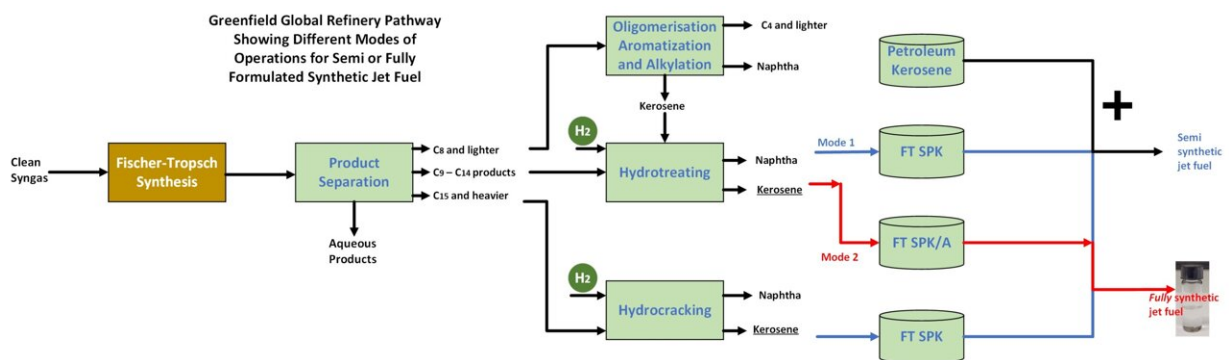


# Synthetic jet fuel is taking off as industry-academic partnership makes case for fully formulated fuel

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Greenfield Global refinery pathway showing different modes of operations for semi or fully formulated synthetic jet fuel. Credit: Greenfield Global/Energy Science & Engineering

Greenfield Global, a leading supplier of fuel ethanol, high-purity alcohols and specialty solvents, have teamed up with scientists at the University of Alberta in Canada, to make a compelling case for fully formulated synthetic jet fuel. This aviation fuel is derived exclusively from renewable feedstocks and would eliminate petroleum-derived kerosene.

The recent study published in *Energy Science & Engineering*, showed the synthesized renewable jet [fuel](#) was indistinguishable from petroleum-

based jet fuel and meets the specifications for kerosene-based fuel produced per standardized international specification. The work highlights the potential of synthetic jet fuel as a drop-in substitute for fossil fuel derived jet fuel.

The research paper also detailed several refining pathways featuring Fischer-Tropsch (FT) synthesis. The pathways involve the conversion of a mixture of carbon monoxide and hydrogen (syngas) produced from the waste biomass and organic municipal waste into a synthetic crude oil that can be refined to produce jet fuel. The refining pathways have the advantage of being effective, flexible and not limited to a specific refining technology.

Speaking to SCI, Dr. Hanan El-Sayed, Senior Process Engineer at Greenfield Global and co-author of the study, explained the advantages of FT refining for sustainable [aviation fuel](#) (SAF):

"Large capacity and scalability are essential factors to consider when producing synthetic jet fuel. Although hydrocarbon-rich feedstocks like waste fats and oils are efficient for short-term production, their availability is limited."

"To meet the long-term goal of fulfilling global aviation demands, synthetic jet fuel production must match that of petroleum. This requires adequate feedstock availability and infrastructure. The advantage of FT refining is its ability to meet the capacity and scalability requirements necessary to achieve this long-term goal."

Nearly a decade ago, Greenfield Global established their objectives to explore the long-term business potential of SAF and develop a fully formulated blend. They have since partnered with the University of Alberta and, through collaborative efforts, developed a unique patented process. The completion of a custom Fischer-Tropsch pilot plant,

marking a significant milestone in the project.

The [research paper](#) also highlights the main barriers in transitioning from petroleum-derived jet fuel to fully formulated synthetic jet fuel at a commercial scale. A primary obstacle centers around regulation.

El-Sayed explained, "Currently, the [regulatory framework](#) in North America does not permit the use of 100% synthetic jet fuel. In contrast, the UK is in a more favorable position due to the provision made by the UK Ministry for Defense DEF-STAN 91-91, which allows for the qualification and utilization of 100% synthetic jet fuel."

"To achieve a similar outcome in North America, we are collaborating with ASTM (American Society for Testing and Materials) to work towards that goal. The pilot facilities will be utilized to produce a sufficient amount of kerosene product required for the qualification process outlined in ASTM D4054."

Meeting global aviation demands is challenging due to the required volume and capacity. According to El-Sayed, addressing this transition will require collaboration among multiple businesses, which is acknowledged in the study.

Greenfield Global aims to overcome the challenges by expanding its technology globally with the support of its partners, using the research findings. "We have utilized this information to make a compelling case for investing in a [pilot project](#), which is currently in progress. Once the pilot project is successfully demonstrated, our plan is to advance to a demonstration-level project, followed by the implementation of a pioneering commercial project," said El-Sayed.

As the [aviation industry](#) continues to prioritize [environmental sustainability](#), collaboration between academia, industry stakeholders,

and policymakers is critical. This paper emphasizes the importance of large capacity and scalability in SAF production.

**More information:** Arno de Klerk et al, Sustainable aviation fuel: Pathways to fully formulated synthetic jet fuel via Fischer–Tropsch synthesis, *Energy Science & Engineering* (2022). [DOI: 10.1002/ese3.1379](https://doi.org/10.1002/ese3.1379)

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