ESTIMATING EMBODIED ENERGY IN RESIDENTIAL BUILDINGS IN A NIGERIAN CONTEXT

Abstract

The housing sector in Nigeria is characterized by huge deficits coupled with un-innovative construction methods. Previous studies indicate a strong relationship between construction materials and techniques on the one hand and embodied energy on the other. Also, studies on construction innovation in Nigeria have focused on its economic and financial benefits while playing down the environmental implications. This paper examined the environmental implications of residential building construction in a Nigerian context using embodied energy as an index of measurement with a view to identifying areas that could benefit from innovative strategies. Primary data for the study were obtained from survey research complemented by observation and interviews. For the embodied energy estimation, the life cycle assessment (LCA) framework and international energy protocols were adopted for the study. The study found that opportunities for embodied energy mitigation exist mostly in the building frame and walls as well as in the recurring embodied energy component. In other to achieve substantial reduction in the embodied energy intensity, substitution of conventional building materials with low energy and durable materials as well as adoption of innovative construction methods were recommended.

**Keywords:** Embodied energy, Life cycle assessment, Materials substitution, Lagos, Nigeria, Residential building.