Tackling the many challenges of smarter, greener cities

August 5 2014

Zero-energy districts are the only possible future for European cities, as costs associated with palliating the effects of climate change soar, but there are many challenges ahead

The quest towards low energy consumption in city districts requires many changes not only at building level, but also at district level. For instance, this may involve improving the thermal properties of the buildings, introducing renewable energies—such as those sources from biomass, photovoltaic or solar thermal technologies—creating a district heating and cooling network and developing an intelligent electricity

network, dubbed smart grid).

These are some of the solutions due to be tested in the EU-funded Project CITyFiED. The project aims to carry out an extensive demonstration of its low energy consumption concept, among other things, through in selected districts in the cities of Laguna de Duero, in Spain, Lund in Sweden and Soma in Turkey. "The current maturity of technology allows us to address the challenge of renovating residential districts and creating nearly-zero energy areas," says Ali Vasallo, the project coordinator and an expert in industrial engineering at the energy division of an applied research institute called the CARTIF Technology Centre, based in Boecillo near Valladolid, in Spain.

Such project does not come without challenges, though. "One of the first steps is to involve all the stakeholders—the neighbourhood, the owners, the energy services and construction companies and the municipalities—in order to make these kind of solutions and strategies available and offer an attractive product for all of them," Vasallo says.

One expert believes that such approach is only feasible if accompanied by an intensive citizen awareness campaign demonstrating the benefits of such renovation plan. This is accounted not only in terms of energy savings, but also in terms of economic benefits in the long term. "It is technologically feasible and economically profitable in the long run, but [we need] a transition process that convinces political, economic and social actors," points out Han Vandevyvere, a senior researcher and project manager at VITO, the Flemish Institute for Technological Research, in Mol Belgium.

Another expert sees a second challenge in that the solutions developed under the project are expected to be replicable in other urban districts on the continent. Although he believes in the importance of creating new examples such as the project showcases, or the Johanneberg district in

Göteborg, replicability may still be an issue. "We know we can do it," says Greg Morrison, head deputy of the department of civil and environmental engineering at Chalmers University in Göteborg, Sweden, "but the challenge is how to replicate these models in urban areas where there is both less money to be invested and also a lack of integration and social cohesion."

The third, more significant, challenge is getting the right business model. To date, the project has succeeded in involving an energy service company (ESCO) together with a construction company who are making the necessary initial investment in these technologies. They expect to recoup their investment, when the owners pay them back in the long term thanks to energy savings.

However, "the upfront investment is one of the main bottlenecks," notes Vandevyvere, who previously served as scientific coordinator of the city project Leuven Climate Neutral 2030, completed in 2013. He adds: "we need to find investors that accomodate for longer pay back time, like 30 years, but we also need to make it understandable to all the agents that this huge investment is economically viable, as you invest in green economy, cleaner cities, a better quality of life, local employment and energy independency."

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