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Société Air France

Reasonable assurance report by one of the Statutory Auditors, appointed as independent third party, on the CO_2 emissions and fuel consumption calculator of Société Air France for the calendar year 2022

Société Air France.
45, rue de Paris, 95747 Tremblay-en-France
This report contains 8 pages

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To the management of Société Air France,

In our capacity as Statutory Auditor of your company (hereinafter the "**entity**") appointed as independent third party, we have undertaken a reasonable assurance engagement on the conformity of the calculations produced by the CO_2 emissions and fuel consumption calculator for the calendar year 2022 (hereafter the "**Calculator**"), available at the date of this report on the Air France website, of the flights operated by the entity with the "Calculation methodology and purpose AF CO_2 Calculator 2023" (hereinafter the "**Calculation Methodology**") as attached to this report.

The conclusion below is limited to the online Calculator and does not cover the entire website.

Conclusion

In our opinion, CO_2 emissions and fuel consumption of flights operated by Air France, HOP! and Transavia, or flights from the integrated network under KLM or Delta Airlines codes for which their own CO_2 efficiency is taken into account are calculated, using the Calculator, in all material respects, in accordance with the Calculation Methodology attached to this report.

How the entity has determined the calculation of the CO_2 emissions and fuel consumption

In the absence of a normative reference for the calculation of aircraft fuel consumption and CO_2 emissions, the entity has developed its own methodology in accordance with IATA[1] guidelines.

Inherent Limits in determining the calculation of the CO_2 emissions and fuel consumption

There is inherent uncertainty in quantifying these emissions due to the incomplete scientific knowledge used to determine the CO_2 emissions and fuel consumption factors.

[1] International Air Transport Association

Responsibility of the entity

The Sustainability Direction of the entity is responsible for:

- setting up the Calculator on the website and update it every year;
- selecting or establishing appropriate criteria for determining the calculation methodology used in the Calculator;
- define the calculation methodology specified in the attached document and used to determine the data for the period from January 1 to December 31, 2022, relating to CO_2 emissions and fuel consumption set up in the Calculator;
- designing, implementing, and maintaining internal control relevant to the design and the functional of the Calculator to provide results in accordance with the Calculation Methodology that are free from material misstatement, whether due to fraud or error.

Responsibility of the independent third party

Our responsibility is to express a conclusion of reasonable assurance that the CO_2 emissions and fuel consumption data are calculated, using the Calculator, in accordance with the methodology described in the attachment named "Calculation methodology and purpose AF CO_2 Calculator 2023".

Professional standards applied

Our work described below was carried out in accordance with the professional doctrine of the National Company of Statutory Auditors (CNCC) applicable to this type of mission and the international standard ISAE (International Standard for Assurance Engagements) 3000 (revised)[2].

Our independence and quality control

We have complied with the independence and other ethical requirements of the International Code of Ethics for Professional Accountants (including International Independence Standards) issued by the International Ethics Standards Board for Accountants, which are based on the fundamental principles of integrity, objectivity, professional competence and diligence, confidentiality, and professional conduct.

Our firm applies International Standard on Quality Control (ISQM) 1 and, accordingly, maintains a comprehensive quality control system that includes documented policies and procedures with respect to compliance with ethical rules, professional standards and requirements applicable laws and regulations.

[2] ISAE 3000 (revised) - Assurance engagements other than audits or reviews of historical financial information

Means and resources

Our work engaged the skills of five people between December 2022 and June 2023 and took a total of two weeks.

Nature and scope of procedures

We performed the following activities:

- We assessed the suitability of the criteria of the Calculation Methodology with respect to their relevance, completeness, reliability, neutrality, and understandability;
- We reviewed the processing of the fuel performance source data of each type of aircraft that are used in the CO_2 Calculator and, in particular, the Calculation Methodology used for the Calculator;
- We spoke with the people responsible for the Calculator to gain understanding of the calculation process and system in place;
- We performed detailed tests on a sample of flights based on calendar year 2022 fuel data in order to verify that the calculation process had been implemented correctly in accordance with the "Calculation methodology and purpose AF CO_2 Calculator 2023" attached to this report. For these flights, we performed arithmetic tests on the CO_2 emissions and fuel consumption calculation process, comparing results with the Calculator results.

During our work, we have been assisted by the experts in Environment and Sustainable Development from the ESG Center of Excellence of KPMG.

We believe that the sampling methods and sample sizes used, based on our professional judgement, were sufficient to enable us to provide reasonable assurance.

Paris-La Défense, on 20th June 2023

KPMG S.A.

Eric Dupré
Partner

Fanny Houlliot
ESG Expert
KPMG France ESG Center of Excellence

Appendix: Calculation methodology and purpose AF CO_2 Calculator 2023

The purpose of AF's CO_2 and fuel calculator is to calculate the amount of CO_2 emissions and fuel consumption of passengers and cargo loads during a specific flight. The calculation is performed for each departure and arrival airport, which makes it possible to indicate the CO_2 impact for each passenger or 100 kg cargo. This helps to define how much CO_2 should be compensated for in our CO_2 compensation service, or how much Sustainable Aviation Fuel (SAF) is needed to reduce the impact of a trip.

The CO_2 Calculator includes flights operated by Air France (AF). For AF's integrated network with KLM (KL) and Delta Airlines[3] (DL) aligned data based on their own CO_2 emission calculations are used. The calculator also includes all data of flights operated by Transavia (TO). Only scheduled flights are considered. That means that for wet leases and code share partners the average emissions are assumed to be equal to the overall efficiency of the AF operations for short-, medium- and long-haul flights.

To be as close to the actual impact per passenger or 100 kg cargo there are three essential elements in the calculations. I) The data that is used, II) The principles of the calculation and III) The implementation. This document explains all the elements and their subsequent steps. To reassure a correct approach and execution of the calculations KPMG France performed a consistency review for both Air France and KLM.

I. OBTAINING THE DATA

For all Air France Group flights, the necessary data are based on actual flight data gathered at each flight by the aircraft onboard systems. All these data are automatically transferred to the AF data warehouse for use in calculations and analysis. The fuel consumption data per aircraft type that is used in the calculations consist of: The fuel use per 100 kg payload per 100 km "bird eye distance", the passenger-kilometers traveled (PKT) and the ton-kilometers travelled (TKT). All this is abstracted over the previous calendar year and translated into fuel-efficiency data for the fleet.

Justification of data collection

The principles of IPCC 2006[4], TIER 3A, are being used in collecting and calculating data on fuel burn and actual load per O&D-segment[5] and aircraft type. KLM used the same principles and has also been part of the KPMG engagement.

[3] Delta Airlines data have not been part of the KPMG engagement.
[4] 2006 IPCC Guidelines for National Greenhouse Gas Inventories; Chapter 3.6 Civil Aviation
[5] O&D stands for origin and destination

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II. PRINCIPLES OF CALCULATION

The methodology is based on the average fuel consumption per passenger and per ton of cargo for each flight of the network of AF.

a) AF methodology to split up fuel burnt between passengers and cargo
The allocation of fuel between passengers and cargo is proportional to the respective overall masses of passengers and cargo. The **overall mass** is constituted by the mass of the payload (passengers including luggage or cargo) to which the mass of the specific equipment necessary to the transportation of this kind of payload, named the equipped mass, is added.

The two equipped masses were estimated for each type of operation (short-, medium haul and long haul). These masses are used to get the average fuel efficiency per passenger and the average fuel efficiency per ton of cargo for each type of aircraft. AF uses average factors for the equipment weights per passenger and amount of cargo load as derived from ICAO calculator principles[6].

	Equipped mass for passenger
Short haul	+ 25 kg
Medium haul	+50 kg
Long haul	+80 kg
	Equipped mass for cargo
Equipped aircraft	+0 kg
Non-equipped aircraft	+ (cargo mass x 5%) kg

b) How to evaluate flight distances
The "bird eye distance" between the departure airport and the arrival airport is different from the actual "**flying distance**," the distance effectively flown by the aircraft. This distance is determined in each flight plan, and this is the information used for the calculation. The flight plan considers operational constraints like military air zones and waiting loops above airports. AF uses the flying distance to express amounts of CO_2 per km.

c) Calculation of the CO_2 emissions per Origin and Destination (O&D)
First, we determine the expected fuel efficiency per passenger (or 100 kg cargo) on a specified O&D. This is done by taking the weighted average of the fuel efficiency of all aircraft types that will be used on this O&D. The weighting is according to the frequencies of the aircraft types on this O&D in the next scheduled plan period of one year from the moment the calculator is updated. The weighted average fuel efficiency per kilometer is then multiplied by the distance of the O&D.

[6] ICAO Carbon Emissions Calculator, April 2008

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Finally, the amount of CO_2 emissions of a flight is calculated by multiplying the average amount of fuel burn per passenger (or cargo) on the O&D by the emission factor. The current emission factor is based on ICAO CORSIA[7] and equals 3.16 per kg kerosine. That means that one ton of fuel produces 3.16 tons of CO_2.

d) Calculation of the CO_2 emissions per Cabin Class

From 2022 onwards, a cabin class split is included in the CO_2 Calculations. This is because a business class or premium economy class passenger takes up more space in the aircraft. Space that otherwise could have been filled by more passengers, which would reduce the footprint of each passenger. To compensate for that, ratios are defined to re-divide the emissions. The re-division is based on the number of extra economy class seats that could have been in the same space, opposed to the current configuration. Both Air France and KLM did this analysis on the short-, medium- and long-haul fleet and use the same ratios that are multiplied with the CO_2 emissions per passenger on an O&D.

Ratios Cabin class

Haul type	Economy Class	Premium Economy	Business Class	First Class	*% Economy versus Baseline**
Short and medium haul	1	-	1.5	-	*98%*
Long haul	1	1.5	3	6	*80%*

*Baseline is the situation without any differentiation between the cabins. To ensure that the total amount stays the same, the Economy Class emissions versus Baseline are lowered.

The **origin and destination entry file** for the calculator comprises for each segment[8] the IATA code of the departure airport and of the arrival airport, the average fuel consumption in liters and the average amount of CO_2 in kilograms per passenger per cabin class and per ton of cargo and the "flying distance". This file contains all the segments of the AF Group network, but it does not contain all the lines of this network, since a line can consist of two or more segments in case of stopovers. Consequently, this file has been manually completed to include all the lines AF operate. For example, the value for MAD-JFK (Madrid to New York) corresponds to the sum of the values for MAD-CDG (Madrid to Paris) and CDG-JFK (Paris to New York).

[7] Carbon Offsetting and Reduction Scheme for International Aviation
[8] A segment is a direct flight –without any stopover- between a departure airport and an arrival airport. For example, CDG-JFK counts as one segment

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e) Calculation of the train's CO2 emissions

Some Origin/Destination in the CO2 calculator concern journeys operated by the SNCF under a code-share agreement with Air France. As the mode of transport used in this case is the train, we have chosen to display the real emissions of this mode of transport. Thus, the emission factors used are those of the TGV, meaning an emission of 3.7g CO2/Passenger per km (Source: ADEME's carbon base). This emission factor is then multiplied by the distance traveled by the train (source GDS) to know the emissions per passenger for the train trip.

III. Implementation for AF Group

The method described in section II is integrally applied to calculate the emissions of AF Group flights run by AF or Transavia aircraft. The output of this calculation is connected to the booking tools and other web-based information to show customers and other stakeholders what emissions and fuel consumptions are related to their trips and travels.

The networks of KL and DL and code share partners are also connected to our calculation interface. The segment-based database of DL has not been part of the KLM and AF validation process and the CO_2 is calculated by the airline itself. The code share flights have been estimated with the average emission of short-, medium- and long-haul performances of the AF and KLM-fleet. We consider that AF efficiency is benchmarked as "best in class" and hence this estimation might be undervalued, however no other objective and actual data are currently available.

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