

A Comparative Analysis of Carbon Footprints of Households in Different Housing Types and Seasons

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Abstract : As a result of rapid urbanization, energy demands for lighting, heating and cooling of households have been concentrated in metropolitan areas. The energy resources for housing in urban areas are dominantly fossil fuel whose uses contribute to increase cost of living and carbon dioxide (CO₂) emission. To achieve environmentally and economically sustainable residential development, it is important to know how energy use and cost of living can be reduced by planning and design. The purpose of this study is to examine which type of building requires less energy for housing. To do so, carbon footprint (CF) quiz survey was employed which estimates the amount of carbon dioxide required to support households' consumption of energy uses for housing. The housing carbon footprints (HCF) of 500 households of Seoul, Korea in summer and winter were estimated and compared in three major types of housing: single-family (detached), row-house and apartment. In addition, its differences of HCF were estimated between tower and flat type of apartment. The results of T-test and analysis of variance (ANOVA) provide statistical evidence that housing type is related to housing energy use. Average HCF of detached house was higher than other housing types. Between two types of apartment, tower type shows higher HCF than flat type in winter. These findings may provide new perspectives on CF application in sustainable architecture and urban design.

Keywords : analysis of variance, carbon footprint, energy use, housing type

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