Life Cycle Assessment of Wood Floor Coverings - A Representative Study for the German Flooring Industry (11 pp)

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Abstract

Goal, Scope and Background

The goal of the study is a life cycle assessment according to ISO 14040–14043 for wood floor coverings (solid parquet, multilayer parquet, solid floor board and wood blocks). The representative study covers approximately 70% of all wood flooring production in Germany. The comparison of the floor coverings among each other was not the aim. Instead the study provides basic data for all wood floor coverings for a possible comparison with other floor coverings later on. The main focus was a hot spot analysis to help the involved industry partners to improve their environmental performance, and to use the results for marketing purposes.

- Inventory Analysis. The study covers the whole life cycle from forest management, sawmilling, manufacturing, laying and surface finishing through to refurbishment and end-of-life. The end-of-life scenario is the thermal utilisation of the floor coverings. The energy gained in the end-of-life scenario is accounted for by system expansion (avoided burden approach).
Impact Assessment. In the Impact Assessment the following categories were considered: global warming (GWP), acidification (AP), eutrophication (EP), ozone depletion (ODP) and photo-oxidant formation (POCP) following the CML baseline 2000 method. Furthermore the use of primary energy is presented. The low emissions of greenhouse gases during the life cycle can lead to a negative contribution to the global warming potential if more emissions are avoided through the substitution process than are emitted during the life cycle of the product. Mainly energy consumption and the use of solvents influence the environmental impacts of the systems under analysis. The most relevant unit processes for the issue of energy consumption are 'production' and for photo-oxidant formation 'laying', 'surface finishing' and 'refurbishment'. These are therefore the unit processes with the greatest potential for improvement.

Normalisation and Sensitivity Analysis. The normalisation results show that the photo-oxidant formation potential is most significant in comparison to the other impact categories. Improvement options and the choice of the functional unit have been further explored in a sensitivity analysis.

Discussion and Conclusions. The most important opportunities for improvements are located in the unit processes laying, surface finishing and refurbishment. The POCP result can be reduced significantly depending on the choice of glue and varnish at each of these stages. The results of the sensitivity analysis showed a potential for improvement in this category. No data for the production of an oil and wax finish was available. This option would be interesting to consider at in a further study. The time aspect of storing CO2 for a period of time is not considered in this paper, but will be addressed in a forthcoming paper (Nebel and Cowell 2003).

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