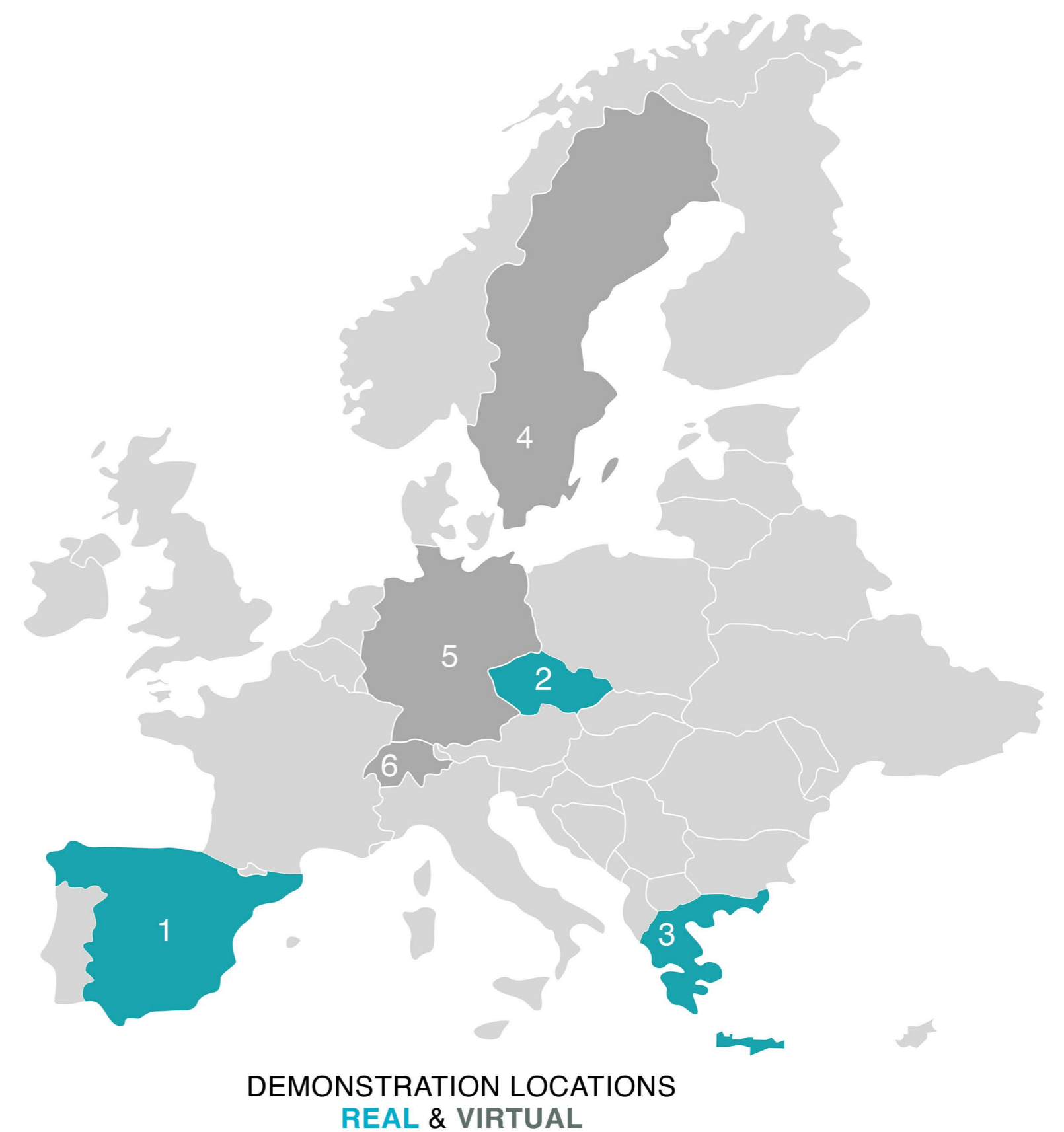


PLURAL Plug-and-use renovation with adaptable lightweight systems

Reduction of energy consumption, emissions and carbon footprint of buildings is vital in meeting the EU's climate and energy targets for 2030. The Near Zero Energy Building concept requires a high level of energy efficiency, in combination with on-site renewable energy production and use. It is evident that improving the energy performance of buildings calls for retrofit/renovation actions that not only meet the energy and environmental targets, but also ensure minimum disturbance of the inhabitants and indoor comfort. The **PLURAL** project aims to tackle this challenge by developing "Plug-and-Use" kits for fast and



OBJECTIVES

The PLURAL project aims to design, validate and demonstrate a palette of versatile, adaptable, scalable, off-site prefabricated plug-and-play kits that account for user needs, thus named "Plug-and-Use" (P-n-U) kits".



NEAR ZERO ENERGY CONSUMPTION

Heat losses through the envelope will be minimized through improved insulation of the façade components, (U values < 0.23 W/m²K; Building primary energy consumption < 60 kWh/m²).



COST-EFFECTIVE

Better descriptions result in more sales. About a 58% reduction in renovation costs will be achieved via offsite prefabrication, lean manufacturing and construction interactively supported by the BIM-based platform and Decision Support Tool.



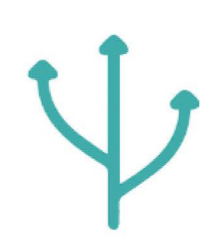
FAST RENOVATION

At least a 50% reduction in the time required for deep renovation mainly by reducing the time to design, procurement, logistics, fabrication and site preparation from average 5-7 months to 2-4 months.



ENVIRONMENTALLY - FRIENDLY

The deep renovation aims at the reduction of CO₂ emissions to reach 15% less than the current average of 0.6 tCO₂eq/m² and additionally to achieve 70% material recyclability.



FLEXIBLE

System combinations will allow easy adaptation of the PnU kits to be developed and validated as part of the project to various residential building typologies in all EU climatic zones.

DEMONSTRATION

The PLURAL concept will be integrated at three different real demo building sites, located in Greece (3), Spain (1) and the Czech Republic (2). Featuring different climate conditions, heating/cooling needs and user requirements, thus demonstrating the versatility and robustness of the overall concept. Additionally, PLURAL includes three virtual building demos in Switzerland (4), Germany (5) and Sweden (6) for simulating and validating the performance and operation of the solutions under further conditions.

Spain, Barcelona

Situated in the southwest of the city of Terrassa (Barcelona), the building is composed of two residential blocks, and a commercial space (not included in the pilot case). All of them are placed in a "U" form with a common courtyard in the middle. PLURAL solutions will be implemented in one block (18 dwellings).



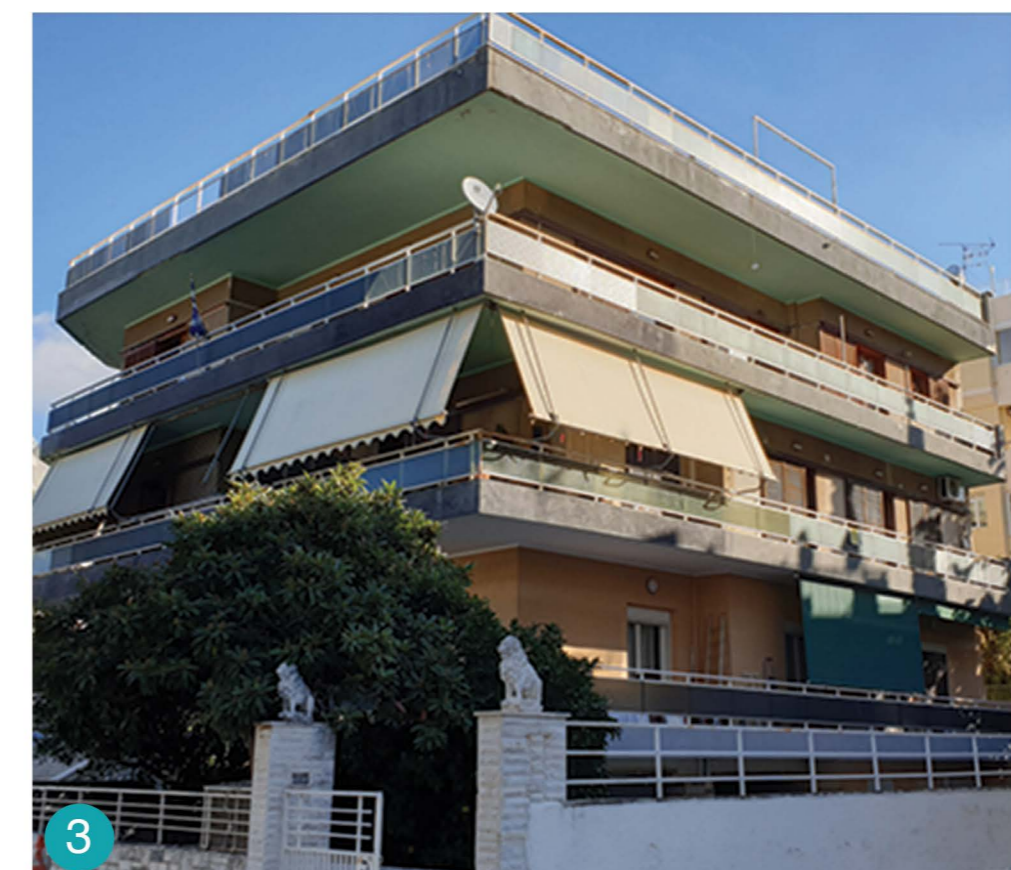
Czech Republic, Kašava

The "Kašava" multiple dwelling is situated in the North-East part of the Zlín region. It is composed of 2 flats for the teachers of a nearby nursery school and is permanently occupied. The façade is made of a 45 cm full brick wall (no insulation). The building is classified as "F" in the energy consumption system used in the Czech legislation. The envelope will be renovated in PLURAL (ca. 400m² façade including windows).



Greece, Athens

The building is protected by the Municipality of Voula, Athens. It was renovated in the 1980s and now is operated as a free-of-charge shelter for homeless or low waged families (10 apartments) The building currently has 21 residents. Two apartments on the first floor will be retrofitted with smart walls.



WWW.PLURAL-RENOVATION.EU



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