Pyrolyis oil Upgrading for the production of REnewable JETfuel

Publieke samenvatting / Public summary

Aanleiding

Europe has set ambitious targets to reduce GHG emissions in all sectors of the economy including transport. Aviation is one of the most difficult sectors to decarbonize because aircrafts are not able to switch to alternative energy sources such as hydrogen or renewable electricity in the foreseeable future and remain to rely on liquid fuels. Sustainable Aviation Fuel (SAF) is a clean and renewable substitute for fossil jet fuel. SAF is a so-called drop-in fuel, which means that it can be blended with fossil jet fuel and that the blended fuel requires no special infrastructure or equipment changes. The commercial production of SAF is currently predominantly based on the hydrotreatment of vegetable oils and used cooking oils (UCO). To meet the European targets for CO2 savings, it's very important to develop SAF from other resources as well. Recently, it was found that during the production of an advanced biofuel for marine applications from 2nd generation lignocellulosic biomass, a co-product rich in cycloalkanes was formed. This product seems very promising as SAF.

Doelstelling

The main objective of the PureJet project is to develop a process to produce a drop-in SAF from RED2 approved feedstocks, that complies with the existing fuel specifications and reaches at least 70% GHG emission reduction. The SAF will be rich in cycloalkanes, which exhibit similar advantageous properties as aromatics (seal swelling, high specific energy content), without the disadvantage of

Projectinformatie / Project information

Projectnummer / Project number
TIND221002
Subsidiebedrag / Grant amount
€ 441.098,00

Algemene informatie / General information

Penvoerder / Secretariat
B.T.G. Biomass Technology Group B.V.

Publicaties en materialen / Publications and attachments

- **05.09.2025**

  Eindrapport TIND221002

Volg Topsector Energie op X / Follow Topsector Energie on X

@TSEnergie

increased soot formation (particle emissions) upon combustion. Specific technical objectives of the project are to develop the production process of sustainable cyclo-alkanes through hydrotreatment of fast pyrolysis bio-oil and subsequent separation & purification steps. Next, the SAF quality will be investigated through a pre-tier product validation procedure based on detailed analyses of the chemical composition as well as dedicated combustion and turbine tests. Non-technical objectives of the project include the determination of the GHG emission savings, investigating the market potential as well as the initial development of an implementation strategy for the value chain.

Korte omschrijving

Activities include the continuous hydrotreatment of fast pyrolysis bio-oil (FPBO) on 5 kg/h scale to produce hydrotreated pyrolysis oil (HPO). Separation of the HPO in a light (aviation) and heavy (marine) fraction and further purification of the light fraction to a drop-in SAF. The produced SAF will be subjected to detailed chemical analysis as well as combustion and turbine tests to determine if fuel specifications are met. Corrective measures will be made in the processing in case specifications don't comply. Production and chemical analysis of the SAF will be done by BTG, along with project coordination and determination of GHG emission savings. The produced SAF will be blended with fossil kerosine and other SAF products by TUD, and combustion and turbine tests will be performed with the fuel. SkyNRG will perform an advisory role in order to select the best possible markets and provide a fast-track towards commercial implementation.

Resultaat

The expected result of the project is the development of a process able to produce a SAF from 2nd generation lignocellulosic biomass. The SAF production is part of a wider biorefinery scheme in which also a marine fuel is produced. Because the marine fuel specifications are less stringent than aviation fuels, market introduction is expected to be easier with lower risk of failure. The PureJet project should collect all information required for the

decision to construct a continuous -pilot scale- production facility (TRL6) after the project. Assuming positive outcome of the project as well as the pilot traject, target is to start commercial implementation around 2030 and scale up to hundreds of kton/year SAF around 2035.

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in samenwerking met de Topsector Energie ontsloten.
Voor meer informatie over de Topsector Energie, ga naar **www.topsectorenergie.nl**.

Voor meer informatie over de TSE / Energie-Innovatie regelingen die RVO aanbiedt, ga naar **www.rvo.nl/tse**.