



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)

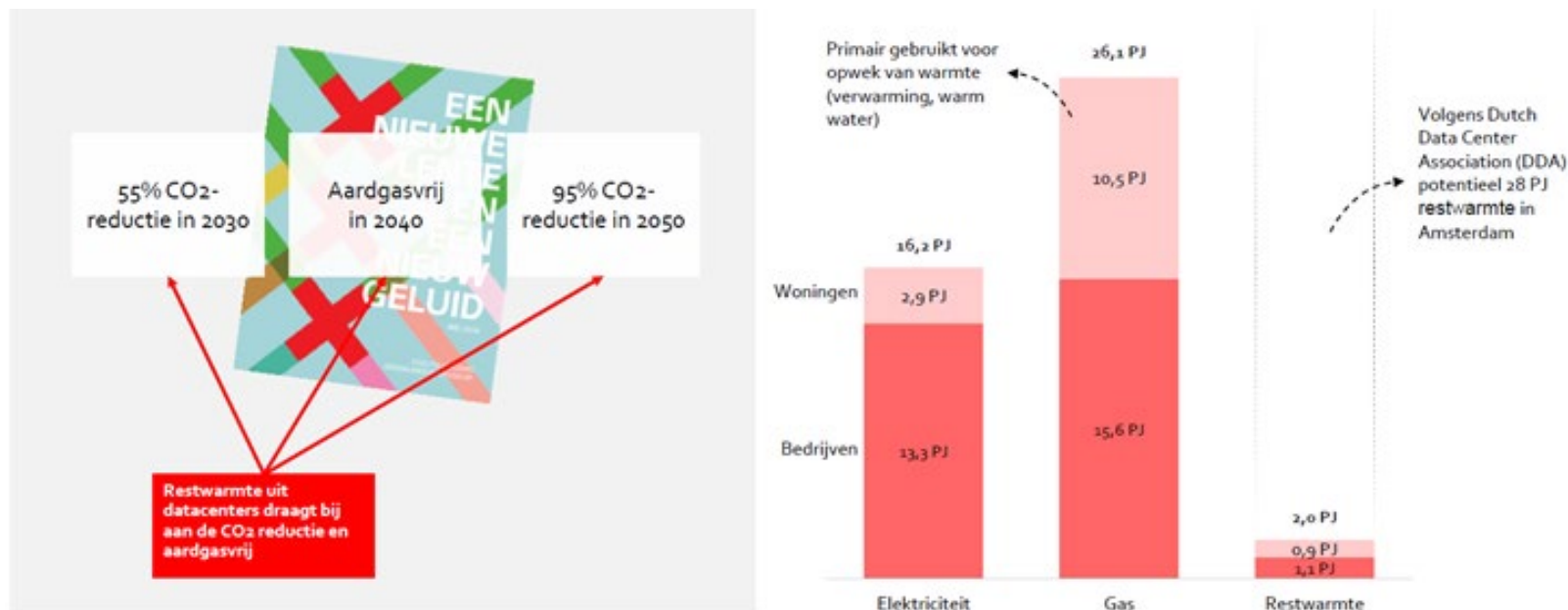
But also:

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



Reduction CO₂

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



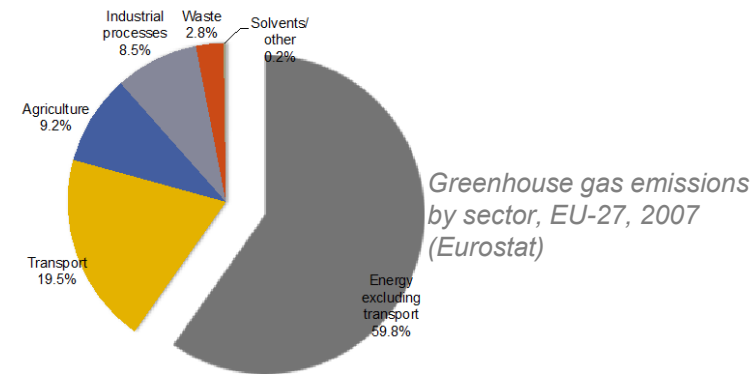
Bron: work in progress versie van City-zen Roadmap Amsterdam 2019, DDA Datacenters & Restwarmte 2028

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 pump needed).



South east Amsterdam Energy neutral through cooperation



PRAATPLAAT

VISIE AMSTERDAM ZUIDOOST ENERGIENEUTRAAL 2040

Het is 2040:
Amsterdam Zuidoost is energieneutraal. Er is een gezonde balans tussen de energie die verbruikt wordt om comfortabel te leven en de hoeveelheid duurzaam opgewekte energie. Die duurzame energie wordt opgewekt door diverse oplossingen. Een belangrijk uitgangspunt bij de ontwikkeling van deze wijk is dat de toekomstige bewoners optimaal wooncomfort krijgen tegen de laagste kosten en minimale belasting van het milieu. Zuidoost profileert zich als de voorloper op het gebied van sociale energietransitie.

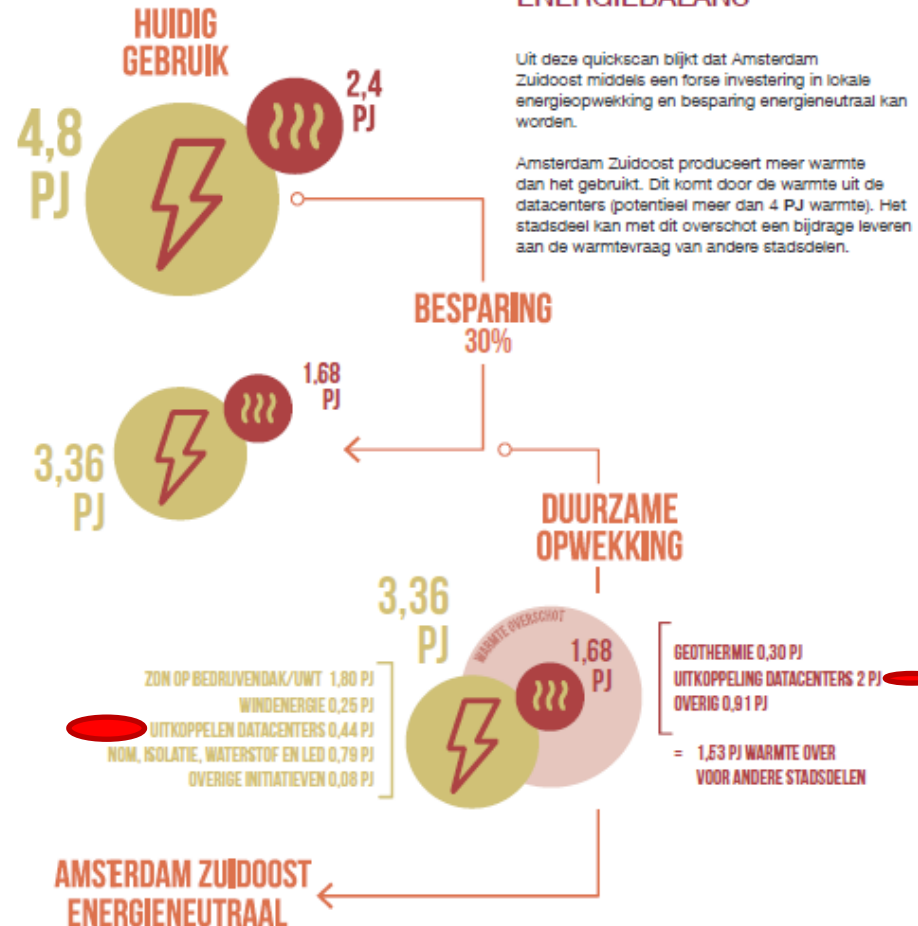
LEGENDA



ENERGIEBALANS

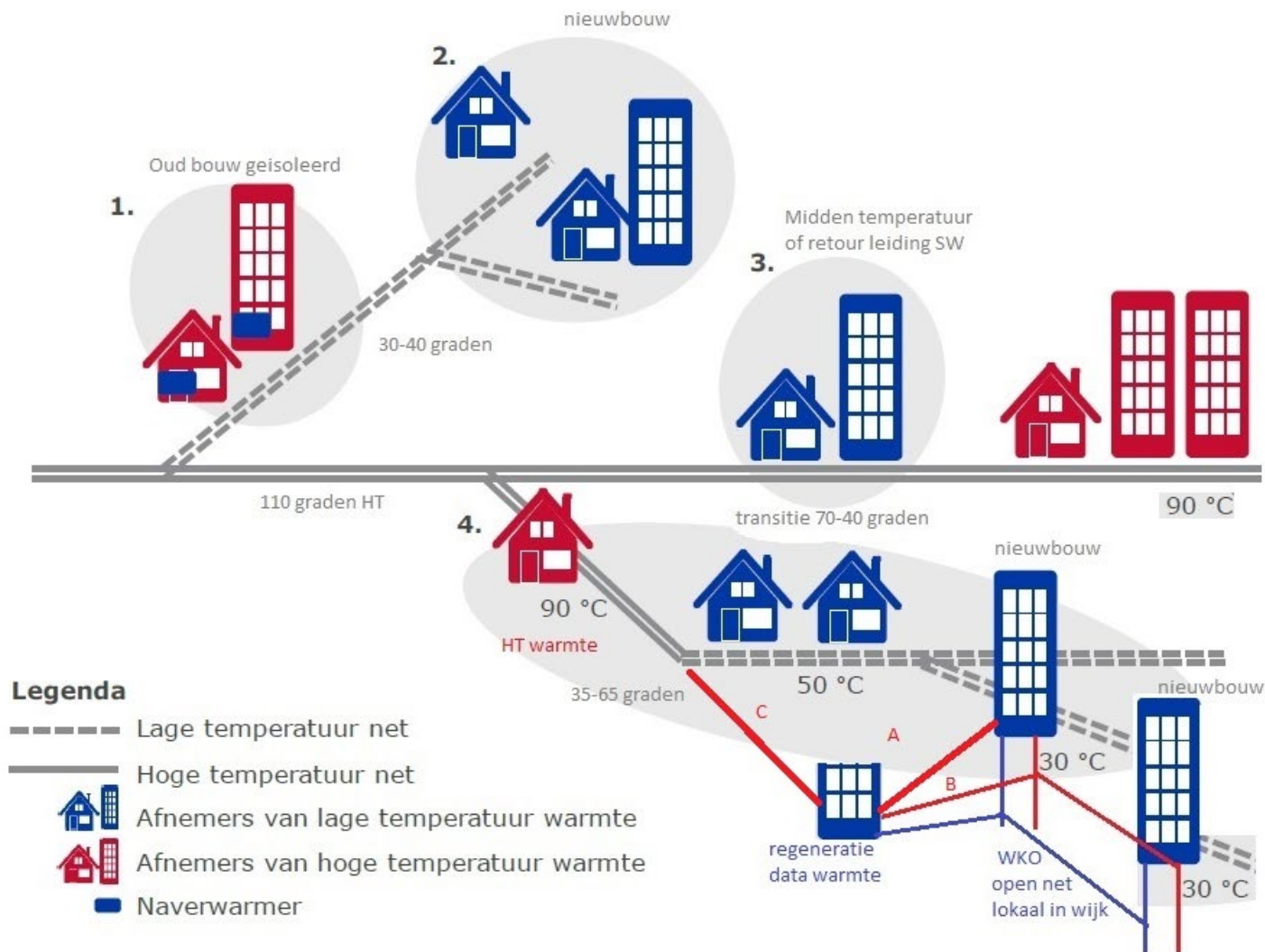
Uit deze quickscan blijkt dat Amsterdam Zuidoost middels een forse investering in lokale energieopwekking en besparing energieneutraal kan worden.

Amsterdam Zuidoost produceert meer warmte dan het gebruikt. Dit komt door de warmte uit de datacenters (potentieel meer dan 4 PJ warmte). Het stadsdeel kan met dit overschot een bijdrage leveren aan de warmtevraag van andere stadsdelen.





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)

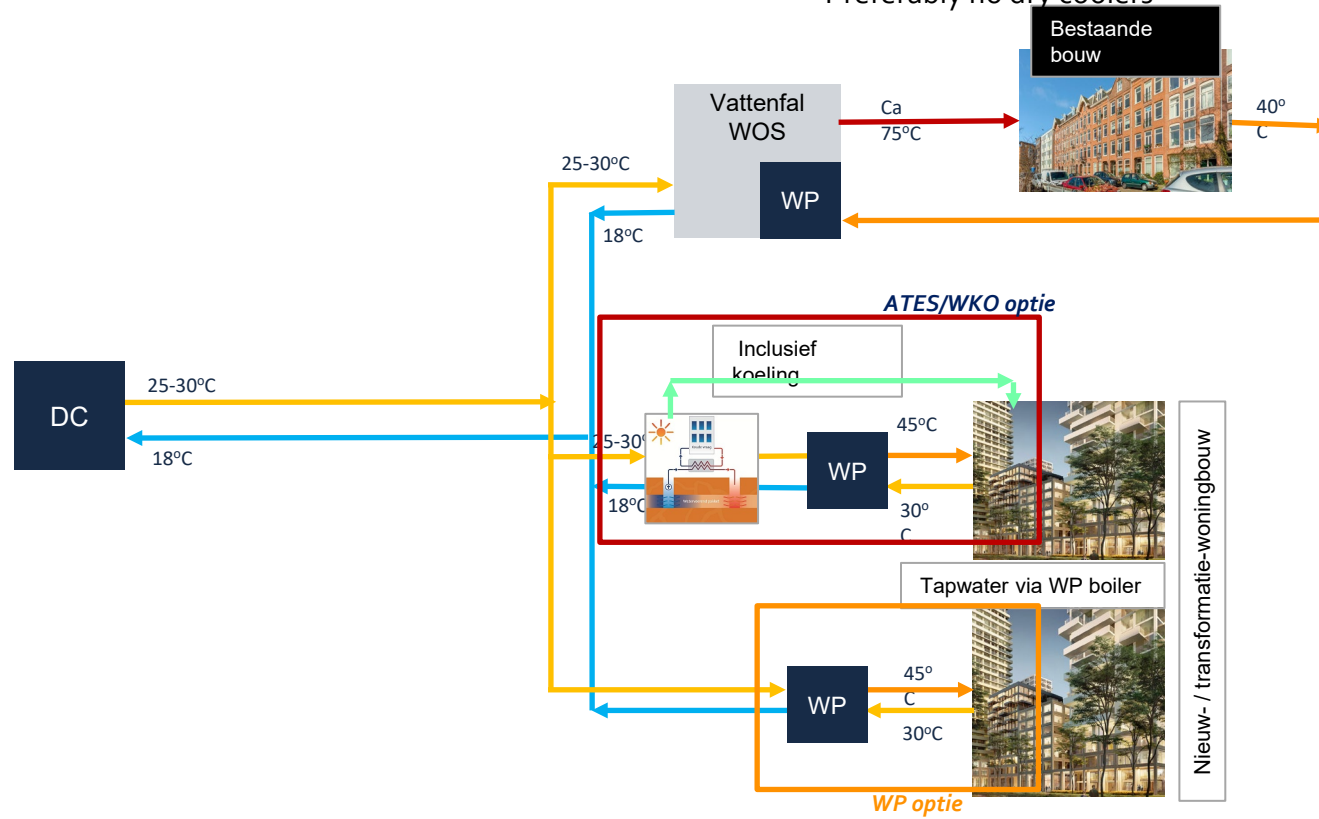
Area with a mix of existing and new buildings

Elektra

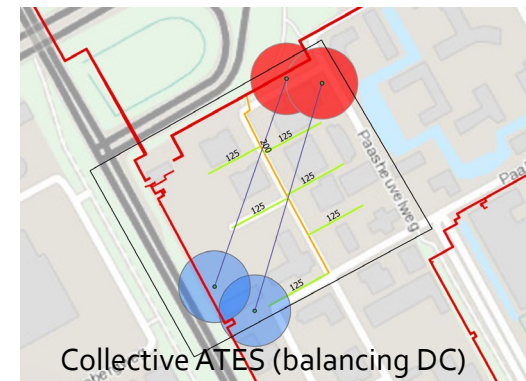
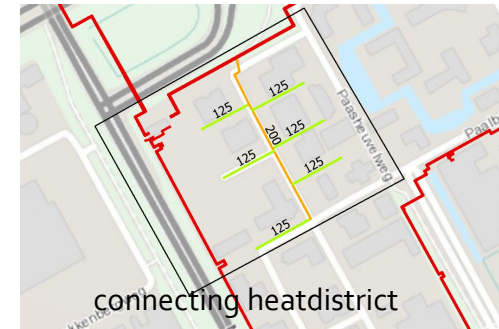
- Local electricity networks Energy
- Energy storage per sub-area
- Smart Grid lot- Smart Grid (DC or AC-DC)
- City -> Permits own network – LEN EU

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



1.000-3.000 WEQ network





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

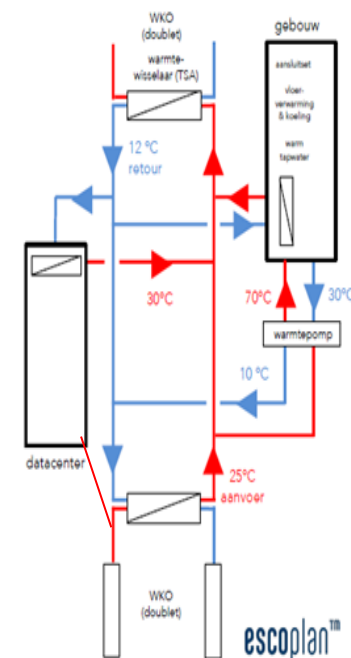
-This can be connected to the data center, ATES systems and buildings

-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

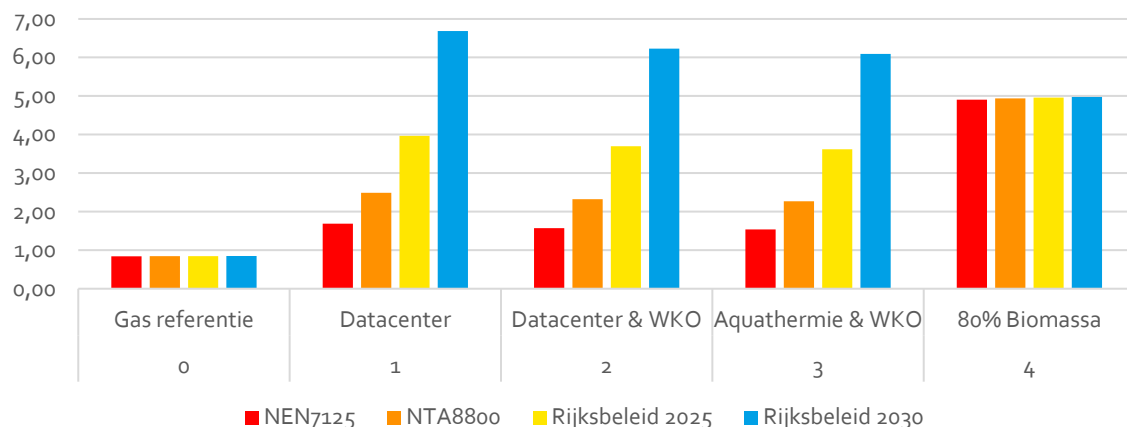


Bron: Duurzame Ring Heerhugowaard, januari 2019
Noot: geen ontwerp, slechts bedoeld ter illustratie

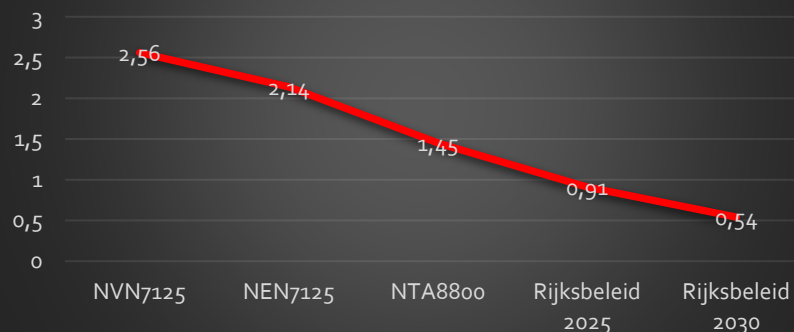


Results KEV + efficiency datacenters

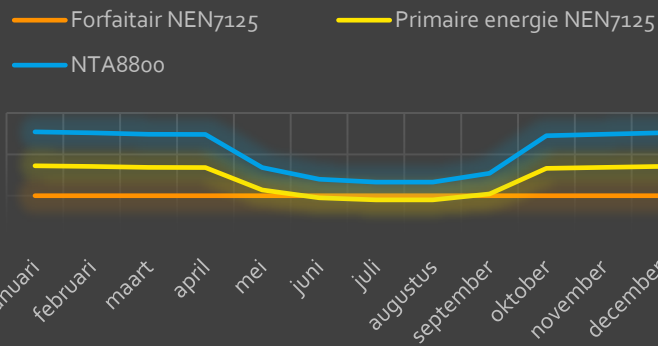
Ontwikkeling EOR energiesystemen in KEV +
omzettingsrendement datacenter AM7-A'dam



Primaire energiefactor Nederlandse elektriciteit



Opwekkingsrendement koeling op primaire energiegebruik

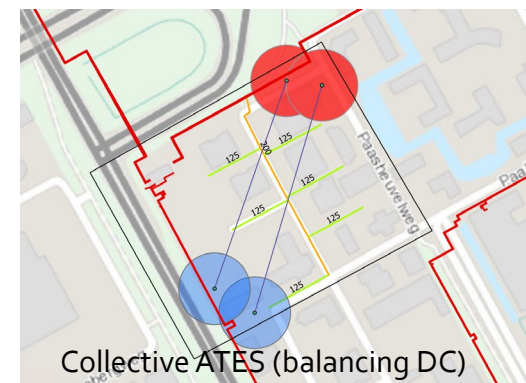
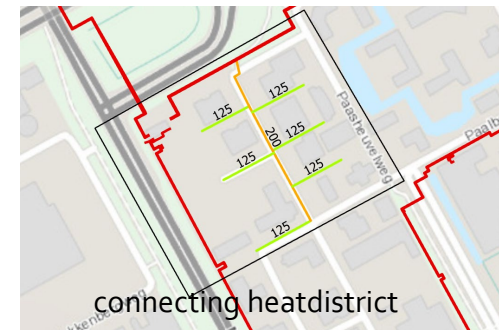
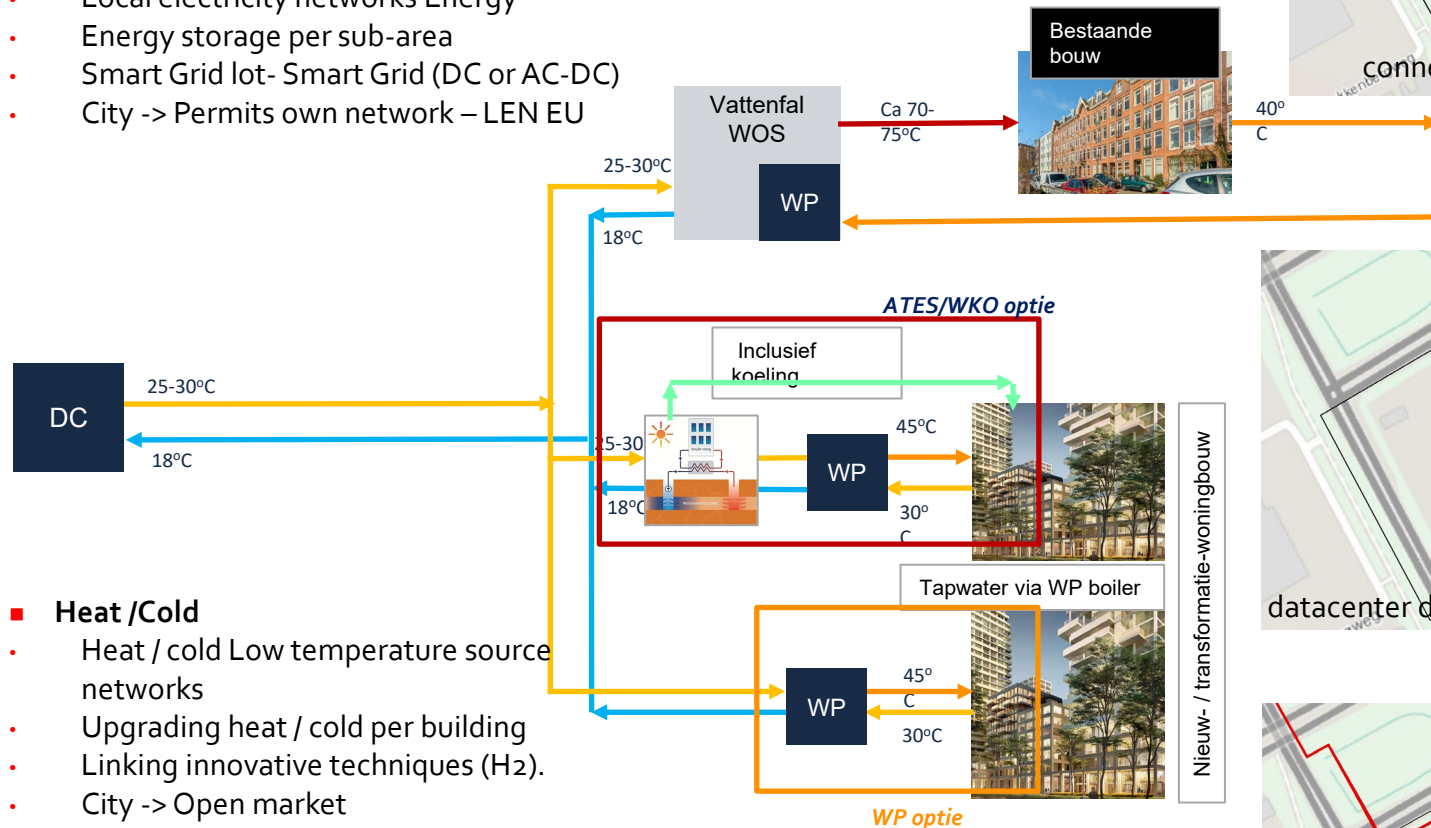


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Gemeente Rotterdam



H2020 Project Rotterdam-Smart Thermal Grid



Central district heating network (high temperature heating)

