

BE2020

BIOENERGY 2020+ GmbH

Programme: COMET – Competence Centres for Excellent Technologies

Programme line: K1-Centres

COMET subproject, duration and types of projects:

C20003016-1 barrel per day, 04/2015 – 03/2019, multi-firm

Diesel derived from wood – One Barrel per Day plant in Güssing

Summary. In November 2016, the press conference on the commissioning of the "1 Barrel per Day" facility took place in Güssing. Via the Fischer Tropsch (FT) Technology, synthetic hydrocarbon compounds can be obtained from the synthesis gas via the path of biomass gasification. FT diesel, kerosene and feedstock for the chemical industry can be provided. The diesel produced is of the highest quality and can be used independently or for the refinement of fossil diesel. With this facility, the biomass-based FT technology can be extended from the laboratory to the pilot scale and allows the acquisition of further insights for scale-up on a demonstration scale.



Planning, construction and commissioning

The plant for the production of Fischer-Tropsch diesel (diesel and kerosene from wood) is completed 1 year after the start of the COMET project "1 Barrel / day". This pilot plant, unique in the world, was planned and implemented by BIOENERGY 2020+ at the Güssing site and can now be used for further research.

After an intensive phase of the design of the plant, the employees at the Güssing site started construction in January 2016 and successfully completed the project in October. About 8500 person hours and nearly EUR 500,000, - have been spent on the implementation of the 1 barrel / day facility. Design, construction, component selection, construction, instrumentation and commissioning were carried out without exception by the employees of BIOENERGY 2020+.

With the completion of this facility, which is unique worldwide, an important step has been taken to increase the profitability of second-generation biofuels. Valuable knowledge on the

way from the laboratory to the industrial plant can be gained.



Fig. 1: One Barrel per Day Plant (Bioenergy2020+ GmbH)

In the next phase of the project, the plant will be dedicated to experimental tests, in order to obtain data for the simulation of the overall process. In particular, the flow behaviour of the slurry reactor (mixing of the catalyst through the synthesis gas) is evaluated by means of measurement technology in order to have sufficient

data for a further stage of expansion on industrial scale. A further objective of the project is to test the fuel produced in the tests under real conditions on modern diesel vehicles. On 22th of November 2016 a press conference was held to inaugurate the facility. The interest of media in this press conference was very promising.



Impact and effects

This pilot plant enables to scale up from laboratory to the pilot scale. In Güssing since 2005 research has been conducted at a biomass-based laboratory scale FT lab plant in the size of 10 LPD (liter per day) and valuable insights into the topics of gas purification and processing, long-term stability of FT catalysts, design of slurry reactors and product separation as well as fractionation have been gained. The collected findings have been incorporated into the planning of this pilot plant. The pilot scale represents an important if not the most important milestone on the way to a demonstration facility.

The hydrocarbon compounds produced can be used depending on the boiling cut temperature as second-generation high-quality fuels (diesel and kerosene) or as non-fossil substituents for chemical substances.

FT advanced fuels are free of aromatics and sulfur and have a significant reduction potential for emissions. Furthermore, HPFT (Hydro-processed FT diesel) has an excellent cold flow

behaviour. Thus, the kerosene boiling section would be suitable as a high-quality aircraft fuel.

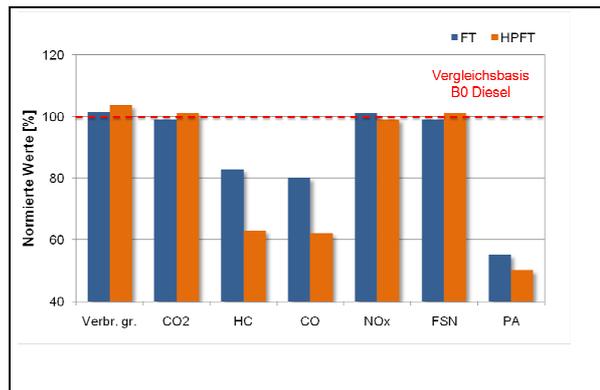


Fig. 2: Emission reduction by the usage of FT advanced biofuels (Institute of Vehicle Propulsion and Automotive Engineering, Vienna University of Technology)

The secondary product of the FT synthesis, high-purity paraffin waxes has been the focus of further research activities. By further processing, it is possible to produce batches with different properties such as, for example, viscosity or melt behaviour. The waxes mainly composed of saturated hydrocarbons can be used as additives in the chemical industry. This means that FT synthesis not only provides advanced biofuels, but also raw materials for the chemical industry.

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