



Newsletter 4

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What's inside

- 2 Fully industrialised Modular Envelope Mesh
- 3 Multifunctional Façade system
- 3 Technology Layer
- 4 Validation and demonstration of modular facade

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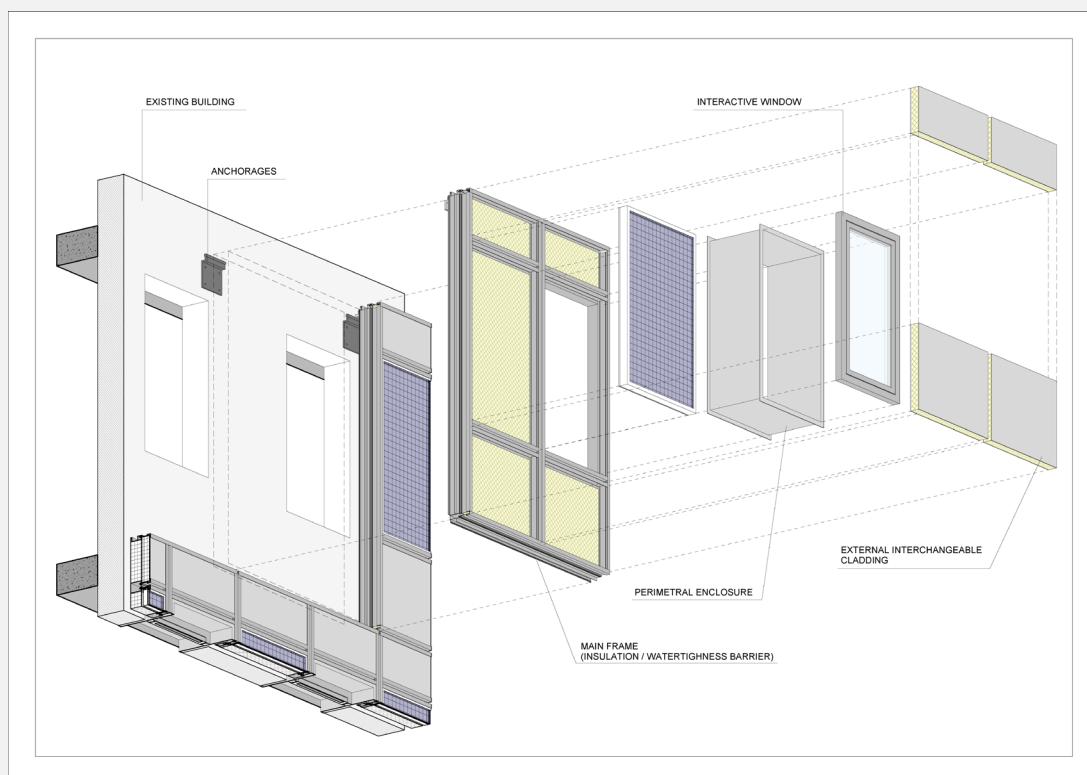


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Fully industrialised Modular Envelope Mesh

ENSNARE boosts the uptake of solutions for NZEB renovation, including the upgrade of the envelope providing also the opportunity to integrate advanced active elements. One of the key solutions being developed is a highly industrialised **modular façade** that facilitates the mechanical assembly and interconnection of all components and networks. This structural design involves a bottom-up assembly process on site to allow accessibility from the exterior to the anchoring elements, located at the top of the module. The modular façade is composed 2 main layers:

- Inner Layer contains the main frame of the module, the insulation and the breathable waterproof membrane providing the main functionalities (e.g., structural, insulating, watertightness).
- Outer Technology Layer is formed by a series of independent panels joined to the main structure (inner layer) by means of secondary profiles. Each technology panel is an independent element within the outer shell, facilitating its replacement and maintenance tasks thanks to a plug & play connection design. It incorporates active technologies, such as photovoltaics, thermal and hybrid solar panels, but which can also include cladding materials (e.g., ceramics, metals, glass, stone).

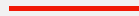


Multiple and alternative modular designs are possible by combining different panels and elements granting significant flexibility and versatility adapted to alternative façade rehabilitation scenarios, with different architectural characteristics, technologies and levels of energy requirements.

Multifunctional Façade system

The envelope mesh represents the main structural part of the modular façade and include the following elements:

- **Anchoring system.** It consists of an anchor plate fixed to the main structure of the building, which includes a hook type element. To minimise installation times, the adoption of the Matching-kit system can also be adopted. By means of this, combined with photogrammetry and UAV technology, fast and precise on-site measurements can be obtained to improve the prefabrication of all components and to speed up the assembly process onsite.
- **Profiles of the main frame**, which make up the main structure of the module. The modular façade system is made up of a series of main profiles, 4 of them designed to be tongue and groove and an intermediate one to improve the resistance of the whole and allow higher flexibility to anchor the outer layer and obtain different configurations.
- **Secondary profiles** to support the technological layer. The secondary profiles support the façade panels that are present in said layer.



Technology Layer

The technological layer integrates different active technologies:

- **Photovoltaic panels** on two different substrates: aluminium sheet and synthetic stone panel.
- **Thermal solar panels** with roll-bond absorption technology.
- **Hybrid panels** that combine roll-bond solar thermal absorption technology with photovoltaics.
- **Active window** that incorporates a heat exchanger and an automated control system to monitor and control its opening according to comfort needs.

Validation and demonstration of modular façade

To evaluate the performance of the modular façade, and to validate its applicability to the different use cases the solutions will be installed in 3 real pilot buildings (in Bulgaria, Estonia and Italy) where the high level of flexibility to define alternative configurations will be demonstrated thanks to the modular approach of the ENSNARE system. Therefore, the modulation design entails the requirement to consider the peculiarities and limitations that a building may present and enables to formulate adaptable solutions within the flexibility ranges provided by the ENSNARE system.



Who are we?

The consortium

ENSNARE is an Horizon 2020 EU funded project carried out by 19 partners from 12 European countries: 11 SMEs, 5 research institutes, 2 corporations and 1 public body.



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