

# Smart building monitoring to respond to all climate conditions

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The energy consumption of buildings is on the rise in Europe. This is due to ageing housing stock. Now the idea is to use a high-tech kind of retrofitting approach using several types of modules that allow real-time monitoring through multiple sensors to optimise energy consumption.

This is precisely the aim of a new multifunctional modular façade system, able to adapt to a variety of climatic conditions. It is currently being tested in a building located in the Extremadura region of Spain, known for its continental climate.

The concept, developed by a consortium gathered under the European project MeeFS, is based on an energy management system. "The system controls and monitors all the technological units of the façade," says Maciej Michajłow, project engineer at Ska Polska, in Warsaw, Poland, "It also implements an algorithm, which takes into account the particularities of its environment."

The system monitors relevant factors, including sun orientation for photovoltaic units and water feeding for organic green components.

The innovative units of the façade can be orientated towards both the sun and the wind to use the energy in the best possible way. They have the ability to transform the [solar energy](#) into [thermal energy](#). That energy can, in turn, be transferred to the building when it is cold, or kept away when it is hot.

The advantage of this approach is that the monitoring operation is performed continuously, with no human supervision, except when the system detects a problematic situation. For example, this can happen when there is not enough water in the hydraulic installation feeding the organic green units on the façade.

Besides, "It would be impossible for humans to process all the information from the sensors and apply proper actions in real-time for all the technical units," says Michajłow. All the active units are designed to be assembled in the façade and to be in constant communication to report on their status.

The team believes "in the synergetic effect" of the different technologies applied. "The point of modular design is that the layout of the façade can be customised to better fit a particular building," explains Marcin Bukat, specialised in the development of control system activities at Ska Polska.

To evaluate building performance, the researchers use an intelligent system to monitor energy consumption. "We deploy it on the demo building and we will be able to compare the energy consumption before and after the MeeFS system," explains Bukat. This data is periodically checked.

One expert recognises the advantage of this approach for certain types of building. The [energy consumption](#) control and management systems provide accurate measurements that are essential in hotels, hospitals, offices or public buildings because "these buildings have a single heating /cooling system, with a centralised temperature adjustment," notes Adriana Alexandru, head of the department at the National Institute for Research and Development in Informatics in Bucharest, Romania.

Energy consumption in residential buildings tends to vary more than in public buildings. Every apartment is equipped with a thermostat and

every dweller can determine their own comfort standard.

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