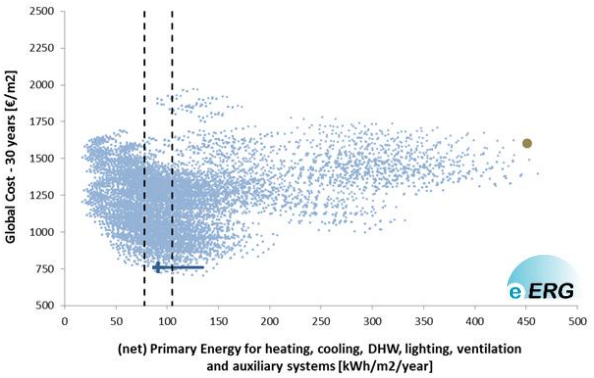
Co-funded by the Intelligent Energy Europe Programme of the European Union

Cost-energy analysis on renovation solutions towards nZEB

- ENTRANZE Report 2013 -

The refurbishment of the existing building stock plays a critical role in reaching the energetic and environmental targets of the EU. The ENTRANZE project partners carried out a comprehensive analysis on various nearly Zero Energy strategies, studying in detail cost optimal renovation levels of residential and public sector buildings. To be consistent with the EU process of EPBD implementation (Directive 2010/31/EU), the study adopted a comparative methodology framework established by the EU Commission to calculate cost optimal levels of minimum energy performance requirements. The study highlights the energy calculations at various boundary levels (from energy needs to net primary energy demand).



For each building type in eight countries (AT, CZ, DE, FR, FI, IT, SP, RO) **cost-energy curves** (representing global cost versus (net) primary energy demand of a large variety of renovation options) are established and thoroughly assessed, based on a selection of renovation packages leading to cost-optimal and nearly Zero-Energy levels (covering both energy efficiency measures and renewables). The **Report on Cost-Energy curves calculation** presents an assessment of curve sensitivity with respect to the main economic input data and the calculation period. The report analyses possible targets of (net) primary energy demand relating to cost-optimal and nearly Zero-Energy Building solutions. From a deep analysis of all cost-energy clouds complete refurbishment solutions were selected, suitable for the considered energy performance targets.

To generate the cost-energy clouds, a major effort was made to pull together all the required data. An important number of national experts contributed to the definition of characteristics of reference buildings. Each national partner made a technology choice for the building envelope and building system, taking into account widespread renovation practices. For each considered technology, the national partners, supported by technology cost experts, built a cost **database**. Different energy prices scenarios were considered in line with POLES, the Energy Policy Scenarios to 2050.

The **Energy-Cost-Tool,** developed by eERG Group of Politecnico di Milano, allows for cost-energy calculations adapted to different economic data and reference building. It is available on the project website (www.entranze.eu). The spreadsheet allows for an impact assessment of different building renovation strategies.

The Spanish project partner CENER has set up a database containing all techno-economic data of technologies and building solutions variants including a selection of 20-30 packages of energy efficiency measures according to cost-optimal calculation. These **energy-cost matrices** allow a comparison in terms of initial investment cost and (net) primary energy consumption of the most suitable packages of energy efficiency measures for each climate and building type.

The report, the tools and database are available on the ENTRANZE website at www.entranze.eu