RESTORATION OF CONTAMINATED ELBE RIVER FLOODPLAIN SOILS BY PHYTOREMEDIATION

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Particulate matter and fine sediments transported by the Elbe River are often loaded with heavy metals and arsenic. These substances are transported during flood events in the floodplains and settled down in areas with almost stagnant flow velocity. As a consequence of these sedimentation processes floodplain soils and plants can have contamination levels which exceed valid reference and precaution values. Based on available measuring data the present status quo about the contamination of representative floodplain sites and plants along the Elbe River (at a longitudinal section starting from Saxony via Saxony-Anhalt until Lower Saxony) will be displayed and discussed. In the following part a conceptual framework regarding the restoration of contaminated floodplains by phytoremediation with willows and poplars will be presented. This includes at the end the possibility to use the contaminated biomass from the floodplains for generation of energy. The concentrations of heavy metals in the biomass exceed the threshold values according to DIN 51731. Normally this biomass can't be used in conventional heat boilers because of the high heavy metal concentration in the exhaust during firing. For this reason the contaminated biomass is transformed into energy in a complex thermo chemical gasification (TCG) facility. An innovative combination of a prototype gasifier and an effective gas cleaning system allows complying with the limits of heavy metals in the exhaust. The power rating of the gasifier is about 200 kW. The generated poor gas is used in a block heat and power plant (BHHP) for generating heat and electricity or only for heating. The size of the plant, the high efficiency of the gasification process and flexibility in the choice of the raw material are interesting facts for a prospective use in agriculture which will be discussed.