Topic: Development of Energy Performance Indicator for Residential Building Envelope
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ABSTRACT

Thailand has been a net energy importing country ever since it began its first Economic and Social Development Plan to embark on a new phase of coordinated economic development in 1964. From 1985 to the present, per capita consumption of oil and natural gas has increased sixfold, while per capita consumption of electricity has increased fivefold. A report of the International Energy Agency (IEA) indicates that the consumption of electricity in commercial and residential buildings constitute 40% of total electricity consumption and the building sector consumes 30% of total energy consumption. Development and implementation of mandatory and voluntary energy performance standards for buildings are necessary and beneficial to society. This study presents the development of Overall Thermal Performance Value (OTTV), or the measure of thermal performance, of building walls enclosing spaces used under bedroom function. This development represents a part of an attempt to develop a building energy performance standard for residential buildings in Thailand. Bedroom function is the major residential function in the use of a residential household. The results of this study indicates that building envelope and interior walls should be constructed by using low thermal mass materials including low solar absorptance of wall surfaces to reduce heat storage from solar radiation during daytime which is major factors of cooling coil load (CCL) of night time function. The exposed wall should be installed with interior insulations and if the wall comprises the window area, the glazing type and shading device should be considered to screen the transmitted solar radiation through window which is much influenced on the performance of building envelopes. The developed OTTV is verified and the results show that the developed OTTV can be used to indicate the performance of building envelopes enclosing residential spaces accurately.

Keywords: U-Value, building envelope, cooling load, OTTV