Gemeente Rotterdam

Motivation to join DRAGLOW

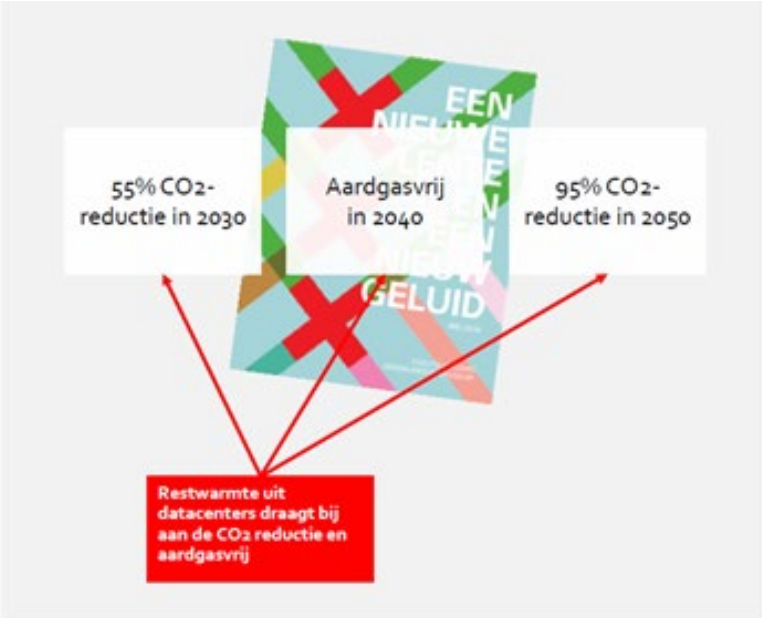
- Rotterdam and Amsterdam have a lot of District Heating
- DRAG reducers can help:
  - To **optimize existing** pipe networks:
    - More capacity
    - Less pumping energy
  - To **expand new** heating networks:
    - Urgency to speed up the energy transition (becoming fossil free)
    - Smaller piping dimensions possible (less investments)

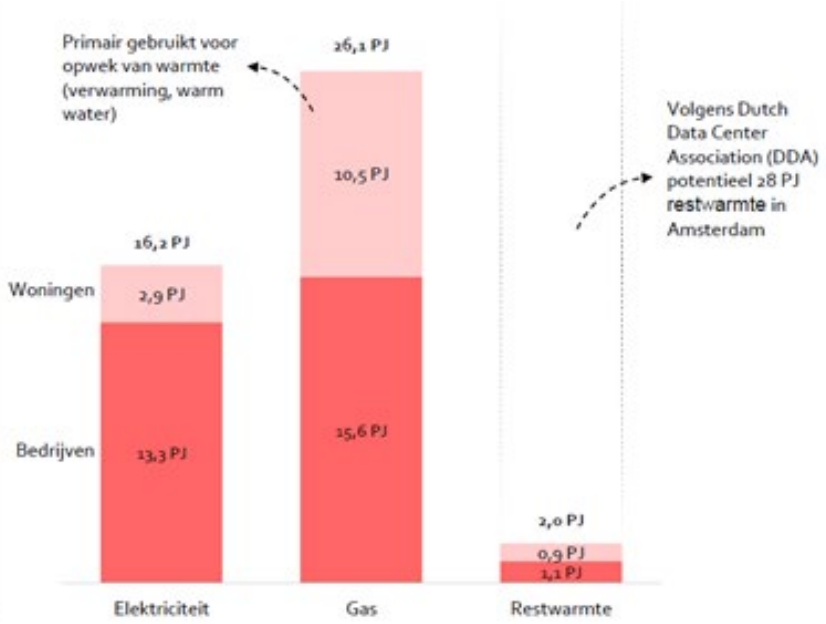
But also:

- Smart electra saving – and reducing emissions – using excisting heat in cities
- Sharing knowledge R'dam en A'dam – every Wednesday through meetings
- Working together in future software devellopments – tenders – plans - grants
- Develloping social emulator and digital twin in life (Q2-2023 untill Q3-2024)

Reduction CO2

Heat plays an important goal in achieving climate goals - Total current energy demand-built environment



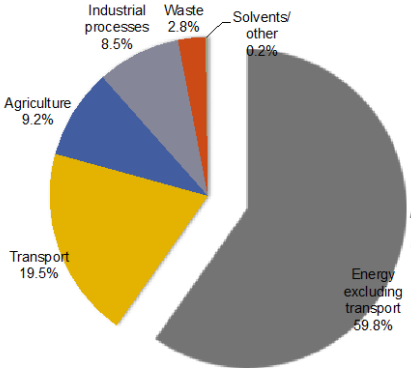


Bron: work in progress versie van City-zen Roadmap Amsterdam 2019, DDA Datacenters & Restwarmte 2018

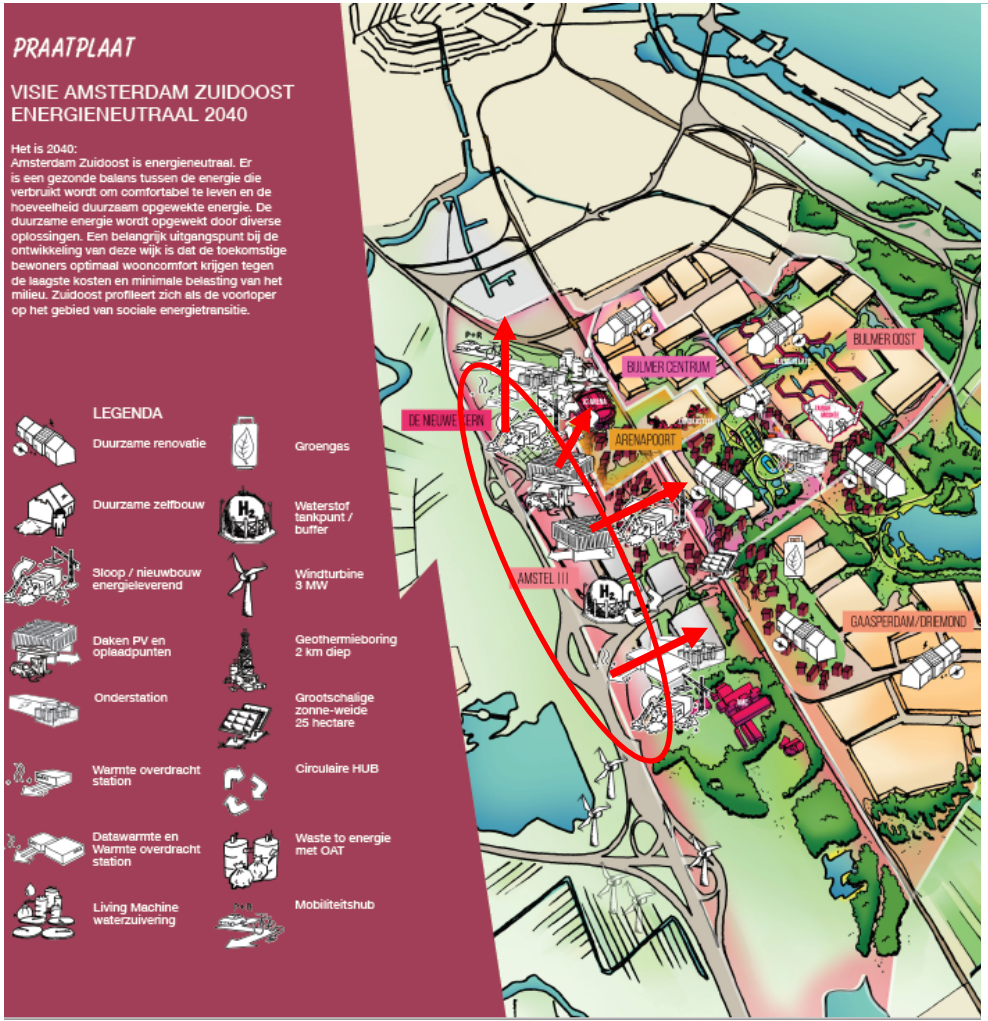
Residual heat from data centers can play an important role in reducing CO2 emissions in the built environment. 410 kton reduction is possible. That is 12% of the task of the NL Climate Table for the Built Environment. Source rapport Berenschot and IF Technology.

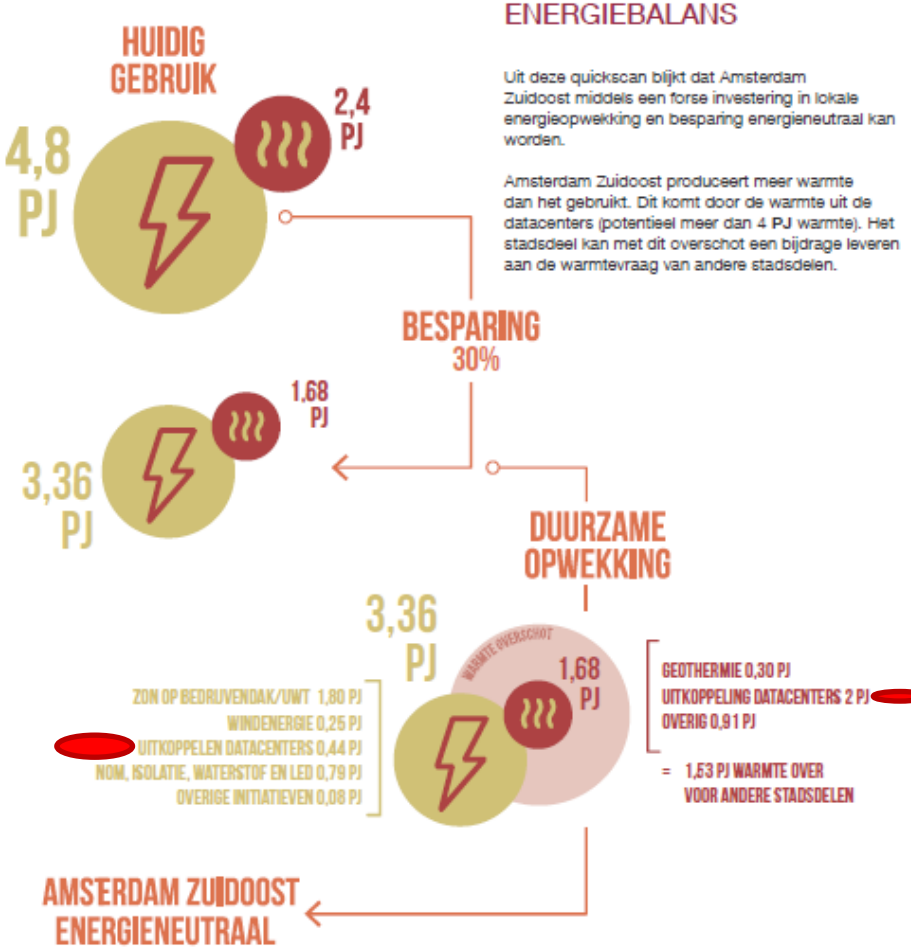
For gas this is approx. 57 kg CO2/GJ and district heating 32 kg CO2 and data heat approx. 3 kg Co2 when powered with wind energy (and no heat pomp needed).

South east Amsterdam Energy neutral through cooperation

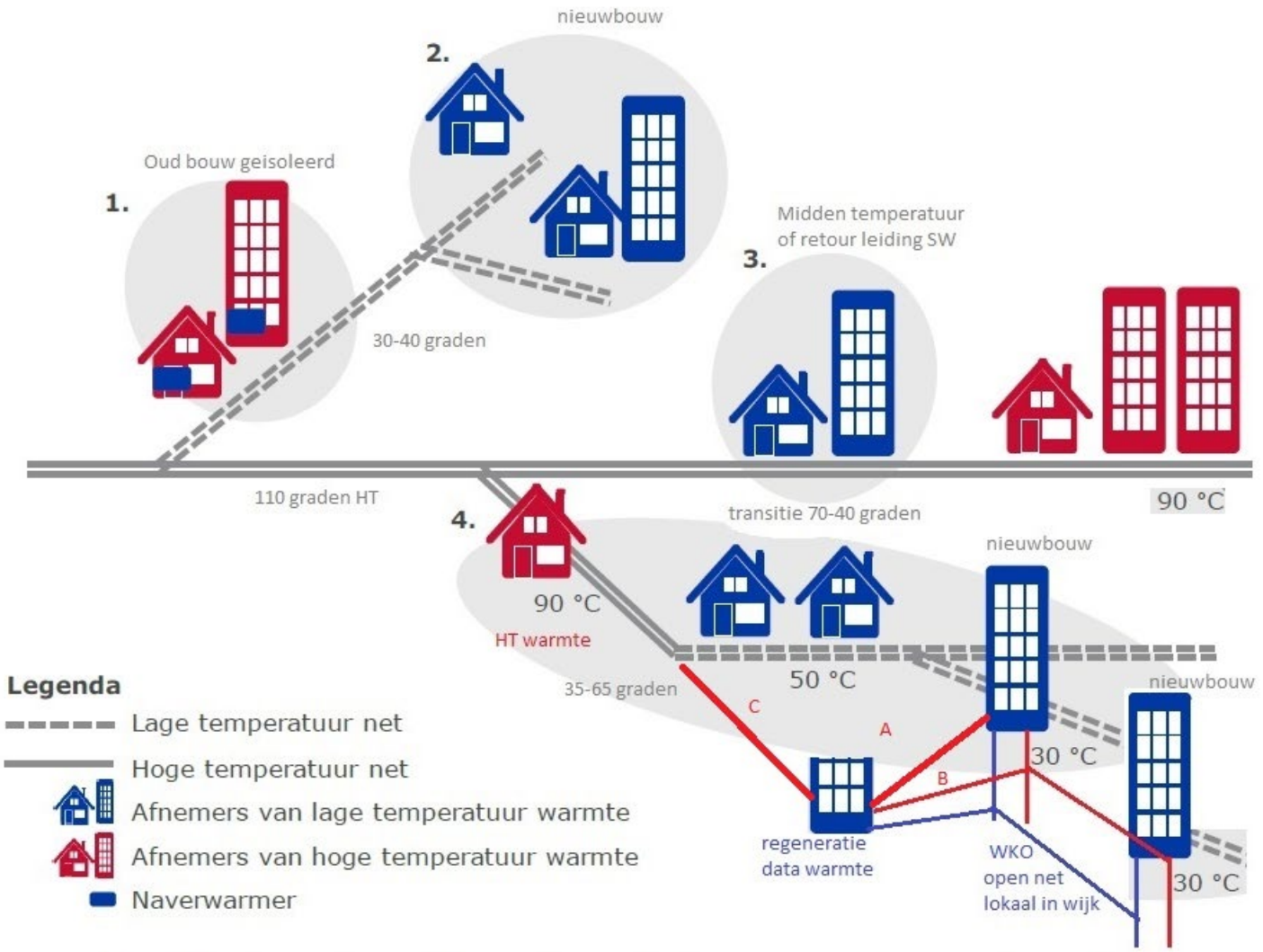


Greenhouse gas emissions by sector, EU-27, 2007 (Eurostat)





Future heat network in mixed area



Figuur 3-1. Mogelijkheden om de transitie van bestaande HT-netten naar LT-netten in te vullen (1. naverwarmer, 2. gescheiden temperatuur zones, 3. aansluiting op HT-retourleiding en 4. cascadering

Area with a mix of excisting and new buildings

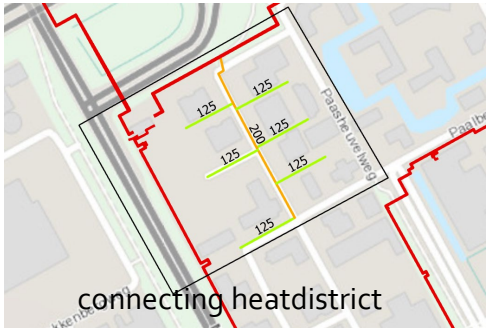
1.000-3.000 WEQ network

Elektra

- Local electricity networks Energy
- Energy storage per sub-area
- Smart Grid lot- Smart Grid (DC or AC-DC)
- City -> Permits own network – LEN EU

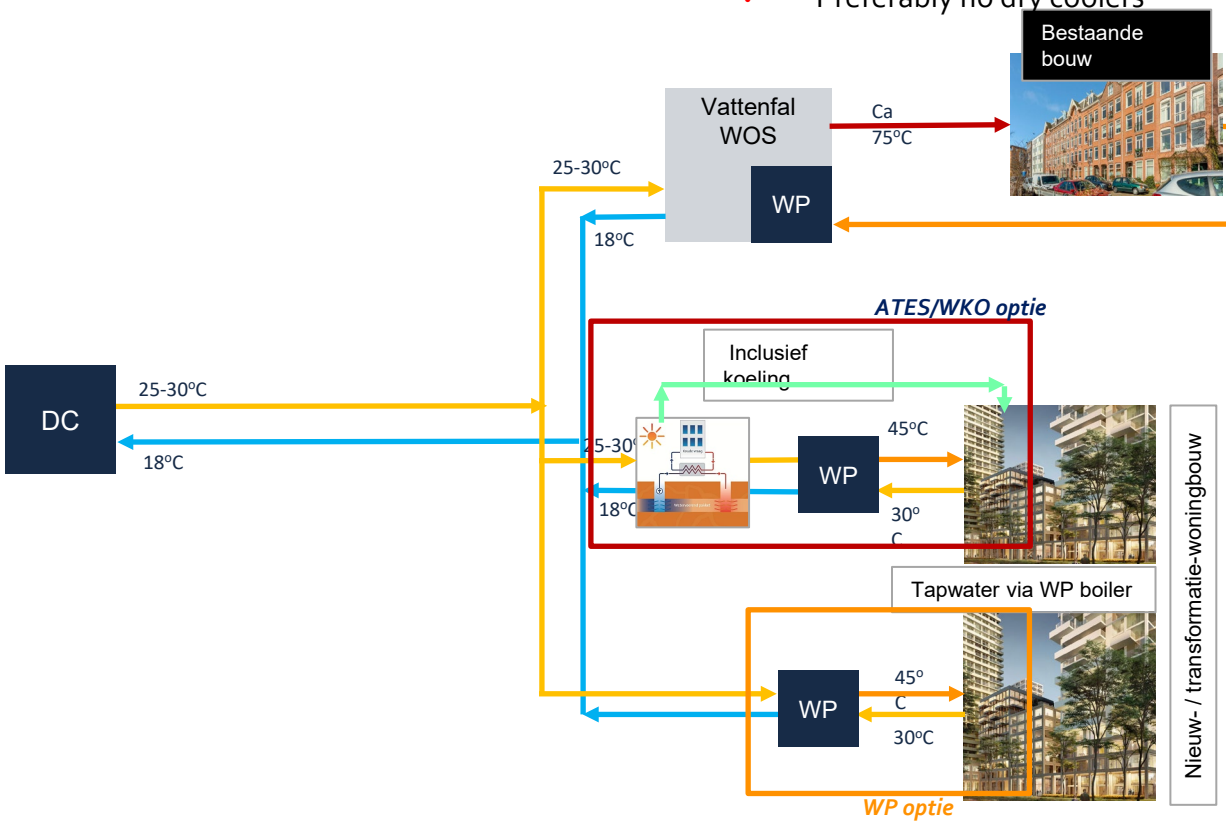
Heat /Cold

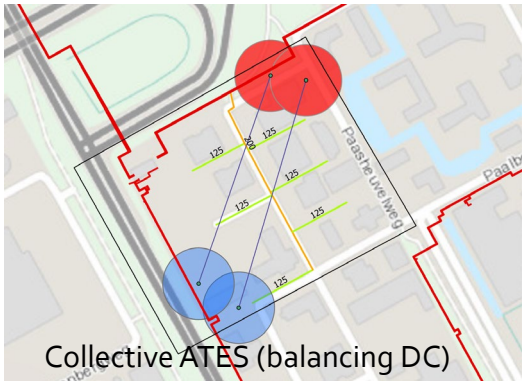
- Heat / cold Low temperature source networks
- Upgrading heat / cold per building
- Linking innovative techniques (H2).
- City -> Open market
- Cabels and pipes regulated
- Good quality buildings (isolation and installation)
- Data heat is possible Regeneration sources water,
- Preferably no dry coolers



connecting heatdistrict

datacenter direct to new development





Collective ATES (balancing DC)

Open heat,- and cold network

Datacenter

-currently, the residual heat in data centers is blown into the air by cooling machines. When connected to a cooling network, the data center receives a cold temperature of 12 degrees and supplies heat of approximately 30 degrees

-A heat exchanger (TSA) ensures that the data center circuit is separated from the distribution network

- The temperature who goes back to the datacenter approx -10 degree.

Distribution network

-In the area, a distribution network is provided with both cold via ATES (WKO) of 12 degrees and data heat of 25-30 degrees

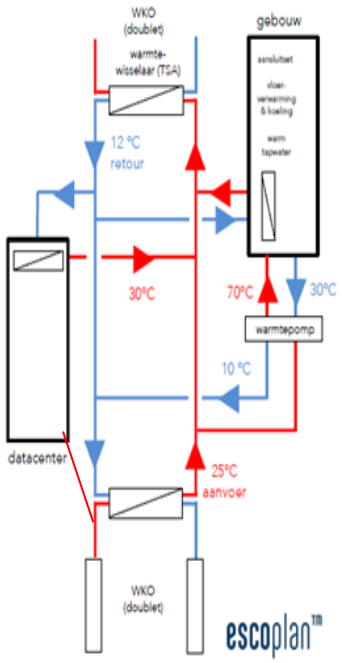
-This can be connected to the data center, ATES systems and buildings

-A TSA heat exchanger ensures that the circuit of the ATES systems is separated from the distribution network

Buildings

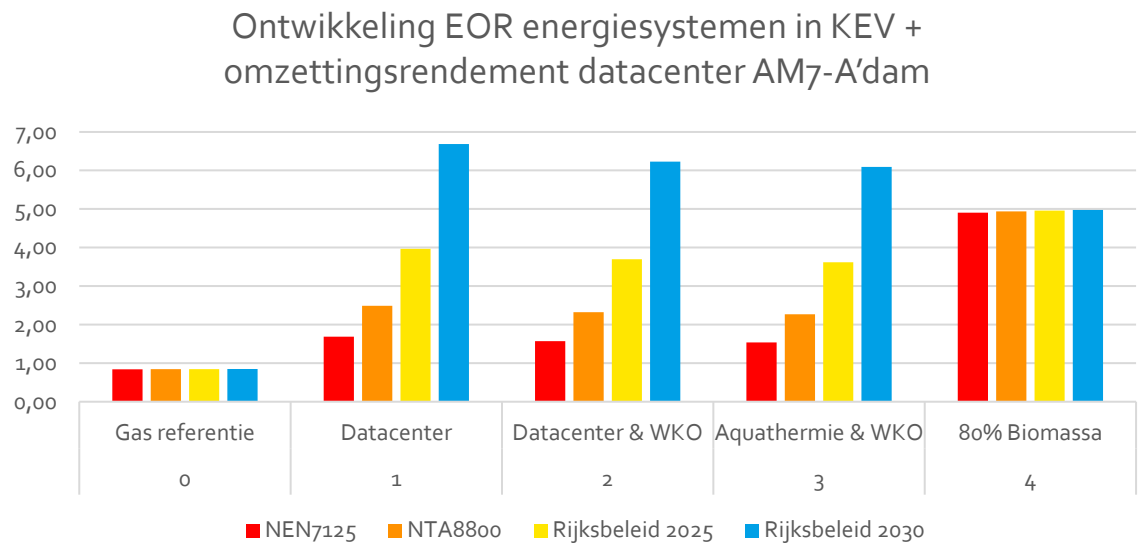
- Buildings receive heat of approximately 25-30 degrees in winter and cold of 12 degrees in summer

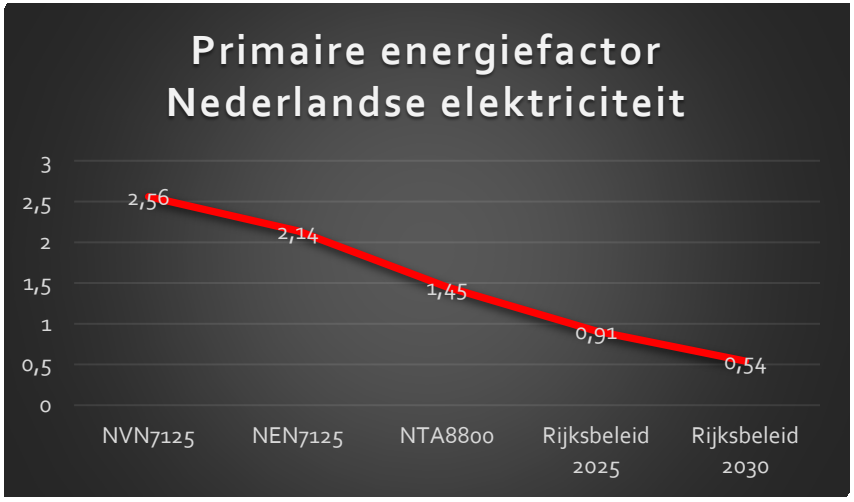
for tap water it is delivered at 25-30 degrees and this saves 1 heating level in the heat pump

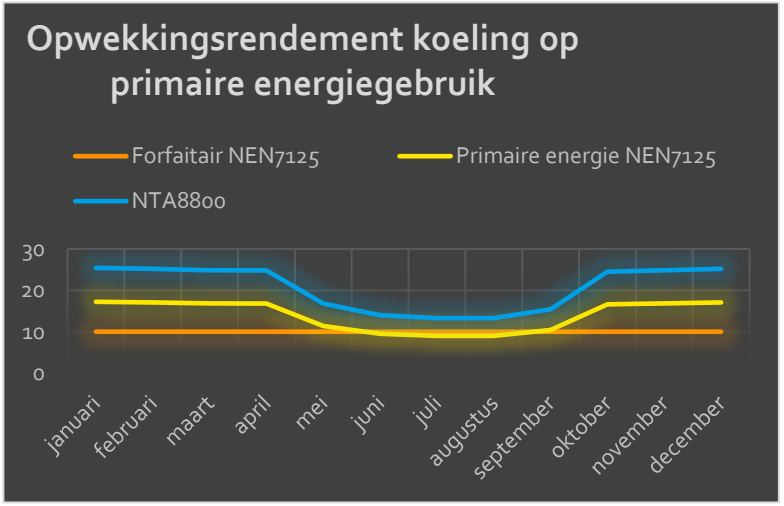


Bron: Duurzame Ring Heerhugowaard, januari 2019
Noot: geen ontwerp, slechts bedoeld ter illustratie

Results KEV + efficiency datacenters







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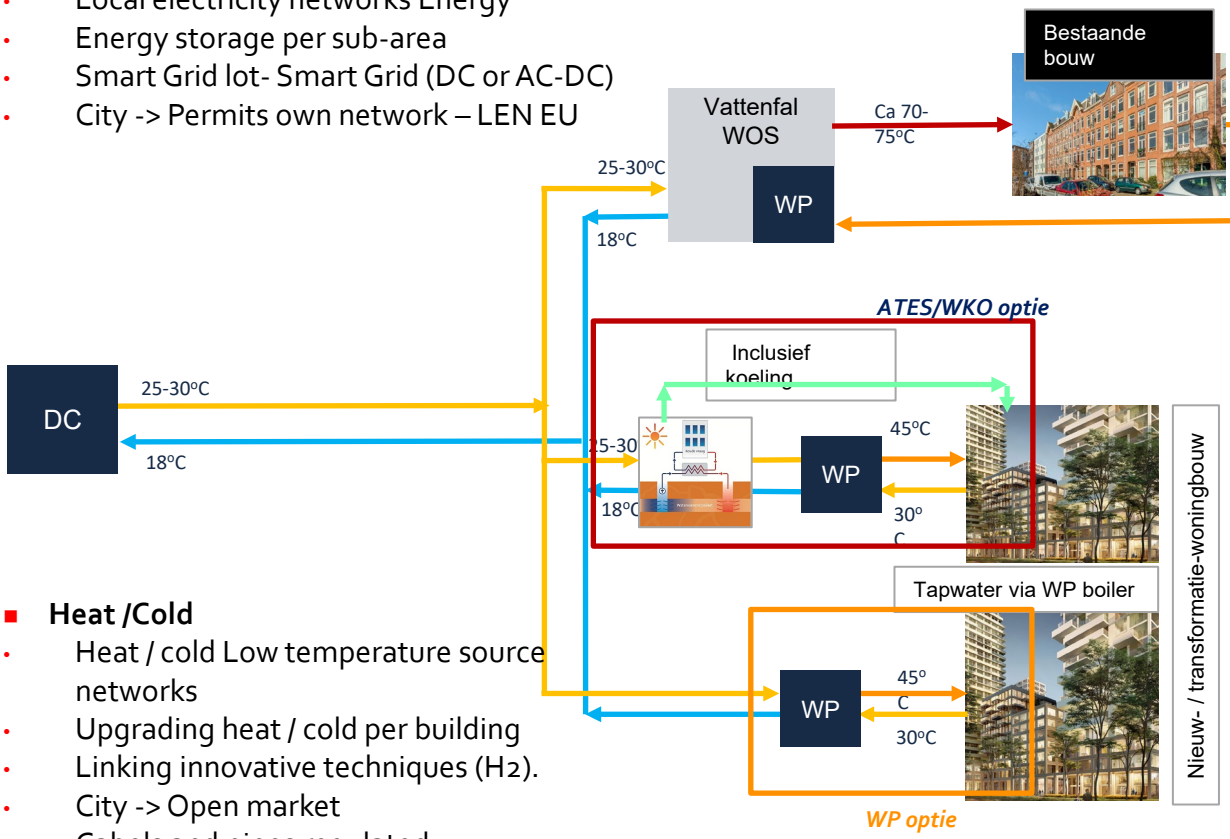

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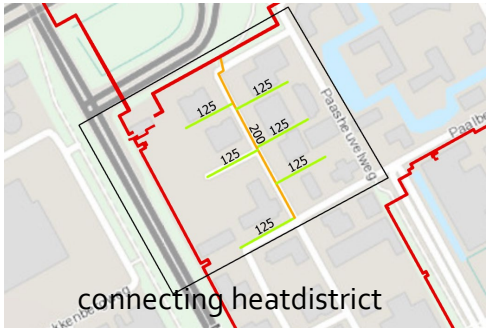

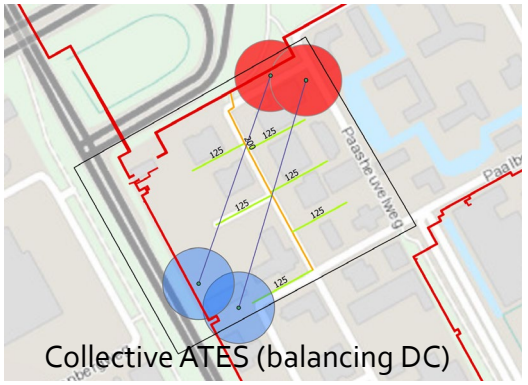

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Gemeente Rotterdam

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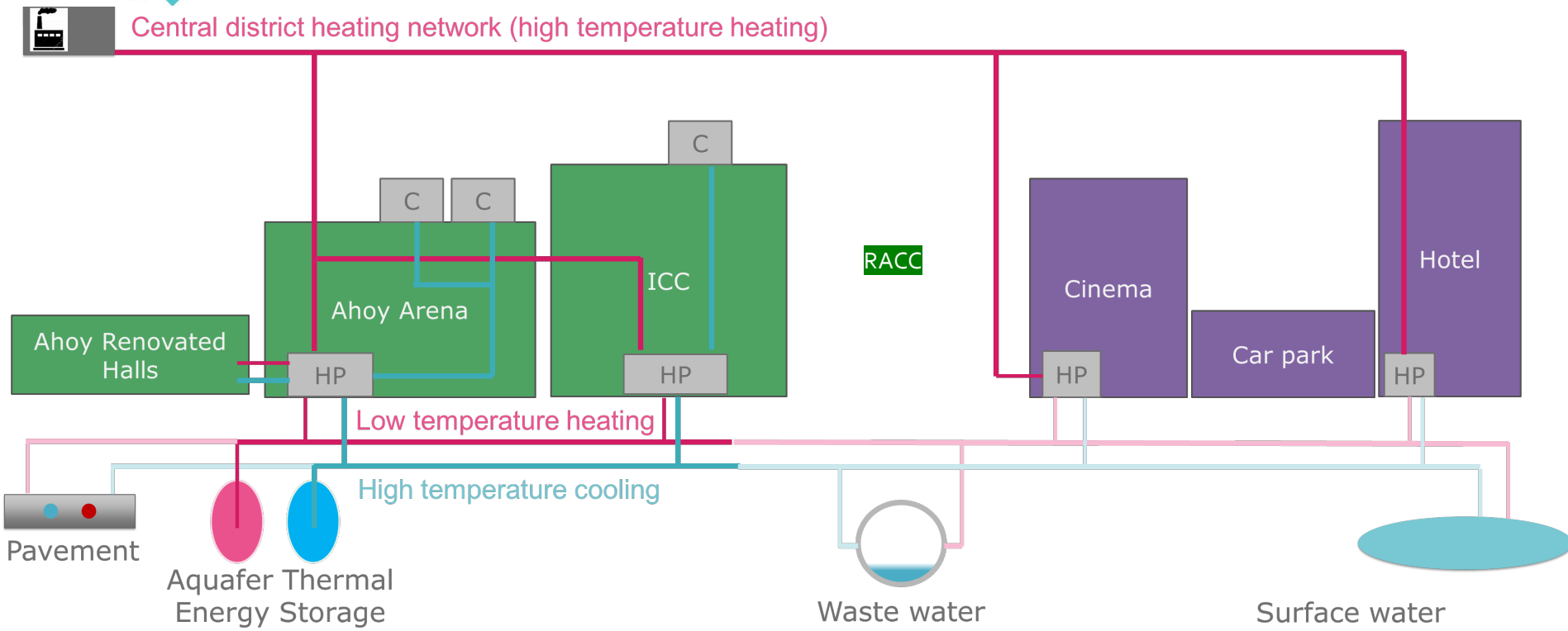
H2020 Project Rotterdam-Smart Thermal Grid



Eneco

ROTTERDAM AHOY

RET AARDIG ONDERWEG

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UNIRESEARCH

Ballast Nedam

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FUTURE INSIGHT