

Energy efficient renovation of dwellings: lessons learned

With the current state of building experience and expertise, it is no longer a challenge to design and build healthy, comfortable and energy efficient new dwellings, as the implementation of the Passive House concept in the German speaking and Scandinavian countries shows. Here, an architectural challenge remains to combine these aspects with an interesting and appealing architecture within the frame of a limited budget.

However, a brief analysis of the energy consumption in the built environment in Europe shows the main challenge to obtain substantial energy reductions lies in improving the energy efficiency of the existing stock rather than in designing energy efficient new dwellings. This challenge is especially pungent when taking into account the building stock of Eastern European countries, where energy efficiency was never a great issue and where investments in energy efficiency are difficult to find.

This is area where the EU - funded project Demohouse is focusing on. In this project, partners from Austria, Denmark, Greece, Hungary, the Netherlands and Spain are working together to develop, implement and demonstrate solutions to reduce the heating demand by at least 30% compared to the present 'business as usual' renovations. This is a first step towards more ambitious targets. These renovation projects, each with its own emphasis on certain renovation aspects will be presented.



Spanish renovation project in Bilbao. Before and after renovation

As a first step in the project, barriers for energy efficient renovation were identified in the participating countries, distinguishing between architectural, technical, socio-economic, organisational and "other" barriers. These will be presented and discussed in the paper.

As in all renovation projects, some things went well and others didn't. Both categories will be presented, including: 'lessons learned' e.g. in the field of quality control. In addition, cost effective solutions developed in the project will be presented, such as a heat recovery unit for the ventilation system, customized for renovations.

An important aspect, both in renovation and new build, is the monitoring of the building after the building process has been completed. From the monitoring results it appears that the expected energy savings that were calculated using sophisticated modeling tools were not achieved in all projects. These cases will be presented including an analysis of what went wrong and recommendations for future projects will be given.