



# ECO-Life in Belgium

*Eline Himpe (PhD-student)*



## Core Project Partners

Social Housing Company



Architecture & Engineering

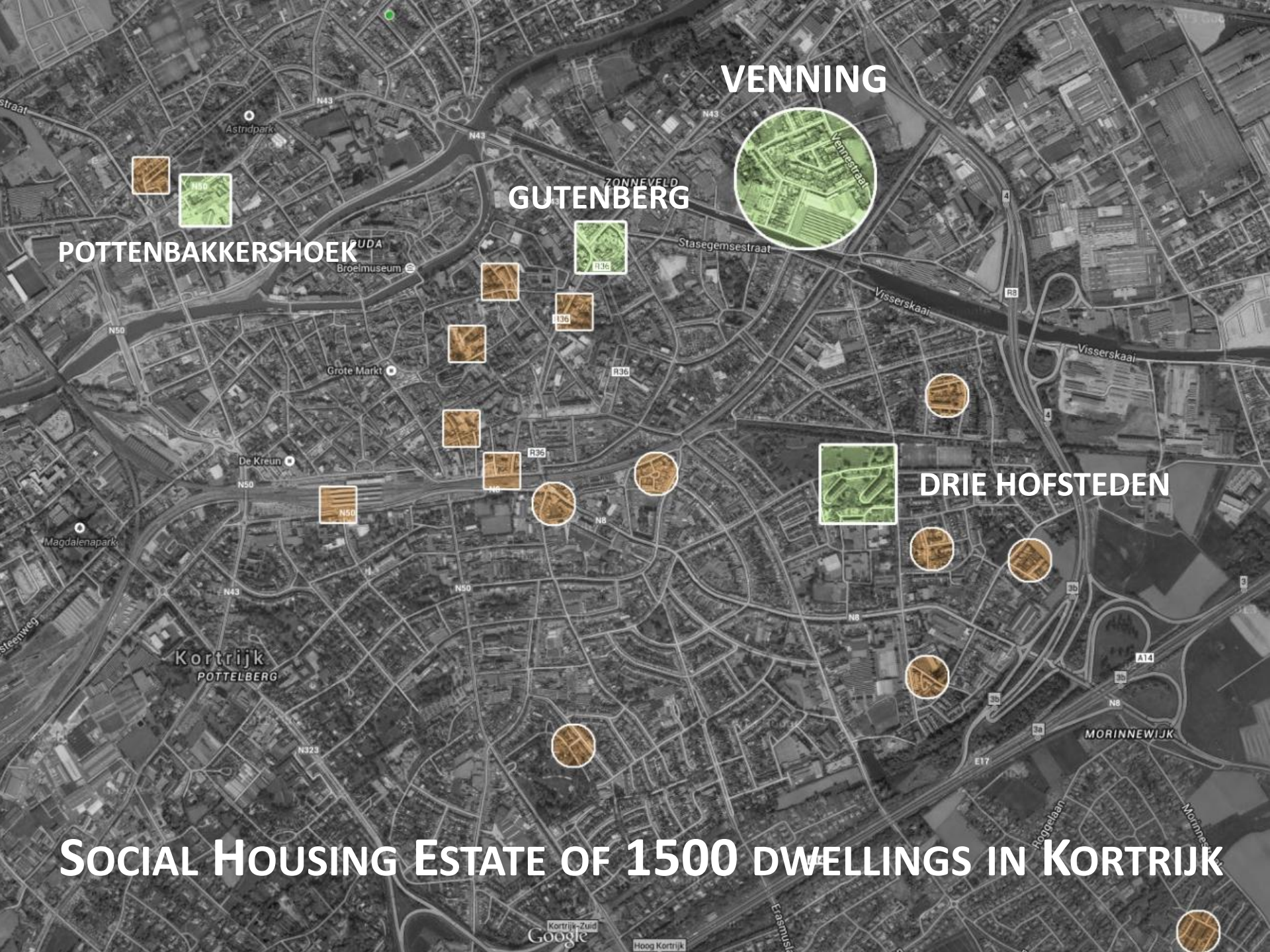


Advice & Monitoring



## Partners

evr-architects – Abscis architects  
E-ster Engineering – Ingenium Engineering  
City of Kortrijk



**VENNING**

**GUTENBERG**

**POTTENBAKKERSHOEK**

**DRIE HOFSTEDEN**

**SOCIAL HOUSING ESTATE OF 1500 DWELLINGS IN KORTRIJK**

# **VENNING NEIGHBOURHOOD: 196 DWELLINGS (MULTI-FAMILY & SINGLE-FAMILY, NEW & REFURBISHED)**



# POTTENBAKKERSHOEK: 23 NEW APARTMENTS



# GUTENBERG: 21 NEW APARTMENTS




# DRIE HOFSTEDEN: 34 REFURBISHED APARTMENTS



# OBJECTIVES...

 Sustainable

 Zero-Carbon

 Quality of Life






# OBJECTIVES → APPROACH: TOOLS

 Sustainable → Monitor for Sustainable Social Housing

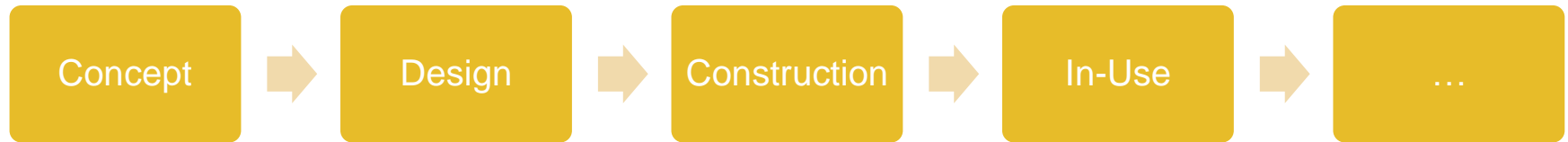
 Zero-Carbon → Clear Definition / Framework

 Quality of Life → Occupants Engagement

+ Financial feasibility




# OBJECTIVES → APPROACH: CONTINUOUS INTEGRATION



 Sustainable → Monitor for Sustainable Social Housing




 Zero-Carbon → Clear Definition / Framework

 Quality of Life → Occupants Engagement

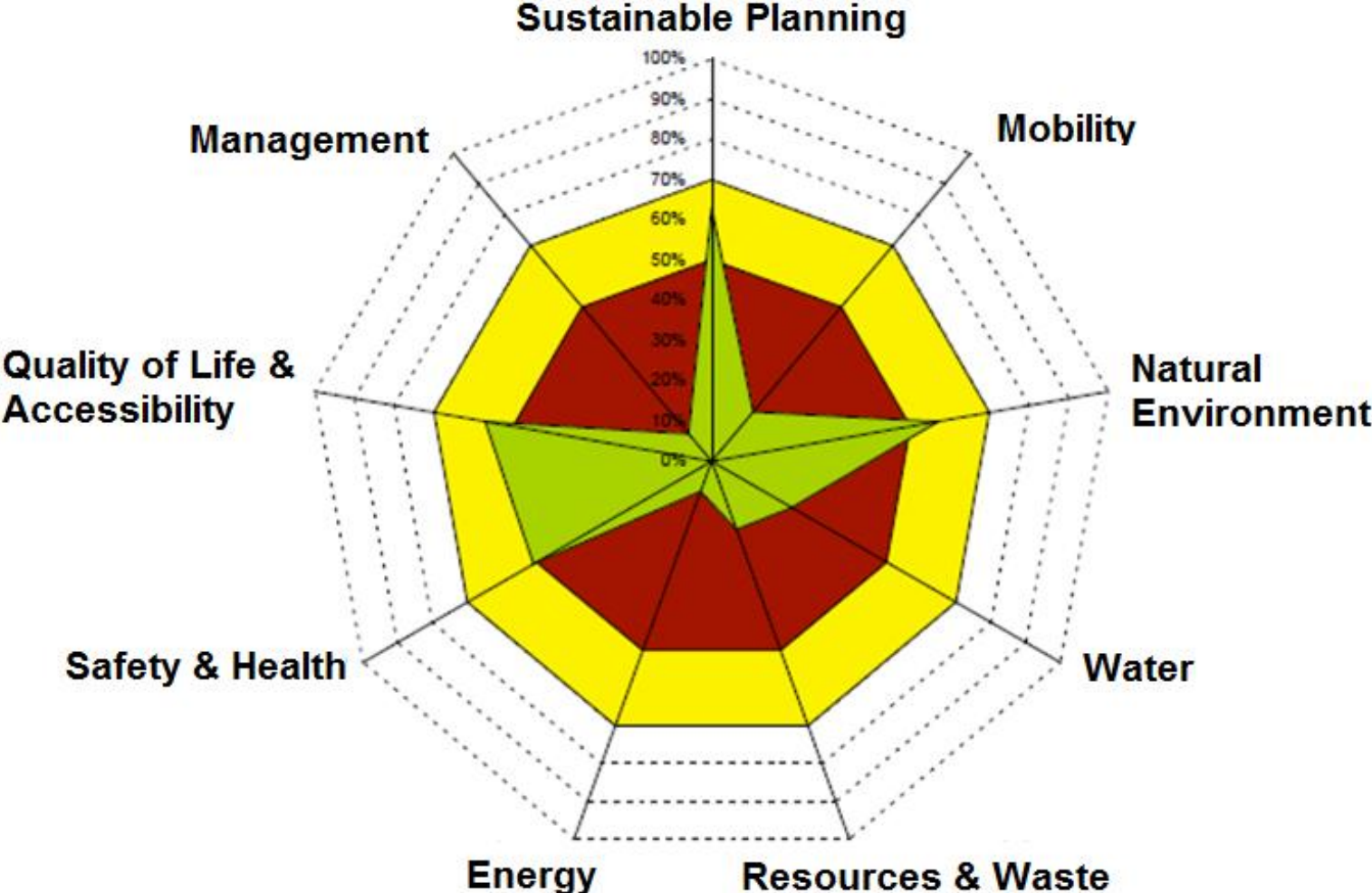
+ Financial feasibility



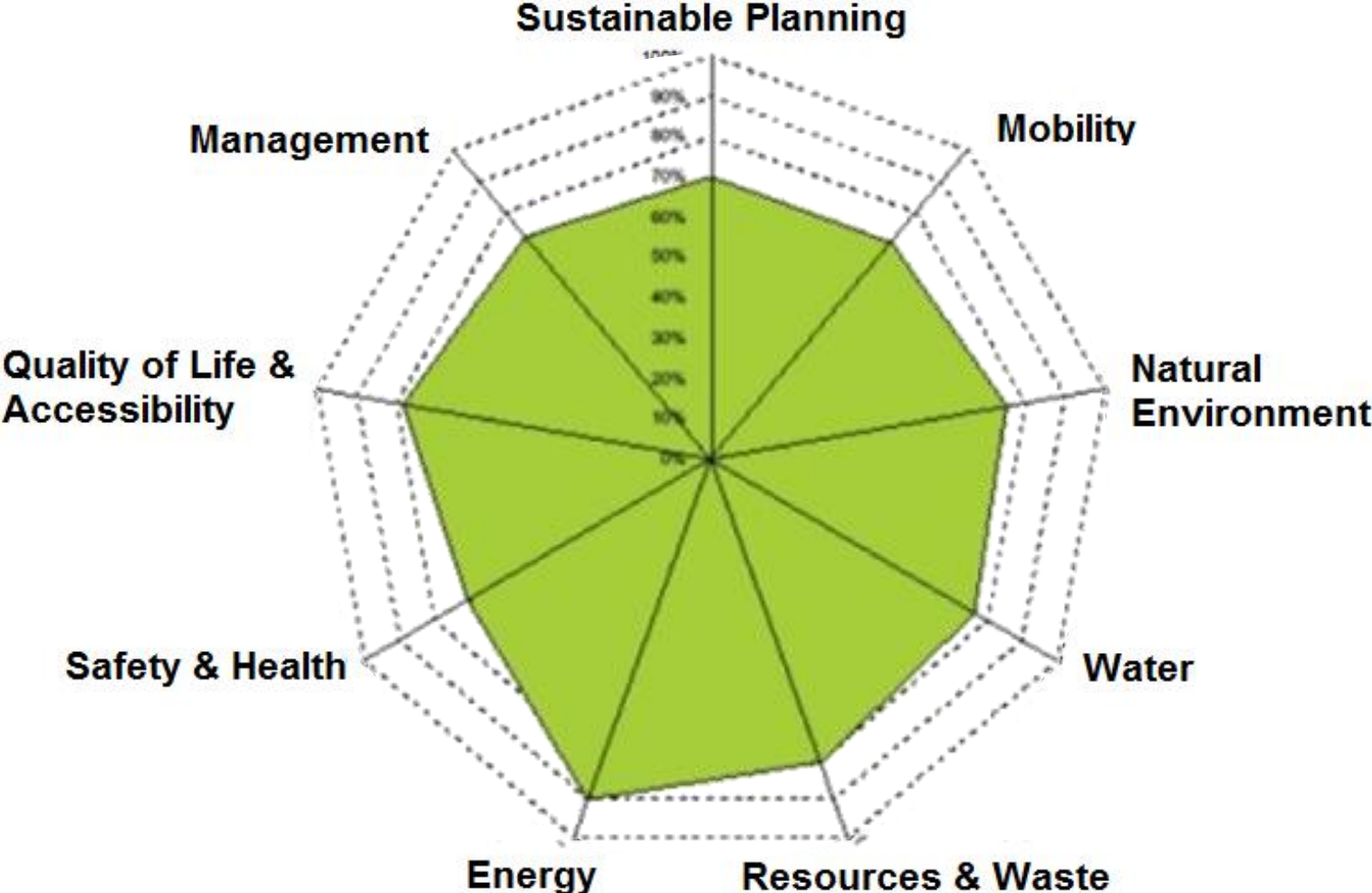


-  **Sustainable → Monitor for Sustainable Social Housing**
-  Zero-Carbon → Clear Definition
-  Quality of Life → Occupants Engagement

# MONITOR FOR SUSTAINABLE SOCIAL HOUSING PROJECTS



# MONITOR FOR SUSTAINABLE SOCIAL HOUSING PROJECTS



# CHALLENGE: RECONCILING CONFLICTING VALUES

Energy (efficiency) ↔ Resources / Waste (materials)

Sustainable planning (orientation...), Quality of Life (floor area...)

*Refurbishment or Demolition?*



# CHALLENGE: RECONCILING CONFLICTING VALUES

Density ↔ Quality of Life

Natural Environment ↔ Water ↔ Mobility

*Outdoor space: Private - Semi-Public - Public*





- ✿ Sustainable → Monitor for Sustainable Social Housing
- ✿ **Zero-Carbon → Clear Definition**
- ✿ Quality of Life → Occupants Engagement

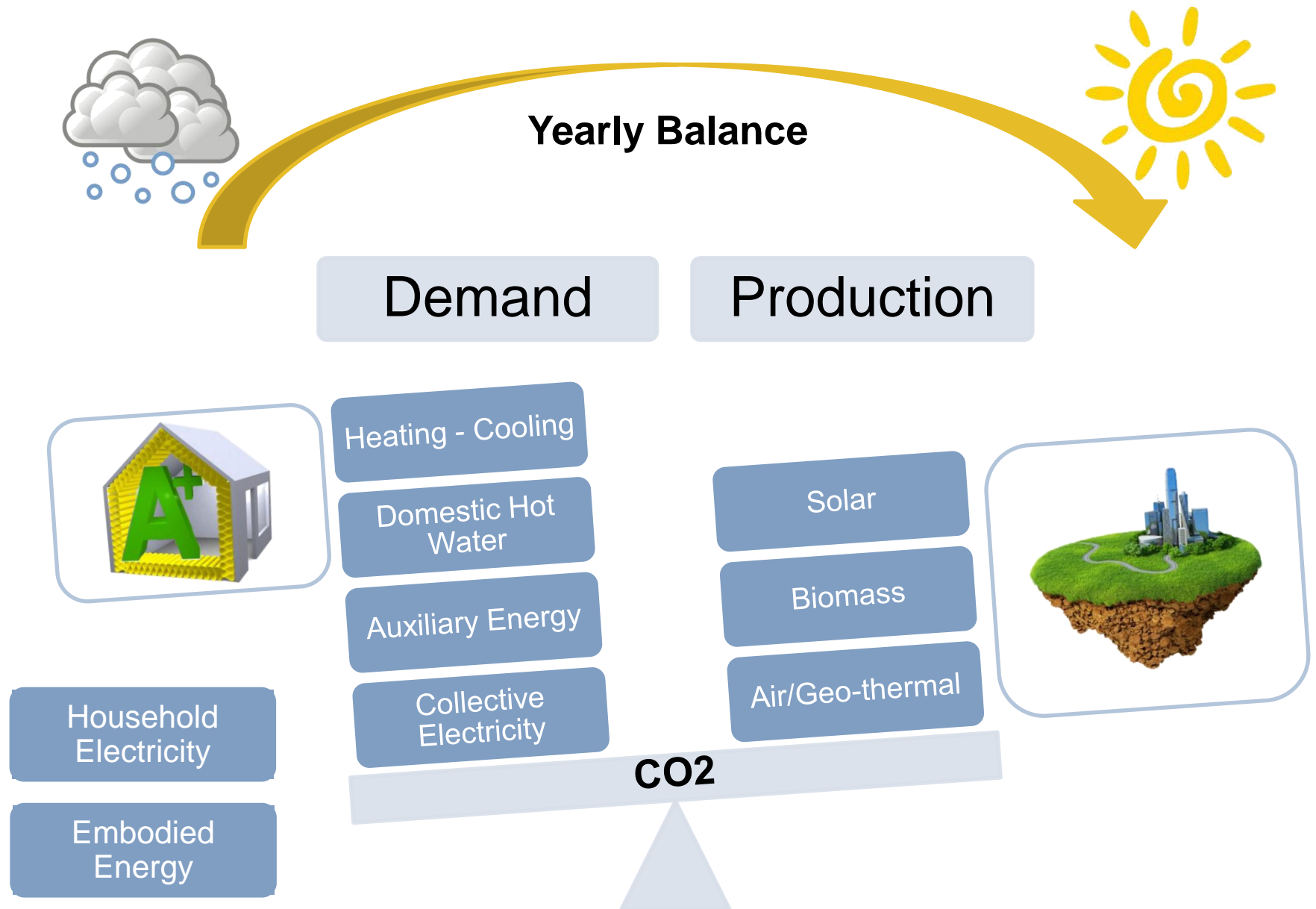


# Zero-Carbon? Zero-Energy? nZEB? Passive? Low-energy?

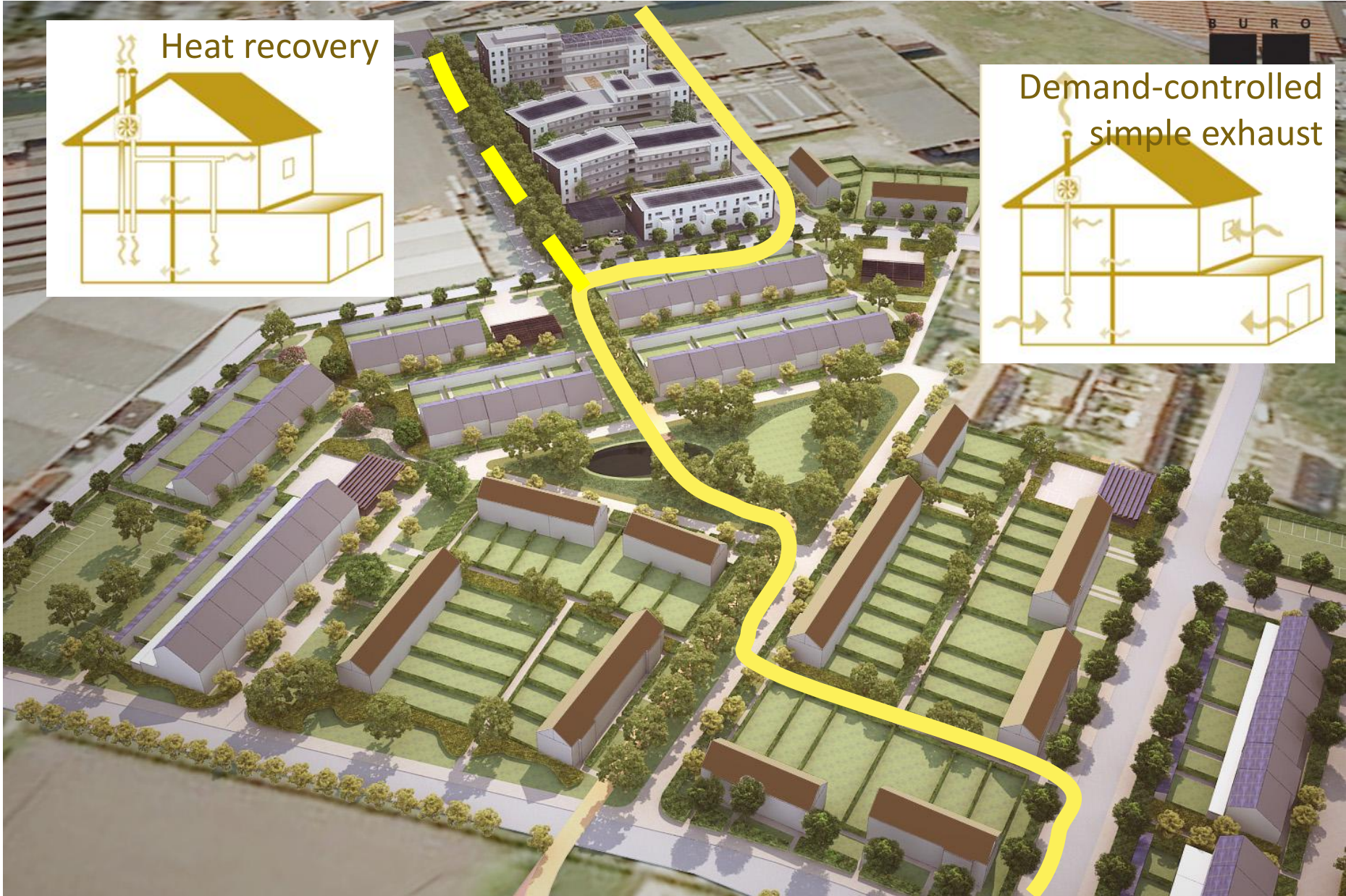
*“Despite the excitement over the phrase “zero-energy”, we lack a common definition, or even a common understanding, of what it means”*  
(Paul Torcellini)



# ECO-LIFE DEFINITION: ZERO-CARBON DEVELOPMENTS



# Ventilation Strategies in Venning neighbourhood



# CHALLENGES: COLLECTIVE RES IN PRACTICE (IN BELGIUM)

- ✿ Juridical: collective RES ↔ EPBD calculations
  - ✿ District heating
  - ✿ Collective PV (e.g. Multi-Family buildings)
- ✿ Juridical: collective RES ↔ electricity grid manager
- ✿ Financial: Investment Costs ↔ Returns



# ENERGY PERFORMANCE: FROM THEORY TO REALITY



## Monitoring

 To optimise the operation

 To evaluate the targets

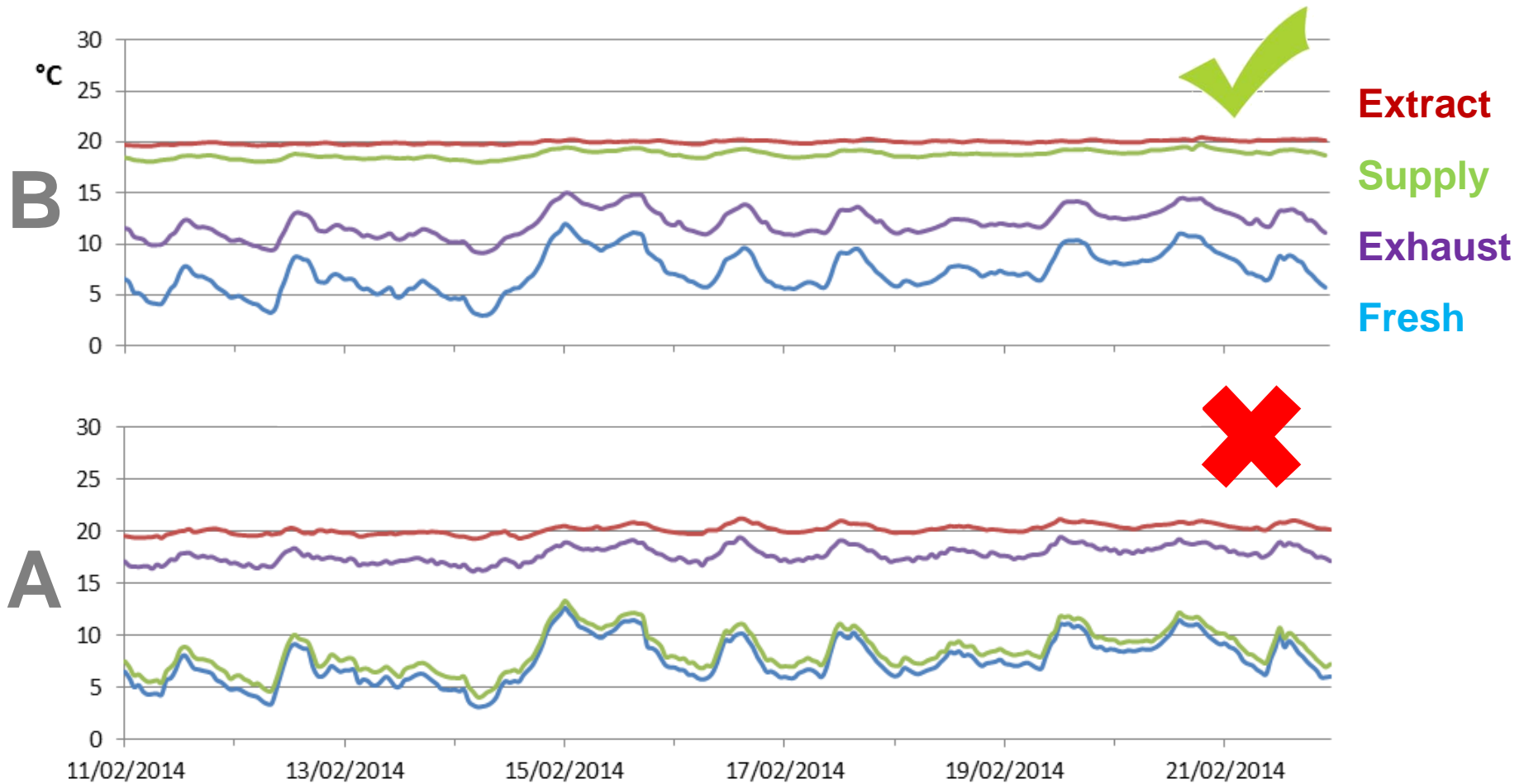
# VENNING 1: MONITORING THE FIRST YEAR OF OCCUPANCY



# MONITORING... TO OPTIMISE THE OPERATION!

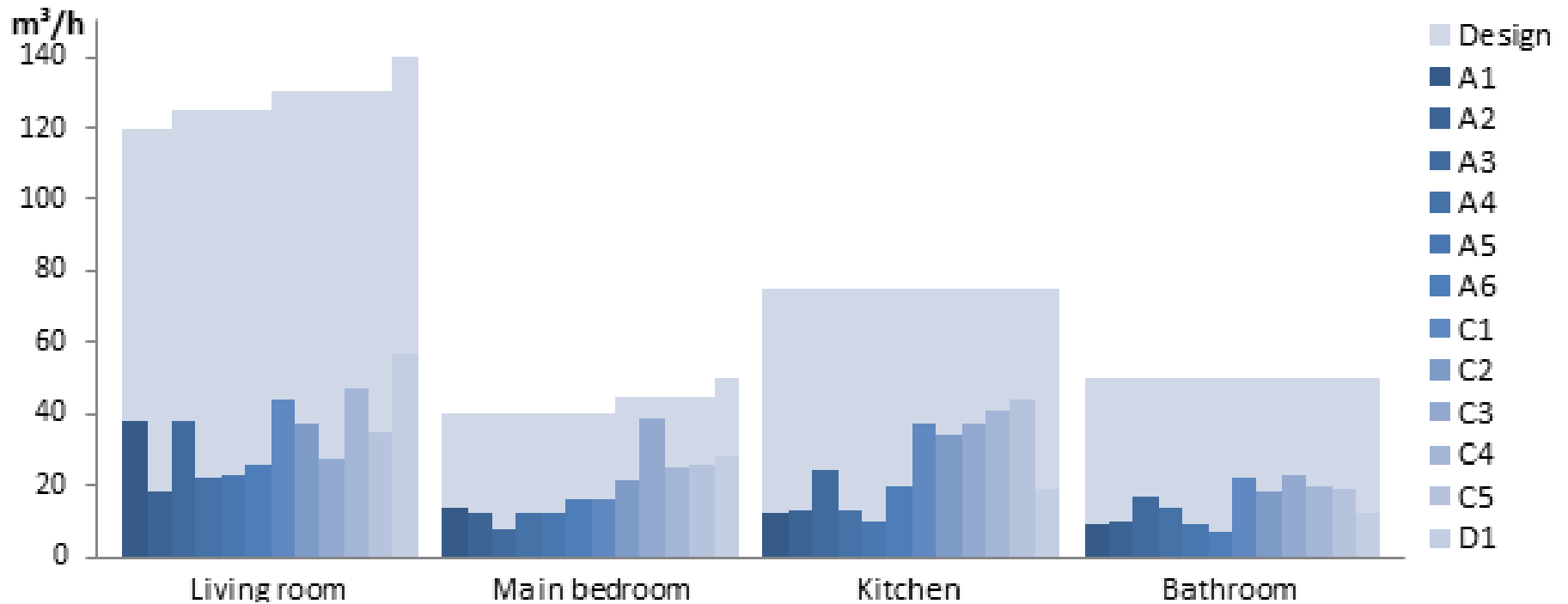


# TEMPERATURE OF THE FLOWS NEAR THE HEAT EXCHANGERS

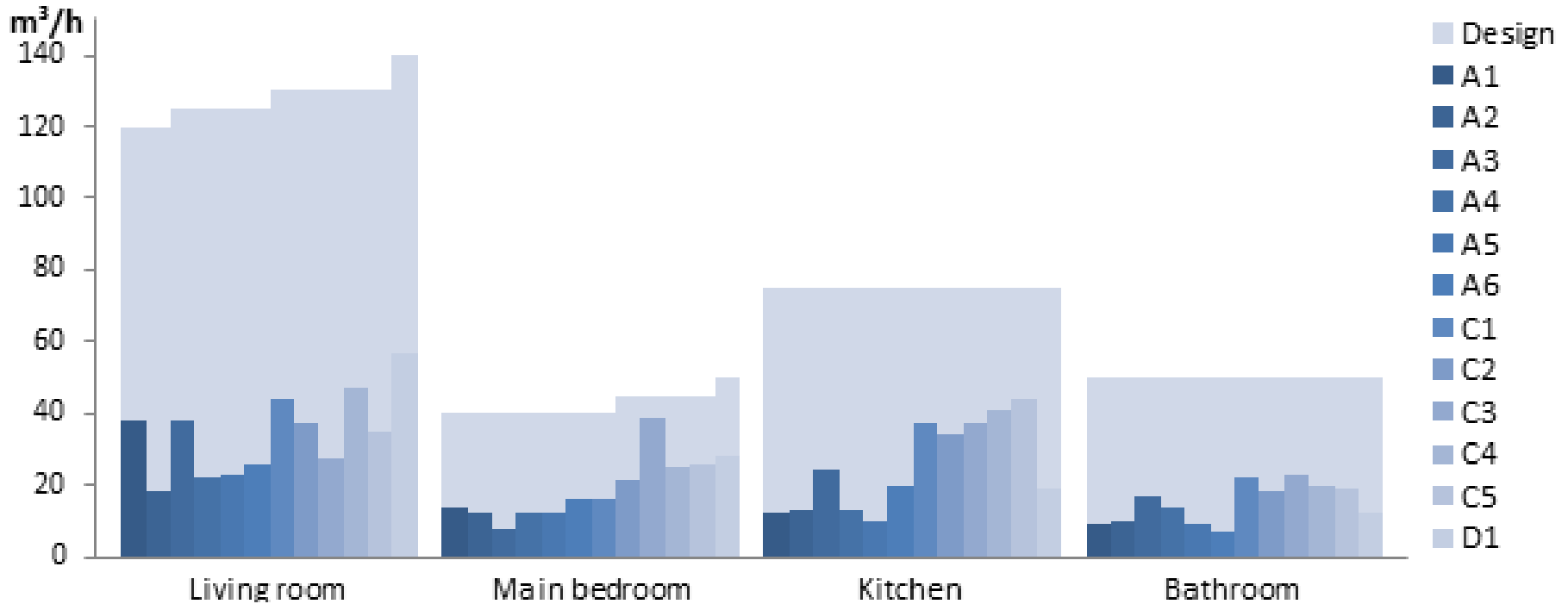
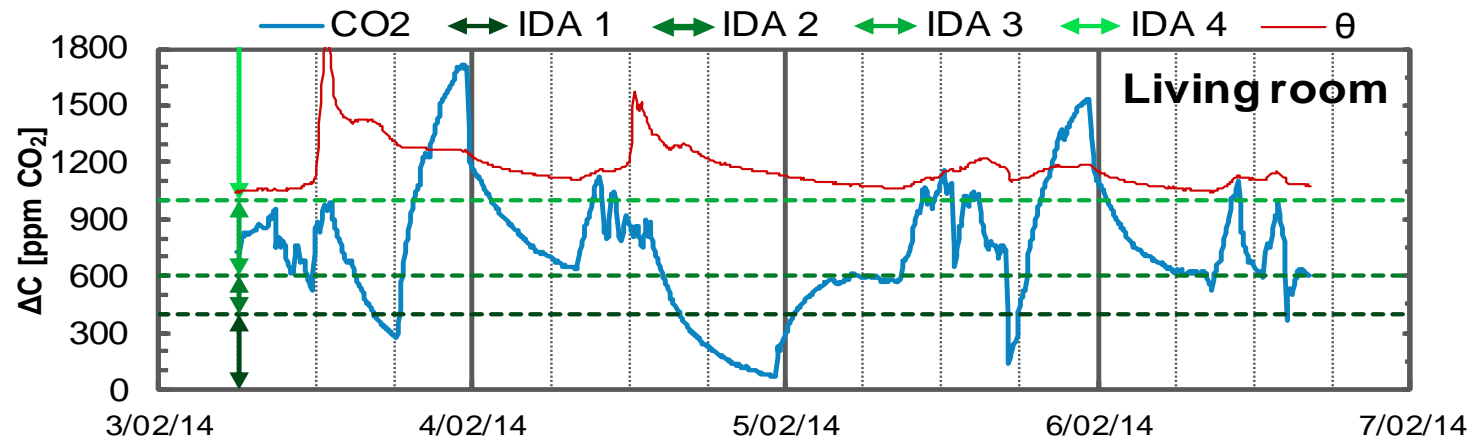




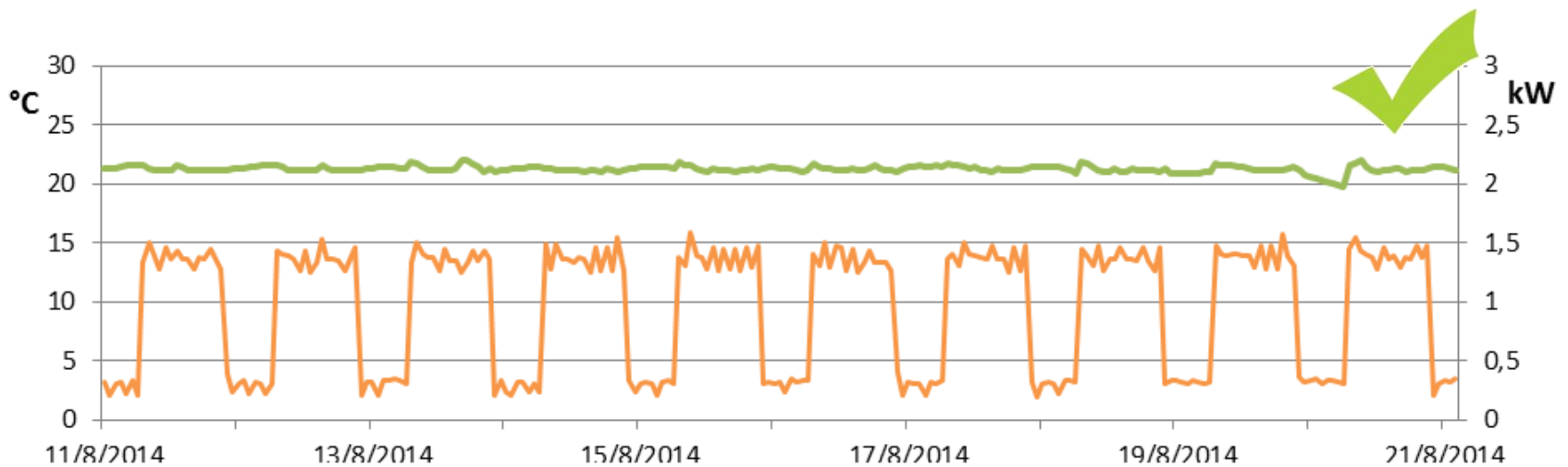
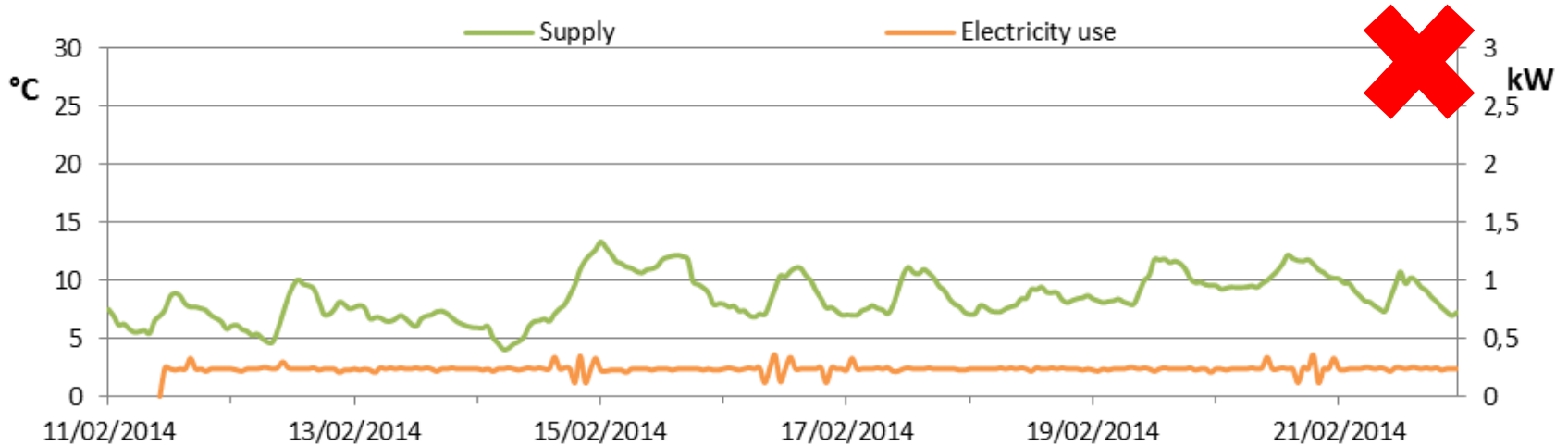
# VENTILATION FLOW RATE MEASUREMENTS



# CO<sub>2</sub> MEASUREMENTS

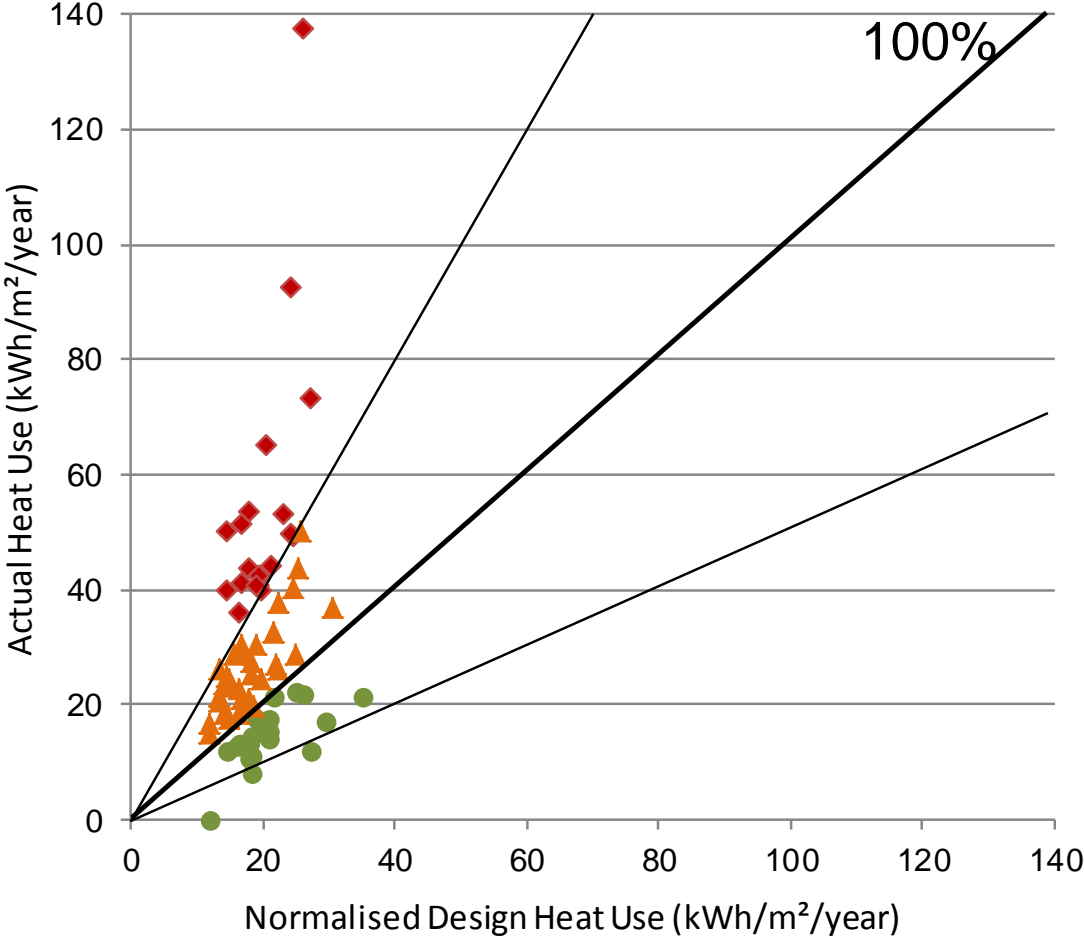


# KEY MONITORING PARAMETERS FOR FAULT DETECTION

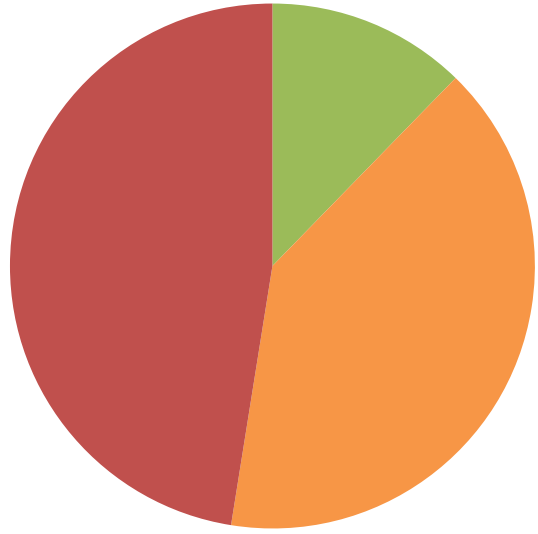


**MONITORING... TO EVALUATE THE TARGETS!**

# HEAT USE PER DWELLING FOR SPACE HEATING AND DOMESTIC HOT WATER

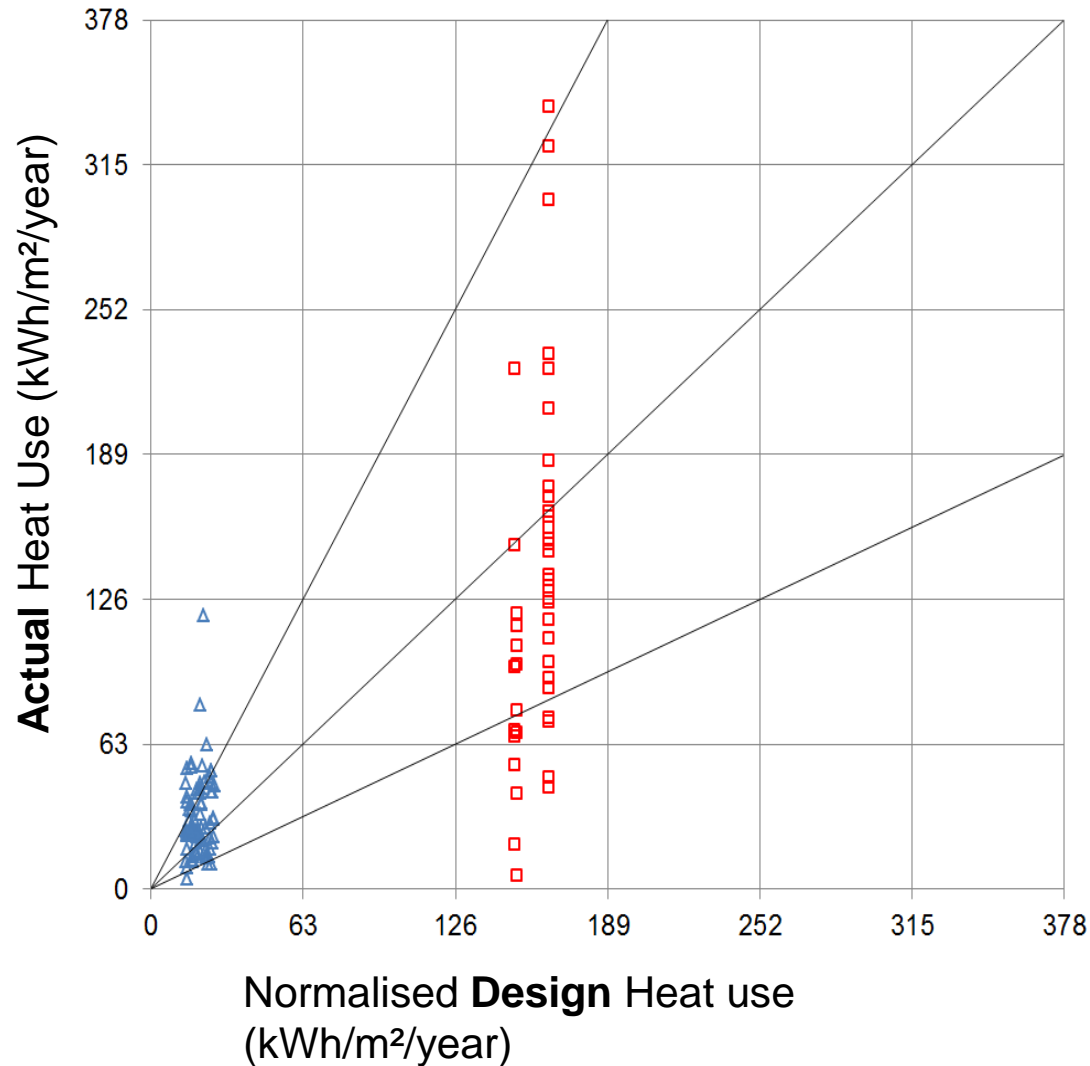


- < Design
- < 2 x Design
- > 2x Design



Total Heat Use

# VENNING BEFORE & AFTER ECO-LIFE

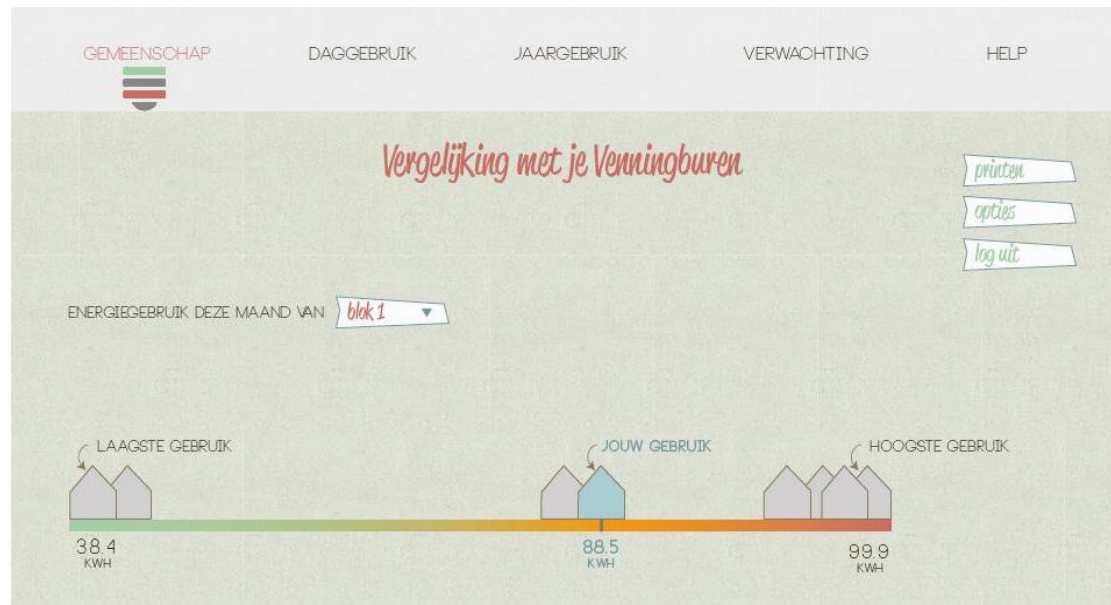




- ✿ Sustainable → Monitor for Sustainable Social Housing
- ✿ Zero-Carbon → Clear Definition
- ✿ **Quality of Life → Occupants Engagement**

# OCCUPANTS ENGAGEMENT

- ✿ interaction in design phase
- ✿ Information, guiding, energy feedback
- ✿ Via meetings with occupants, surveys, letters, web tool...






# CHALLENGES IN OCCUPANTS ENGAGEMENT


- ✿ Moving occupants during construction works  
(coördination, dwelling availability, occupants effort...)
- ✿ Learn people how to use the buildings and systems
- ✿ Make people aware about energy use
- ✿ Management and Malfunctioning of a system
- ✿ Individual control ↔ centralised operation



## **Three Objectives... One Approach... Different results**

 Sustainable → Monitor for Sustainable Social Housing

 Zero-Carbon → Clear Definition

 Quality of Life → Occupants Engagement

**Tools provide a framework for decision-making**

→ Read more in our ECO-Life Deliverables!



# Thank You!

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