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**Economic and environmental prospects of biofuels in the European transport sector**

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Decarbonization of the transport sector as proclaimed in the COP 21 targets requires the transition from fossil to renewable energy sources. While electric vehicles may become a viable option towards decarbonization of individual car traffic, at least aviation, shipping and heavy duty transportation will continue to rely on liquid fuels. Biofuels can replace a large share of fossil fuel in these sectors. However, the usage of biofuels within transportation is only reasonable with significantly reduced Greenhouse gas (GHG) emissions compared to fossil fuels and lower GHG abatement costs compared to other decarbonization technologies (e.g. Power-to-Liquid, hydrogen, electric mobility etc.). A detailed discussion of biofuels prospects in Europe shall be presented. Different biofuel production paths are compared and analyzed in terms of technical potential, fuel costs, GHG footprint and GHG abatement costs. Based on the results the following superordinate questions are addressed: What share of the European transportation energy consumption can be covered by biofuels? In which sector seem biofuels most realistic and most feasible and what type of biofuels are required? How compare biofuels GHG abatement potential and GHG abatement costs with other GHG reducing technologies? A standardized techno economic assessment method was applied out in order to calculate the fuel production costs of the most promising biofuel routes. The methodology was adapted from a best-practice cost calculation standard from the chemical process industry and built up in the in-house cost estimation tool TEPET (Techno Economic Process Evaluation Tool). With transparent cost data input a reliable prediction of current net production costs of alternative fuels is achieved, what is automatically linked to the steady state PFD simulation? The impact of economic boundary conditions such as plant location, biomass price, key equipment costs and economy of scale can be demonstrated.

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