



# 4RinEU

Reliable models for deep renovation

Sustainable Places 2019  
Cagliari, 6 June 2019

## Data Handling in 4RinEU



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 723829

# 4RinEU OBJECTIVE

## Improve information flows and knowledge share among stakeholders

- Several methods and tools in the project to deliver this
- Main principles:
  - Cover the whole life cycle
  - Address performance and function
  - Collect quantitative and qualitative data
  - Transform data into information and knowledge

# INFORMATION FLOW

Tools and approaches for:

**Design  
process**



**Business  
modelling**



**Data collection  
and processing**



# DATA FOR RENOVATION

## Before renovation:

- What is the status of the building?
- What are the main needs?
- What is the overall performance?
- What are critical areas?
- What are common user complaints?

## After renovation:

- How is the building performing now?
- How are new technologies working?
- Is the building performing as designed?
- Is something not working as expected?



# DATA ALLOWS TO...

- Verify performance targets
- Confirm effectiveness of design
- Correctly operate and maintain a building

**No understanding without data**

# DATA USES IN 4RinEU

## project objectives

Energy saving at least of 60% in comparison to pre-renovation levels

Improvement of Indoor Environmental Condition and Air Quality

Increase of Renewable Energy Generation and self-consumption of the renovated building

Did we do this? Check through data

# DATA USES IN 4RinEU

- Collect data to guide renovations
  - *What is the pilot building's performance and characteristics, before even starting the design?*
- Monitor renovations
  - *How are prototype technologies actually performing in real buildings?*
- Monitor KPI
  - *Did the post-intervention performance improve as expected?*
- Feed back on renovation outcomes to users
  - *What data do owners, occupants, facility managers need to access to better engage with the renovated building?*

# 4RinEU PROCESS

- Gather requirements from pilots
- Pre-installation monitoring
- Ad hoc campaigns (e.g. IAQ)
- *Installation of technologies*
- Post-installation monitoring
- Ad hoc campaigns (e.g. IAQ)
- KPI tracking & evaluation
- Information feedback (bespoke dashboards)



# RECOMMENDED DATA SET

- Weather
  - Temperature
  - Humidity
  - Solar radiation\*
  - Wind speed, direction\*
  - Rain\*
  - CO2
- Indoor environment
  - Temperature
  - Humidity
  - CO2
  - Luminosity
- Occupancy
  - Presence
  - Windows opening
- Consumption
  - Thermal metering
    - Water flow rate, temperature
  - Electricity metering
    - Separate lights and appliances
- Equipment setpoints
- Resolution: **5 minutes**

*\*third party data*

# AD-HOC ANALYSES

## Eq-ox (EURAC prototype)

Multiple parameters

IAQ

Thermal comfort

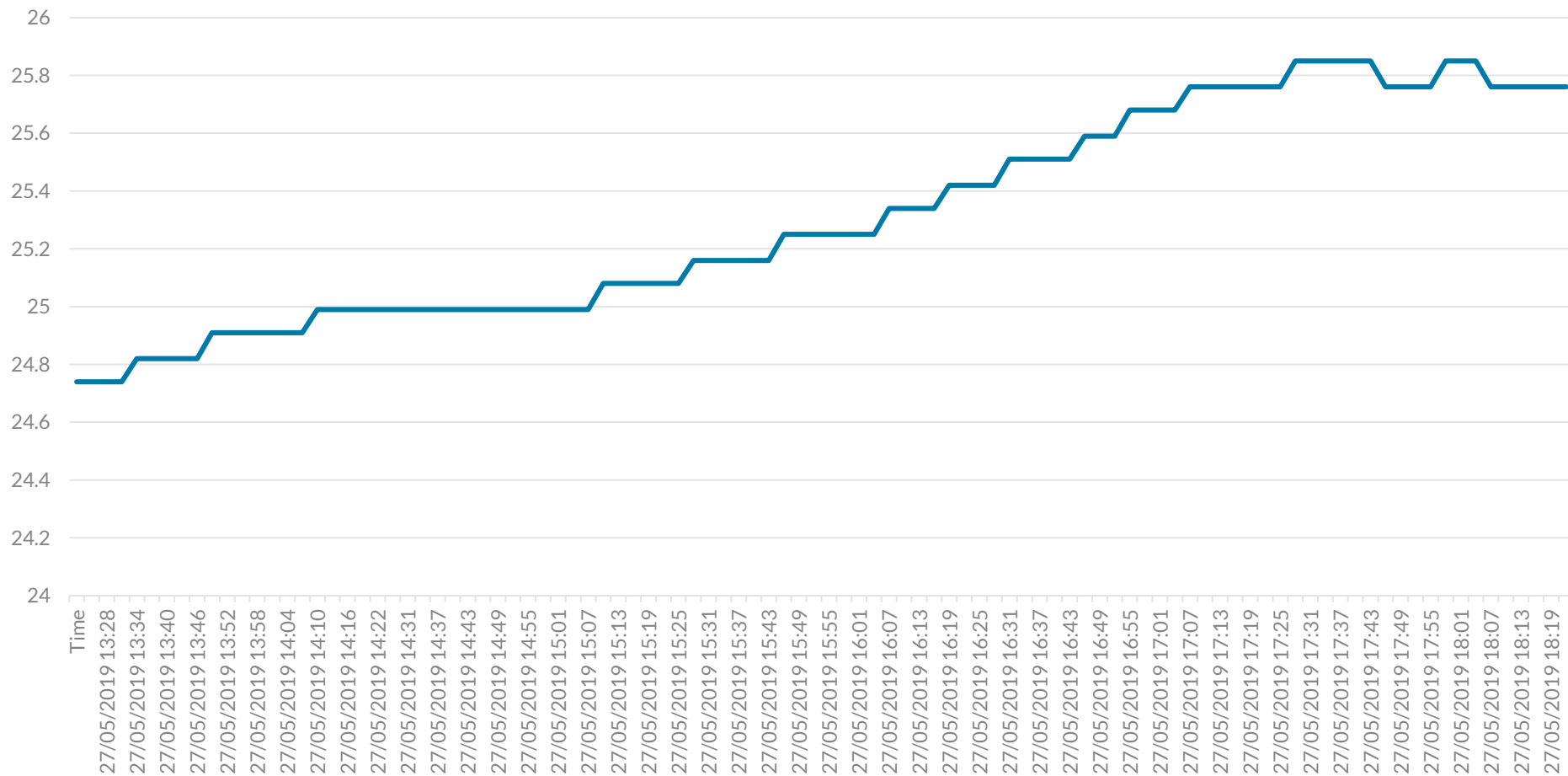
## High detail monitoring

Bellpuig pilot, 3 apts, 7-9 plug loads

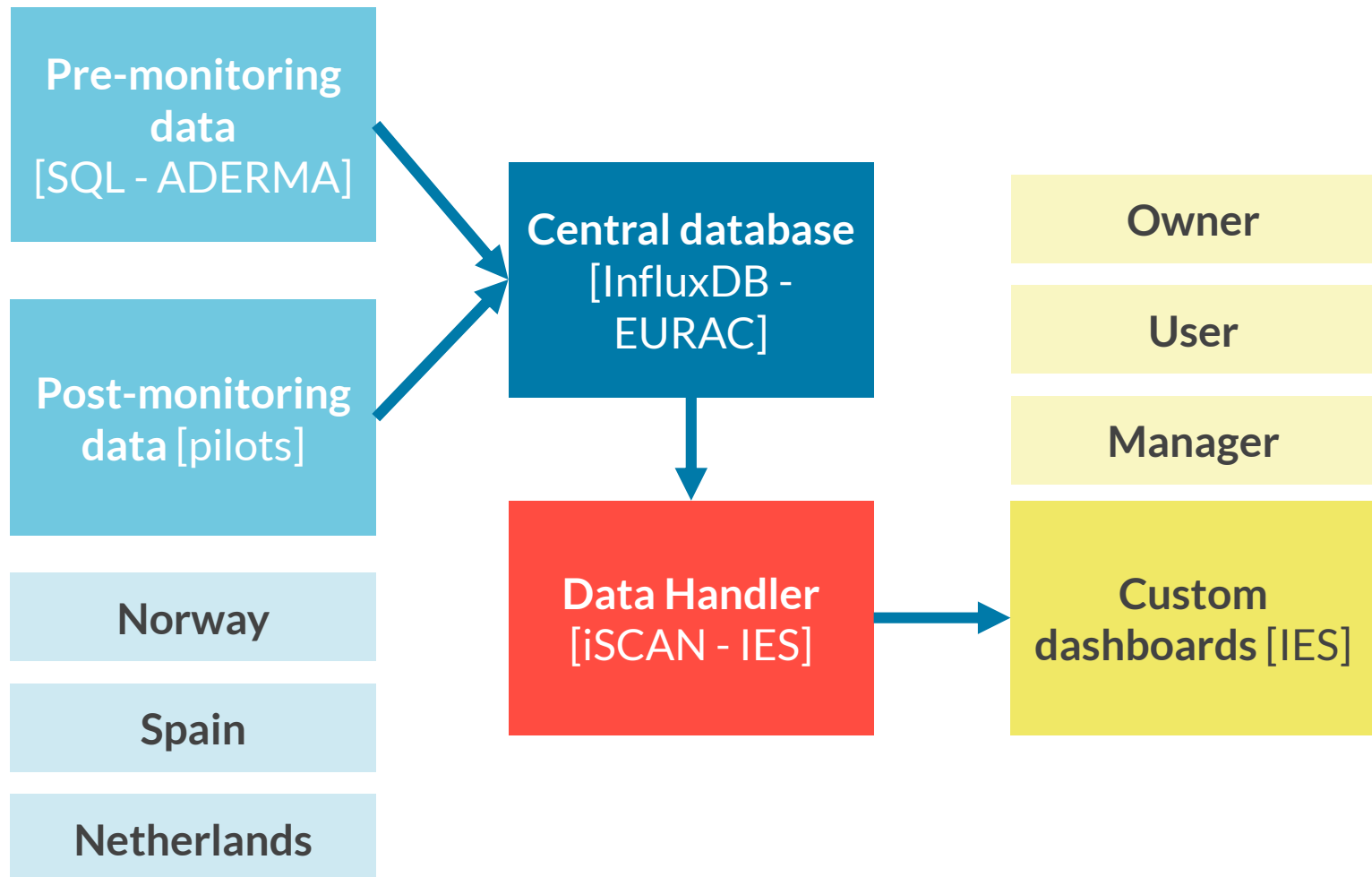
Track specific appliances (fridge, tv, oven...)

Thermal loads (electric heater, water heater...)

# DATA SAMPLE



# 4RinEU ARCHITECTURE





**4RinEU**

**THANK YOU!**

**Any questions?**

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