

# Science for Environment Policy

## Refurbishment of Italian homes could provide energy savings of 85%

**Simple measures** to upgrade buildings by improvements to insulation or heating systems could result in energy savings of up to 85% in Italian homes, according to recent research. Across Europe, such measures could potentially provide energy savings of more than 40% on average, say the researchers.

**Over their entire life cycle**, buildings account for around 40% of energy consumption and 36% of CO<sub>2</sub> emissions in the EU. Improving energy efficiency and using renewable energy technologies in buildings is therefore vital to [climate change](#) mitigation. To this end the European Directive on the [energy performance of buildings](#)<sup>1</sup> provides a framework for Member States to make improvements in areas including heating, insulation and air conditioning.

Funded by the EU, the [TABULA](#)<sup>2</sup> project created building types (reference buildings typical of a climatic zone or region, building age and size) for residential buildings in 13 Member States: Germany, France, Italy, Denmark, Sweden, Belgium, Poland, Austria, Czech Republic, Greece, Slovenia, Ireland and Bulgaria. The aim of the project was to identify the energy performance of common types of buildings and to evaluate the potential for energy savings.

This study reports on the results of the Italian contribution to the TABULA project. The researchers defined three climatic zones: Mediterranean, Middle and Alpine, and four typical sizes of residential homes: single family houses, terraced houses, multi-family houses containing a small number of apartments, and apartment blocks.

The researchers classified the buildings into eight age classes ranging from those constructed before 1900 to after 2005. They carried out the analysis for the Middle climatic zone and focused on 18 building types found in the Piedmont region in northern Italy, but suggest the methodology could be extended to the whole of Italy.

For each building type, the researchers estimated the building's energy demand, based on the heating and hot water systems. Using national statistical data they identified how many buildings in the region were represented by each reference building to determine the total energy demand for the region's residential housing stock.

The researchers calculated two levels of energy savings, standard and advanced, considering the refurbishment both of the building itself (insulation of walls, floors, roofs and replacing windows) and of the heating and hot water systems (e.g. insulation of pipes or replacing the heating system).

Standard refurbishment included basic measures to upgrade insulation and heating and hot water systems. Advanced refurbishment represented the best available technology, e.g. greater insulation of the building, geothermal heat pumps or systems to generate heat from solar energy.

The results reveal that substantial energy savings, up to 77%, could be made in the residential building stock in the Piedmont region even with standard refurbishment measures. Advanced refurbishment could potentially provide 85% energy savings; although the additional cost to achieve the 8% extra energy savings would need to be taken into account.

In addition, the study also reported on other studies from the TABULA project: standard refurbishments could provide savings of 41% for the Czech Republic, 46% for Denmark and Germany and 62% for Greece. Overall, the results from the project suggested that more than 40% of energy could be saved by standard refurbishment of the residential building stock in the 13 Member States studied.



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1. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32010L0031:EN:NOT>

2. TABULA (Typology Approach for BUilding Stock Energy Assessment) project within the European programme 'Intelligent Energy Europe' (IEE). See <http://episcops.eu/iee-project/tabula/>