

Land Use of Transport Services: Inventory and Evaluation

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Abstract

ECOINVENT is one of the worlds' most prominent databases for Life Cycle Assessment (LCA). In a joint effort of LCA institutions within or associated with the ETH this database is currently updated. The work is cooperatively distributed over several modules. For instance, data for energy systems are being compiled as well as data for the production of bulk plastic and metal products. The database contains a comprehensive section of transport data, which – besides its integration within the assessment of other complex product life cycles – can be (and has been) employed for optimisation of transport and logistic processes as well as for decision support in comparisons of the environmental performance of different modes of transport.

In the past the focus of traffic related environmental data was on energy use and (mainly) air emissions. Environmental data for the assessment of land use, however, have been paid less attention. This was mainly due to a lot of methodological drawbacks, which have been addressed in recent years. Thus, the integration of land-use relevant data has become a key issue of the current update of the ECOINVENT database. The specific methodological developments to solve the transport related land use issues in LCA are summarized in this paper.

For the comprehensive evaluation of environmental impacts – as it is conducted in life cycle assessments – only impacts on ecological quality of land are included and a distinction between land transformation and land occupation is proposed. Whilst, transformation directly changes the ecological quality of land, occupation postpones changes of the ecological quality.

The methodological framework specifically emphasises the following issues:
data collection and allocation of land occupation to transportation modes
data availability and treatment of land transformation
classification of land use by means of several types

Various options to address the above issues are investigated. They are developed in cooperation with the large project team of ECOINVENT2000 in order to provide an overall consistent database for environmental evaluations.

Finally, the results of the new methodology provide an improved environmental trade-off of rail and road transport, now including land use as defined in LCA.