



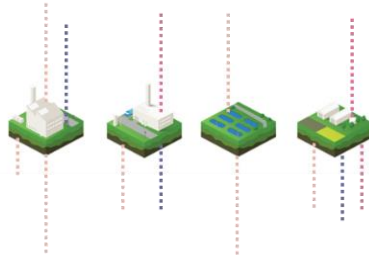
**DE  
NIEUWE  
DOKKEN**

# Smart multi-energydistrict @DE NIEUWE DOKKEN

Peter De Smet

04/10/2023

## TRADITIONAL long linear logistics

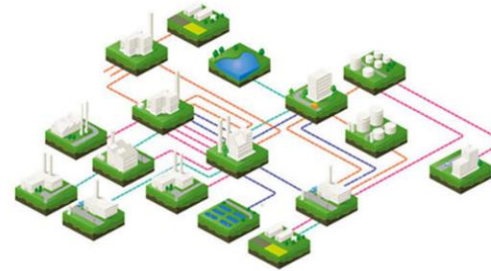


### Economies of **SCALE**

- Vertically organized markets
- Optimization of distinctive processes
- Less complicated value chain
- Resource intensive
- Potential technology lock-in
- Robustness, less flexibility



## MULTIPLE CLOSED LOOPS short circular systems



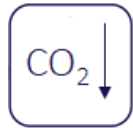
### Economies of **SCOPE**

- Horizontally organized markets
- Process optimization on a holistic scale
- More complex, interacting value chain
- More sustainable processes & system efficiency
- Higher adaptability ('Tailor-made')

- Development of new technologies, products and business models
- Potential savings on public infrastructure
- Increasing societal benefits

Overview of the opportunities for decentralized systems versus traditional centralized systems (picture: after Kalundborg Symbiosis) [www.symbiosis.dk](http://www.symbiosis.dk)

# Living tomorrow



- 70%



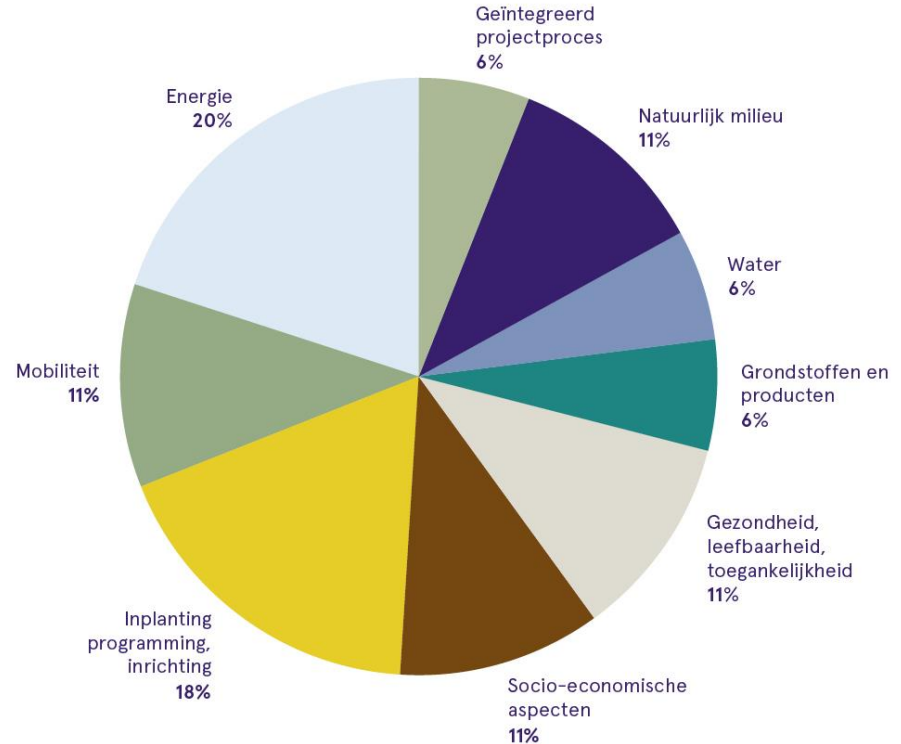
13%



47 kWh/m<sup>2</sup>

Duurzaamheidsbarometer: 93,7

<https://stad.gent/nl/wonen-bouwen/stadsvernieuwing/toekomstvisie-voor-stadsvernieuwing/duurzaamheidsmeters>



# 4 activiteitsdomeinen DuCoop




**Energy**

4de gen. Heat network  
(waste heat Christeyns)  
rooftop PV  
Smart Grid appliances




**Water**

Local sanitation  
Reuse as process water  
(Christeyns)



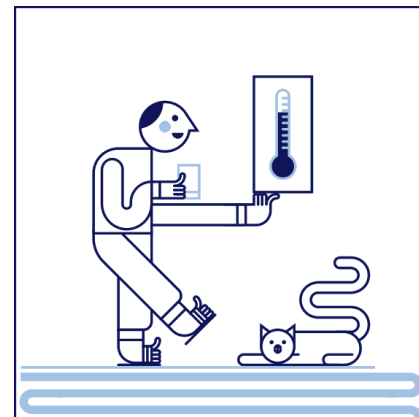
**Waste**

Source separation  
e.g. vacuum systems  
Waste collection  
Water treatment  
Nutrient recovery



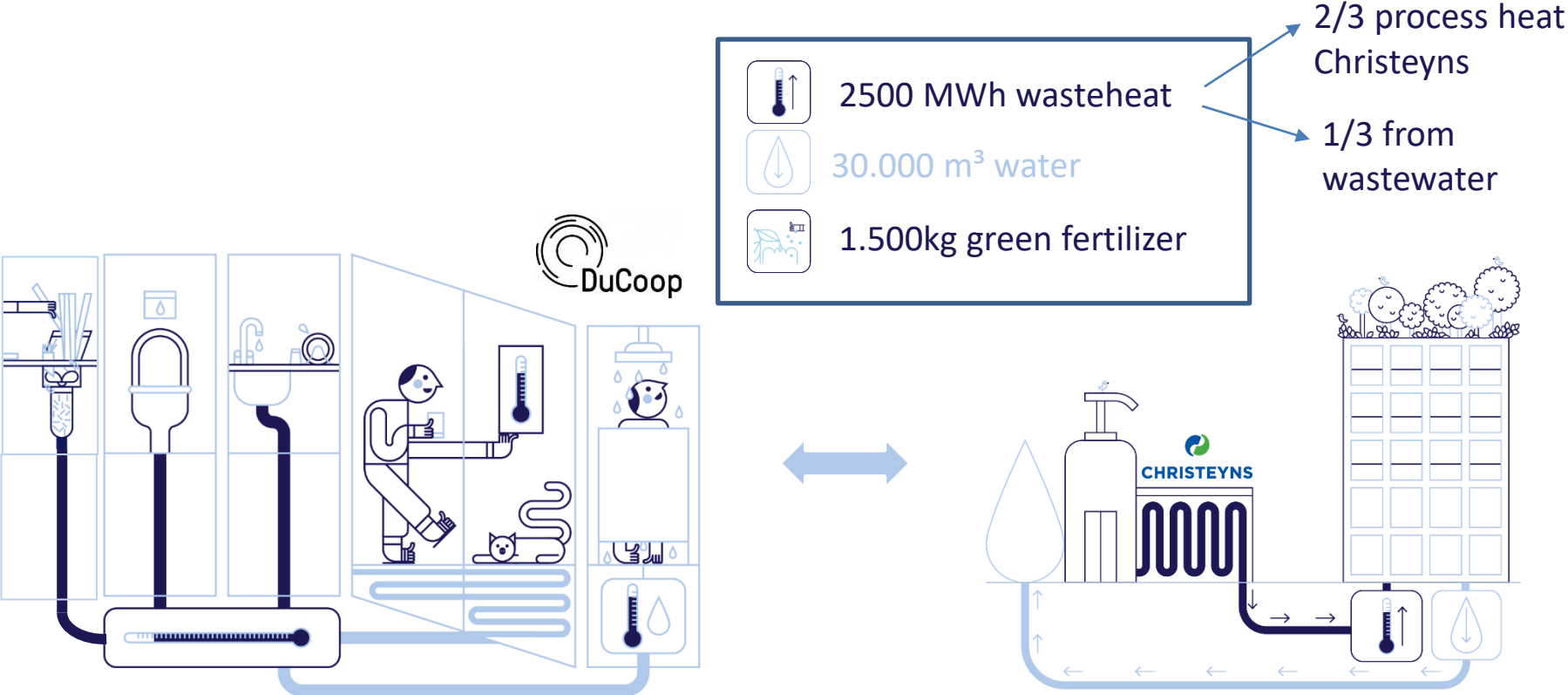
**Mobility**

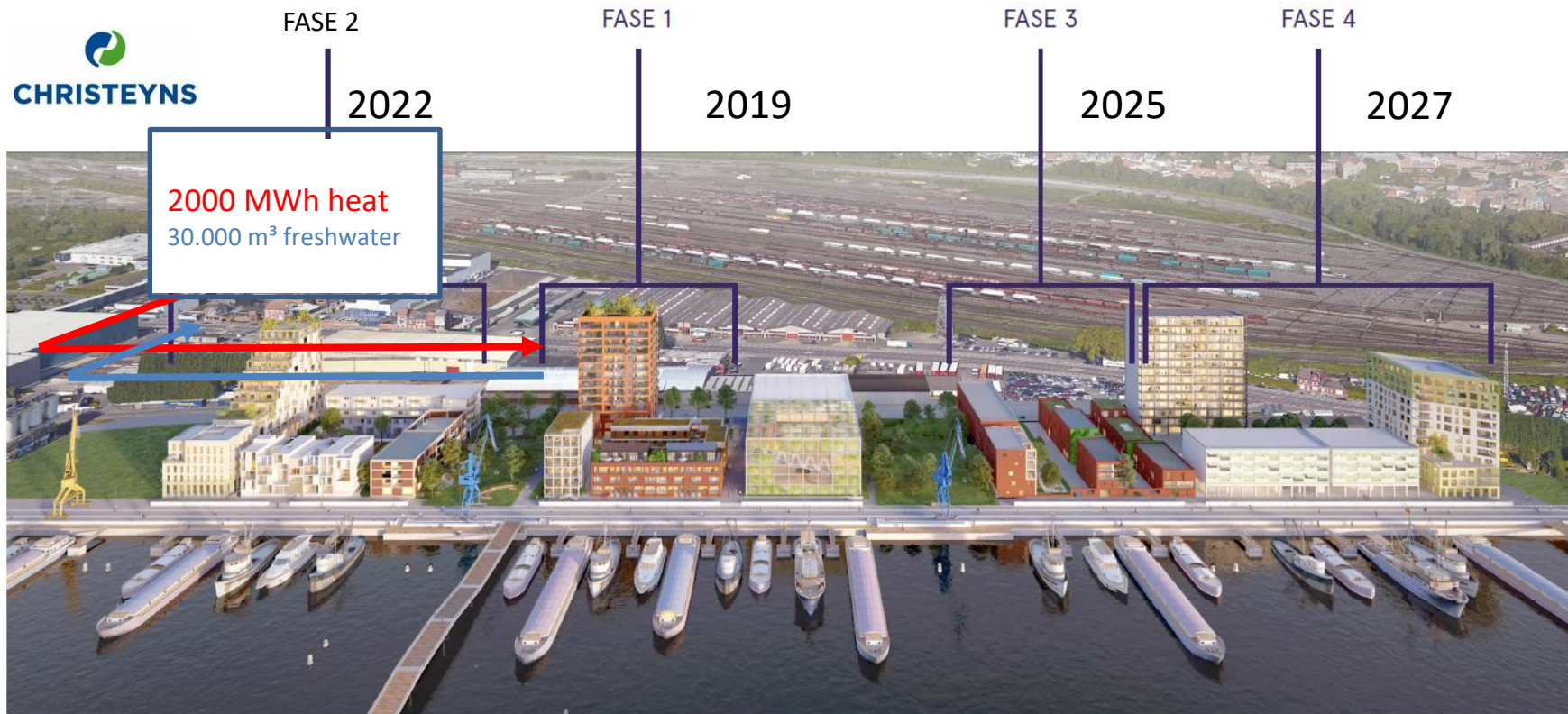
Electric bikes  
Electric sharing cars  
& charging stations



# ZAWENT UITGELEGD

## ZERO WASTEWATER WITH RECOVERY OF ENERGY & NUTRIENTS

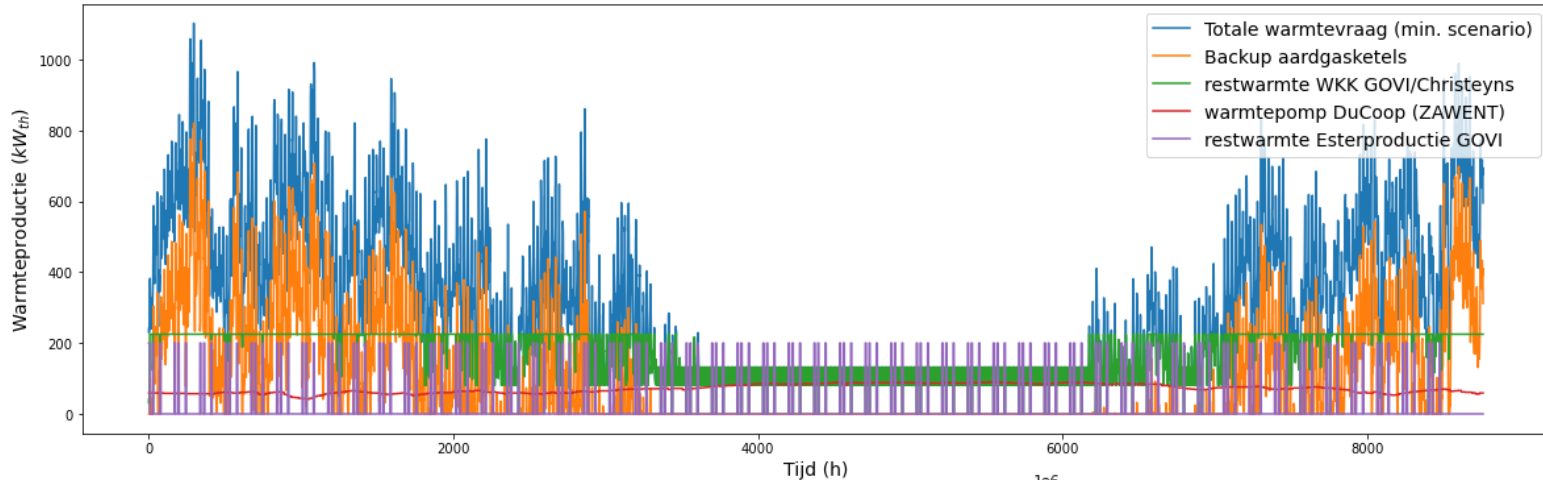




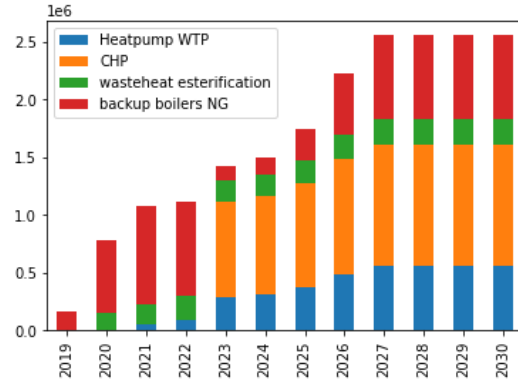
**> 400 Housing units + City complex (schools, sports infrastructure etc.)**



# Warmtenet: next steps



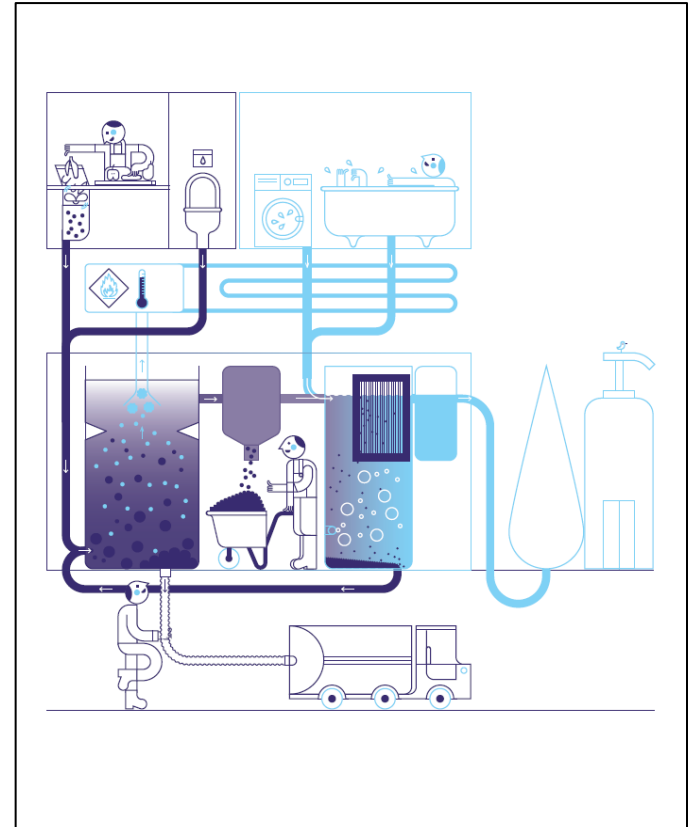
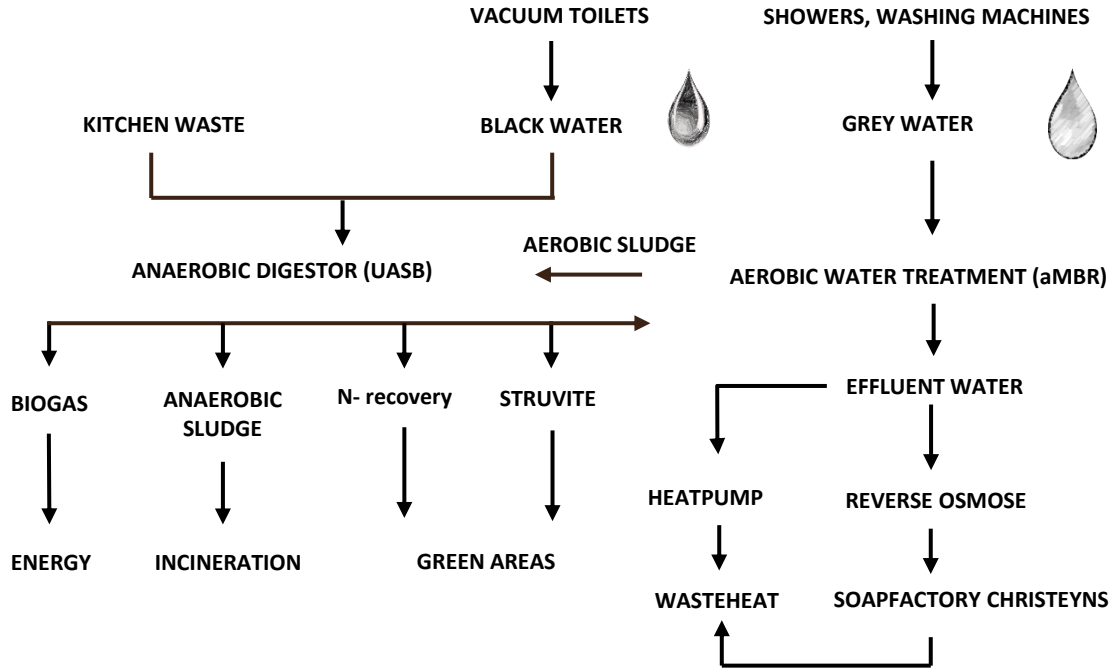
WKK restwarmte = 1050 MWh per jaar  
Warmtepomp afvalwater = 565 MWh per jaar  
Restwarmte industriële processen = 220 MWh per jaar  
Lucht-water warmtepomp = to be determined  
Aardgas backupketels = maximaal 724 MWh per jaar  
Totale vraag = 2600 MWh per jaar





# DECENTRALE WATERZUIVERING

## RESIDENTIAL WASTEWATER



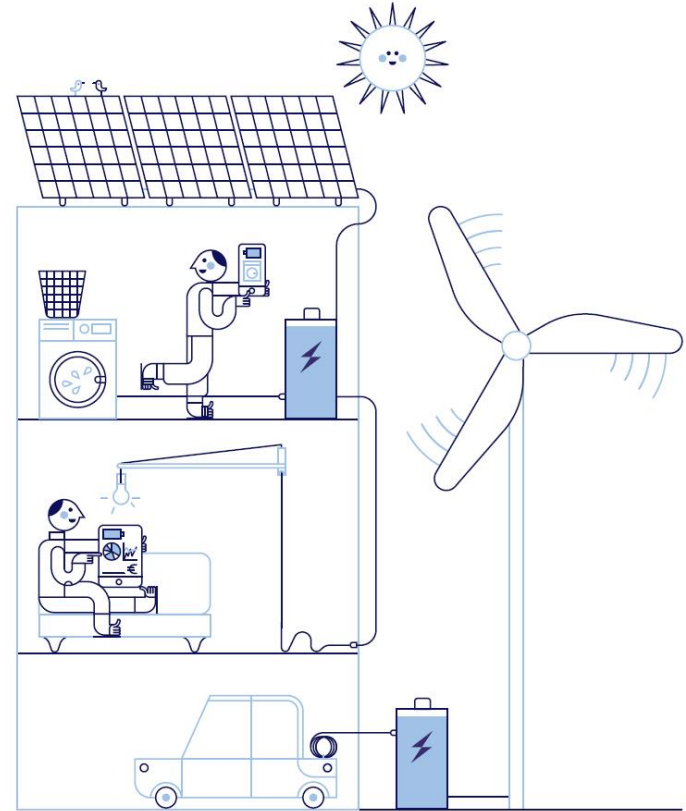
# Multi-energy District

## DATA MONITORING, VISUALISATIE & STURING

- Real time consumer data: water and energy consumption
- Monitoring and management of industrial processes

## ENERGY

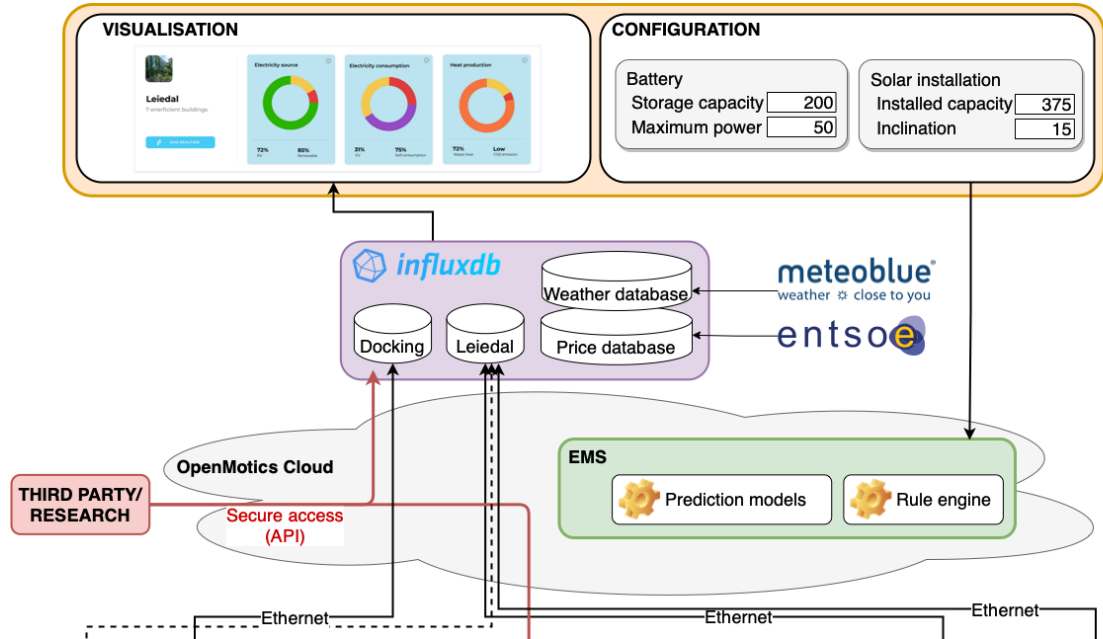
- Balancing of DuCoop portfolio (storage, demand side management)
- Optimization consumption of local RES and waste heat
- Limiting congestion of local DSO-grid
- Grid services (flexibility) to TSO



# Multi-energy District

## DATA MONITORING, VISUALISATIE & STURING

- Monitoring
- Sturing met focus op eigen verbruik en kostoptimalisatie
- Management-interface voor dagelijkse opvolging
- Integratie met derde partijen
- Elke assett houdt eigen PLC-sturing, die wordt geoptimaliseerd vanuit EMS



### De Nieuwe Dokken als pilootproject

- Via diverse Europese programma's is een lerend network ontstaan met gelijkaardige toepassingen in nieuwbouwprojecten
- Reeds een 10-tal gelijkaardige projecten zijn gebouwd (Sneek NL – 140 units, De Nieuwe Dokken - 400 units, Jenfelder Au Hamburg – 770 units, Oceanhamnen Helsingborg – 1000+ units, ...)
- Vlaamse spin off [www.Circular-Living.be](http://www.Circular-Living.be) ontwerpt integratie van circulaire technieken en ESCO-modellen voor nieuwbouwwijken

## Circular Economy Service Company DuCoop (cooperatie)

- Implementatie van nieuwe technologie vergt een nieuw business model teneinde wonen betaalbaar te houden
- DuCoop = CESCO (Circular Economy Services Company).

Financiering opstart:

- ✓ Mix van short term & long term Impact Capital Investors
- ✓ Burgerparticipatie
- ✓ Subsidies voor onredabele top (warmtenet, innovaties, ...)



DE  
NIEUWE  
DOKKEN

Dank voor uw aandacht



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