FuelForward Fund

CHALLENGE

Aviation is a key driver of climate change, accounting for 2-3%[1] of all global emissions, and demand for flights is projected to further increase by 44% until 2050.[2] While usage of green hydrogen engines or electrification might be possible in other transportation industries, similar concepts for long-haul flights, are not feasible due to the lower energy density of alternative fuel types.

This highlights a need to find other ways of reducing CO2 emissions in airplanes and several legislatures around the world have honed-in on Sustainable Airline Fuels (SAF). For example, under the ReFuel EU Plan, the European Union (EU) has proposed a mandatory target of 5% SAF blend-in by 2030 and 63% by 2050.[3]

While there is an overall technology risk as several types of SAF are competing for dominating future production, HEFA (hydroprocessed esters and fatty acids), which is currently the only SAF in commercial use, is comparatively easy to produce and can be produced at the desired scale.[4] It can also be sustainably sourced as HEFA is produced from waste and residue oils rather than vegetable oils.

While this appears to be a viable solution to reduce emissions, it poses several steep challenges for both the economics, as well as the availability of supply, for airports, airlines and other stakeholders in the industry. Currently, the total global supply of SAF is estimated at 0.24 million tons, while the EU's target of 5% blend-in will require 2.3 million tons, disregarding other geographies.[5]

With air travel being an inherently global industry, more challenges arise for airlines to be compliant with upcoming regulation. While the EU focuses on a penalty approach for non-compliance, the UK and US provide incentives for manufacturers like grants or interest-free loans. Therefore, the EU has yet to address how it will increase SAF production capacity.

SOLUTION

FuelForward is a private equity fund which aims to address SAF supply issues through the acquisition of oil refineries which will be used for SAF production. Given decreasing demand in the EU for fossil fuels and higher penalties for carbon emissions, oil refineries in the EU are increasingly facing closure or underutilization.

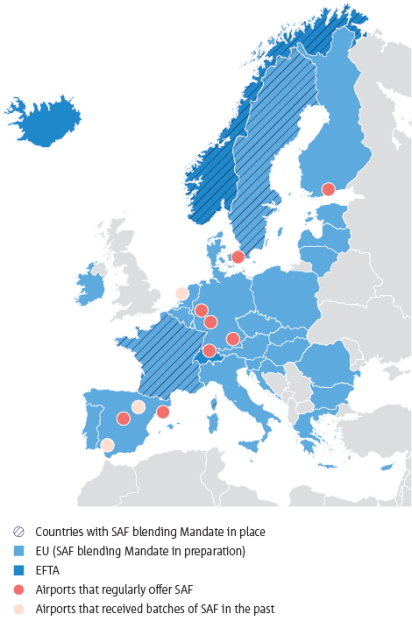
This provides an opportunity for FuelForward to acquire existing oil refineries rather than invest additional capital in the construction of entirely new SAF facilities. The acquisition method is cost-effective, lower risk and will generate returns in a much shorter time span thereby attracting greater private investment in biofuel production. It also enables impact on several dimensions: reduced carbon emissions per passenger-kilometer by up to 80%[6], reduced unemployment arising from the revival of oil refineries for SAF production and greater cooperation with feedstock farmers. Acquiring refineries also helps to avoid the costly process of dismantling heavy equipment and remediating the land.

Private investment from FuelFoward into SAF production will work in tandem with government funding of feedstock farmers and strategic use of sewage facilities to enhance waste sources required to increase SAF production capacity. Investments into FuelForward will provide attractive returns while providing both environmental and social benefits. Potential government subsidized financing (as it is desired by governments to refit & keep open otherwise closed-down refineries) would boost returns further.

GEOGRAPHY

Globally, 14% of oil refineries face risk of under-utilization or closure by 2030 and could grow to 50% by 2040.[7] Europe specifically is prime for oil refinery acquisitions as it has been disproportionately affected by the energy transition compared to other regions. This is due to faster expected decline in regional demand, higher energy costs and rising CO2 prices under the EU Emissions Trading System (ETS).[8]

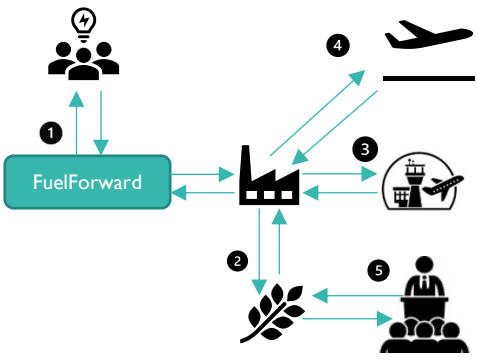
The EU has some of the busiest airports for international travel, including Paris Charles de Gaulle which has been actively testing SAF-fueled flights in collaboration with Total.[9]



Investment Vehicle	SPV, Private Equity
Asset Class	Real Asset
Investment Size	€120m
Total Addressable Market Size	€10Bn+
Target Investors	Impact-oriented investors, family offices, institutional investors, private equity
Target IRR	13.2% (gross)
Management Fee	0.25% AUM
Time Horizon	6 years
Geography	European Union (EU)

FUND STRUCTURE

1. Investors provide equity capital to FuelForward for acquisition, payout of cashflows over 6 years.
2. Used cooking oil and bio waste is used for HEFA production
   Long-term strategic supply agreements for bio waste supply
3. SAF claims provided to airlines
   Offtake agreements with SAF facilities
4. Airports achieve SAF mandated blend-in rates
5. Legislators provide grants to feedstock farmers and source public sewage facilities for untapped bio waste
   CO2 savings contribute to emissions savings targets



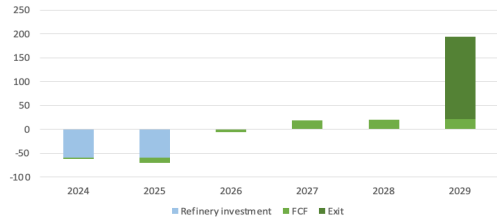
KEY ASSUMPTIONS

- HEFA remains main SAF technology until at least 2045. It is assumed that other technologies, especially P2L only become price competitive and scalable towards 2050.

- We assumed stable prices due to an offtake agreement with carrier in line with AA 2027 offtake agreement. Ramp-up of production capacity over 2 years after refitting the refinery for SAF[10].

- Refinery capacity, acquisition and sale cost based on past oil refinery acquisitions and re-fitting, e.g. Neste Rotterdam, Total Le Mède[11].

CASH FLOW MODEL



IMPACT

7 AFFORDABLE AND CLEAN ENERGY

KPIs:
- Total direct global greenhouse gas ("GHG") emissions per airline
- Efficiency measured as GHG emissions per passenger-kilometer
- % of HEFA prices on overall cost of fuel per flight

13 CLIMATE ACTION

KPIs:
- Reduced indirect GHG emissions (based on life-cycle assessment) from waste feedstock
- Increased SAF blend-in rate by offtakers per flight

8 DECENT WORK AND ECONOMIC GROWTH

KPIs:
- Increased rate of employment in communities living within 100 km of Fuel Forward refinery
- Increased rate of employment for high-value innovative work within 100 km of Fuel Forward refinery measured as annual growth rate of real GDP per employed person

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

KPIs:
- Compliance with RED-II Sustainability Criteria and CORSIA Sustainability Criteria
- Reduction in CO2 and toxic gas emissions as a result of state-of-the-art retrofitting and increase in quality of surrounding water bodies

SCALABILITY

FuelFoward's initiative is highly scalable as the fund can acquire oil refineries across the EU and save costs through synergies. The EU taxonomy also pushes growth in SAF production by mandating blend-in targets and advocating tax credits.

RISK & MITIGATION

Risk	Mitigation
Legal risk: EU focuses on penalties rather than subsidies	Acquiring refinery in the Netherlands makes use of state-level subsidies and benefits. Experts foresee an increase in subsidies either on state or EU-level as SAF is not economically competitive otherwise, which could be leveraged if implemented soon enough before fund acquisition.
Market risk: Limited feedstock supply	Feedstock volumes required to cover breakeven production level would be contracted long-term with strategic supplier. Suggested Rotterdam port location will allow for easy access to both domestic feedstock which is readily available in NL due to high rates of UCO collection as well as imported feedstock where necessary (e.g., Jatropha).
Operational risk: Costs of decommissioning and running brownfield plant vs. greenfield plant	Building consortium with previous owner & operator plus experienced technological partner to build out SAF production line creates buy-in and de-risks it. Lower resulting investment requirements also increase project IRR significantly, making SAF output more price competitive, even at smaller scale production facility.
Environmental risk: Feedstock source contravenes Sustainability Criteria	As RED-II criteria is constantly being refined towards stricter standards, only waste-derived feedstock with completed life cycle assessment (LAC) will be used.[13] If required, additional feedstock from Jatropha, a non-food competing sustainable feedstock grown in Sub-Saharan Africa will be used. Third party auditors will be engaged to permanently ensure that production facilities and product are in line with sustainability standards.
Technology risk: Other SAF technologies become more price competitive	Short investment period reduces risk, since economic viability of e.g., P2L is only forecasted for 2050. Meeting the required SAF production capacity to reach sustainability goals around the globe will be an enormous task that requires all available capacity that could potentially be used, even if some of it at a higher price.

FOOTNOTES

1. https://ourworldindata.org/co2-emissions-from-aviation
2. https://www.eurocontrol.int/article/aviation-outlook-2050-air-traffic-forecast-shows-aviation-pathway-net-zero-co2-emissions
3. https://www.easa.europa.eu/en/light/topics/fit-55-and-refueleu-aviation
4. https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/659361/EPRS_BRI(2020)659361_EN.pdf
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6. https://www.iata.org/en/iata-repository/pressroom/fact-sheets/fact-sheet---alternative-fuels/
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11. https://www.neste.com/about-neste/who-we-are/