The Hague: Using (big) data to plan for renewable thermal energy districts

Gerwin Hop-CEO
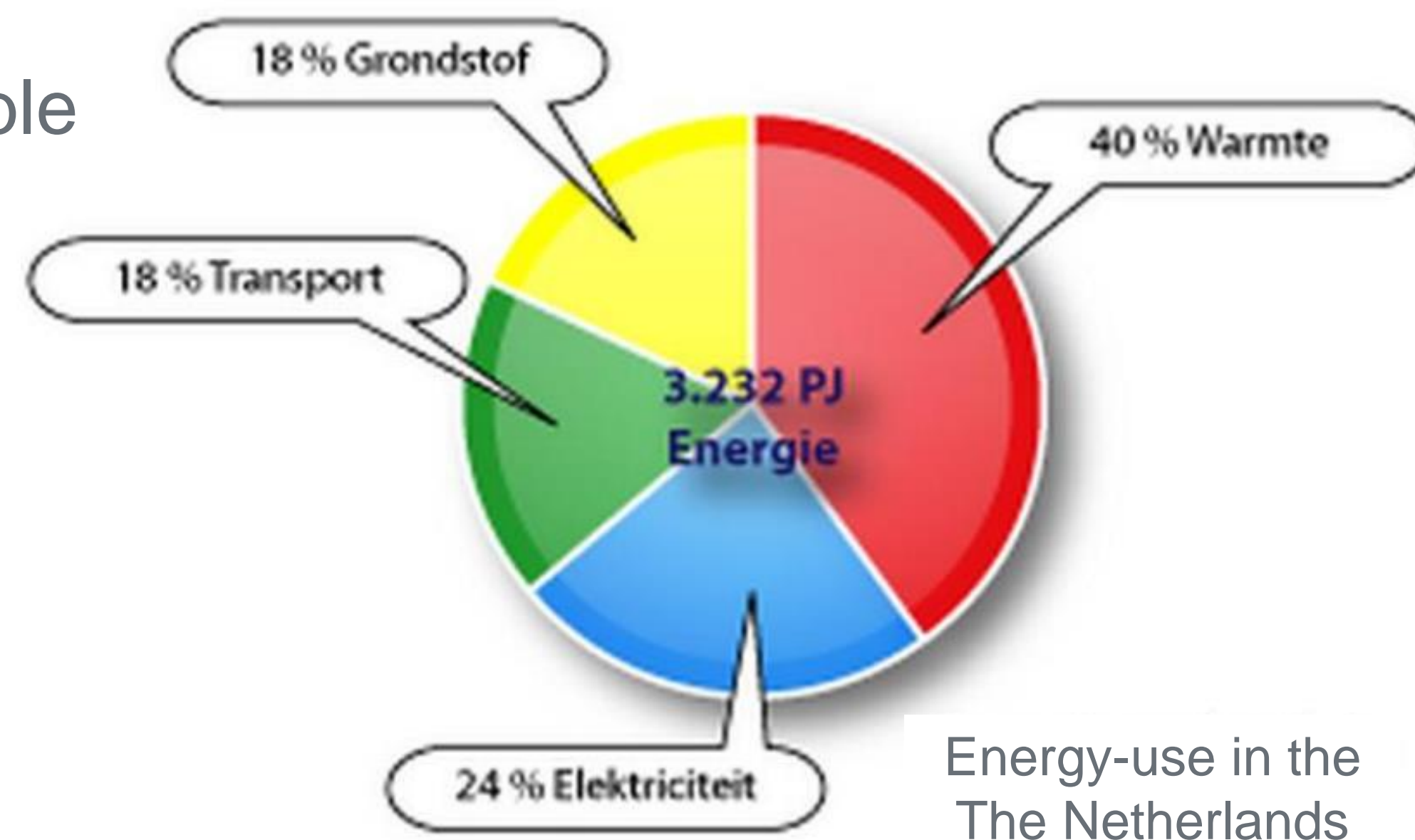
OVER MORGEN

Heat and Cold

We strive to heat and cool cities without the use of fossil fuels. Although the use of fossil fuels for heating and cooling is inefficient and can cause air pollution, 95% of our buildings are heated and cooled with these energy sources.

This is not necessary as sustainable and affordable alternatives exist and have been successfully implemented in large numbers. The challenge to realize a sustainable energy system for a city is a large undertaking and requires cooperation from multiple stakeholders.

Energy transition

OVER MORGEN
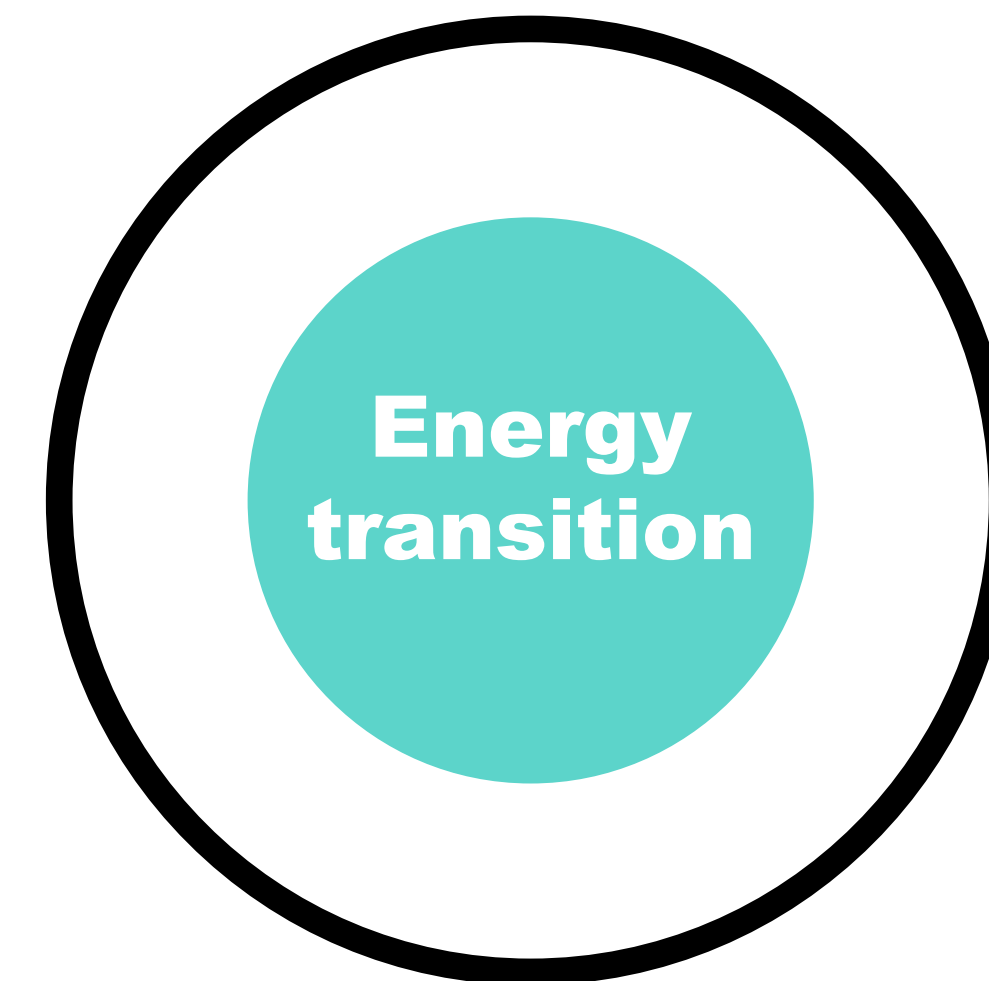
Re- designing Heat and Cold in the city

- Dutch cities invest in/promote affordable, secure, carbon neutral heating and cooling
- Steps (national policy) :
  1. Energy reduction
  2. Using residual heat
  3. Making rest demand more sustainable
     - Geothermal (deep)
     - Biomass
     - Biogass
     - Electrical (heatpumps, ATES, solar)
     - …..

- 48% of total energy used in US goes to heating and cooling (DOE), NYC 75%

18 % Grondstof

18 % Transport

40 % Warmte

3.232 PJ Energie

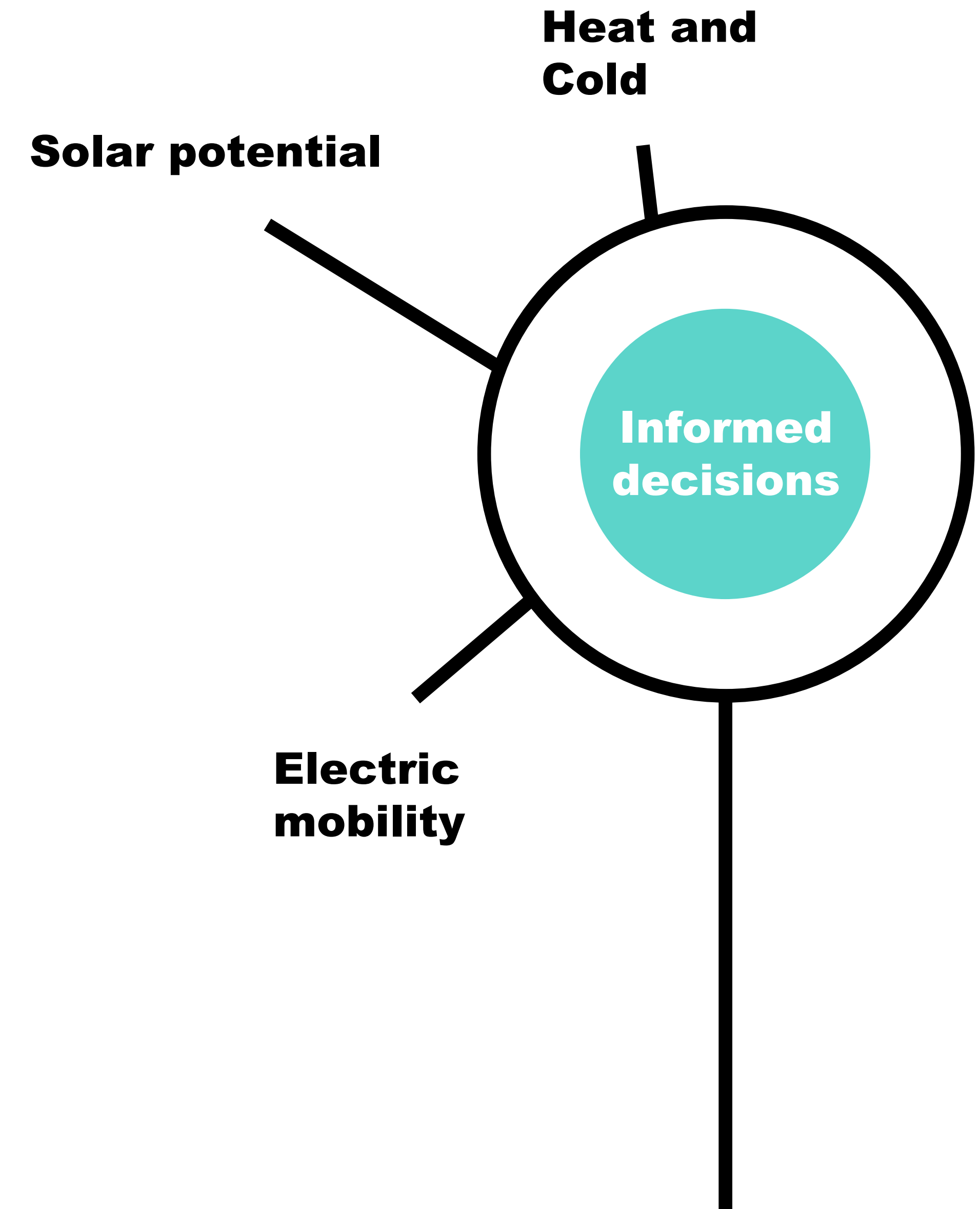24 % Elektriciteit

Energy-use in the The Netherlands

Re-designing heat and cold

- Where to start?
- Where are the biggest gains?
- What are costs and benefits?
- What techniques in what part of the city?
- How to communicate and discuss the task at hand?
- …

GIS/data

Rede-singning heat

Business cases

Projects and programs
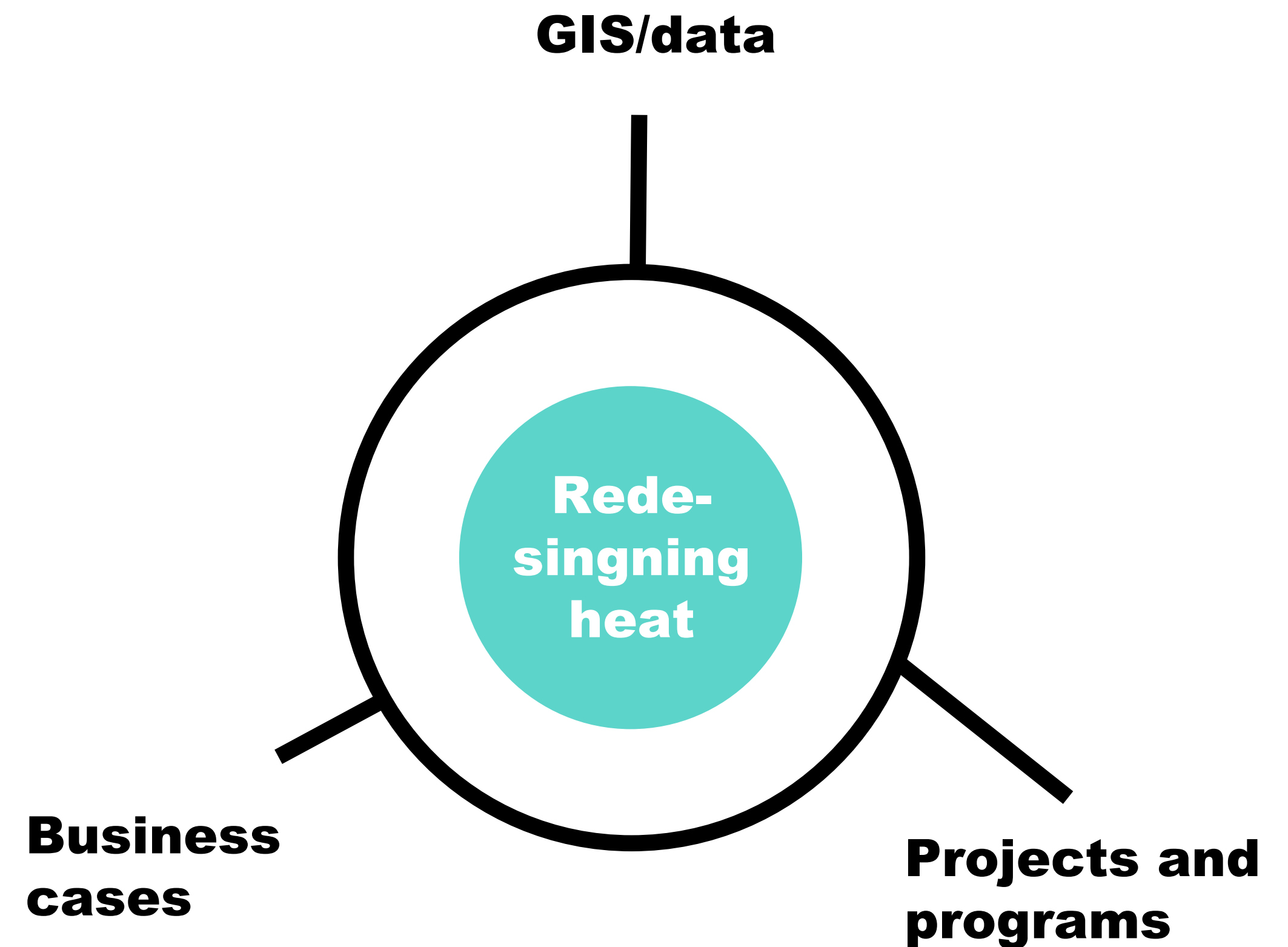
We use data and GIS

GIS is a tool in our consultancy. We break down complex problems into understandable facts and use interactive maps to communicate results and guide decision making.
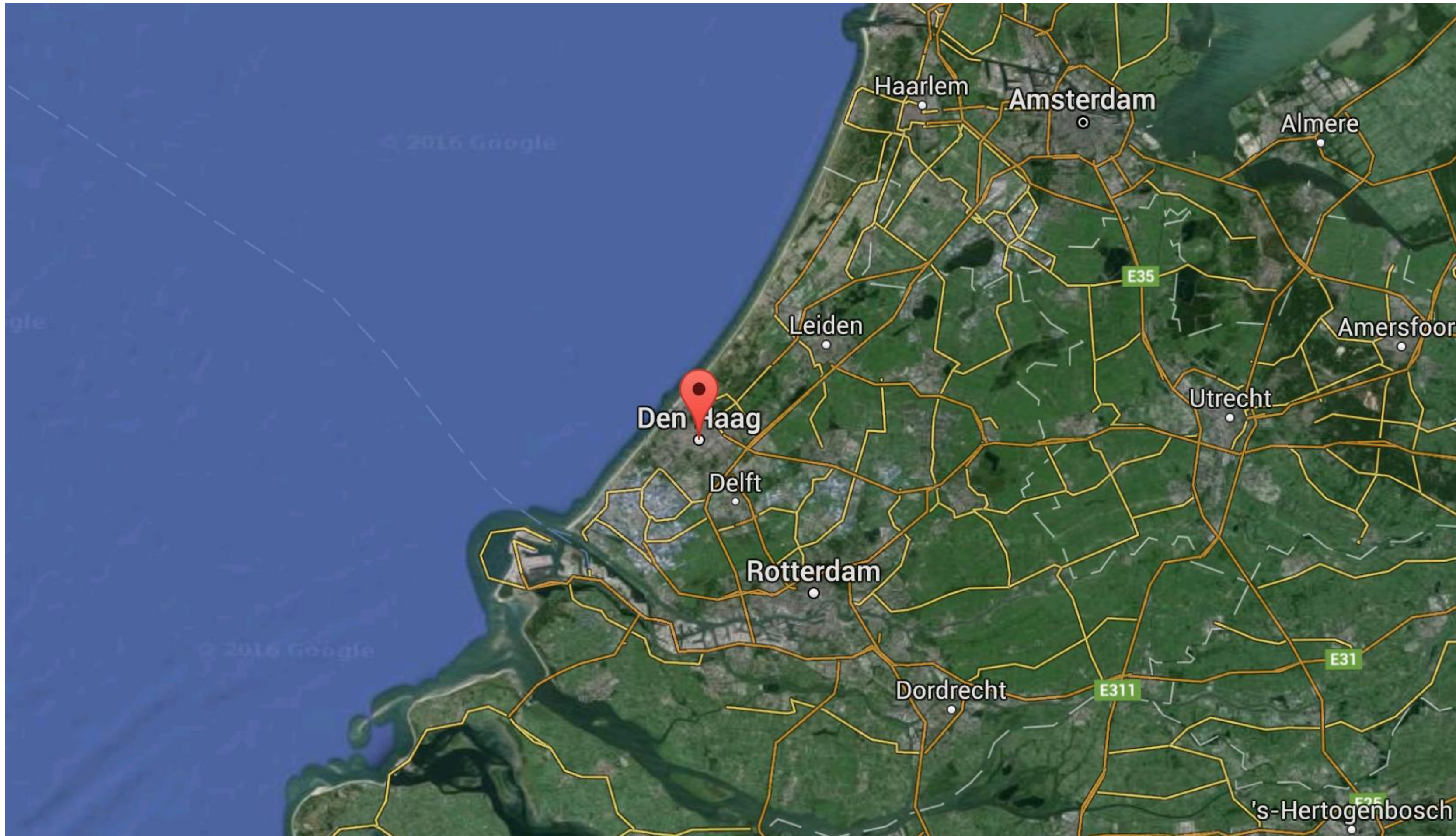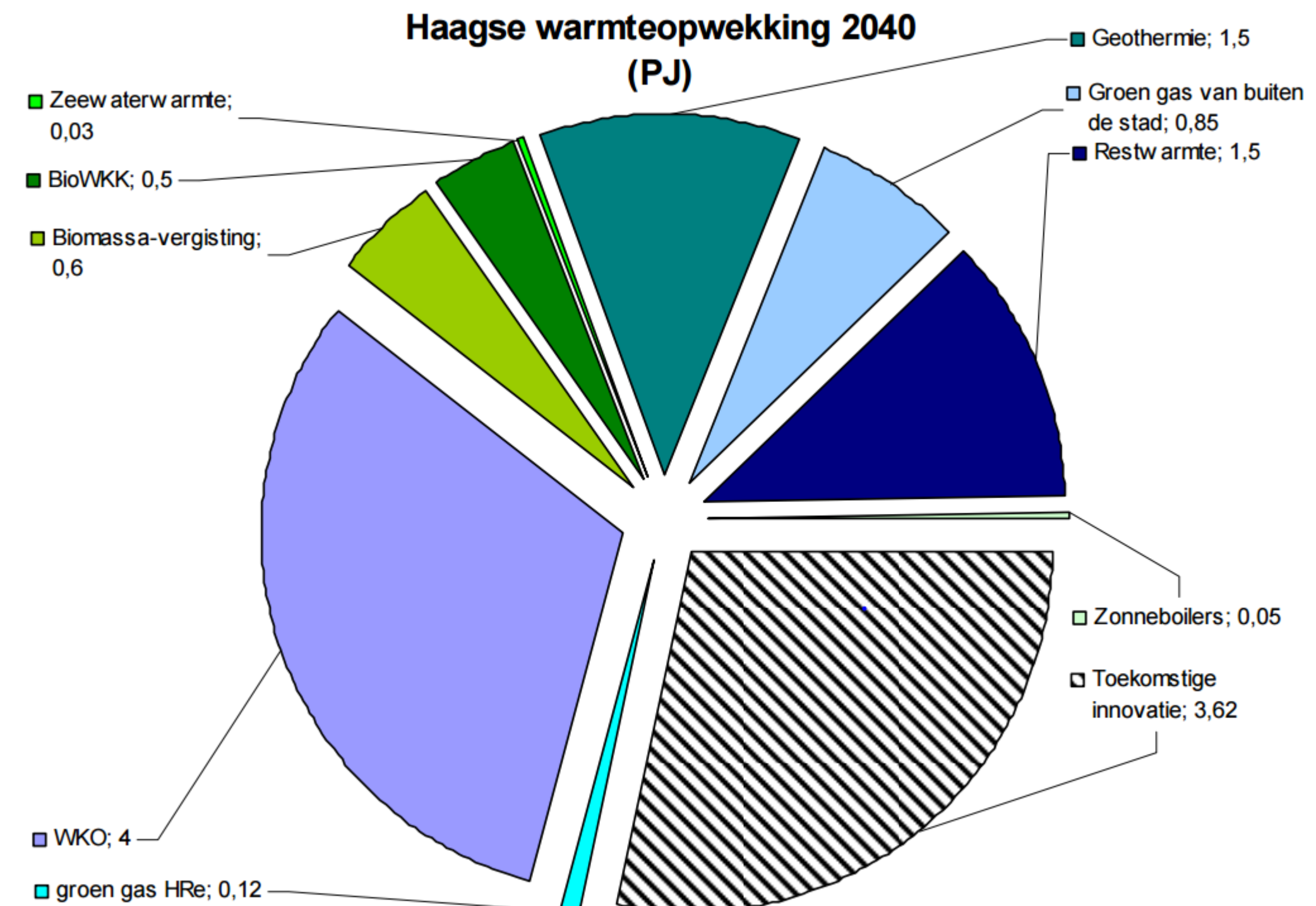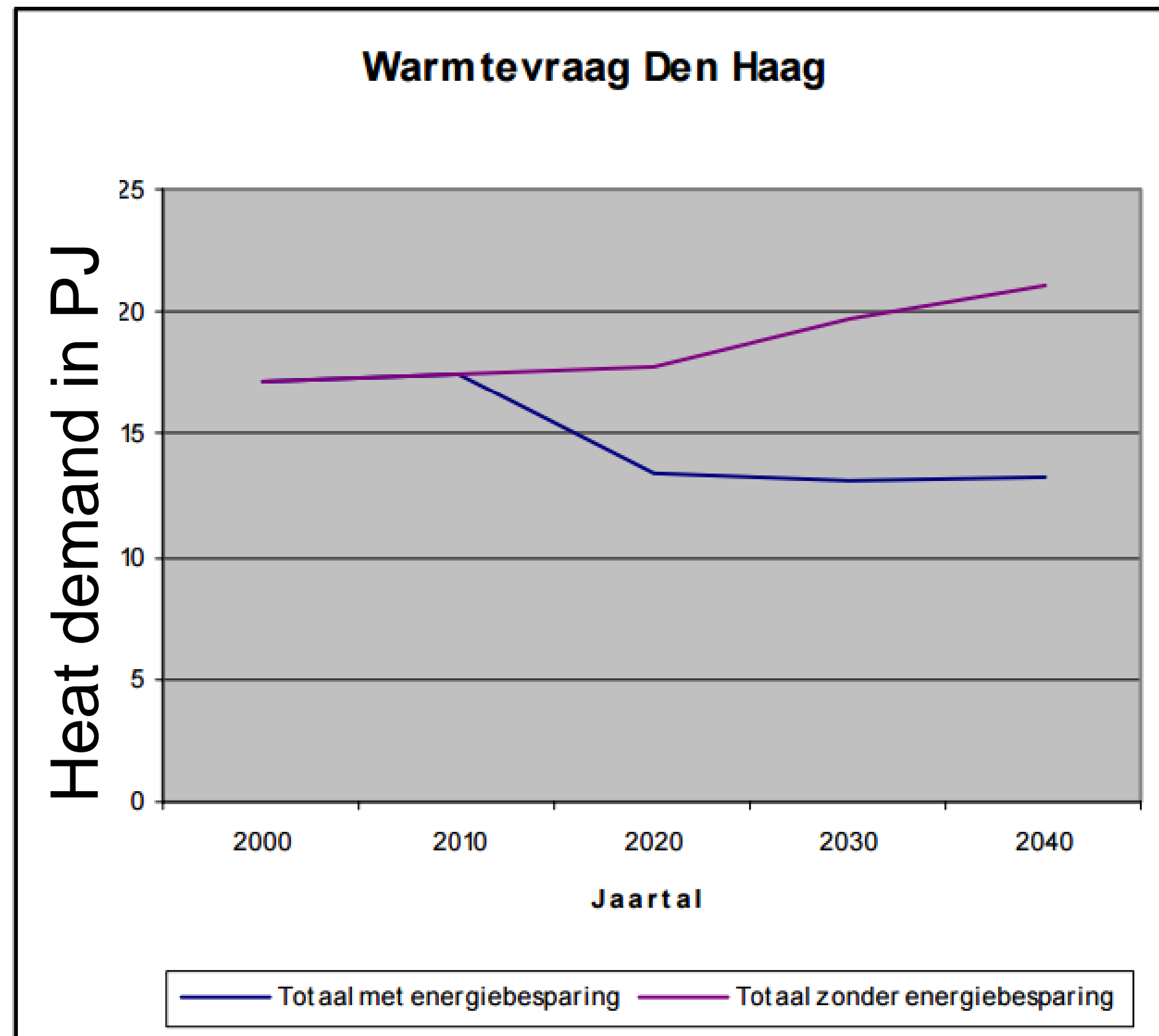
Solar potential
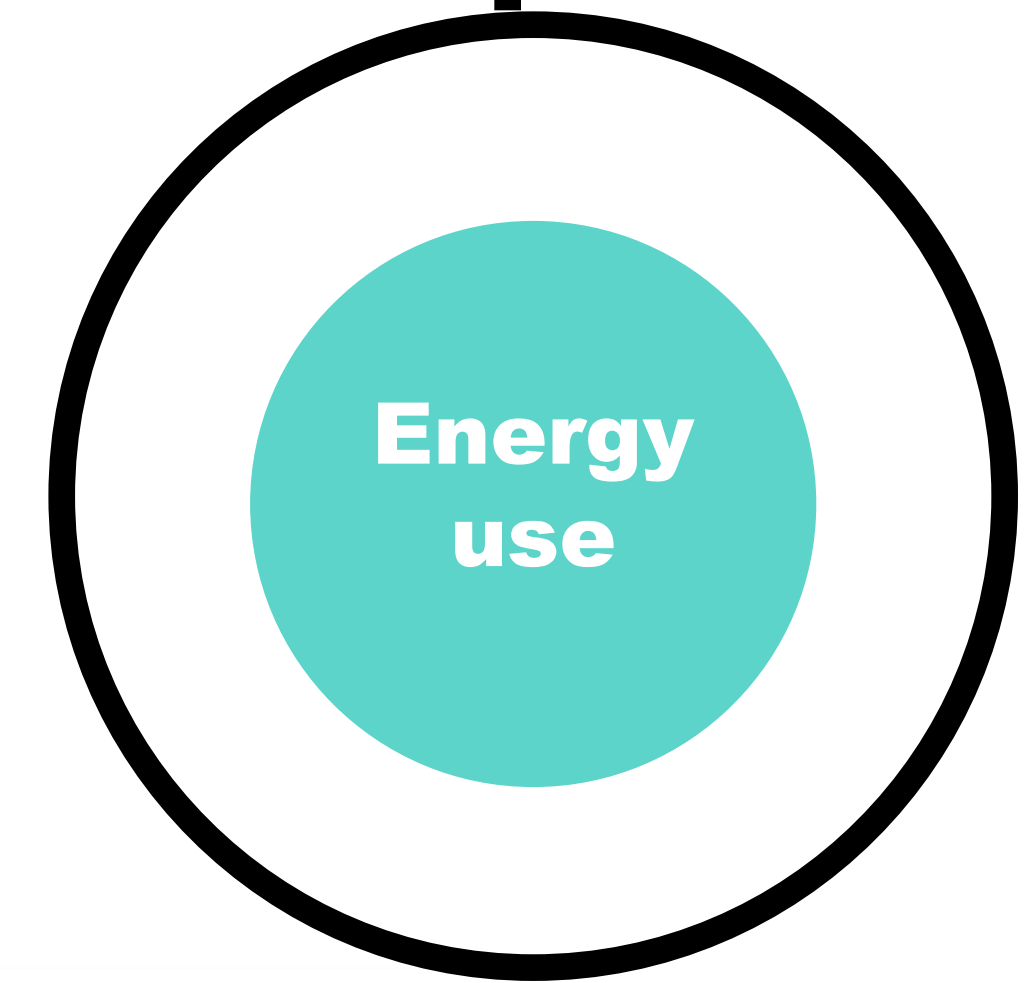
Heat and Cold

Informed decisions

Electric mobility

Case: The Hague

NL, The Hague

Case: The Hague

NL, The Hague

The Hague: energy use

Energy use

Warmtevraag Den Haag

Heat demand in PJ

— Totaal met energiebesparing — Totaal zonder energiebesparing

Haagse warmteopwekking 2040 (PJ)

- Geothermie; 1,5
- Groen gas van buiten de stad; 0,85
- Restwarmte; 1,5
- Zeewaterwarmte; 0,03
- BioWKK; 0,5
- Biomassa-vergisting; 0,6
- Zonneboilers; 0,05
- Toekomstige innovatie; 3,62
- WKO; 4
- groen gas HRe; 0,12
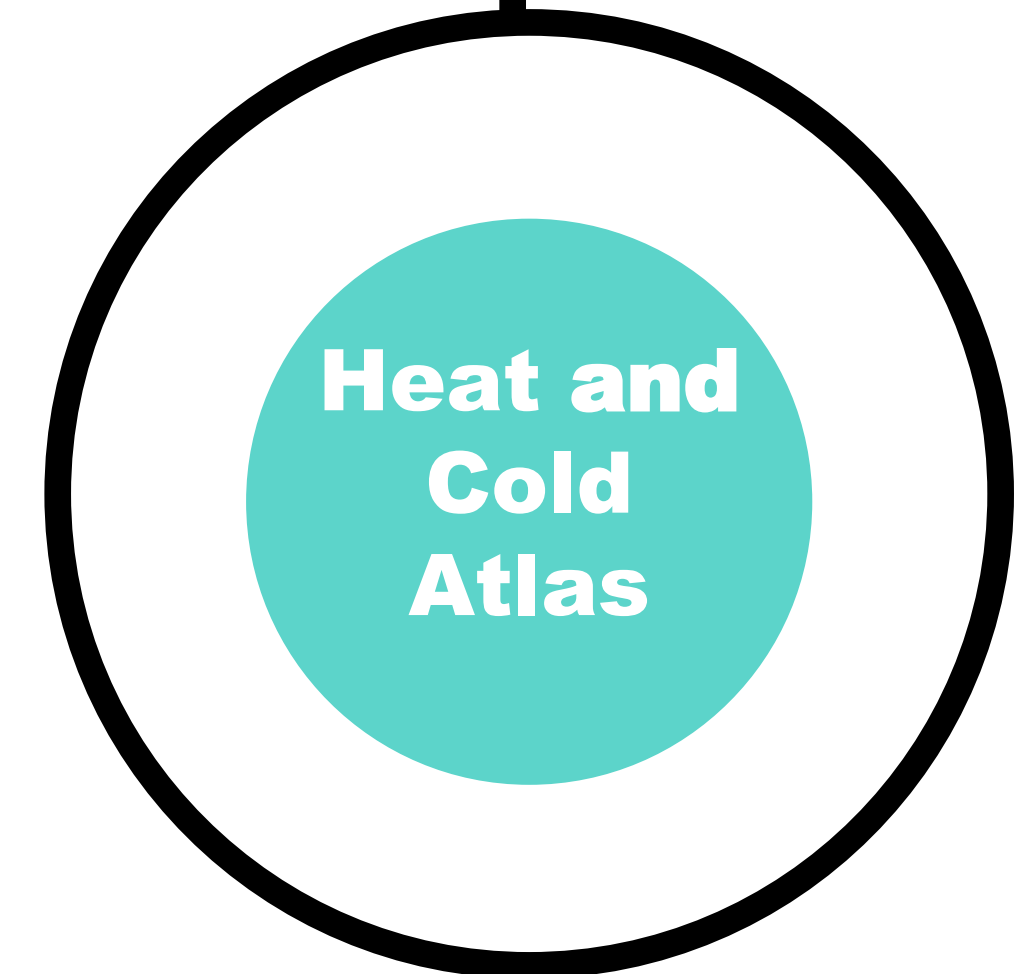
The Heat and Cold Atlas
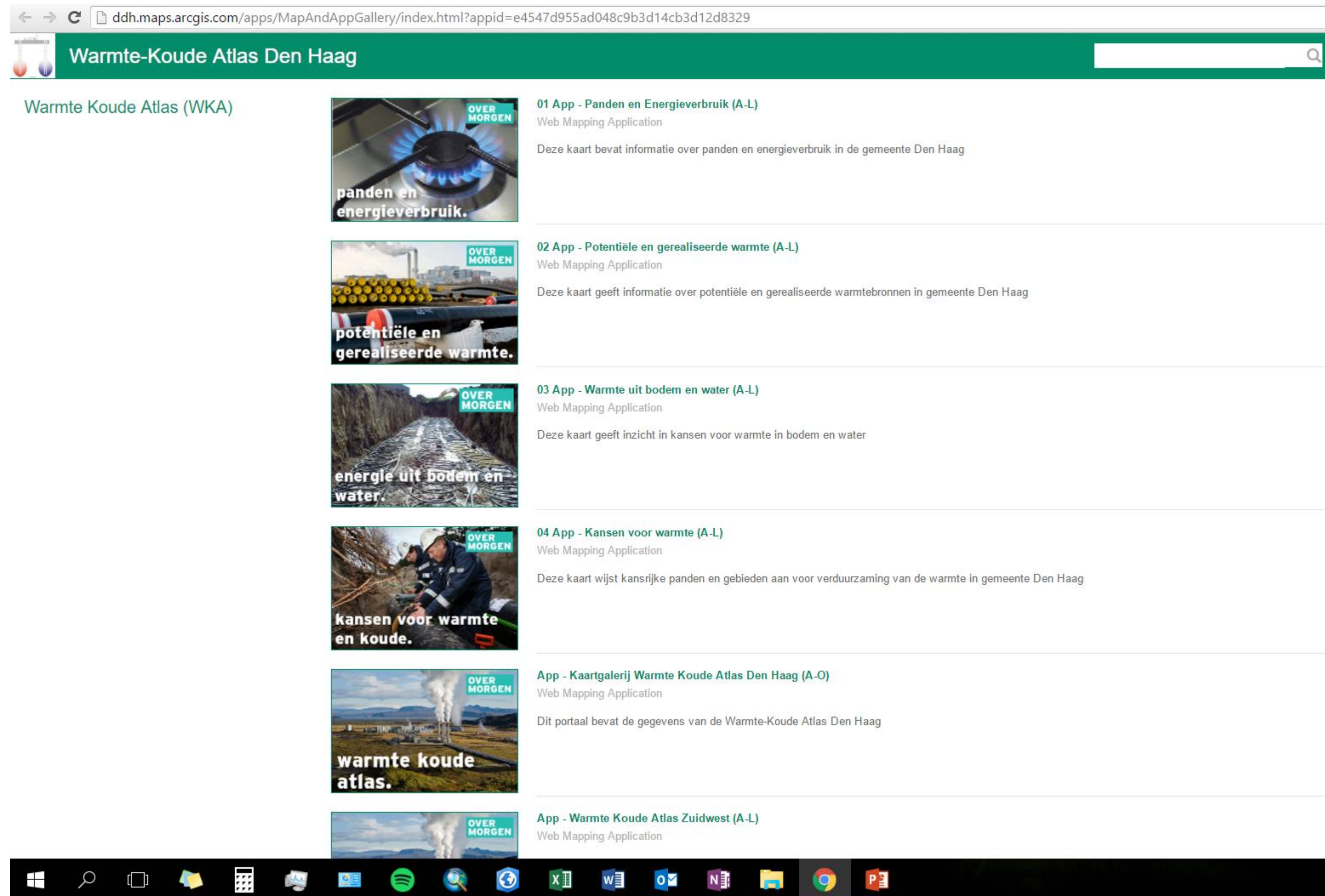
The Heat and Cold Atlas
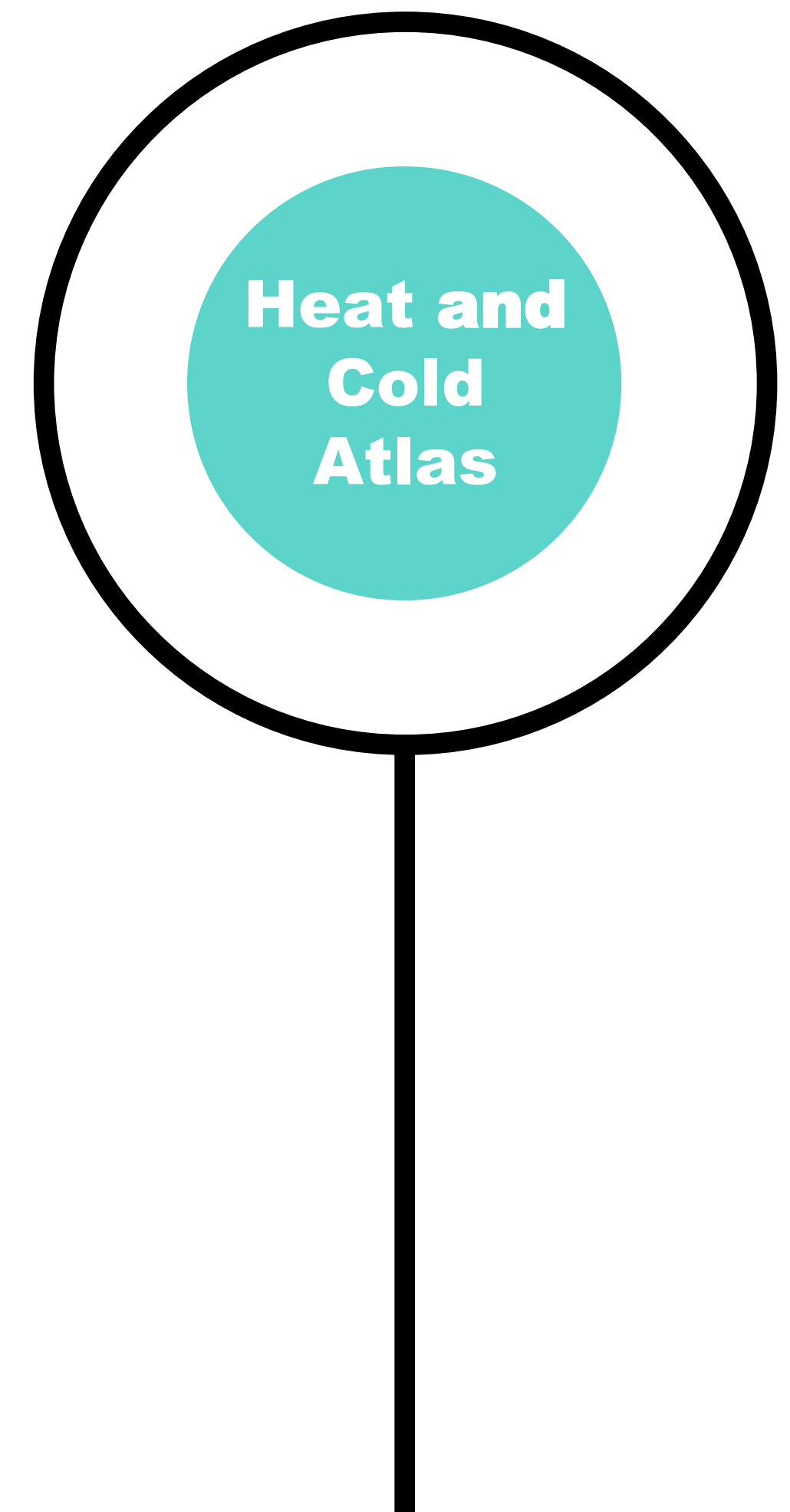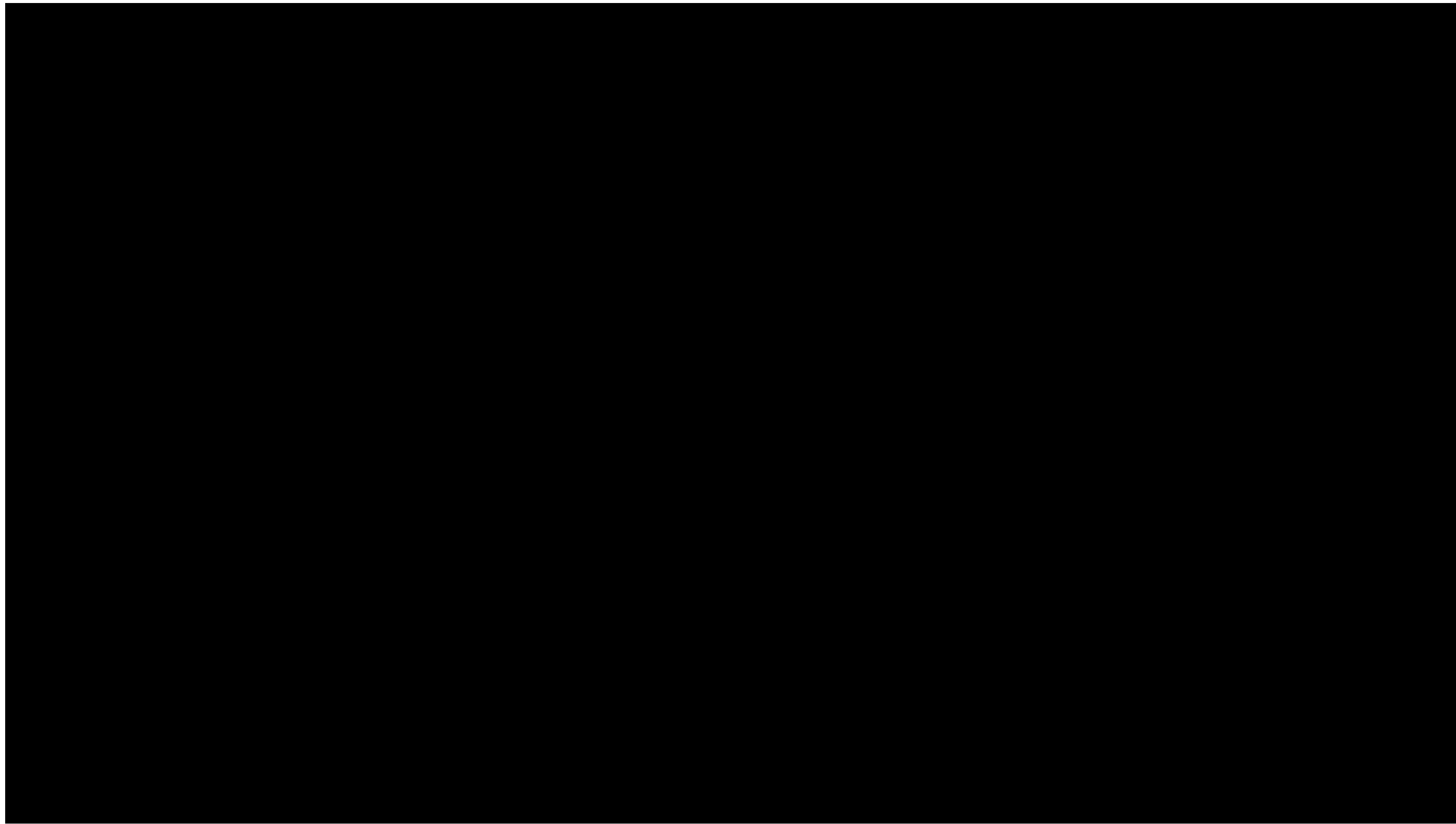
Heat and Cold Atlas

The Heat and Cold Atlas

- GIS based
- Mostly open-data
- Starting point for discussion
- Level playing field for stakeholders with regard to information
- Aimed at concrete solutions
- All sustainable heating/cooling options are represented
- Extendable to different theme's and area's

Heat and Cold Atlas

The Heat and Cold Atlas

Planning

Data mining

Calculations

Heat and Cold Atlas

Communication
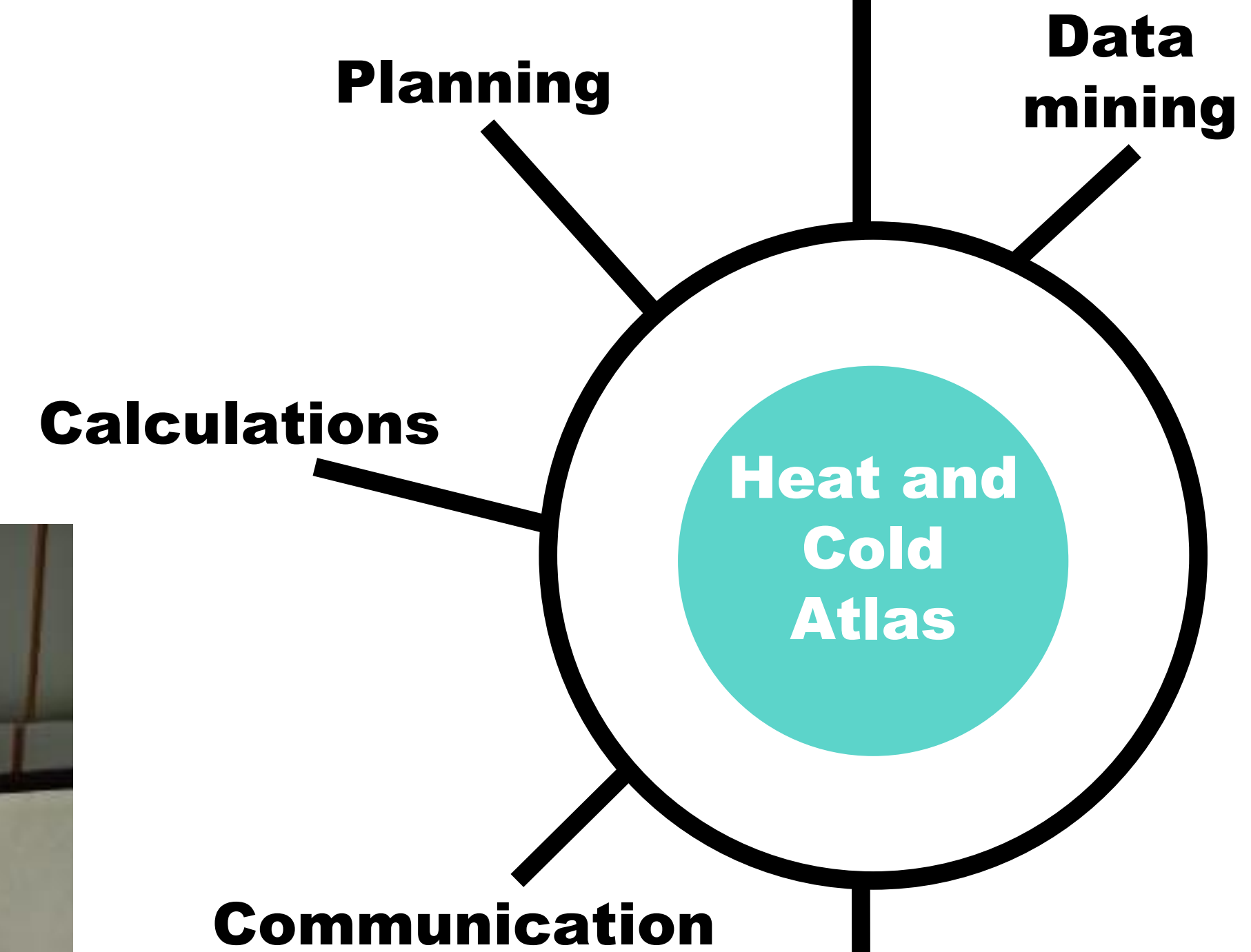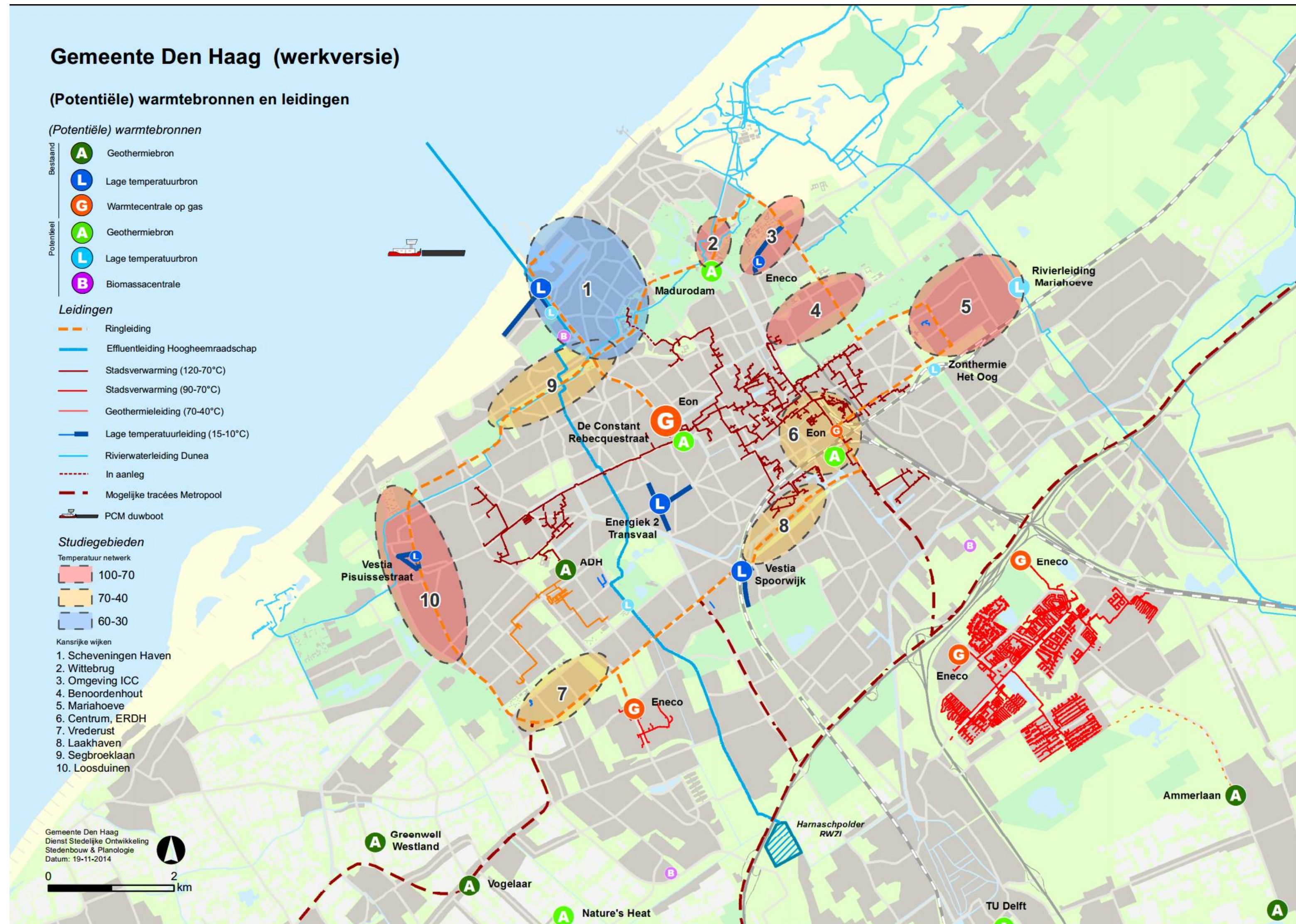
The "grand design"

Grand Design

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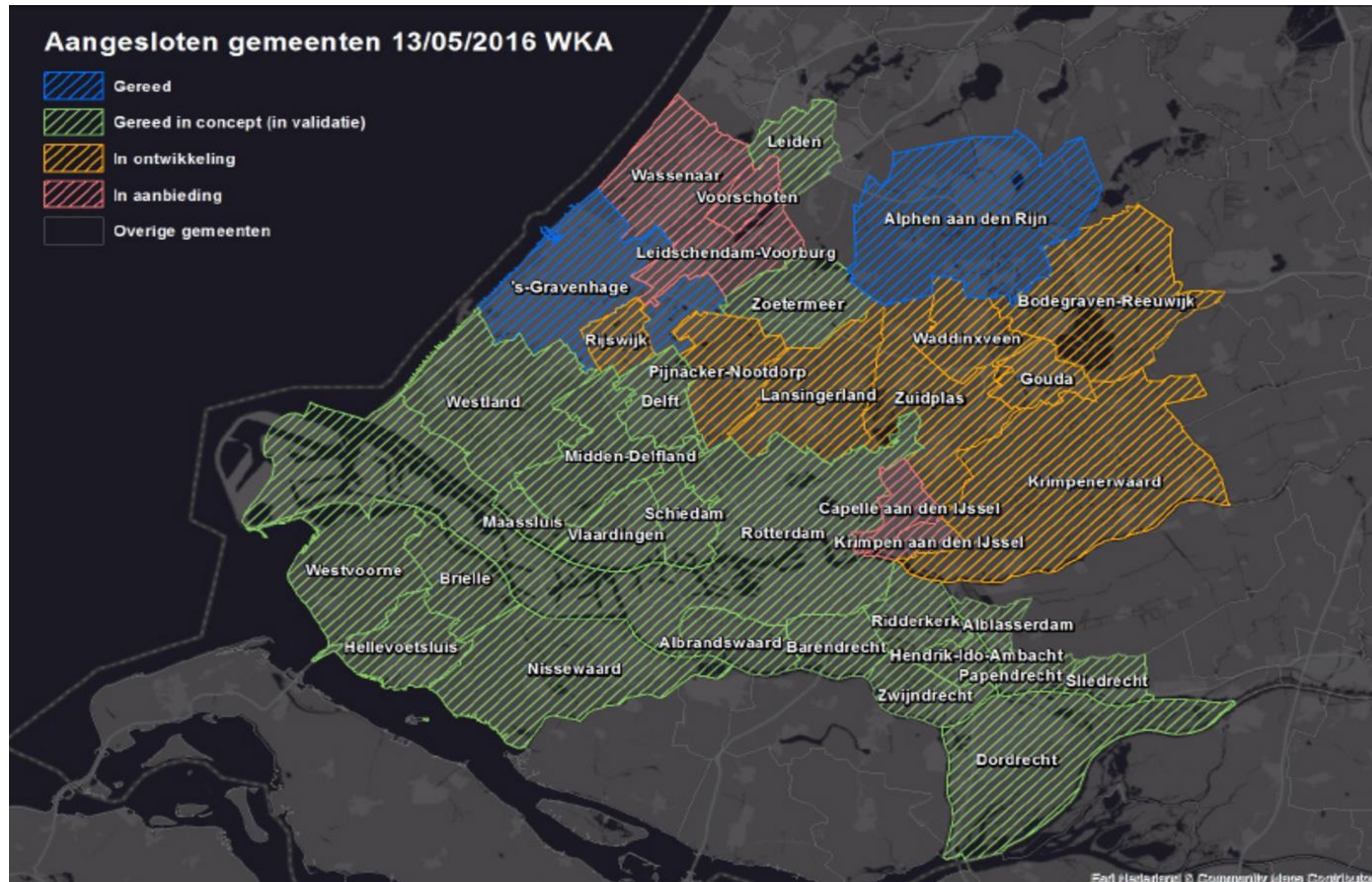
Heat and Cold Atlas

Results

- City decided positive on long term framework
- Buget for City involvement (proces and investments)
- Social Housing corporations are involved
- First projects derived from atlas are in preparation
  - Deep geothermal
  - Combined ATES/ Waste Water project (public participation)
  - Power to heat conversion
- City is going to publish data online
- Heat and cold atlas is being further developed to decision making tool (costs, external effects etc.)
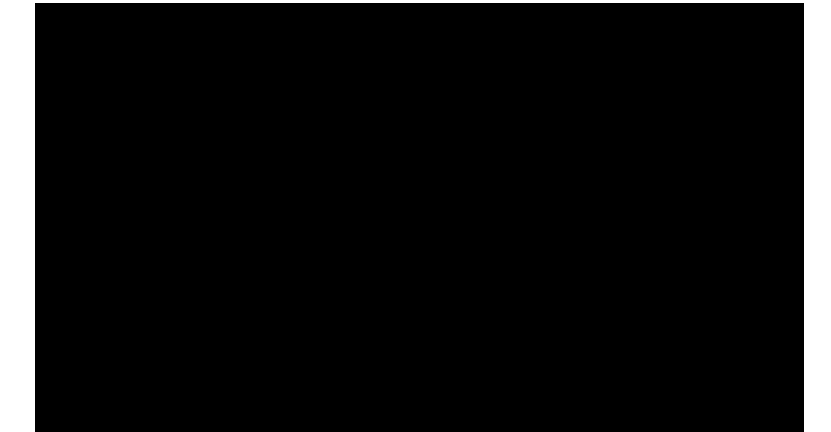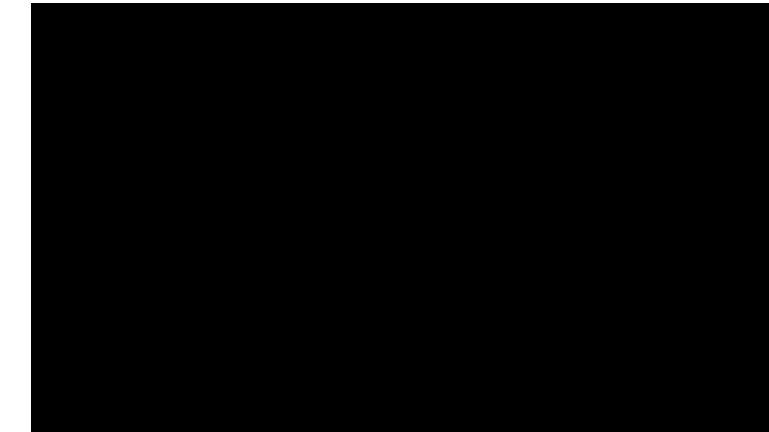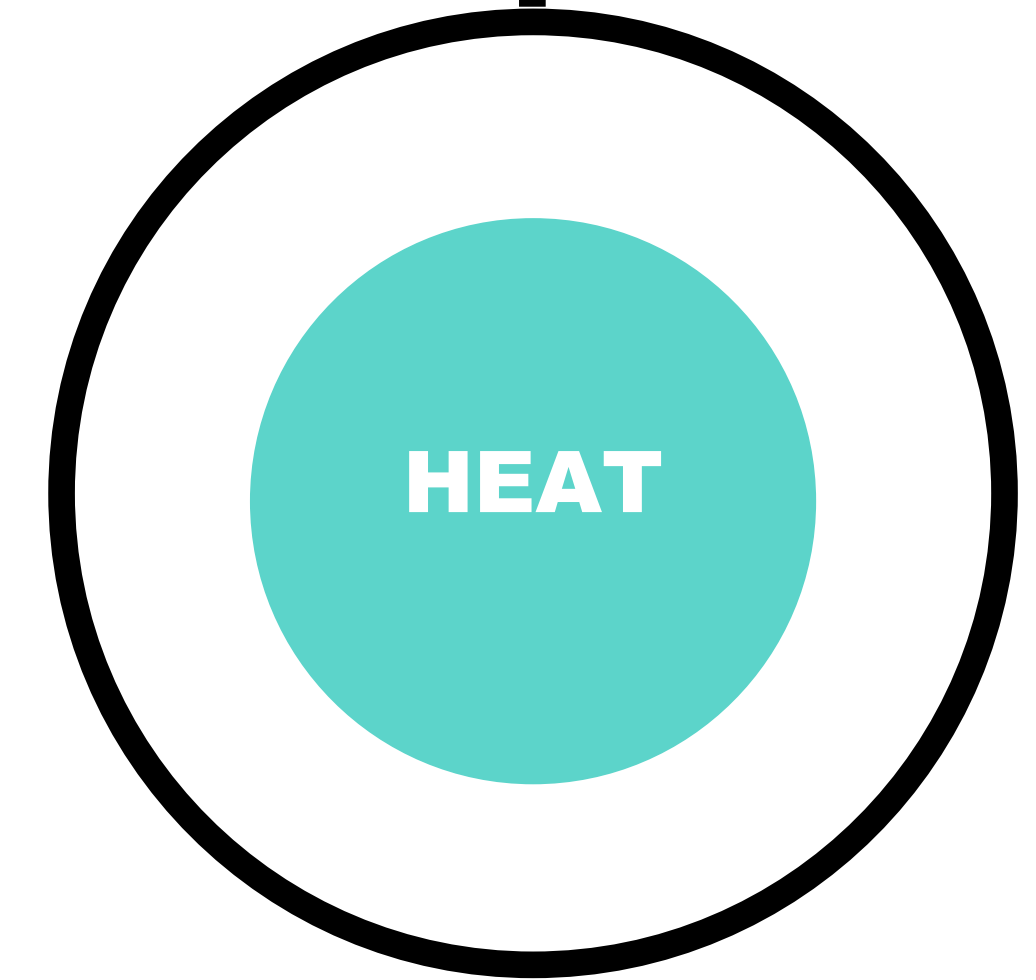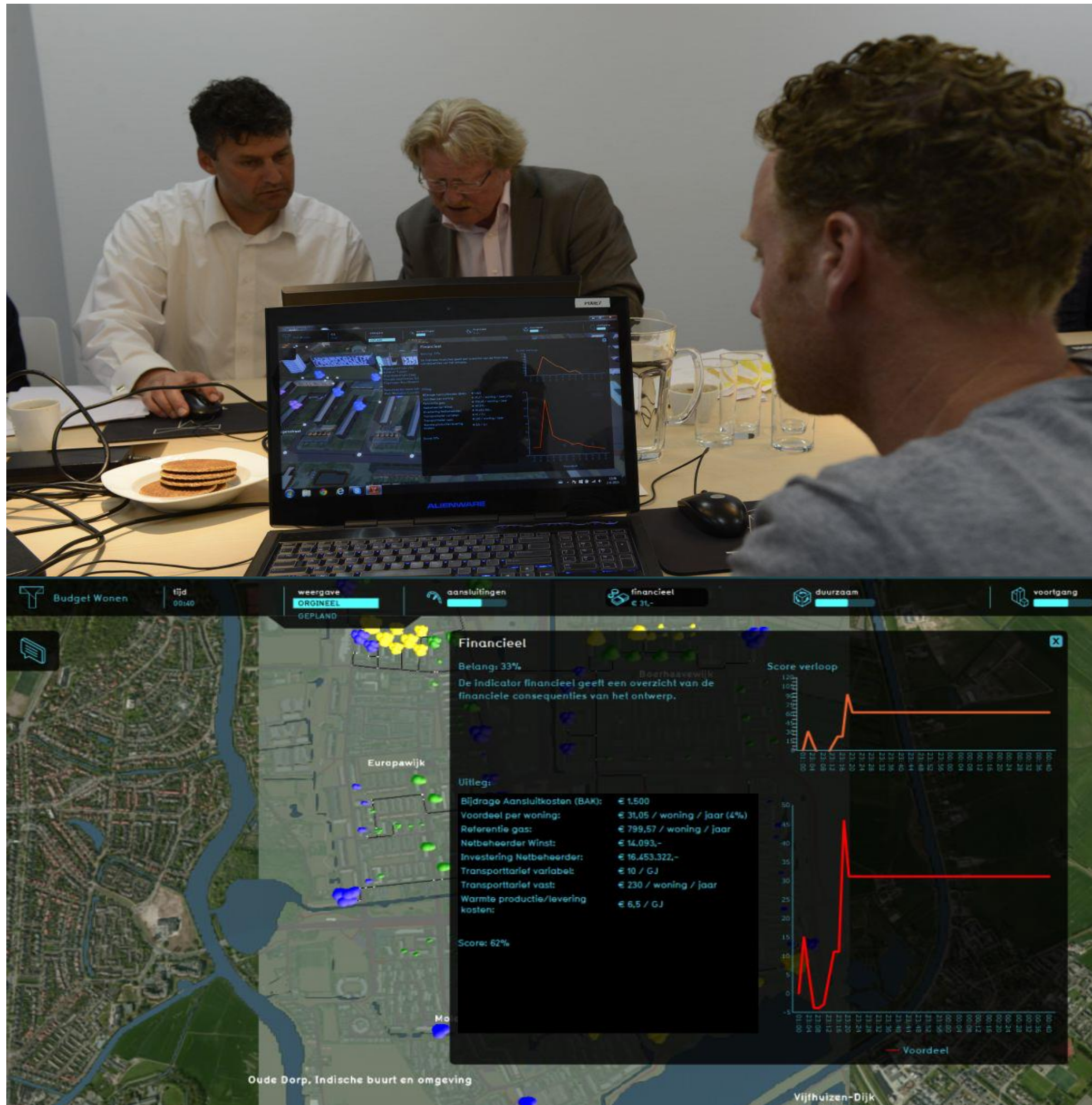- G2G co-operaton
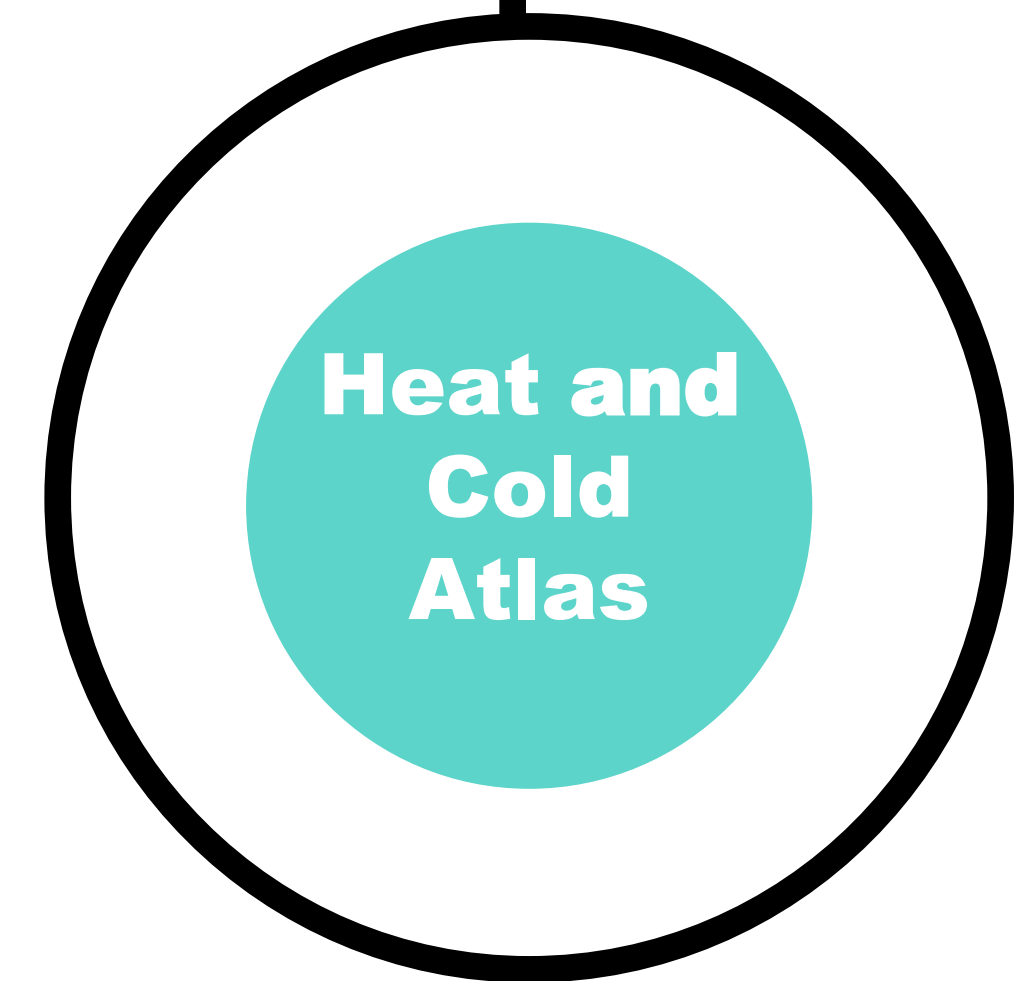
Heat and Cold Atlas

Towards a regional energy network

Heat and Cold

Next steps- using serious gaming

HEAT

https://youtu.be/RQ1ge4bHH7Q
https://youtu.be/rEJM6K4yIkw