Financing aviation decarbonisation

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Introduction

Aviation decarbonisation is associated with significant costs and investments for all stakeholders. For manufacturers, this implies research and development of aircraft with advanced tube-and-wing, or unconventional airframe/propulsion. Developments in Sustainable Aviation Fuel (SAF) beyond existing drop-in options towards hydrogen/electric powered aircraft will also require fundamental changes in airport infrastructure. To achieve these developments, massive public and private investments are required.

While access to finance is a critical factor in enabling the aviation sector to decarbonise, the market conditions driven by the COVID-19 outbreak, coupled with growing levels of sustainability ambition from States also bring about a unique set of challenges and opportunities.

Financial stakeholders are looking closely at the opportunities and taking action. This article provides perspectives from different but complementary private financiers.

Perspectives from large private banks, by Michael Halaby

Aviation remains one industry that is difficult to decarbonise.

Aviation is a capital-intensive industry in which commercial aircraft cost anywhere from single digit millions up to nearly USD200 million. As such, most airlines and aircraft leasing companies require outside financing to acquire aircraft. These funds will generally come from equity and debt investors as well as from lenders. Market participants believe, despite Environmental, Social, and Governance (ESG) concerns over aviation, that the sector will continue to grow for the next several decades due to a rising middle class and the increasing inter-connectivity of our world. Boeing predicts ~43,500 new aircraft worth USD7.2 trillion in list prices to be sold by 2040[3]. While the "S" and the "G" are also important, the focus at the moment is on the "E" to meet the Paris Agreement of 1.5ºC.

CO_2 emissions per passenger has reduced[4] by 50% over the last 30 years and the industry has pledged net zero emissions by 2050. The sector is viewed as a transition sector – i.e., difficult to abate. In order to incentivise the industry to move to net zero, various participants – such as financiers – are working on strategies to assist airlines and lessors achieve this goal. It is, however, unclear if we will reach this milestone based on current technology.

What are financiers doing to assist in the drive to net zero? At present there are no national or international regulations to follow. In Europe, we see the emergence of the EU Taxonomy but the rules around aviation decarbonisation have yet to be implemented. It is early days still as debt and equity investors consider options but there are a few strategies emerging. One broad way to incentivise airline and lessors to reduce emissions is to offer a financial incentive or disincentive to airlines based on their (Scope 1) emissions which are the financiers' (and lessors') Scope 3. Tangible, measurable facts (KPIs, or key performance indicators) are required to objectively track emissions.

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3 https://www.boeing.com/commercial/market/commercial-market-outlook/index.page
4 https://www.iata.org/en/pressroom/pr/2019-12-12-01/

As financiers begin to measure their Scope 3 emissions, some are constructing terms to encourage relative and absolute reductions in emissions from airlines. This needs to be done thoughtfully and carefully so as to avoid accusations of greenwashing. These KPIs need to be achievable but also challenging. For example, we have witnessed several transition debt financings in which the borrower would receive a discount on their borrowings if they reduce the grams of CO_2 per revenue passenger kilometre ("CO_2/RPK") over a period of time (such as the life of the debt). While most of these loans and bonds do not disclose details for competitive reasons, we expect these will – and should – become more publicised over time.

We further witness airlines and lessors looking at new technology such as sustainable aviation fuel (SAF) as well as hydrogen- and electric-powered aircraft development. Financiers will likely consider SAF as something to incentivise airlines and lessors for financing. While these strategies are in their infancy at the moment, we expect financiers to consider these potentially mitigating investments as ways to reduce emissions over time. It is expected that by 2050, all aircraft could be flown using the above technologies. However, it will require significant and expensive investment. Other incentives could be to offer discounts to encourage behavioural change such as air navigation improvements, or green-electric-powered ground handling equipment and airport infrastructure.

Perspectives from a private investment firm, by Christian Pho Duc

For Smartenergy, the smartest investments for the decarbonisation of aviation are Renewable Energy Sources (RES) investments.

The nature of a private investor is the independence from other bodies in its decision to invest. This allows fast decisions, engaging into opportunities at an early stage with entrepreneurship and a risk-taking spirit. Since its first day, Smartenergy has focused into renewable energies and has added hydrogen (H2) projects into its development portfolio as the missing link for full decarbonisation of hard-to-abate sectors, including aviation. By now the H2 pipeline of approx. 700MW electrolyser capacity and approximately 1,2 GW of co-located RES for the production of over 30.000 tons of H2 with projects in various development stages addresses applications in industry, mobility, and de-carbonizing the gas grid.

Current renewable hydrogen projects often lack the clear commitment and willingness to pay from the off taking. The decarbonisation of aviation will likely follow several paths but, as of today, renewable hydrogen is one of the future solutions for mid-range flights and, at least for long haul flights, there is no alternative to e-kerosene. For the decarbonisation of aviation, both products need to be sustainable, with zero emissions. The binding Sustainable Aviation Fuels targets set out in the proposed European Union ReFuelEU regulation are expected to solve the number one challenge for investment into H2 projects: the off taking of high volumes.

Smartenergy has reviewed its H2 project pipeline to make it suitable also for e-fuel and e-kerosene production and already has projects in active development, such as the "Montealegre" project.

Besides the availability of land, input materials (water, CO_2) and infrastructure, the direct access and control of a large amount of renewable power is key. Given the expected demand volumes of H2, many consider using H2 from fossil fuel with CO_2 capture (blue hydrogen) or H2 generated from nuclear power (pink hydrogen). Fully committed to sustainability, Smartenergy has ruled out these options for its investments. Not only blue hydrogen still poses challenges related to methane and CO_2 leakages, but also the dependency on fossil fuel persists. Being dependent on fossil supply and volatile prices, this option also does not have a compelling cost down roadmap – for Smartenergy, such investments have the high risk to become stranded assets.

Although nuclear power can produce large volumes of energy, its production is associated with well-known safety and security risks, its environmental impacts (notably waste management) are not resolved, and the sector is highly dependent on uranium supply. Therefore, for Smartenergy, as for the blue hydrogen option, the option of nuclear power which on top is very expensive is unlikely to be a sustainable solution for the future.

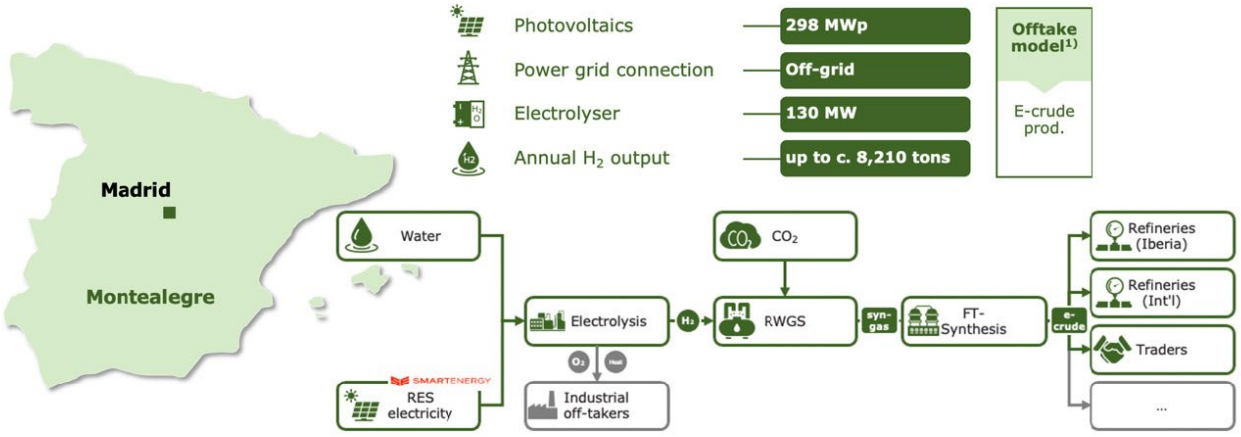

FIGURE 1: Scheme of the Montealegre project

Producing H2 and e-kerosene from decentralised renewable power, using CO_2 from the air or re-using the emissions from industry, is the most elegant setup conceivable for Smartenergy.

Perspectives from a venture capital, by Clyde Hutchinson

2021 has been a landmark period for start-ups in Sustainable Aviation Fuels (SAF). We have seen momentous activities from airlines securing their largescale, long-term delivery pipeline to significant inflection investment points. In March 2022, Neste partnered with BP to pledge to deliver over 800 million litres of SAF to DHL Express by 2026. Previously, in September 2021 alone, we saw a furry of airline deals from Delta, Jet Blue and United Airlines to secure $3.5 Billion of SAF from for Aemetis, SG Preston, and Honeywell/Alder. Meanwhile, SkyNRG struck massive deals with Boeing, Bank of America and Alaska Airlines.

Staying with SkyNRG for a moment, the company marked another milestone in the history of SAF when they became are the first in the world to receive ICAO's RSB CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation) certification, thus allowing their airline customers to reduce the need for external carbon offsets to count towards their CORSIA and other carbon reduction targets. SkyNRG also partnered with SAF technology company, Lanzatech, to develop Europe's first programme to convert waste-to-ethanol to SAF at a scale of over 30,000 tons/yr. This is being funded using €20M grant from European Commission's Horizon 2020.

Such partnerships mark the significant inflection of SAF tech companies' valuations. In March 2022, LanzaTech announced their plan to go public in a SPAC deal, valued at $2.2 billion. These orders, partnerships and evaluations have attracted major venture capital funds to the world of SAFs (Sustainable Aviation Fuels). The leading energy venture fund, Breakthrough Energy have partnered with American Airlines, Microsoft and GM to focus on SAF and green Hydrogen. American Airlines reported put $100M into this initiative, a strong signal to the investment community of potential returns from investing in SAF and related technologies. This year has seen even traditionally sceptical airlines make moves in this space, such as Ryanair donating €1.5M for the development of the Ryanair Sustainable Aviation Research Centre at Trinity College Dublin. It might prove to be a smart move as some of the most interesting SAF start-ups, such as Dimensional Energy or Phycobloom, are university spinouts.

In terms of Team ABC, we see significant opportunity in funding start-ups with supportive technologies in the SAF space, from novel technologies to biotechnology, circular economy to digital platforms, to create the infrastructure for the SAF supply chain. With the recent US Securities and Exchange Commission (SEC) declaration that airlines will be required to report actual greenhouse-gas emissions in as little as two years, we see this upward investment trajectory continuing exponentially.