Fly Responsibly, an airline perspective

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Introduction

The climate crisis continues to intensify, as highlighted in the 6th Assessment Report of the Inter-governmental Panel on Climate Change (IPCC) from their Working Group 1 (IPCC, 2021). The report links human-caused activities to global warming, highlighting that global temperatures, on average, have been 1.1°C degree higher during the decade 2010-2019 than in the pre-industrial era. Consequences of such warming include rising sea levels, extreme heat waves, floods, severe droughts, and irreversible trends such as glaciers and polar ice caps melting away.

Aviation is one of the hardest-to-abate sectors vis-a-vis carbon emissions. Over the past three decades, the sector's carbon intensity decreased by 1.5% per year on average. Yet, annual global aviation CO_2 emissions have increased steadily, from 400 million tonnes in 1990 to 900 million tonnes in 2018 (for scope 1 emissions), as seen in Figure 1 below. The increase in absolute emissions has been driven by worldwide air traffic growing at an average annual rate of approximately 5%. From 2005 to 2019 aviation emissions have grown by +42% in absolute terms.

Time is of essence in the global race to fight the climate crisis. To limit the temperature, increase to less than 2°C, and strive for 1.5°C by the end of this century. CO_2 emissions worldwide must start to decline immediately, at an average rate of 5% per year. For aviation, this calls for a break in a structural emissions growing trend towards stabilization, and steady decline at a rate compatible with a well below 2°C climate trajectory.

(Carbon intensity in grams CO_2 per passenger-km)

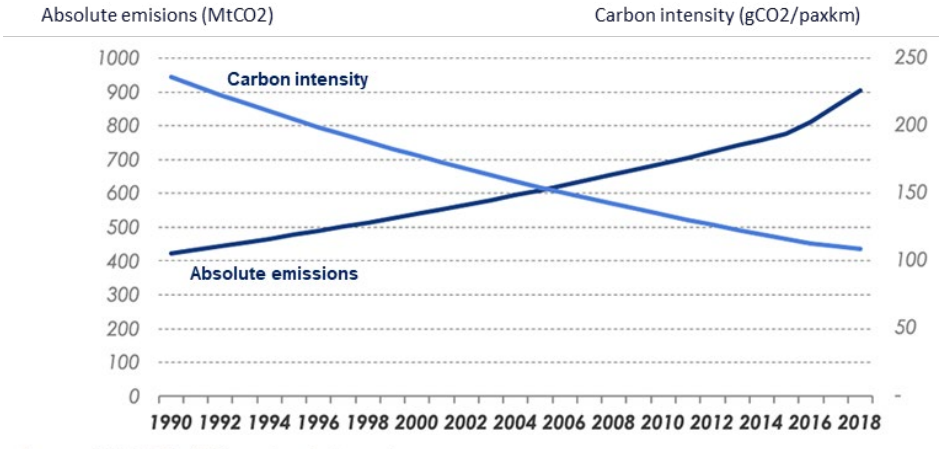

FIGURE 1: Change in Absolute Emissions and Carbon-Intensity in Aviation: 1990-2018[1]

1 *ICAO, IATA, ATAG; Carbone 4 analyses* (Meunier & Amant, 2020)

This article aims to shed light on the experience from Air France and KLM while embarking towards a Paris Agreement compatible decarbonisation trajectory, on the latest enhancement of emissions reductions levers to reach this goal, and on the necessity for all sector's actors to join forces under a credible, science-based emissions reduction ambition.

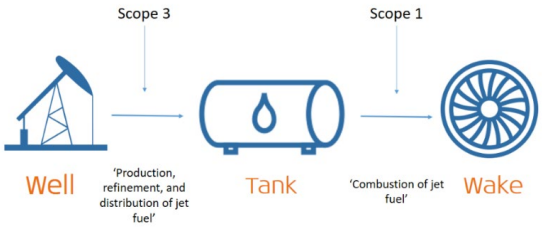

FIGURE 2: "Visualisation Well-to-Wake."

The Science Based Target initiative as the emerging reference in climate objectives

Over the past years, Air France and KLM have been working on her own climate ambitions and reporting their emissions. Both air carriers have been, and are active, at a national, European, and global level, to cooperate, innovate and define agreements. However, they both acknowledge that they should go beyond ambitions that they see as feasible, and work towards ambitions that are needed to operate inside the limits of our planet.

The earth has clear limits as to how human-kind use their resources and the volume of emissions that they generate. Therefore, both air carriers committed to the Science Based Target initiative (SBTi) in November 2021 and updated their emissions reduction targets accordingly in April 2022.

In Table 1 below, Air France-KLM's current CO_2 reduction target is presented, portraying –30% relative reduction, and based on this a forecast of -12% absolute. These are based on the scientific guidelines and calculations for the aviation sector specifically from the SBTi[2], and thus creates a roadmap to reach the Paris Agreement objectives.

TABLE 1: "Overview CO_2 Reduction Targets AF-KLM Group."

CO_2e reduction targets AF-KLM group	CO_2 reduction in 2030 compared to 2019 (scope 1 & 3)
Intensity target (ppkm)	-30%
Projected absolute reduction (based on SBT forecasts)	-12%

Three aspects of these targets are important to note. First, these current targets cover Air France and KLM's scope 1 and 3 jet fuel emissions, Well-to-Wake (Figure 2) as named by SBTi. Second, following the SBTi guidelines, to achieve these, market-based measures, and offsetting, that both are not counted towards the overall CO_2 reduction. This is in-line with the consensus within the scientific community that the priority to fight climate change should be put towards strict GHG emissions reduction. Third, industry-wide growth should be considered in the forecasts.

The Initiative

The SBTi is a partnership between four Non-Government Organizations (NGOs) and knowledge institutions: the Carbon Disclosure Project (CDP), World Resources Institute (WRI), and the United Nations (UN) Global Compact and World Wide Fund for Nature (WWF).

SBTi helps private-sector organisations to set climate targets in line with the Paris Climate Agreement, based on what science tells them is necessary to honour the Agreement, and to give aid in the development of concrete short and medium-term targets. These guidelines are based on scientific data and assumptions from the International Energy Agency (IEA) and latest IPCC report, and are developed in collaboration with industry experts. To keep the sector's decarbonisation pathway aligned with the Paris Climate Agreement goals, the SBTi introduced guidelines specific to aviation for target development in August 2021are well below 2°C. By establishing this SBTi pathway, both air carriers can further reduce our CO_2 emissions systematically in a transparent manner.

Currently, a 1.5°C pathway is currently under development for the aviation sector by the SBTi, which will be integrated into the SBTi Aviation Guidance and accompanying target-setting tool. Once the pathway is updated, both Air France

2 SBTi tool Aviation, 2021.

and KLM will update their targets in line with SBTi guidance accordingly to 1.5°C. Both air carriers' current projections are based on a below 2°C scenario.

Air France and KLM decarbonisation levers

Defining science-based Green House Gas (GHG) emissions reduction goals is a critical step for air sector actors to engage in climate change mitigation. The biggest challenge, for a sector considered as one of the most hard-to-abate ones, will then be to fulfill those goals. As there is no silver bullet, achieving aviation decarbonisation will require a combination of GHG reductions levers, with different emissions reduction potential, levels of development, and challenges associated with implementing each of them.

Capitalizing to the largest extent on short term levers: fleet modernisation, Sustainable Aviation Fuel (SAF) operational measures, and other measures like intermodality are highlighted as follows:

- **Fleet modernisation:** Fleet renewal is the most impactful short term lever to reduce CO_2 emissions as new generation aircraft generate 20 to 25% less CO_2 per seat kilometer vs the aircraft they replace. Despite the COVID crisis Air France maintained a €1 billon annual investment cycle to add 60 short- and medium-haul Airbus A220s, as well as 38 long-haul Airbus A350s. It is also worth noting that new generation aircraft offer significantly lower noise footprints (34% lower in the case of the Airbus A220 compared to Airbus A319-A320s), a significant environmental externality affecting communities living near airports. From late 2023 onwards, KLM will replace their existing Boeing 737 NG by new Airbus A320neo/A321neo aircraft will begin replacing KLM and Transavia's existing Boeing 737 NG aircraft on European routes. Having previously opted for the Embraer 195-E2 aircraft for intra-European flights, this new order is an important step in enhancing sustainability. The Airbus A320neo family not only produces 50% less noise than the current, older generation of aircraft, but also reduces fuel consumption and CO_2 emissions to 15%.
- **Sustainable Aviation Fuel:** SAF will be key to supporting Air France and KLM's energy transition. By mobilizing the eco-system, Air France-KLM has established innovative partnerships with corporate clients, suppliers, airports, and logistics partners. Furthermore, as part of its WWF-Netherlands partnership and Green Deal commitment, in 2012 KLM launched the KLM Corporate Biofuel program, a first for aviation. Furthermore, in 2022 KLM voluntarily announced to start blending 0.5% SAF for flights departing from Amsterdam. Finally, since the start of 2021, cargo customers can also aid the development and production of SAF through the Air France-KLM-Martinair Cargo SAF Program. Customers can now buy SAF for their loads in the cargo flights. To reach their goals, they need to go beyond their current commitments. They have already made a commitment of 10% worldwide, however they realise that this may be not enough. Therefore, the options to be evaluated are whether more SAF can be purchased, or whether SAF with a higher sustainability level than 75% is opted for. The latter significantly impacts the reduction potential of SAF.
- **Operational measures:** From reducing as much weight on board to eco piloting; operational measures seem to have a small CO_2 reduction potential, but cumulatively, they make a significant impact. One of these measures' worth mentioning is eco-piloting: Pilots apply, whenever possible, the mostfuelefficient procedures; Flight Plan precision, speed adjustments and optimized trajectories, and, on the ground, taxiing with half of the engines shut down. New Artificial Intelligence (AI)-based tools can help ensure the best application of such fuel efficiency practices for each flight. For example, Air France cockpit crews use SkyBreathe®, developed by Openairlines, a French start-up company. Further flight optimization measures could also be deployed, driven by regulators, airports, and airlines. Significant CO_2 emissions reductions, for example, can be achieved through traffic and airspace optimization. In Europe, the Single European Sky project aims for the better management of air traffic that could lead to 10% CO_2 reduction for intra-Europe traffic. Air France and KLM are proactively involved in the SESAR program, which contributes to the targets of the Single European Sky (SES) for the better management of air traffic.

- **Intermodality:** Collaboration with railway systems can have short-term benefits in terms of overall GHG emissions as well as meeting a growing customer demand that favors low-carbon alternatives when they exist. In the case of Air France, the past year has seen a reinforcement in its cooperation with the French railways operator SNCF, with the extension of joint product "Train + Air", offering high speed short haul train service on 33 routes in connexion with medium or long haul flights. This service offered by KLM provides transfer passengers the option of boarding a Thalys high-speed train instead of a flight on the Brussels-Schiphol leg of their journey (or vice versa). Before the Covid-19 pandemic, 20 to 25% of these passengers (some 36,000 customers) chose this option. KLM and Thalys would like to increase this percentage, and KLM is consequently purchasing enough seats from Thalys, which makes one of its daily services between Brussels and Schiphol redundant. Customers are now welcome to book these seats on KLM.com for travel dates starting 17 July 2022.

From ambitious targets to industry action

For both air carriers, it is clear that they should strive towards ambitious targets together with the whole industry. However, it is important that they should also take action together. As Air France and KLM, they are not looking for only reaching their own targets, they both want to create a sustainable industry. A good example of working towards a sustainable aviation industry was the participation of Air France and KLM in the Sustainable Flight Challenge presented by SkyTeam in May 2022.

The Sustainable Flight Challenge was the "brainchild" of a group of KLM employees called the Bold Moves, who in a quest for ambitious new ways to make flying more sustainable, drew inspiration from the 1934 'Greatest Air Race' from London to Melbourne. During this race, flight pioneers proved how long-distance commercial aviation was possible. The Sustainable Flight Challenge takes up the baton from these early innovators to make sustainable air travel a reality.

SkyTeam was so inspired by The Sustainable Flight Challenge idea, that they brought it under the alliance umbrella to encourage all member airlines and their partners to take part. The Sustainable Flight Challenge is one of the ways SkyTeam and its members are supporting their recent partnership with the United Nations Sustainable Development Goals (UNSDGs), which also forms the basis for the initiative.

Although sustainability is not a game, gamification will push the boundaries and encourage creativity. That is why the air carriers initiated The Sustainable Flight Challenge: 17 airlines have given it all, to fly their most sustainable flight and, most importantly, share their experiences, innovations, and ideas, as the challenge is working with an open-source principle.

The Sustainable Flight Challenge is not really about the rewards. It is about putting their collective heads together, being responsible, and finding innovative ideas and practical solutions. Everyone wins. As members of SkyTeam, they do not compete on safety, nor should they on sustainability. With this challenge, they want to bring about faster innovation for sustainable aviation. So that reuniting with loved ones on the other side of the world or growing your business in Europe will still be possible in a sustainable way in the future.

Hopefully, they can invite all airlines to step up their game and join this challenge with Air France and KLM in the years to come.

Opportunity for the industry to embark on a sustainable journey

Both Air France and KLM agree that the aviation requires the entire industry to embark on a sustainable journey. As civil aviation's share of emissions is only increasing, the industry needs to act on a global level in order to effectively reduce absolute emissions. As an aviation sector, in goal setting, the sector has the tendency to focus on feasibility but is their obligation to move towards goals that are needed to avoid a climate crisis. SBTi is an independent body which helps them set these goals.

It is a difficult journey, but only together can the possibility to create sustainable aviation for every global citizen become a reality.