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Why the Market for Sustainable Aviation Fuel Will Grow

By: Jun Goh | August 17, 2023

New York - Calvert's research team examines the potential of different energy sources as the globe transitions into a distributed, lower carbon energy system. In our coverage of Renewable Fuels, we identified Sustainable Aviation Fuel (SAF) as the primary lever for air transportation to reduce emissions.

Importance of SAF

Air transportation accounts for only 2.5% of global greenhouse gas emissions today, but absolute emissions from the sector are poised to triple by 2050. Accounting for the lifecycle of the fuel, from production to consumption, SAF produces between 20% and 80% less emissions compared to fossil jet fuel. Very similar in chemical composition to traditional jet fuel, SAF can be blended at rates of up to 50% with jet fuel and be fully compatible with existing refueling and engine infrastructure. SAF is the best positioned technology to lead decarbonization in aviation, other low-carbon solutions such as battery electric and hydrogen lack high energy densities required to power longer haul flights.

SAF is a biofuel that can be produced from a variety of feedstocks, from vegetable oils, fats, greases, to municipal solid waste. It is commonly produced alongside renewable diesel in biorefineries and, in general, competes with renewable diesel for feedstocks and production capacity.

Why we expect the SAF market to grow

SAF's total penetration in global jet fuel supply remains less than 0.1% today, but sources of demand are growing. In the EU, regulators have introduced a new law mandating SAF blending for all-flights departing from EU airports, beginning with 2% in 2025, increasing to 6% in 2030 and 70% by 2050. In addition, many airlines have entered into off-take agreements with SAF producers to secure future production of the fuel.¹

Efforts to facilitate SAF transactions also help strengthen demand signal for the fuel. An industry group called the Sustainable Aviation Buyers Alliance (SABA) has created a procurement process enabling corporates to purchase SAF certificates to reduce emissions from air travel. As with Renewable Energy Certificates (RECs), where companies purchase RECs to reduce emissions from electricity, SAF certificates allow customers to claim the fuel as their own even if it was not actually consumed in their operations.

Over time, we expect biorefineries to favor production of SAF over road-based biofuels. In the long-term, we expect alternative propulsion technologies — namely battery electric vehicles — to drive emission reduction in road transportation, reducing demand for road-based biofuels such as renewable diesel. Based on announced capacity additions, about 30% of global biorefinery capacity will be dedicated to SAF production in 2030, up from about 11% in 2023.²

Remaining challenges

While we expect demand to increase, there will be challenges to ramping up production. Production is not widespread because of costs (SAF is three to five times more expensive than regular jet fuel), feedstock availability and technology. Feedstocks that have high global availabilities, such as municipal solid waste, lack technologies to process them at commercial scale today. On the other hand, feedstocks such as used cooking oil and vegetable oils have economic methods of production but are scarce in supply. Expansion of virgin vegetable oil production is possible but introduces deforestation risks in some regions. As such, investments into novel technologies are necessary to bring production costs down and unlock sources of feedstocks greater in supply.

Bottom line: Calvert sees long-term potential for SAF to decarbonize air transportation. As the market develops, responsible investors have to evaluate new risks and opportunities, paying close attention to innovations that lower unit cost of production and the sustainability characteristics of feedstocks.

1. International Civil Aviation Organization. SAF Offtake Agreement Dashboard. Accessed August 7, 2023.

2. Bloomberg New Energy Finance. Global Renewable Fuel Project Tracker. Accessed August 7, 2023.

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