

Generic Energy Models in Life Cycle Assessment

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The energy sector as significant contributor to the worldwide environmental impacts also dominates most Life Cycle Assessment studies. Therefore it is important to model energy supply chains as a basis for further LCA studies.

The globally connected energy and fuel supply chains as well as the various conversion technologies used in the energy sector together form a complex overall system. To prepare consistent, comparable and comprehensive models considering all relevant supply chains (e.g. for crude oil, natural gas or hard coal) for the production of final energy (e.g. electricity) a large amount of data has to be handled.

To generate extensive energy supply models and especially to adapt the models to various technologies (e.g. fluidized bed combustion, pulverized combustion, grate firing or combined heat and power generation) as well as country and technology specific boundary conditions (e.g. emissions limits, flue gas treatment systems or cooling systems) the usage of generic parameterized models is very suitable. With an LCA software and a strictly systematic approach the creation is manageable and the resulting LCA models are easy to use.

Considering as example the German electricity grid mix the chosen modeling approach will be introduced, highlighting the possibilities of sophisticated system modeling. The usage of parameters in this context allows the development of detailed and flexible models, thus forming the basis of comprehensive and consistent LCA databases. In addition the transfer and adaptability to other countries will be shown.