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GREENHOUSE GAS MITIGATION POTENTIAL OF SHORT-ROTATION-COPPICE BASED GENERATION OF ELECTRICITY IN GERMANY

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ABSTRACT To sustain our resources for the future and avoid drastic climate change, society is now forced to increase energy efficiency as well as to explore and establish sustainable energy resources worldwide. Moreover, it is widely accepted that ideas have to be implemented on a regional scale. Wooden biomass, used for energy generation, is supposed to be helpful in securing local energy supplies as well as reducing the greenhouse effect by substituting fossil resources with bio-based ones. The latter can, in the case of short rotation coppice (SRC), be generated by extensive agricultural production systems. Consequently, they produce less CO₂-equivalent emissions than fossil resources. This work presents a model system for a regional supply chain producing second generation bioenergy generated from SRC in eastern Germany. It focuses upon the generation of electricity. For that reason, it is compared to a business-as-usual reference system, based on the latest German CO₂ mitigation factors for renewable energies in the German power-generation mix. Based on greenhouse gas inventories, according to the methodology of life cycle inventories, the assessment also takes into account further important aspects, for example possible options for nutrient cycling. The paper discusses major determinants for greenhouse gas mitigation with SRC with respect to indirect land-use effects, due to the possible increased demand for land.

Keywords: Sustainability, short-rotation-coppice, SRC, greenhouse gases, climate change, second generation bioenergy, supply chain, life cycle inventory, CO₂ mitigation factors, extensive agricultural production