How to refurbish urban residential low energy districts

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Three cases studies will constitute the basis for developing an easily replicable strategy for renovating districts so that they reach near zero energy consumption

Achieving nearly zero energy consuming cities: this is the goal of three large scale district renovation projects. They are currently being tested in Valladolid, Spain, Genoa, Italy and Kartal - Istanbul, Turkey. There, the local authorities provide the demonstration sites for the renovation of three residential districts, under the recently initiated EU funded R2CITIES project. Project co-ordinator, Rubén

García, researcher at energy and information and communications technology division at the Spanish research centre CARTIF, based in Boecillo near Valladolid, tells youris.com about the challenges ahead.

How did you become involved in this large scale district renovation project?

In Europe, there is a very high need for energy renovation. Buildings are generally aged. Energy availability is limited. And the amount of people moving to the cities is continuously growing. Our research centre participates in the Smart Cities programme on some of the strategic projects in our area. We have got involved when we realised that Valladolid city council, who is one of the Smart Cities partners, was planning to holistically refurbish the city's neighbourhood of Cuatro de Marzo. This project perfectly fitted with the concept of energy renovation. We therefore started working together with Valladolid's municipal housing society, Viva, and the construction company Acciona Infraestructuras—both of which are project partners—to prepare a showcase project for Valladolid.

How does energy efficient residential district renovation differ from standard energy efficiency in single dwellings?

When renewing an entire district you can think of solutions on a larger scale than you would in a single house. For example, it is possible to implement a district heating by installing a much bigger biomass boiler than you could possibly do in a home. Moreover, when refurbishing a whole district in a homogeneous way the results are much more visible than in a single building. These can therefore be more easily replicated.

Why did you choose the three demonstration sites?

These sites are interesting because they bring in different building types and different kinds of properties. There are common solutions planned for the three showcase buildings. These include improvements in insulation and implementation of photovoltaic and solar thermal systems.

For example, the Cuatro de Marzo neighbourhood of Valladolid is a privately-owned district built in the 1960s'. The local authority promotes its renovation works through Valladolid's municipal housing society. By comparison, Kartal and Genova have been chosen to allow ambitious district-level renovations. Renovations are normally based at building level rather than at district level. What makes this project ambitious, unlike typical renovations, is that it will, for example, involve approaches such as façade renovation combined with renewable energy installations.

The Italian demonstration site, Lavatrici neighbourhood, is a social housing district in the periphery of Genoa, Italy. It was built between the 1980s' and the 1990s' and belongs to the Genoa city hall. By comparison, the Yakacik district of Kartal belongs to the municipality of Istanbul. It was built at the end of the 1990s. Most of the area is mainly occupied by a large building originally planned as a retirement home, which was never used for that purpose because of high energy inefficiencies due, mainly, to lack of insulation and to the high costs of running it. Instead, it has been used to shelter hundreds of people affected by an earthquake for eight months. And now, it is about to be converted into social housing due to its inability to be used for other purposes because of its high energy inefficiencies related to poor insulation.

What is the most challenging aspect of the project?

The joint participation of several different actors in the renovation of different districts, in different European cities is one of the most

challenging aspects of the project. The main actors include municipalities, research centres, building and renovation companies, financial and non-profit organisations and more than thousand users. The other main challenge is to ensure that the project results can be replicated in other European cities.

What makes you anticipate that other places will emulate the example set by the project case studies?

The main project output will be the development of a so-called integrated project delivery based methodology. This involves using a method called Building Information Modelling (BIM) to gather and share all the project information including development stages, tools, details of successful and less successful solutions as well as costs related information. As a result, any actor involved in renovation work can have access to the BIM content and adapt the information for specific purposes. This could be relevant, for example, to architects, engineers, local authorities, energy services companies, equipment and maintenance operators and even individual users.

We think we will be able to publish a first version of our methodology report in the project website by the beginning of the last project year, in 2017. We are creating a very ambitious strategy to disseminate our methodology and lessons learnt for policy makers, professionals and the general public.

We will never be able to ensure our methodology will be replicated since the last word is with the relevant actors. Nevertheless, we will handle all interested stakeholder the project results gathered in a copy of our good practices book. This will constitute a form of benchmark for future holistic large scale renovation projects across Europe, should other cities involved in district renovations decide to adopt the project's

methodology and similar technology solutions.

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