

Life cycle assessment of plastic waste into furniture using open LCA software

ABSTRACT

Plastic waste management is one of the most severe environmental issues confronting municipalities worldwide, and it is the most serious environmental issue in Malaysia. Furniture gains attention in the life cycle assessment (LCA) of a net-zero energy building. It was responsible for 10% of the building's impact on global warming and nonrenewable energy demand. Therefore, it shall be considered in the building's design. This study evaluates the environmental effects of recycled high-density polyethylene (HDPE) eco-furniture using the Open LCA software. The scope of the study considered the cradle-to-gate boundary of recycling and manufacturing 1 kg of the eco-furniture functional unit. This paper assesses the LCA through Open LCA in obtaining the environmental impact of waste-to-wealth product generation. Primary data (amount of plastic waste, electricity, emission, and water) were gathered in a local recycling centre, EZ plast Plastic, data from the European Life Cycle Data database and data from a previous study for the electricity. In addition, the CML Baseline impact method, readily available in the Eco Invent LCIA database, is employed to determine plastic waste performance in their impact categories. Nine environmental impact categories were considered. The result shows that the consumption of electricity and HDPE during the manufacture of eco-furniture resulted in the most significant amount of environmental loading, up to 78% to 90% on all the impact categories.