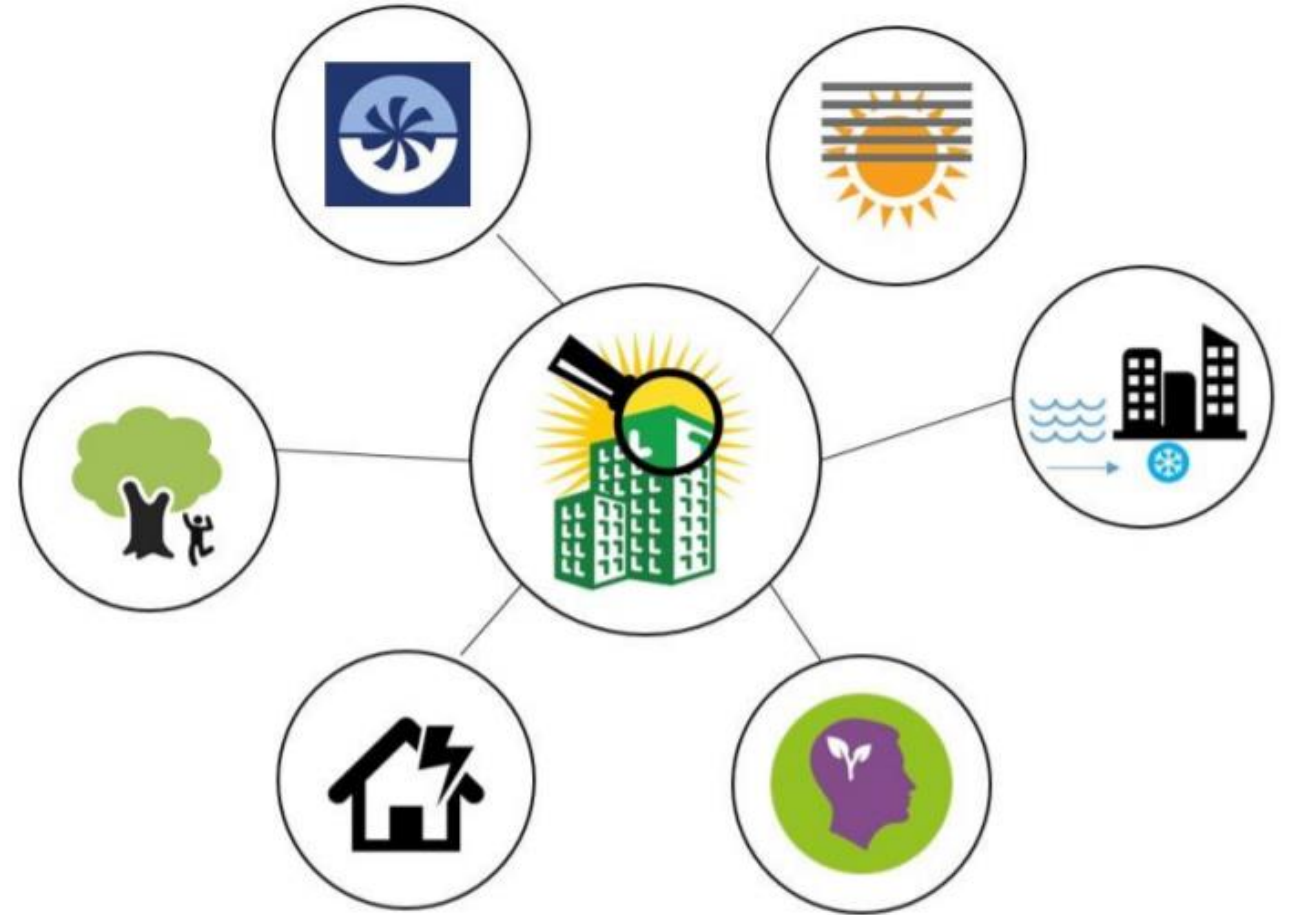
Share of total demand:

- Housing: approx. 55%
- Commercial: approx. 45%



What options exist to meet cooling demand?

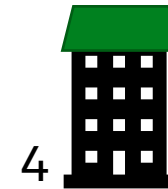
- Cooling demand reduction
- Cooling reuse
- Cooling generation



What are the best solutions?

Top 5 from our own MCA:

1. Urban greening
2. External shading
3. Fans
4. Green roofs
5. Building design (overhangs, solar-oriented design)



Collaboration with TU DELFT

Cooling demand

2 Rotterdam neighbourhoods

Cooling demand strategies: urban greening, sun blinds