

Establishing Embodied Carbon Coefficients for Building Materials in Sri Lanka

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Buildings are identified as a major energy user and carbon emitter throughout their lifecycle. Carbon emission associated with energy consumption and chemical processes of material production is termed as 'embodied carbon'. Material production stage or cradle-to-gate building lifecycle includes processes of raw material extraction, transportation and material production which are responsible for about 20-40% of building lifecycle carbon emission. As embodied carbon of building materials highly vary with raw material quality, energy sources and production technologies, development of embodied carbon coefficients in the specific context of a country is necessary. Currently, Sri Lanka lacks such data inventories. This study was aimed at establishing embodied carbon coefficients of commonly used building materials in Sri Lanka. The process is made up of 3 stages; scoping, data collection and calculation. The data were collected through on-site surveys of material production facilities. In determining embodied carbon coefficient of a building material, aggregation decomposition hierarchy method was used. The embodied carbon coefficients obtained in the study were compared with values given in Inventory of Carbon and Energy (ICE) database. As the linkage between material production, energy use and carbon emission is dependent on many country specific factors, differences in values can be observed. A country-specific database ensures reliability and accuracy of building carbon emission studies. The process of establishing material embodied carbon coefficients should be standardized and data should be collected throughout the country so that computed values will represent national averages. This study will lead to future development of an embodied carbon coefficient database in the context of Sri Lanka, which will be useful in assessing embodied carbon of building materials and identifying appropriate strategies for mitigating embodied carbon of Sri Lankan buildings.

Keywords: Building material; Cradle-to-gate; Embodied carbon coefficient; Sri Lanka.