A Tool to Facilitate Energy Retrofitting Policies for Urban Residencies in Greece

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SUMMARY

This paper addresses the problem of energy consumption of the dwelling stock in the urban environment, using GIS to map energy consumption and calculate the energy and CO2 emissions savings after certain retrofitting interventions. The overall aim of the project is to provide a tool to facilitate location-based methodology for evaluating various retrofitting interventions; and to support decision making in the context of location-based policy implementation in order to promote effective, sustainable urban planning. With this approach, energy planners, local administrators and other stakeholders can take more effective actions to minimise energy consumption at a city or neighbourhood level. The case study is focused on the urban centre of Kos Island, in Greece. The residential building stock of the area is analysed in terms of energy consumption and the potential savings for various retrofitting measures are calculated. Objectives: – Build a database with information on buildings characteristics, households and dwellings characteristics and energy performance; – Create a building typology of the area by identifying the most representative building types for the different eras; – Calculate energy consumption, assess energy performance and classify the stock according to their characteristics; – Propose retrofitting measures based on the current trends and existing situation; and – Compare and contrast different interventions by calculating potential energy and CO2 savings. Firstly, a database of the retrofit characteristics of the housing stock of the area is created by using statistical data and primary data derived from field surveys. This database is further extended with data about energy consumption and energy class, which are derived from simulations of the typologies of residencies in the area and these are extrapolated to the entire stock. Then, a review of existing energy retrofit policies and current trends in improving housing energy efficiency is conducted, leading to the identification of the most relevant retrofit options. These options are then evaluated to assess (a) which intervention is the most effective in massive reduction of energy use and carbon emissions, and (b) which one is most economically attractive to each individual house owner. An application and adaption of the methodology to the Greek urban environment of Kos island shows that envelope insulation is the most effective intervention across the city, but installing solar thermal collectors for domestic hot water produces the greatest energy and carbon cuts for the individual house owner. The policy implications of the findings of the study are discussed.