Rethinking Low Carbon Emission on Apartment Design: Lesson Learned from Construction of An Experimental House

ABSTRACT

As a developing country with a high growth rate, the housing needs is constantly increasing from year to year in Indonesia, especially in big cities. The housing demand results in the growth of apartments development, particularly for the low middle-class apartment. The development causes impact on increasing carbon emissions due to the embodied energy during project life cycle. Consideration of sustainability in reducing carbon emissions is needed. However, current condition indicates that the sustainability approach has not been widely applied in apartment development. To accelerate the application of the concept of green buildings, the application needs to focus on factors that have a significant impact. In the Tropics area, the largest source of carbon emissions is due to the energy for cooling load. Therefore, in reducing the impact of carbon emissions on tropical buildings tend to focus on efforts to reduce the cooling load. This paper will discuss various efforts (passive design) in reducing carbon emissions by reducing the cooling load in apartment designs. These efforts have been applied in the construction of experimental apartments in Tegal City. These efforts include appropriate site development, door and window design (interior and exterior), wind fin design, and the use of insulation. Analysis of various design strategies is done by simulation methods and field observation. Observation results indicate that each effort has a different effect on reducing the cooling load. These comprehensive and integrated efforts are expected to reduce carbon emissions by at least 30% from the existing design that currently applied.
Keywords: *Low Middle-Class Apartment, Carbon Emission, Design Strategy, Low Energy, Sustainability*