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SMART-ECO BUILDINGS: THE INTEGRATION OF INNOVATIVE FIBRECEMENT COMPONENTS INTO AN EXPERIMENTAL, LOW-ENERGY BUILDING IN NORTHERN ITALY

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Abstract.

The widespread adoption of holistic design methodologies was one of the most significant indications deriving from the Smart-ECO European research project (FP6), where the authors contributed to the "Innovation" workpackage. Smart-ECO defined a shared vision of sustainable, smart buildings in 2030 and the innovations required to implement this vision, with a large number of stakeholders contributing to the discussion and helping shape the results.

This paper will present the integrated design approach adopted for the design of an experimental, very low energy residential building not far from Milan. Among the different strategies and technologies adopted to reduce energy consumption in winter and summer (the building was A-rated according to the energy labelling scheme of Lombardy), two specifically use fibrecement boards in innovative products.

First, the paper will deal with the development of an innovative component integrating support for rainscreen cladding and high thermal resistance. This modular component, allowing to install very quickly the external layers of a façade, was designed to work with flat fibrecement boards as external cladding.

The second innovation that will be presented is an adjustable shutter with insulated blades that will be closed during cold winter nights. The blades can be adjusted during the day in order to shade the glazed parts of the envelope while, if necessary, reflecting indirect light to the rooms. Louvers will be finished in fibre-cement in order to be integrated in fibre-cement façades.

Both innovations were tested on the experimental building that will be featured in the paper as a replicable example of a Smart-ECO building for mild climates.

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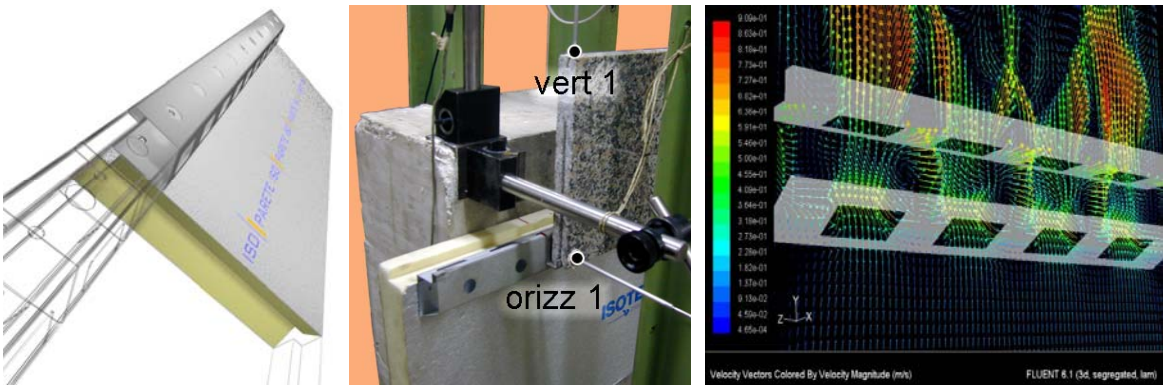
The experimental building in Northern Italy, seen from the South-West corner.



The experimentation on the integrated insulation panel.

The prototype of the insulated, adjustable shutter finished with fibrecement boards.