

Retrofitting towards nZEB – a Cyprus case study for residential buildings based on current cost optimal market levels

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Buildings consume approximately 40% of the total energy needs of the EU and are responsible for 36% of Union's total CO2 emissions. In the context of the Kyoto protocol and the EC's commitment of reducing its carbon footprint, setting goals on energy savings and RES penetration for 2020 milestone, it is no wonder that buildings are included in the core focus areas of the EU's Roadmap for moving towards a low carbon economy.

Directive 2010/31/EU (EPBD recast) officially introduced the term of the near Zero Energy Building (nZEB) and set the mandatory target that all buildings constructed in the EU following the year 2020 should meet the nZEB criteria, as a means of reaching the 2020 target levels. Taking into account that the residential buildings sector is responsible for more than 60% of total energy consumed by buildings in general, volume of new constructions is below 1% (EU average) and the fact that the majority of the building stock in most EU countries has been built before any serious regulations on building energy performance had been imposed, it is evident that special emphasis in retrofitting current residential buildings to nZEB standards should be given in order to achieve the aforementioned goals.

In the scope of the present study, data gathered from a previous research work were used for five representative residential buildings in Cyprus in order to estimate their energy class and the actual annual energy consumption. Energy efficiency measures (EEM) retrofitting the buildings under study to nZEB standards have been identified and quantified, the investment cost estimated and financial performance has been evaluated, both from measurements and simulations.

The application of the proposed EEMs results in calculated energy savings ranging from 30% to 65% compared to current energy consumption and an overall financial project performance ranging from medium to excellent; thus, proving the essence for energy upgrades on current building stock but also providing an insight on aspects that potential policy measures should target in order to encourage such investments.

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