

## Heating energy demand and related efficiency potential of apartment buildings in the Czech Republic, Romania and Bulgaria

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## Abstract

Apartment buildings make up the largest distribution of total building stock in several Central and Eastern Europe (CEE). Apartment buildings built between 1950 and 1990 dominate. Lack of basic energy efficiency requirements at that time and typically applied concrete panel construction are the main reasons for their high heating energy consumption. The main aim of this work is to model energy demand for heating and hot water preparation in the apartment building sector built between 1950 and 1990 with the example of three CEE countries: Czech Republic, Bulgaria and Romania. Moreover, the energy reduction potential for those countries is calculated by defining different level of refurbishment measures. One of the used measures correlates to a very ambitious, deep renovation standard. To calculate the final energy demand and energy need for space heating and hot water in those buildings, a bottom-up approach which is based on the Monthly Balance Method is used. The CEE apartment building stock is broken down by period of construction, thermal characteristics, heating systems etc. The results show that the final energy demand for heating and hot water preparation in all apartment buildings built between 1946 and 1990 in Czech Republic with a share of 45% of all apartment buildings is 4.8 TWh. In Bulgaria's apartment buildings (1960 to 1990) final energy demand makes up 3.9 TWh (63%) and in Romania (1945-1989) 8.3 TWh (52%).