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## Environmental and energy impact of the EPBD in residential buildings in cold Mediterranean zones: The case of Spain

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### HIGHLIGHTS

Compliance with EPBD in Spain (CTE-DB-HE) ensures major energy savings in buildings.

The total energy demand of the building can be reduced by up to 150.22 kWh/m<sup>2</sup>-year.

Non-renewable primary energy consumption rating can be changed from E to B.

An increase from a rating of E to B in CO<sub>2</sub> emissions can be achieved.

The possibility of an A rating was studied as a primary requirement of NZEBs.

### ABSTRACT

The residential sector in the European Union accounts for 27% of final energy consumption and 23% of CO<sub>2</sub> emissions. Due to this situation, the European Union, in order to strive for greater energy efficiency and savings, has established the Energy Performance of Buildings Directive, which, in the case of Spain, takes the form of a Basic Document outlining Energy Saving in the Technical Building Code (CTE-DB-HE). The aim is to perform an energy and environmental analysis in a multi-family housing block, evaluating improvements that are the result of the implementation of the CTE-DB-HE and comparing them with the previous situation. For this purpose, five representative cases for 26 Spanish cities located in cold climate zones are analyzed. The results reveal that with the current rules, an energy demand reduction of over 60% is achieved. In addition, 65% higher reductions are obtained both in the consumption of non-renewable primary energy and CO<sub>2</sub> emissions, thereby achieving class B building status. These remarkable savings show that the right direction is being taken toward nearly zero-energy buildings (NZEBs).

### Abbreviations

CTE-DB-HE Basic Document for Energy Saving of the Technical Building Code (Documento Básico de Ahorro de Energía del Código Técnico de la Edificación)

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