PLUG-AND-PLAY DEEP RENOVATION

Deep renovation Joint Workshop, Rome, 5 October 2018

Dr. Rizal Sebastian (Project Coordinator)

P2ENDURE

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5 October 2018

Rome, Italy

Rizal Sebastian PhD, Anna Gralka MSc

P2ENDURE

INTRODUCTION TO P2ENDURE

Plug-and-Play product and process innovation for Energy-efficient building deep renovation

- Start date: 1 September 2016
- Duration: 48 months
- Partners: 16 (8 SME, 5 IND, 2 HES/RES, 1 PUB)
  - DK : Invela
  - DE : Lenze-Luig 3-L-Plan, Fermacell, Technische Universitaet Berlin
  - NL : DEMO Consultants, Huygen Installatie Adviseurs, PANplus Architektuur, Camelot Vastgoed
  - PL : Bergamo Tecnologie, Fasada, Mostostal Warszawa, Miasto Stoleczne Warszawa
  - IT : Becquerel Electric, SGR Servizi, D'Appolonia, Universita Politecnica Delle Marche

PROJECT OBJECTIVES

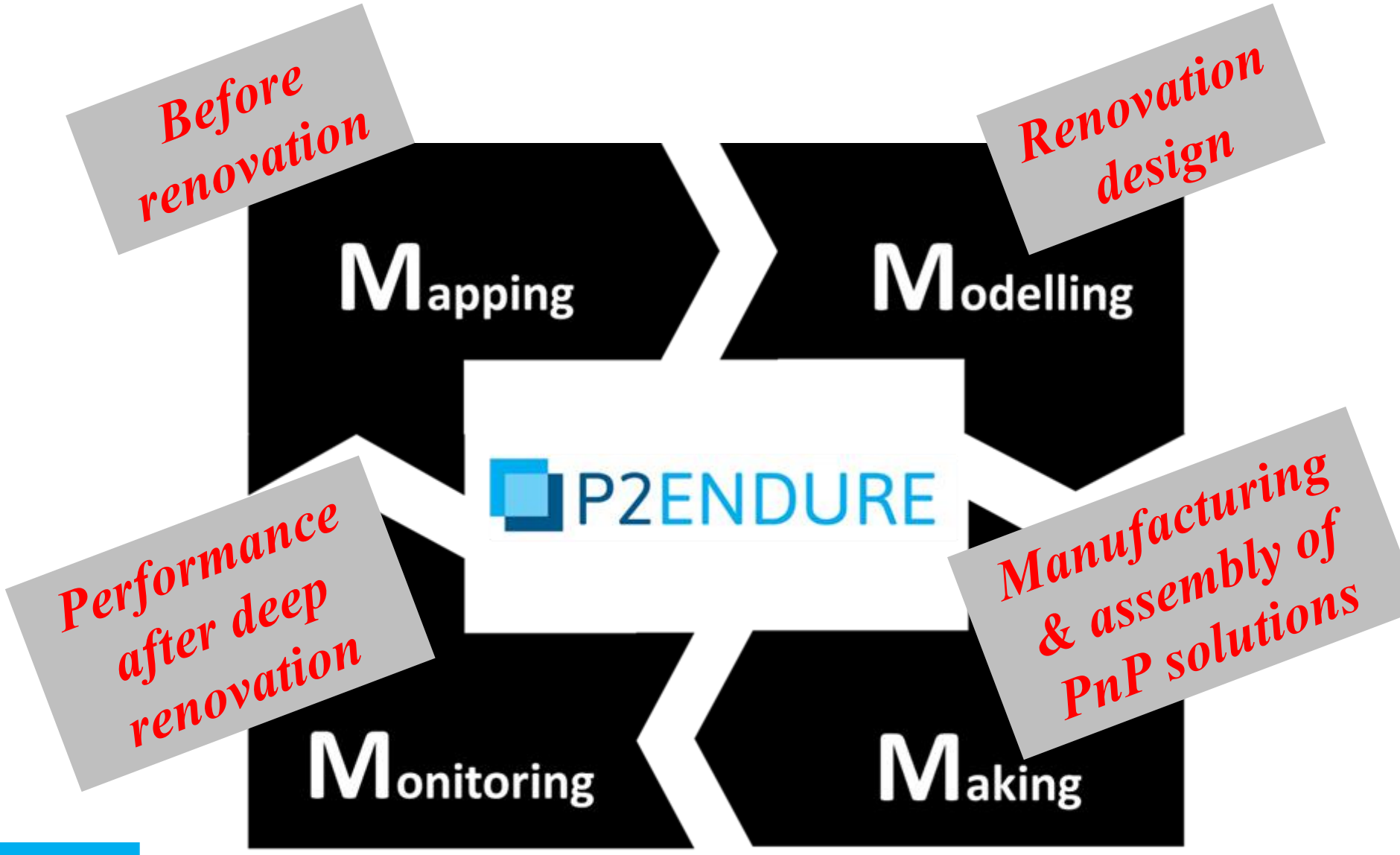
- **Main mission of P2Endure:**

  Give evidence of the innovative added value of Plug-and-Play solutions for deep renovation

- **Technical goals:**
  - Implement a new 4M Methodology for PnP deep renovation
  - Ensure the readiness of PnP solutions (building envelope and MEP retrofits)
  - Configure and use supporting ICT tools (BIM, BEM, software tools)
  - Demonstrate in real deep renovation projects

- **Measureable indicators of achievement:**
  - At least 60% energy saving (more energy-efficient compared to before renovation)
  - At least 15% cost saving (cheaper compared to traditional renovation techniques)
  - At least 50% time saving (faster compared to traditional renovation techniques)

4M MODULAR PROCESSES



4M MODULAR PROCESSES

New systems, technologies and non-technological innovations

1. Integrating and optimising PnP prefab systems and on-site 3D technologies for deep renovation:

PnP prefab systems and on-site 3D technologies	PnP components for building envelopes
	PnP technical systems
	On-site 3D technologies

2. Implementing PnP and on-site 3D innovations through 4M modular proceses and ICT tools:

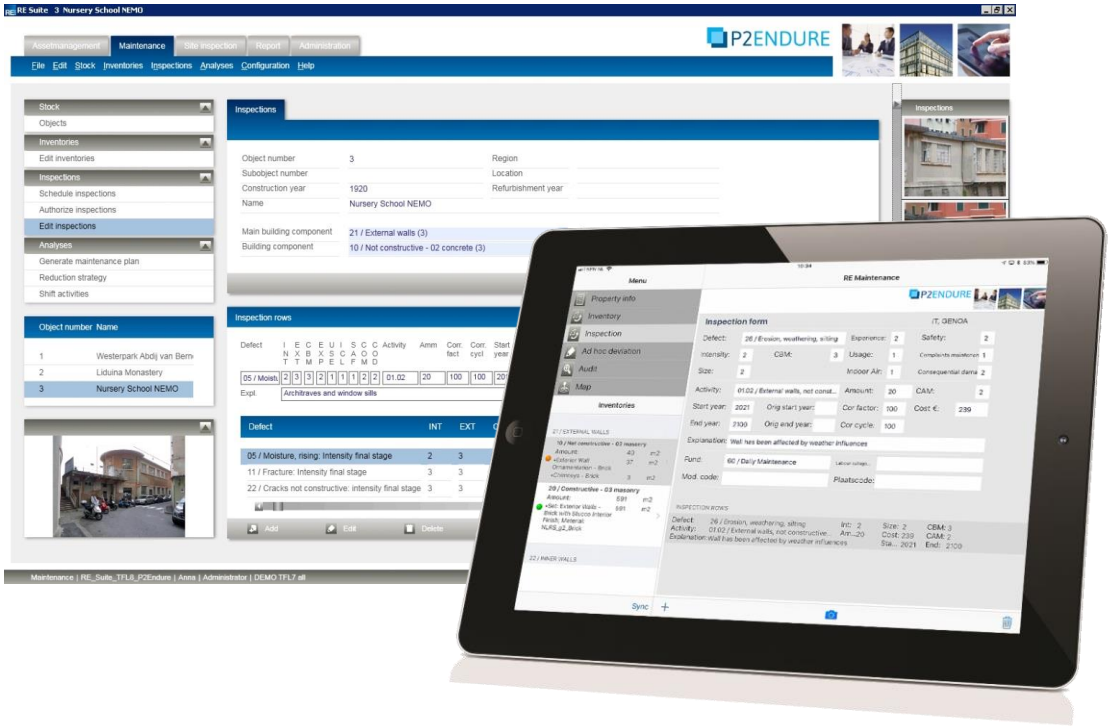
Modular processes and ICT tools for deep renovation	4M modular processes: Mapping – Modelling – Making – Monitoring
	e-Marketplace value-chain integration & local factory for district logistics
	BIM-based lifecycle information management

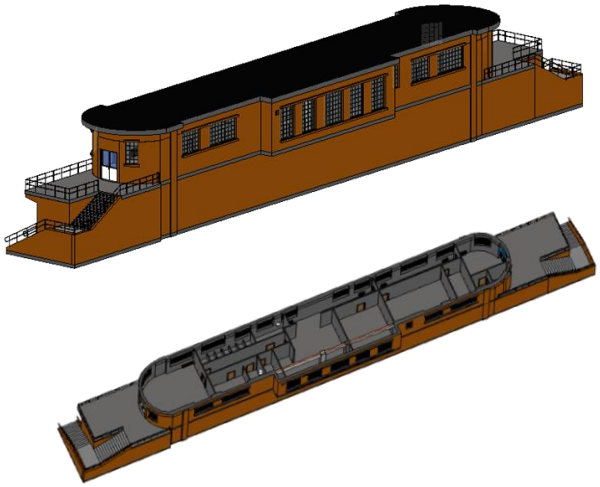
3. Demonstrating and upscaling the innovative products, processes and tools in real projects:

Evidence-based deep renovation solutions with performance monitoring	Deep renovation of public and historic buildings
	Deep renovation of residential buildings and districts
	Transformation of public and historic buildings to dwellings

4M - MAPPING

- Deep renovation of nursery building in Genoa, IT

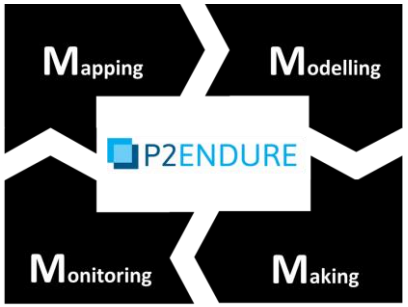




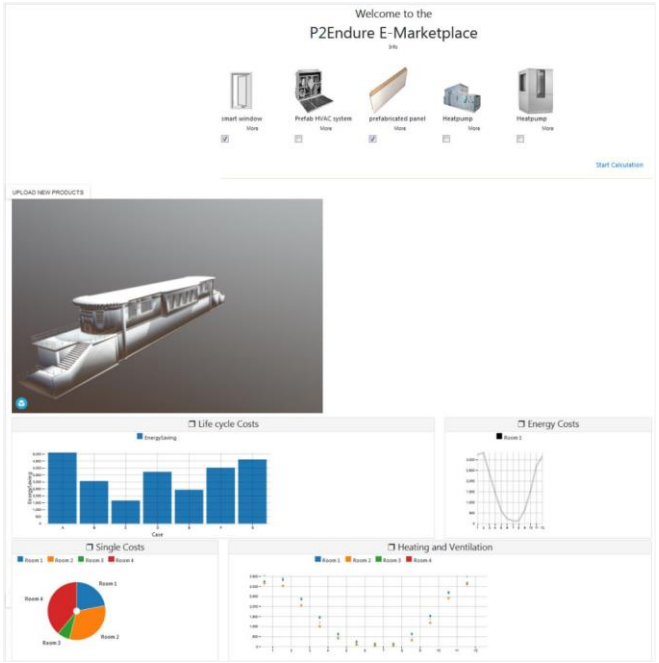
- **Data collections** for building auditing using DEMO RE Suite mobile inspection tool for simplified operation

- **BIM modelling** of the As-Is building

4M - MODELLING



- Deep renovation of nursery building in Genoa, IT



STEP 1 — **EVALUATION of FURTHER DEEP RENOVATION ACTIONS to achieve the 60% OF ENERGY SAVING**

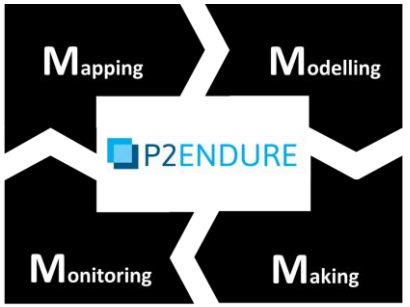
DEEP REN 01 — Installation of the **SMART WINDOWS** (P2Endure tech.) **28% Energy Saving**

DEEP REN 02 — Installation of the **SMART WINDOWS + INTERNAL INSULATION** **57 % Energy Saving**

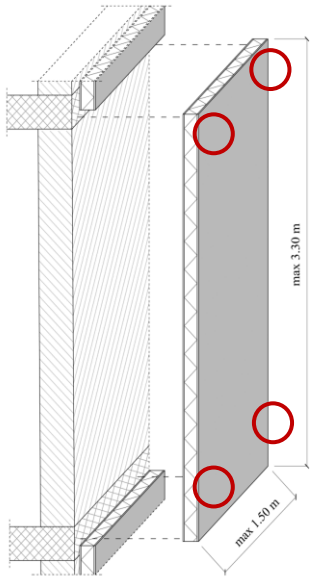
DEEP REN 03 — Installation of the **SMART WINDOWS + INTERNAL INSULATION + CONDENSING BOILER** **62 % Energy Saving**

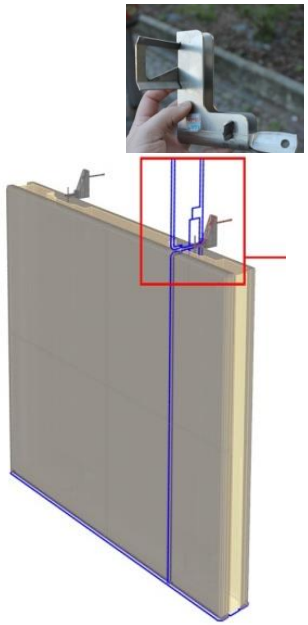
- Renovation Design with PnP solutions as smart windows and HVAC engine with **e-Marketplace** and **BIM parametric Modeller**
- Results of **BIM-to-BEM** process for semi-automated conversion to energy model for accurate performance assessment

4M - MAKING



- Nursery building in Warsaw, PL



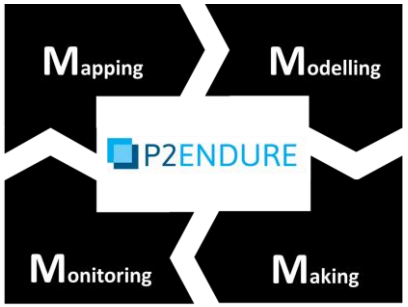


- Lightweight **PnP panels** (Fermacell)

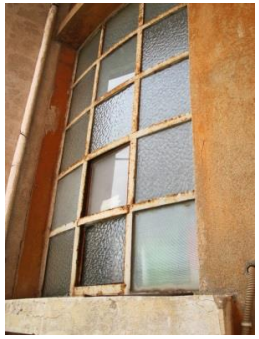
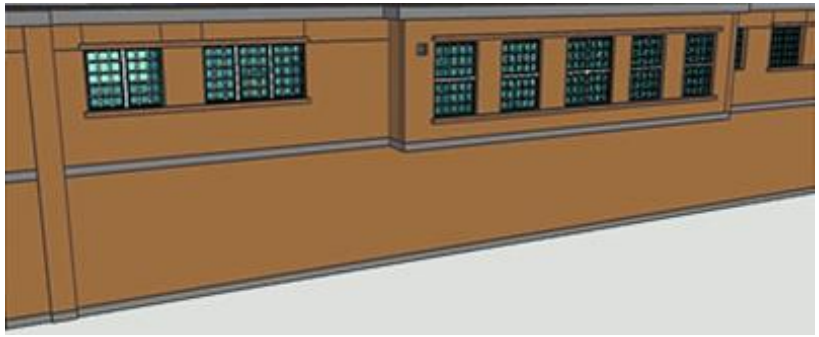
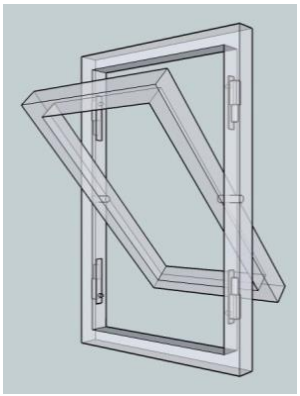
- Residential buildings in Odense, DK

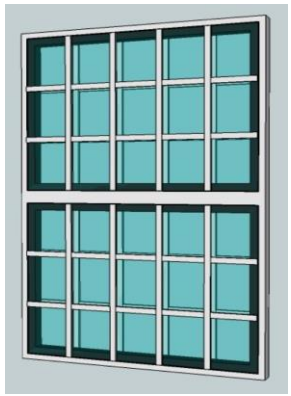
- Robot for **3D printing** on-site (Invela)

4M - MAKING



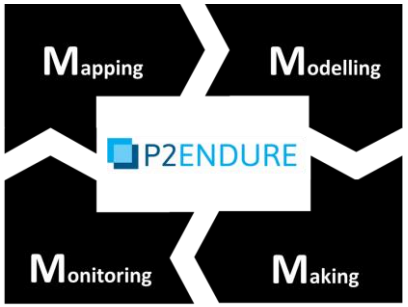
- Deep renovation of nursery building in Genoa, IT

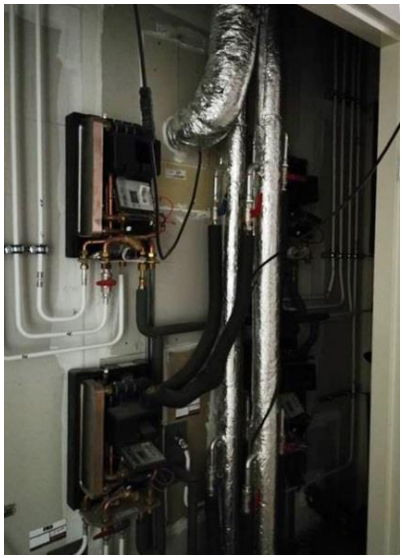



- **Renovation activities**: fabrication and implementation of smart windows from Bergamo Tecnologie – a reversible system for improved performance

4M - MAKING



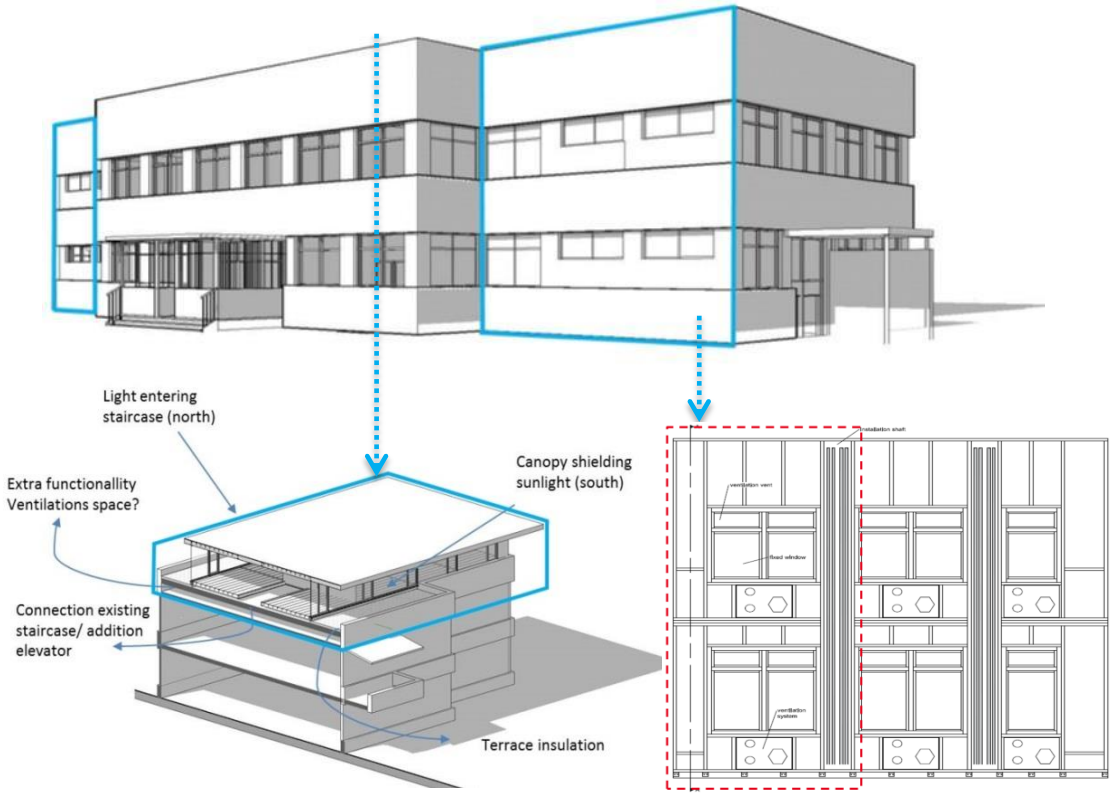
- Student housing in Enschede, NL



- Prefabricated **bathroom units**

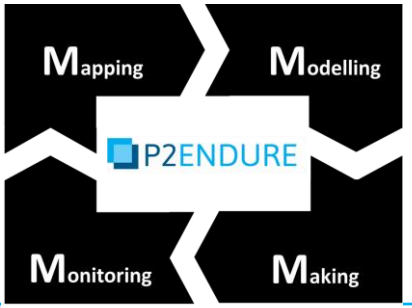
4M - MAKING

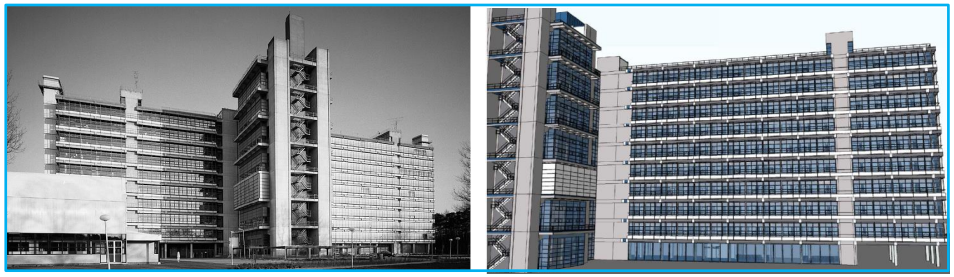
- Deep renovation of nursery building in Warsaw, PL



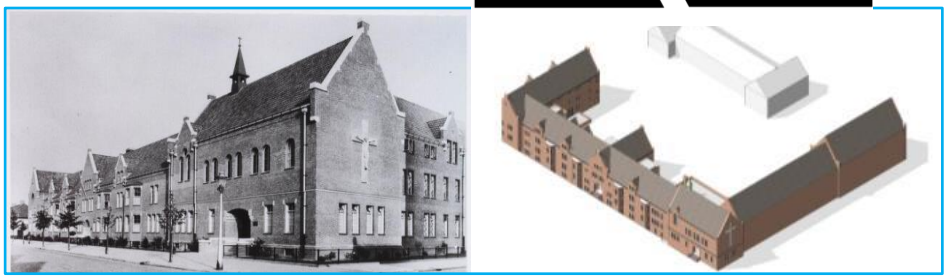
- **3D Point Cloud** from laser scanning
- **PnP rooftop retrofit solution** (PANplus Architecture)
- **PnP façade retrofit solution** (Fermacell)

4M - MAKING





Transformation of university building to student housing in Enschede, NL



Transformation of historical monastery to a hotel in Tilburg, NL

Deep renovation of public nursery building in Gdynia, PL

Residential district renovation in Odense, DK

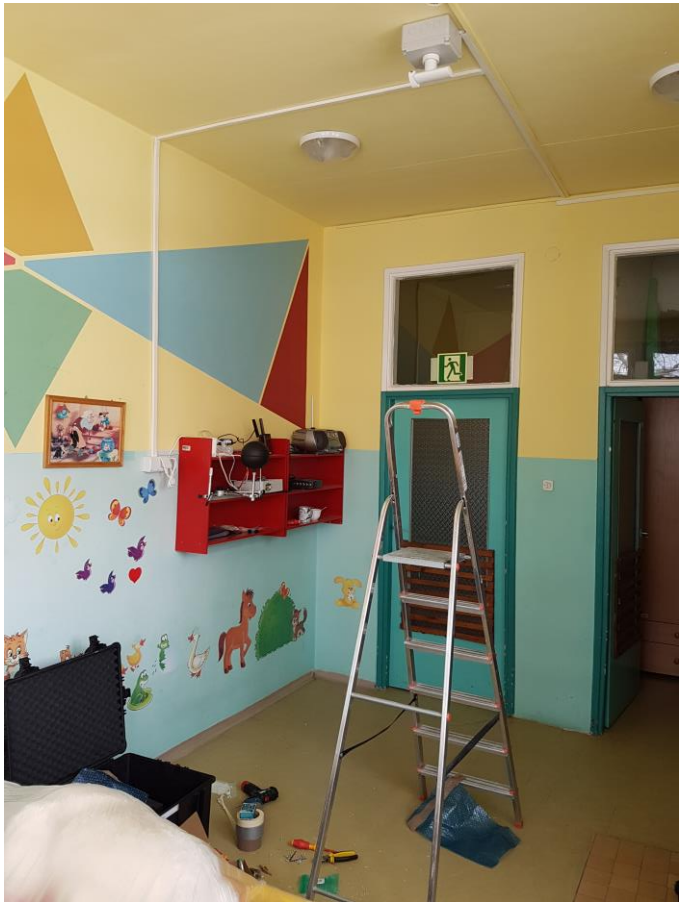
Deep renovation of residential building in Ancona, IT

Deep renovation of public nursery building in Warsaw, PL

Deep renovation of historical nursery building in Genova, IT

Deep renovation of historic residential building in Florence, IT

4M - MONITORING



- **Comfort Eye** from Università Politecnica delle Marche for IEQ monitoring and assessment, monitoring thermal comfort according to ISO7730 and IAQ

COLOPHON

THIS PROJECT IS FUNDED UNDER THE EU PROGRAMME H2020-EE-2016-PPP (SUPPORTING ACCELERATED AND COST-EFFECTIVE DEEP RENOVATION OF BUILDINGS THROUGH PUBLIC PRIVATE PARTNERSHIP (EEB PPP) UNDER GRANT AGREEMENT NUMBER: 723391. THE CONTENTS OF THIS PRESENTATION REFLECT ONLY THE AUTHOR'S VIEW AND THE AGENCY AND THE COMMISSION ARE NOT RESPONSIBLE FOR ANY USE THAT MAY BE MADE OF THE INFORMATION IT CONTAINS.

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