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Publication date:
2013

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Abstract

LCA of waste management systems requires modelling of complex systems, handling waste of heterogeneous composition. Furthermore there are large variations in both composition and technologies for the treatment of residual material. This implies large uncertainties with regards to the results of assessment of such systems. A general approach for quantifying uncertainty in LCA modelling of waste management systems was proposed (Clavreul et al., 2012), which consists of 4 steps:

1. Sensitivity analysis
2. Uncertainty propagation
3. Uncertainty contribution analysis
4. Combined sensitivity analysis

In a new model EASETECH, developed for LCA modelling of waste management systems, this general approach has been implemented. First general contribution analysis is done through a regular interpretation of inventory and impact assessment results. Based on findings from this step, the user can carry out sensitivity analysis on numerous key parameters through the use of parameters at most input places. In the next step, uncertainty propagation is done through the use of single probability distributions in lieu of the parameters. Carried out for a number of scenario's this can be used to generate cumulative relative frequencies for each scenario and for the difference between them. Uncertainty contribution analysis can be generated based on the results of steps 1&2.

The 4th step of combined sensitivity analysis can currently not be carried out in the model, but results can be exported and imported to software that can facilitate this.

The use of a module based waste matrix model with this integrated general approach for uncertainty analysis enables a much better understanding of uncertainties in LCA results. It has been used to reveal hidden impact of the use of aggregated emission factors in application of organics to agricultural land, or the impacts of assumptions of the heterogeneous composition of waste.

Key words: waste management, uncertainty analysis, EASETECH

References: Clavreul, J., Guyonnet, D. & Christensen, T. H. (2012) Quantifying uncertainty in LCA-modelling of waste management systems. *Waste management* **32**, 2482–95