

Regional aspects in LCA for Bioenergy Systems

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Compared to other renewable energy sources Bioenergy offers a number of advantages such as simple storage, supply of control and base-load energy. Furthermore, Bioenergy is a key element of German and wider European climate protection policy approaches. This is highlighted, for instance, by the ambitious development goals for various energy sectors (such as power generation, transport, etc.) at national and European level. Further expansion of bioenergy use however, also entails major ecological and socio-economic risks. Key aspects which may in fact run counter to bioenergy policy goals include indirect and direct effects of changes in land use, intensive industrial farming, and poor working and production conditions in third-party countries. In order to assess these environmental and socio-economic effects, existing methodologies like the life cycle assessment need to be adapted to the specific (regional) characteristics of biomass value chains. This process includes a number of aspects related to i) the quality and regional resolution of the input data for the modelling of the life cycle inventory, ii) the definition of regional specific reference systems to represent and model the complex relations of product and by-product substitutions and iii) to enhance existing approaches for environmental impact assessment.

Based on an exemplary biomass-to-bioenergy pathway a number of regional aspects for the environmental impact assessment of bioenergy systems by means of the LCA methodology will be introduced and discussed.