Low energy district renovation

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Renovations of entire districts, designed to reach near zero energy consumption, need to be replicable if they are to be widely adopted.

The overall building stock represents about 40% of the EU's energy consumption. It also produces about 36% of its total CO2 emissions. Besides, new buildings only account for 1% to 1.5% of the building stock. This means that renovation of existing buildings could be relevant for energy saving and greenhouse gases reduction.

In particular R2CITIES, bets on reducing, by about 60%, the energy consumption of districts renovated on a large scale. "District renovations

are not very well developed in Europe", says project co-ordinator Rubén García, a researcher at the energy and information and communications technology division of an applied research institute, called the CARTIF Technology Centre, based in Boecillo, near Valladolid, Spain. "Our aim is to approach the district as a whole to boost economies of scale and ensure replicability of our approach to other cities."

Three local authorities in three different countries have become involved in showcasing these potential savings. They are located in Valladolid, Spain, Genoa, Italy and Kartal-Istanbul, Turkey. All three share common problems, such as insufficient insulation. Common solutions to meet the energy needs of these districts include adoption of solar thermal and photovoltaic energy production. Their ultimate goal is to achieve cities with a near-zero energy consumption.

Today, the regulatory framework for energy savings, related to renovation, is not homogenuous across Europe. "Until now legislations in Europe have been concentrating mainly on new buildings, for which we have good rules and requirements, rather than on the renovation of existing ones," says Kurt Eriksen, general secretary of an international non-profit organisation promoting sustainable building, called the Active House Alliance, and based in Copenhagen, Denmark. "Few countries, such as Denmark and Germany, do have good requirements for renovation, but many others don't." However, "this is definitely going to change," Eriksen says "holistic renovation is necessary to meet the targets for CO2 reduction in 2050." These targets are of 80% below 1990s' levels.

To realise the ambitious goal of reducing energy consumption in urban districts, it is essential to define renovation standards. "Individual countries have different methodologies to refurbish buildings, so if we managed to find, as the project aims to, a common standard to implement in different countries, it would be a breakthrough," says

Eriksen, "like having three different languages merged into a common one." This explains why ensuring the replicability of the building showcases is key. A methodology made of "a book of good, and perhaps bad practices," as García defines it, could help turn these showcases into mirror of future cities. This book would include the various building development stages, a description of the tools used during the renovation and cost-related information. All this information will be gathered into a single place thanks to a so-called Building Information Modelling (BIM) system.

However, achieving replicability may not be that straightforward. "If you want replicability of solutions you need to use the same philosophies and perhaps also the same technologies that were in the first project," Eriksen points out, "knowledge sharing from within a project to others is limited; therefore replication very often requires involvement of one or more of the previous partners."

The concept of replicability is relative. "Replicability per se in buildings and in urban policy does not exist because each site has specific characteristics such as ownership structure, hydrogeological, climatic, cultural characteristics and users' needs," remarks Antonio Borghi, an architect based in Milan, Italy, and the chairman of the working group urban issues of the Architects' Council of Europe ACE-CAE.

However, he definitely sees the potential advantages of these projects lies in their knowledge collection and sharing, which can then be adapted to the individual case. "Replicability is intended as] the knowledge transfer of procedures, methodologies, technological solutions from one context to another," Borghi says. "Therefore the best practices book will always need to be adapted according to different contexts, needs, solutions and available resources and also be tailored to reach decision makers".

All three experts agree that finance is a possible obstacle to successful achievement of large scale district renovation. Indeed, the lack of resources of public administrations and their failure to promote districts energy efficient renovation is an issue.

Besides, the unavailability or unwillingness of buildings owners and end-users, whose involvement and often contribution is essential, would also represent a major barrier to renovations. "In order to achieve district energy renovation it is important to find a balance between the various stakeholders," says Borghi referring to public administrations, end users, businesses, banks, "so that no one has much more power than the others," he adds. He also points to the need to restrain industry's pressure to sell their products. He concludes: "The best guarantee of success for all urban requalification projects is decision sharing by a broad partnership of stakeholders."

More information: r2cities.eu/

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