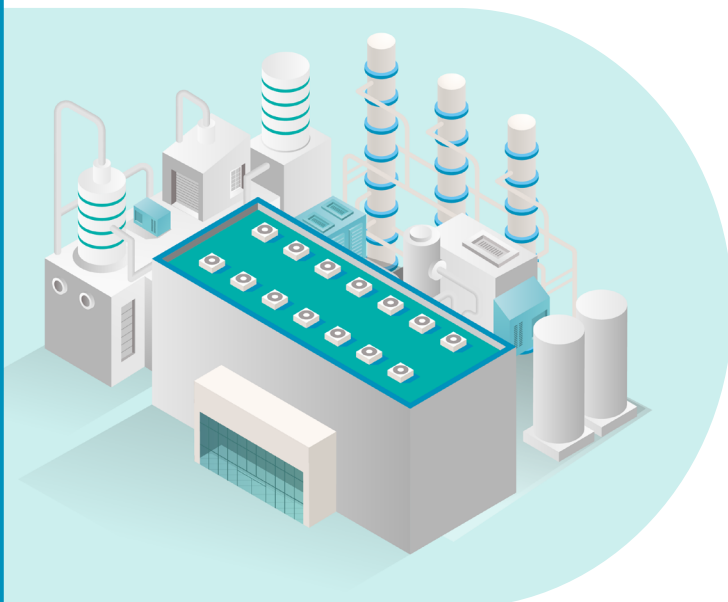




FISCHER TROPSCH AND SUSTAINABLE AVIATION FUEL

Platinum is required across all major SAF production pathways, including Fischer Tropsch

Sustainable aviation fuel (SAF) is emerging as a core pillar of decarbonisation in aviation, with the International Air Transport Association estimating that it could contribute around 65% of the reduction in emissions needed by aviation to reach net zero emissions by 2050. Unlike petroleum-based kerosene, SAF is produced from sustainable, non-petroleum feedstocks such as waste oils, agricultural residues and municipal solid waste, or via synthetic e-fuels combining renewable electricity with captured CO₂.

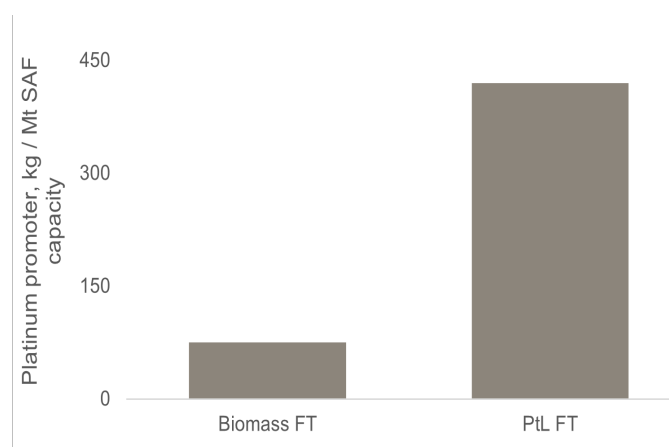
Platinum is required across all major SAF production pathways, including Power-to Liquid (PtL), which utilises the Fischer Tropsch process (FT), as well as the FT process itself. While current platinum demand from SAF is modest, in the long term it is expected to grow significantly.

Originally developed by German chemists Franz Fischer and Hans Tropsch, this year marks 100 years since the FT process was developed. Their research demonstrated that a mixture of the gases carbon monoxide and hydrogen could be transformed over suitable catalysts into liquid and solid hydrocarbons. Today FT is used in myriad industrial applications.

PtL is a synthetic jet fuel produced using renewable electricity, with water and CO₂ serving as the primary inputs. To create a climate-neutral carbon feedstock, green hydrogen and captured CO₂ (from the atmosphere or industrial sources) are used. These

components are then combined through FT synthesis to form liquid hydrocarbons, which are subsequently refined into a kerosene-equivalent fuel.

In the FT SAF production pathway, solid materials such as biomass are first converted into synthetic gas (syngas). This syngas is then processed through FT synthesis into liquid wax. FT has significant scalability potential for SAF production as it can utilise a wide range of feedstocks, including waste materials that would otherwise be discarded. This makes it a strong candidate for commercial scale SAF production, although supportive policies and regulatory frameworks are needed to accelerate its deployment.



Platinum is used to a far greater extent in PtL FT compared with biomass FT (kg Pt required per Mt SAF). Source: WPIC Estimates, Science Direct

The role of platinum

Platinum plays an important supporting role in certain types of FT synthesis. Iron catalysts dominate biomass FT and do not use platinum. However, cobalt catalysts are preferred in PtL FT and these use platinum as a promoter. Even at very low concentrations, platinum improves cobalt catalyst reduction, stability, and dispersion, resulting in higher efficiency and longer lifetimes.

Further, platinum has a significant role in isomerisation, which is needed in both the FT and the PtL FT SAF production pathways, where it functions as a catalyst to transform straight-chain hydrocarbons

into branched isomers with superior cold-flow properties. Without this step, SAF would fail to meet the strict freezing point requirements necessary for safe, high-altitude flight.

WPIC expects annual SAF capacity additions to increase eight-fold from around 2 Mt in 2024 to approximately 16 Mt by 2050, while platinum demand from SAF production is expected to increase from negligible volumes to around 260 koz per annum by 2050. This platinum demand growth will be incremental overall, mitigating the expected decrease in petroleum platinum demand as global markets continue to make their energy transition from 2030 to 2050.

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