

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



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What is P2ENDURE

P2Endure promotes **evidence-based innovative solutions for deep renovation** based on **prefabricated Plug-and-Play systems** in combination with on-site robotic 3D-printing and BIM, demonstrated and monitored at **11 real projects, 2 virtual demonstrators** in 4 geo-clusters with EU-wide replication potentials.

Technical goals are:

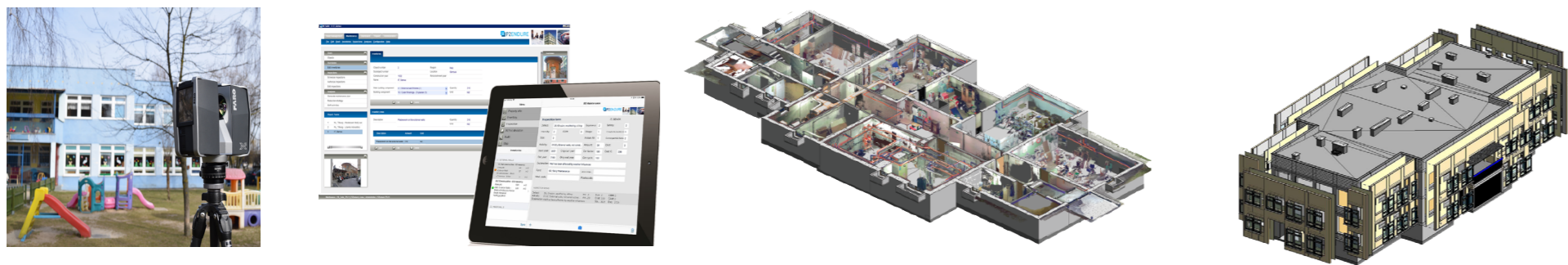
- 1) the implementation of a new **Methodology for Plug-and-Play deep renovation**;
- 2) to ensure the **readiness of Plug-and-Play solutions** (Building envelope and Technical Systems retrofits);
- 3) to configure and use **supporting ICT tools** (BIM, BEM, software tools);
- 4) to **demonstrate the solutions in real deep renovation projects**.
- 5) to **improve Indoor Environmental Quality** for end users.

Measurable indicators of achievement are:

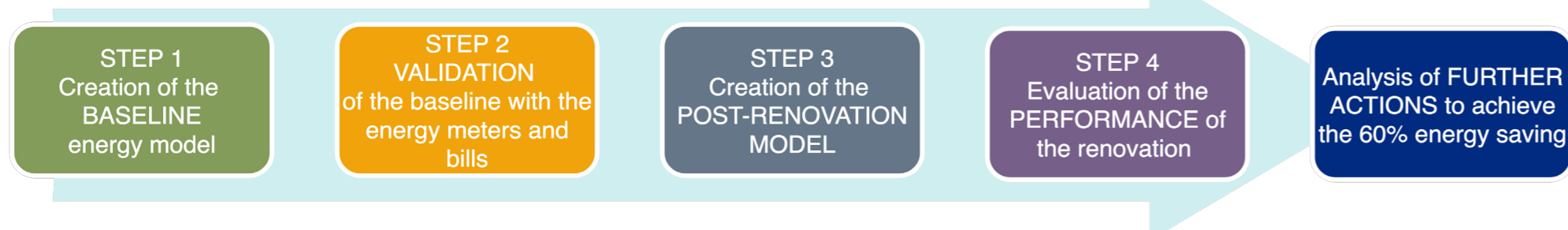
- At least **60% energy saving** (more energy-efficient compared to before renovation).
- At least **15% cost saving** (cheaper compared to traditional renovation techniques).
- At least **50% time saving and less disturbance during deep renovation** (faster compared to traditional renovation techniques).

BIM-based Innovative Process and Tools for building deep renovation

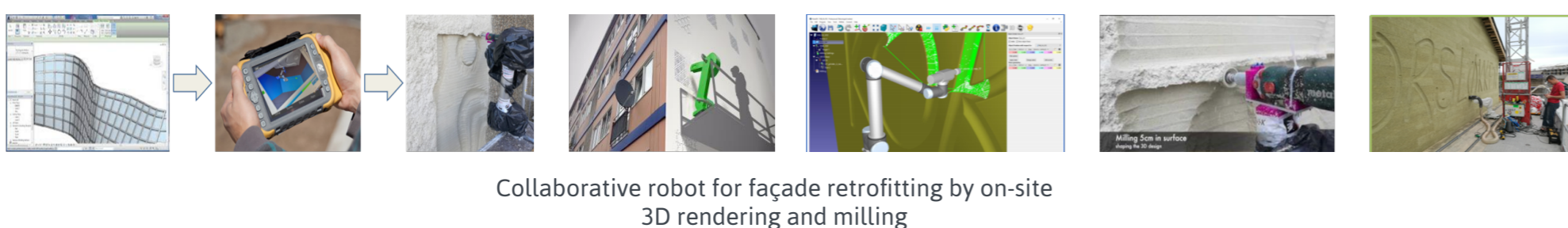
MAPPING: develop a detailed technical plan and economic feasibility report for deep renovation, as starting point for the renovation design.



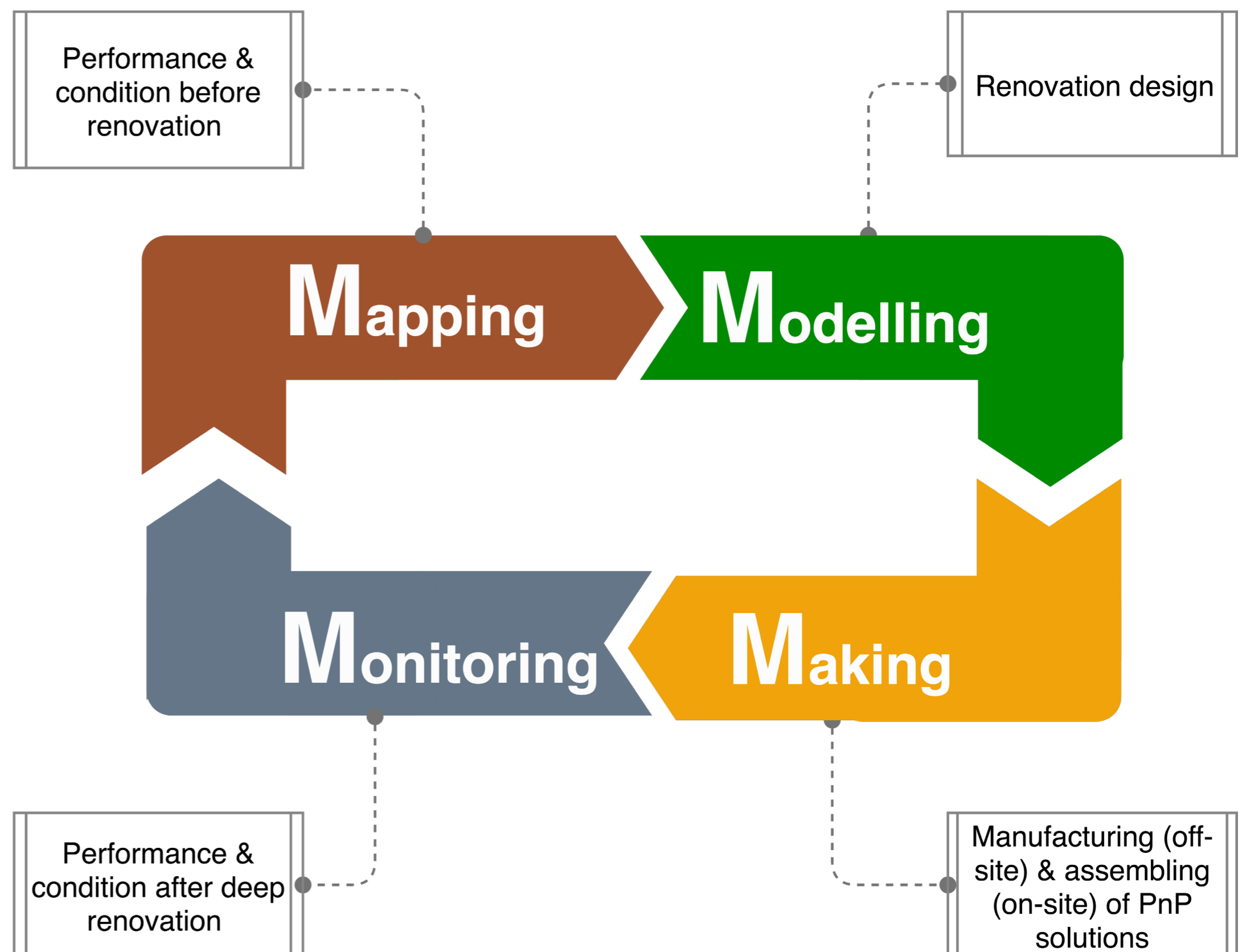
MODELLING: develop the deep renovation design ready for execution with advanced Building Information Modelling and Building Energy Modelling of the existing buildings and deep renovation designs.



MAKING: improve, test and implement Plug-and-Play prefab components for deep renovation and to execute deep renovation activities.



MONITORING: monitor and guarantee the high-quality execution of the construction works, and to monitor the Indoor Environmental Quality and Energy Performance after deep renovation.



The **P2ENDURE 4M process** is a stepwise approach for preparing and implementing the deep renovation, followed by real monitoring of the resulting performance improvements.

Acknowledgments

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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 reflects 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.

