

Biomass - Energy - Health

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Background In recent years the European energy policy has changed from fossil to renewable CO₂-neutral fuels in order to improve both the quality of life and the energy situation. The use of energy plants instead of traditional fossil fuels is one of the possibilities strongly supported in the Upper Rhine region in Germany, France and Switzerland.

Aims Our international multidisciplinary project aims to explore and to communicate the impact of fine-particle emissions from biomass combustion on air quality and health. The expected results will provide a basis for technical and economic applications, supporting the improvement of environmental conditions and human health.

Methods Biomass combustion results in the emission of VOCs, NO_x, fine and ultrafine particles, whose effect on humans has not been well studied so far. Physicochemicals and mineralogical methods will be used to characterize the aerosol particles from biomass combustion. In addition, we will focus on the characterization of potential biological effects of particulate emissions and ashes from biomass combustion on humans. Using complex *in vitro* cell systems mimicking human lungs, we will assess the impact on cell viability, integrity of the lung tissue, and potential DNA damage providing evidence for possible tumorigenic effects. Moreover, we will investigate activation of transcription factors and formation of ROS.

Expected results The results will include: (i) assessment of the impact of particulate emissions from biomass combustion on the local and regional air quality; (ii) improvement of our understanding of the potential impact of particles from biomass

combustion on human health; and (iii) evaluation of the produced ash as a possible CO₂-neutral clinker substitute for the regional cement industry.

Conclusions The BIOCOMBUST project serves primarily to improve the life quality of the population in the Upper Rhine region, supporting a sustainable economic growth of the regional biomass industry.