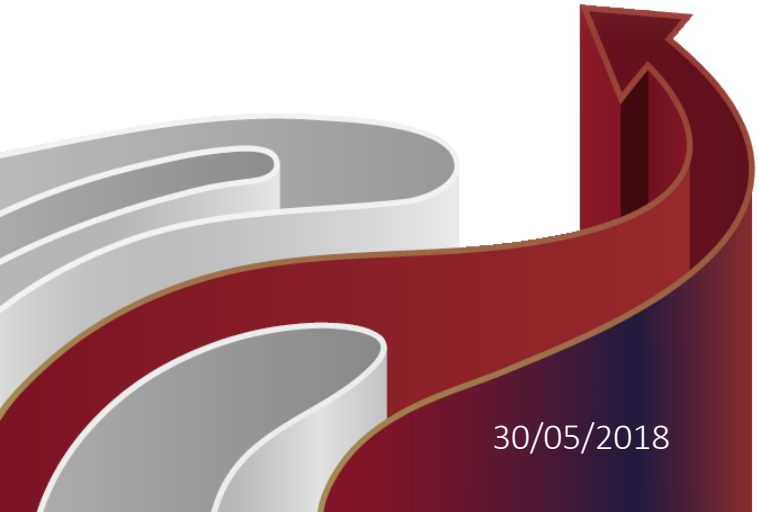
Energy Efficient Ventilated Façades for Optimal Adaptability and Heat Exchange enabling low energy architectural concepts for the refurbishment of existing buildings.

E2VENT

E2VENT WORKSHOP

DEMO IN SPAIN AND POLAND



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ACCIONA

30/05/2018

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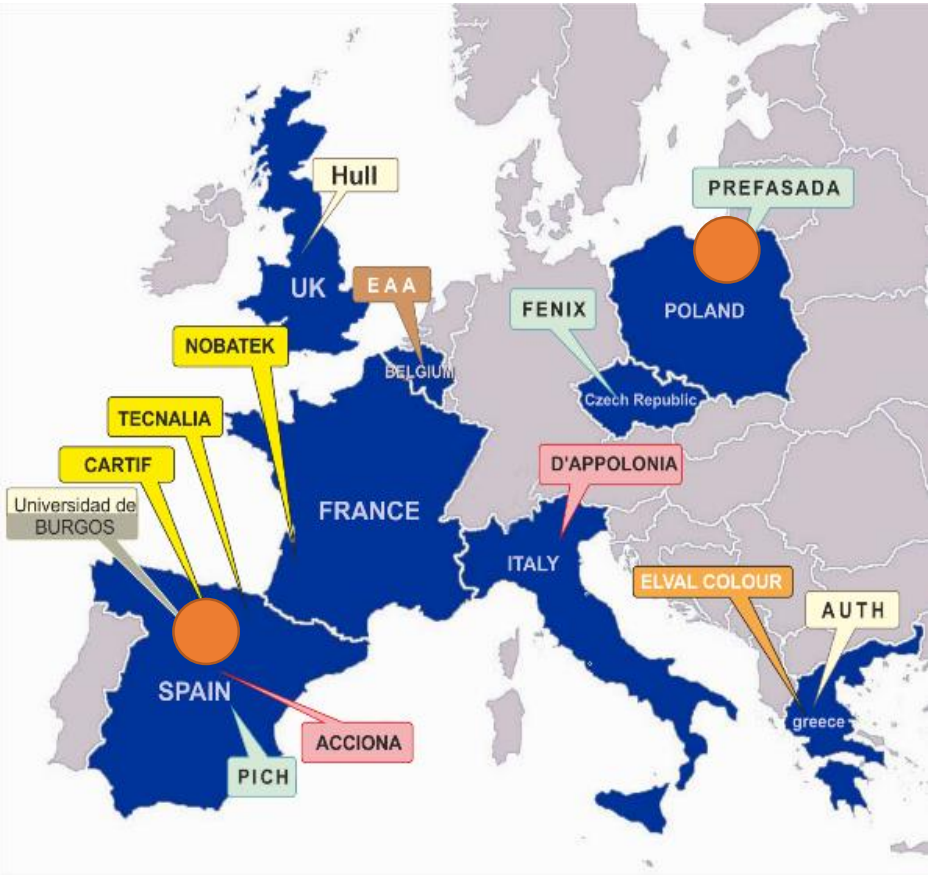
Pilots

- Main objective:
  - Validation of the E2VENT deep renovation strategy
  - Assessment of
    - Robustness
    - Effectiveness
    - Viability
- Implementation and execution in two buildings
  - Different climate
  - Different typology of construction and use.
- Burgos:
  - University
  - Climate: Continental Moderate
- Gdansk
  - Residential
  - Climate: Marine West Coast
- Energy Goals
  - Reduction of 40% of primary energy consumption
  - Reduction of 40% of CO2 emissions
  - Reduce thermal and electrical peak loads



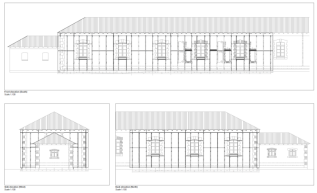
Project Management

Energy Audit → Measurement and Verification Plan → Deep renovation Design → Installation → Commissioning → Evaluation of Results

- Technical assessment of the building:
  - HVAC systems
  - Constructive and architectural features
- Definitions of Energy Conservation Measures

- IPMVP protocol (What, why, how and where to measure)
- Definition of the monitoring plan

- Definition of technical requirements
- Engineering and architectural design



- Preparation of the site
- Manufacturing and transport of the materials and components
- Preassembling of the Prototypes
- Installation works

- Commissioning of the system:

* Communication between control and energy systems.
* Optimize performance.
* Airflow and acoustic test, etc.

- Assessment of:

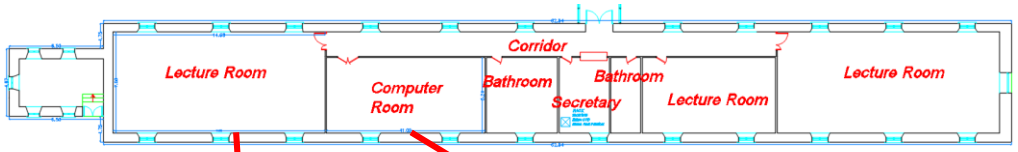
* Improvement of Inner Comfort conditions
* Energy Savings
* Energy system operation and performance

Pilot site in Burgos

- University building in Burgos
- One-level block, with pitched roof, masonry walls of 65cm thickness , not-insulated
- Centralized heating system. No mechanical ventilation
- Related Pathologies:
  - Comfort:
    - Low Indoor Environmental Quality
  - Energy-Related Pathologies:
    - Poor Building Envelope
    - Low Performance of heating system

Pilot site in Burgos

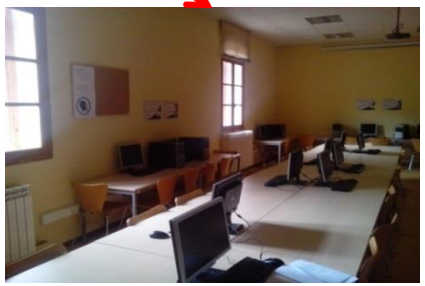
- Two rooms of study: Lecture Room, PC Room
- Monitoring System
  - Energy Consumption
  - Internal comfort conditions
  - External weather conditions





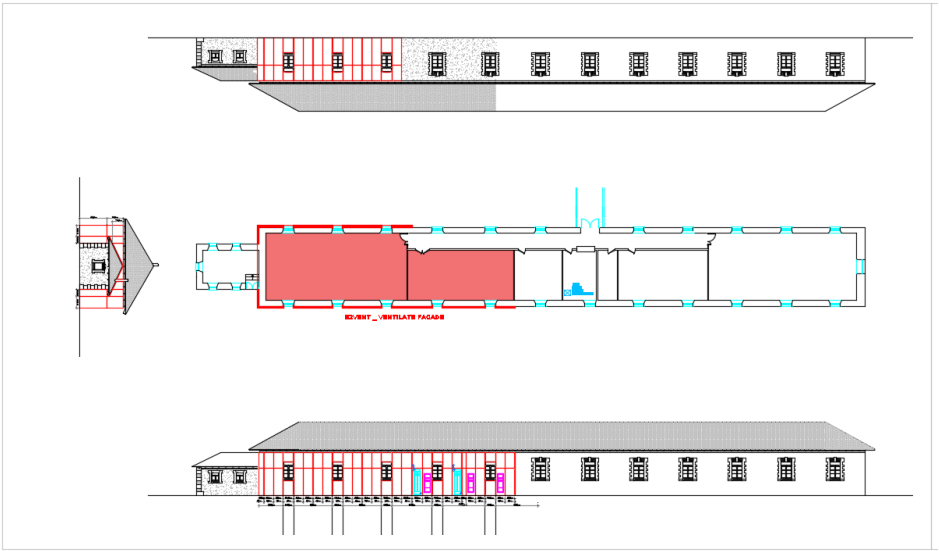


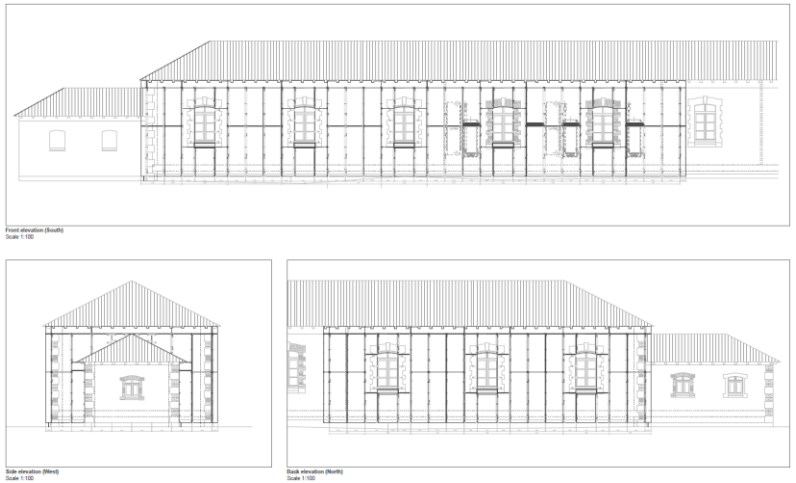


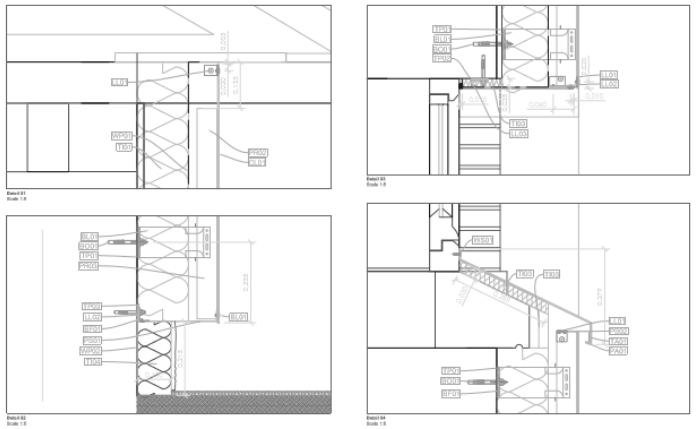


Pilot site in Burgos

- Proposed Renovation
  - Envelope Upgrade
    - Ventilated façade
    - Ceiling insulation
    - Windows replacement
  - HVAC upgrade (just PC Room)
    - Ventilation System with heat recovery (SMHRU)
    - Cooling System (LHTES)
    - Control System (BEMS)







Pilot site in Burgos

- Manufacturing
- Pre-assembling in factory
- Transport to the site

Pilot site in Burgos

- Installation
  - Envelope: Ventilated façade modules, windows, insulation.
  - Prototypes (LHTES, SMHRU)
- Commissioning
  - Dampers and fans
  - Airtightness
  - Air flow
  - Acoustic

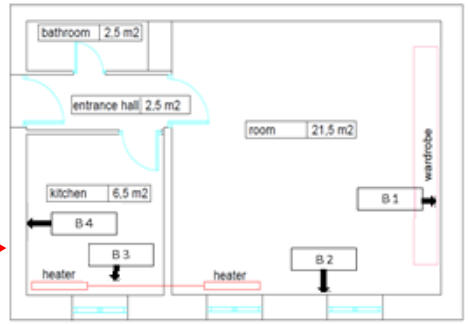
Pilot site in Burgos

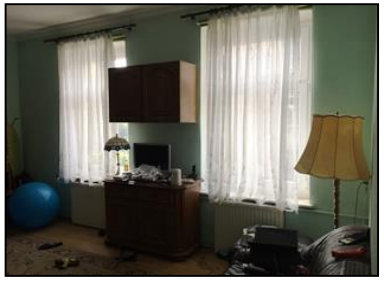
Pilot site in Gdańsk

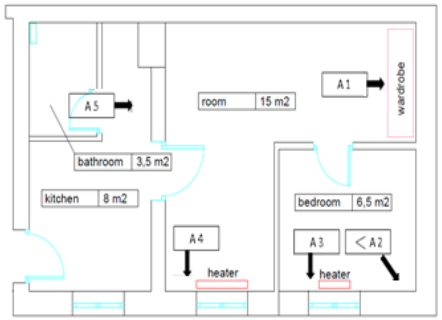
- Multi-family residential building in Nowy Port, Gdańsk
- External walls from full brick with thickness 38 cm, not-insulated
- 10 flats
- Individual heating system. No mechanical ventilation
- Related Pathologies:
  - Comfort:
    - Low Indoor Environmental Quality
  - Energy-Related Pathologies:
    - Poor Building Envelope
    - Low Performance of heating system

Pilot site in Gdańsk

- Two dwellings of study: ground floor, first floor
- Monitoring System
  - Energy Consumption
  - Internal comfort conditions
  - External weather conditions

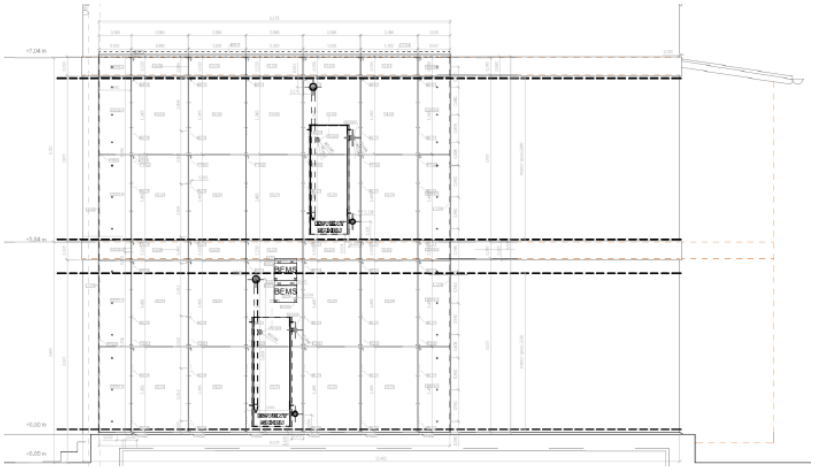


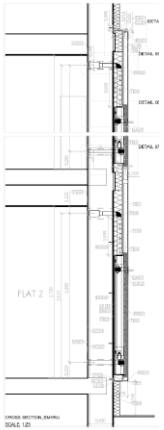


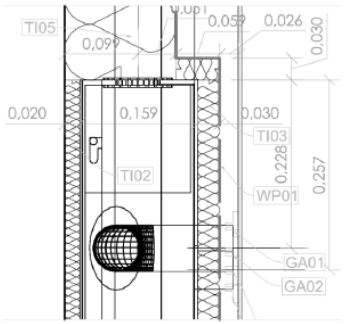


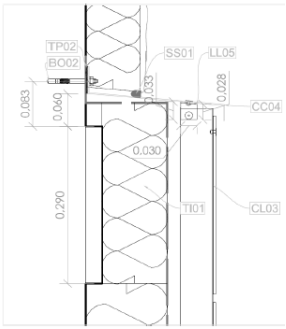
Pilot site in Gdańsk

- Proposed Renovation
  - Envelope Upgrade
    - Ventilated façade (South orientation)
    - ETICS (West orientation)
  - HVAC upgrade
    - Ventilation System with heat recovery (SMHRU)
    - Control System (BEMS)









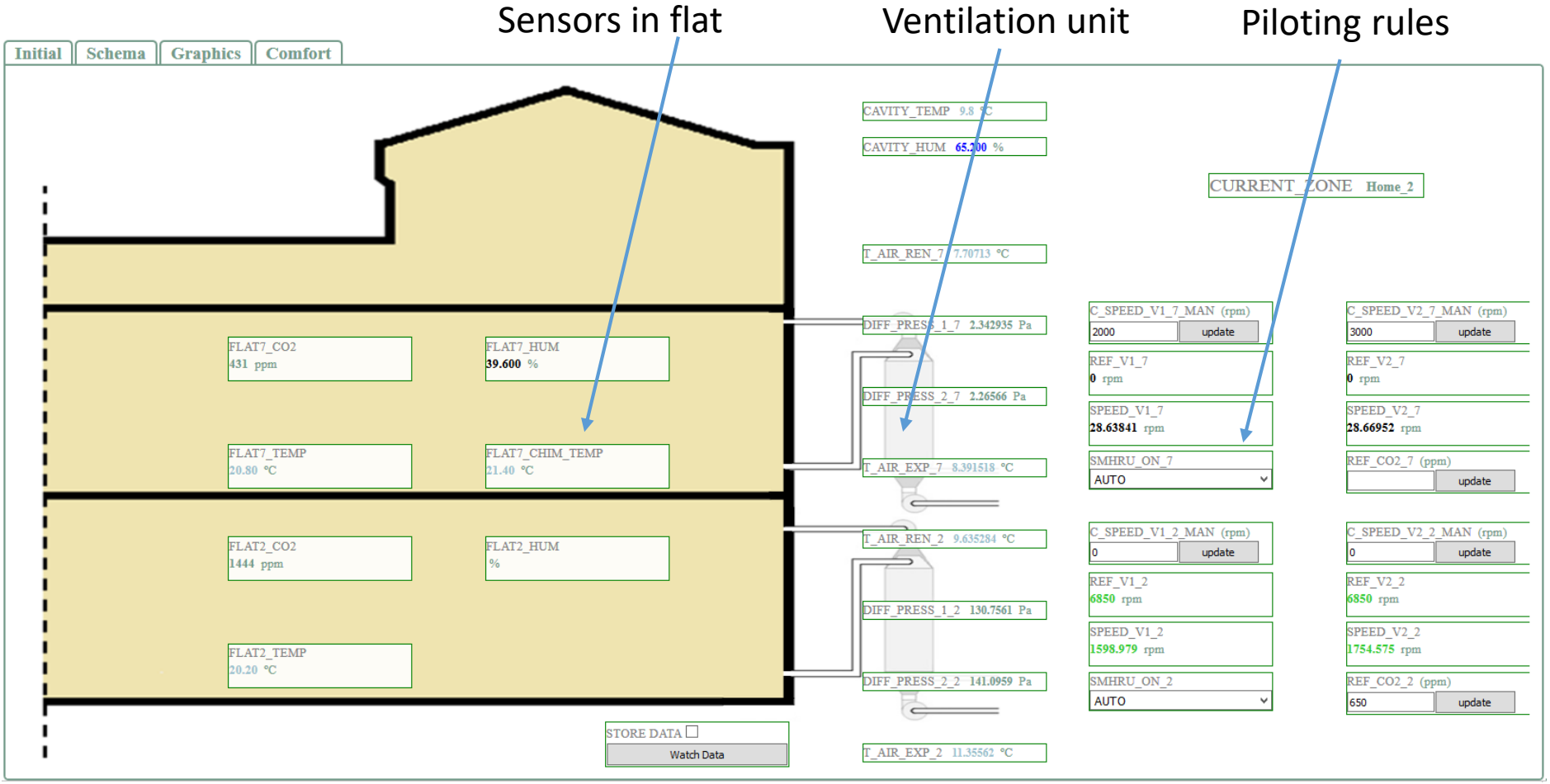
Pilot site in Gdańsk

- Manufacturing
- Pre-assembling in factory
- Transport to the site
- Installation

Pilot site in Gdańsk

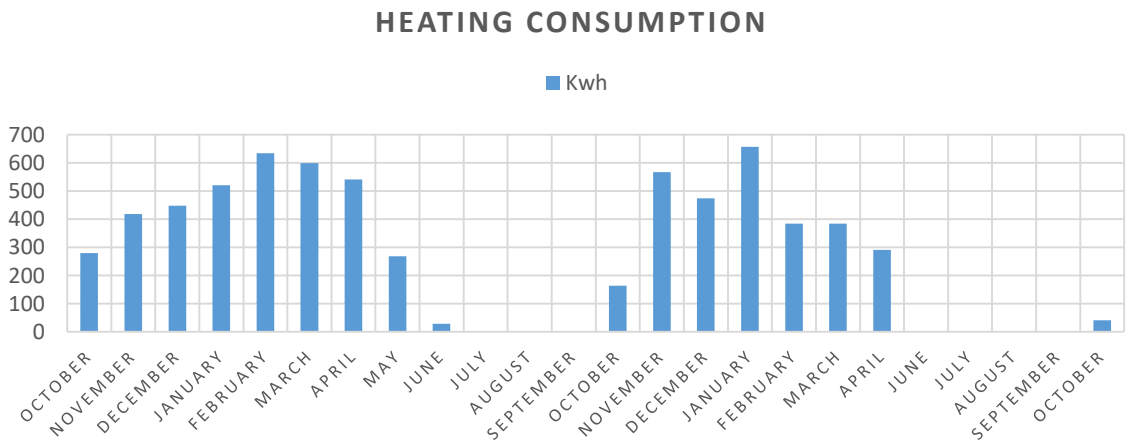
- Commissioning
  - fans
  - Airtightness
  - Air flow
  - Acoustic

BEMs interface



Data analysis

- Pre-Monitoring data



- Post-Monitoring data: (Assessment in Progress)
  - Energy Savings
  - Comfort conditions improvement
  - Performance of Energy devices (LHTES, SMHRU)

Thank you for your attention.

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