

Solving the energy challenge in public buildings

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Civil servants of the Government of Extremadura, located in Mérida, Spain, will have to work under challenging conditions when retrofitting public buildings with technological solutions based on renewable energy. They are participating as a showcase site in the EU-funded [Project BRICKER](#), which focuses on the development of so-called passive—that is architecture-based—and active—that is facilities-based—measures to improve the energy efficiency in public buildings that are non-residential.

Carolina Grau, general director of industry and energy at the Agriculture, Rural Development, Environment and Energy Council of the Government of Extremadura, and Noemí Jiménez, [industrial engineer](#) and director of the department of research and development of CEMOSA, a company that specialises in the study of materials and building control, talk to youris.com about the two-fold challenges of the project. First, it combines technologies that have never before been used together. Second, it integrates these technologies into existing and occupied public buildings.

What are the expectations with this research project?

Carolina Grau (CG): With this project we are hoping to reduce the building's energy consumption by about 50%. We then plan use it as a showcase for the region to encourage the use of renewable energies, particularly solar and biomass, both of which we are very lucky to have

in abundance.

What is the main approach proposed?

Noemí Jiménez (NJ): In the Spanish pilot, only active energy saving measures are going to be applied as the building is relatively new and its passive behaviour with respect to energy saving is good enough. The project consists of integrating Parabolic Trough Solar Collectors (PTC), a biomass boiler, a heat and electricity cogeneration unit based on so-called Organic Ranking Cycle (ORC), an adsorption chiller and a cooling tower.

The PTC and the biomass boiler will produce hot oil that will feed the ORC unit. The ORC unit will produce electricity as well as hot water. This water will be used for heating the building during winter. In summer, the hot water will go through the adsorption chiller to produce chilled water to cool the building. The hot and chilled water will go to the terminal units that will condition the different building spaces. This system is known as tri-generation because it produces hot and cold water for heating or cooling and electricity. The electricity can be used in the building for own uses and the surplus energy can also be sold in the energy market.

Does the fact that the buildings will be in use during the renovation make it more difficult?

NJ: Indeed, one of the challenges is the integration of its technologies in existing [public buildings](#). It means that people working in the building should not to be disturbed and that the available space for all the facilities is constrained.

CG: We plan to carry out the building work at times when the site is

being least used. And most of the elements that could cause a nuisance—due to noise for example—will be housed in a new building, an annex to the demonstration site building. That way, the building's staff will be affected as little as possible during both the installation phase and for the day-to-day operation.

Are there any other barriers and bottlenecks that you have to deal with?

NJ: There are three barriers. First, the space restrictions due to the fact that it is an existing building. Second, the control of the whole project components and their integration with the existing heating, ventilation, and air conditioning (HVAC) system. Third, the compatibility of the project goal of profitability of the building performance in the energy market with the Spanish regulations. The latter have restricted support for micro-generation from renewable energies.

CG: From the perspective of the Government of Extremadura, we are convinced that the use of low energy measures carries no limitation and presents a number of economic and environmental benefits. One of the main challenges we face is getting the funding to put initiatives like this into practice. We know that the profitability of the initiative is guaranteed in a reasonable medium-term period, as they can be paid for either directly or following the energy services model.

Is this approach likely to be replicated in other public buildings owned by the Government of Extremadura?

CG: One of the initiatives included within the framework of the project is the drafting of a replication plan. It includes an evaluation of the potential for replication of other government buildings in Extremadura. We, the government of Extremadura, believe that implementing low cost

energy measures brings about a series of both economic and environmental advantages. Therefore, we opt for the use of renewable energies. This means converting them into a genuine engine for economic growth for our region and laying down the basis for a sustainable economy.

Provided by Youris.com

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