Priorities for Energy Conservation Measures in Buildings

According to a recent Greek study on potential energy savings in the building sector, the most effective energy conservation measures include the insulation of external walls, weather proofing or sealing of openings, and the regular maintenance of central heating boilers. The results also show that efforts to improve energy efficiency in residential buildings can result in considerable reductions in CO₂ emissions and thus play a key role in meeting the EU target of reducing emissions in accordance with the Kyoto Protocol.

Currently, the building sector accounts for 40% of the EU’s energy requirements. In particular, residential buildings represent 63% of the total energy consumption in the building sector. Furthermore, CO₂ emissions from residential buildings are the fourth largest key source of greenhouse gas emissions in the European Union. They accounted for 10% of total greenhouse gas emissions in 2002. Significant potential exists to reduce the rate of future gas emissions in the building sector by promoting energy efficiency in buildings.

A recent Greek study has quantified the potential benefits of different energy conservation measures (ECMs) and has determined priorities for building energy conservation strategies to reduce CO₂ emissions. Firstly, the researchers collected and adapted available data for existing buildings and their energy consumption; they estimated the thermal and electrical energy consumption for heating, cooling, and lighting for existing buildings and predicted growth for new buildings. This is the first time that this kind of aggregated data has been presented on a national level. Thereafter, they estimated energy savings, costs and reduction of CO₂ emissions for 14 different ECMs that had been implemented in Greek residential buildings in different climatic zones. Different energy conservation scenarios and their impact on the reduction of CO₂ emissions were evaluated.

The results show that the most effective ECMs are the insulation of external walls (33–60% energy savings), weather proofing of openings (16–21%), the installation of double-glazed windows (14–20%), the regular maintenance of central heating boilers (10–12%), and the installation of solar collectors for sanitary hot water production (50–80%). Moreover, according to the results, the thermal insulation of external walls and the solar collectors for sanitary hot water production are the ECMs that could provide the largest CO₂ emissions reductions by 2010 for the residential buildings in Greece, although results may differ depending on national conditions.

Furthermore, the authors propose the following additional support actions for the implementation of the recommended ECM:

- A public campaign to inform consumers of the most effective ECMs.
- Direct and indirect financial incentives, through investment subsidies.
- Development of building audit methodologies and the establishment of an appropriate monitoring and coordinating body for the effective implementation of the relevant regulation.
- A well targeted public campaign for engineers and consultants, who will be called in to implement the relevant regulations.
- Enhancement of existing electronic infrastructures (i.e., web sites of the ministries involved in the implementation of the relevant regulations) to provide easy access to relevant information through the internet.

Overall, the current study illustrates how energy efficiency efforts in residential buildings can result to a multitude of positive effects, including a decrease in the use of fossil fuels, an easing of the burden of energy imports, and the reduction of greenhouse gas emissions. The European Union is working intensively to improve energy efficiency in all end-use sectors and to increase the exploitation of renewable energy sources (RES).


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Additional information: Under the EU LIFE-Environment programme, several projects have been funded which aim to increase energy efficiency in the building sector. The most recent one is the Luxembourg project EFFENERGY (LIFE06 ENV/L000121), which demonstrates new membrane products for walls, floors and ceilings that can improve the thermal performance of existing buildings (see project summary). Other projects include the S-House (LIFE00 ENV/A/000243; see project summary, layman’s report and web-site), or Sustainable Retrofitting (LIFE99 ENV/A/000392; see project summary, layman’s report and web-site).

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