Technology Platform Power-to-Liquid Fuels (TPP) – Addressing the obstacles of scaling-up PtL production

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Sustainable Aviation Fuels (SAF) play a key role in achieving climate-neutral aviation. Especially Power-to-Liquid (PtL) SAF will be needed to supply sufficient quantities in the long term. However, there are several obstacles in scaling-up PtL production to an industrial scale, e. g. high PtL production costs and technological risks in scaling-up PtL production technologies from lab-scale to an industrial scale.

To overcome these obstacles, the German Aerospace Center (DLR) is building a semi-industrial PtL demonstration and research facility at the Leuna Chemical Site (Germany), the Technology Platform Power-to-Liquid Fuels (TPP). The TPP will demonstrate the entire process chain with a capacity of about 2.500 t/a PtL. RED II conform CO_2 and H_2 will be supplied to the TPP by external sources. Syngas is generated using an electrically heated Reverse Water Gas-shift (eRWGS) reactor. Afterwards, the syngas is converted into a syncrude in a Fischer-Tropsch (FT)-reactor. The syncrude is then upgraded into norm-conform fuels and other products, such as naphtha. Core research objectives of the TPP are the integration of the selected individual mature technologies as well as derisking the PtL route. Furthermore, the TPP has the objectives to support industrial scaling-up, to gather application experience of PtL production and product use, to optimise the PtL process and to perform Fuel Design. Fuel Design leads to an optimized PtL kerosene with e.g. low particle emissions to reduce the non-CO_2-effects in aviation, while fitting for existing aircraft and airport infrastructures.

This contribution gives an overview about the current obstacles of scaling-up PtL production and shows how the TPP will support in addressing these obstacles.