

**PROVIDING  
SUSTAINABLE ALTERNATIVES  
FOR THE FUTURE**

**#AFTakesCare**

Discovering the world through travel can only make sense if future generations have the chance to do so too. This is why Air France is convinced that offering its customers the possibility to travel responsibly is an absolute priority and has been committed for many years to reducing its environmental footprint.

The strong commitments undertaken by Air France, in phase with its customers, staff and partners, are producing concrete and encouraging results, which confirm the relevance of its actions and encourage the group to step up its efforts.

This new drive fully supports a new ambition for global performance and contribution to the international, national and local sustainable development goals, that the group is committed to implementing as a responsible leader and paving the way for all the other players in the sector – regulators, aircraft and engine manufacturers, aeronautical industrial companies, etc.

Acting responsibly is one of the Air France-KLM group's main priorities. In 2018, Air France-KLM was included in the Dow Jones Sustainability Indexes (DJSI World and DJSI Europe) for the 14th year running. This distinction ranks the group as one of the world's 59 most responsible companies, in their different sectors of activity. Read all about the Air France-KLM group's commitments and action in its 2018 corporate sustainability report.

The Air France group acts on a daily basis to reduce the environmental impact of its operations, in all its sectors of activity and has set itself three main lines of action for its environmental commitment -



Reduce and offset  
its CO<sub>2</sub> emissions



reduce, recycle and reprocess  
its waste



reduce the noise footprint of its  
operations

# REDUCING AND OFFSETTING CO<sub>2</sub> EMISSIONS

Reducing CO<sub>2</sub> emissions is the primary objective set by the Air France group, aware of the impact of each ton generated, as well as of each ton offset. Thanks to its targeted actions, Air France has obtained visible results -

## 20%

reduction in CO<sub>2</sub> emissions (g.CO<sub>2</sub>/passenger/km) in 2018  
compared to 2011 for the Air France group

## 7%

reduction in net CO<sub>2</sub> emissions between 2005 and 2018 for the Air France group,  
in a context of increasing air traffic

## 3.3 litres

of fuel consumed per passenger/100km on average  
for the Air France group  
(a petrol-powered car consumes approximately 7 litres per 100km)

## 50%

of electric ramp vehicles

## 85,500

trees planted since the launch of the new Trip and Tree by Air France reforestation programme.  
This programme allows Air France customers, on purchasing a plane ticket, to take action for the planet and reduce the environmental impact of their trip by planting trees.



The group is focusing its actions on upgrading the fleet, improving its operational efficiency, researching and promoting sustainable alternative fuels and offsetting CO<sub>2</sub> emissions to reduce the carbon footprint of its operations as far as possible.

Air France's actions and innovations have allowed it to reduce **CO<sub>2</sub> emissions per passenger by 20%** and eliminate the emission of an additional 2.4 million tons of CO<sub>2</sub> compared to 2011.

In total, the Air France group reduced its net **CO<sub>2</sub> emissions by 7% between 2005 and 2018**, in a context of increasing air traffic.

## **MODERNIZING THE FLEET BY OPERATING AIRCRAFT THAT PRODUCE FEWER CO<sub>2</sub> EMISSIONS**

By investing in new-generation aircraft that consume less fuel, Air France is improving its environmental performance along with its customer experience.

In May 2019, Air France took delivery of its ninth Boeing 787 and will welcome the Airbus A350 into its fleet next autumn. **These two new-generation aircraft use 20% less fuel than older aircraft of similar size.**

Similarly, Transavia France operates a modern fleet to reduce its environmental footprint. Since the beginning of 2019, the Transavia France fleet comprises 36 Boeing 737-800. These new-generation aircraft, with an average lifespan of 7 years, are equipped with blended winglets. These winglets allow for an annual saving of 400 tons of fuel per Boeing 737-800, i.e., 1,200 tons of CO<sub>2</sub> emissions eliminated per year and per aircraft.

## **IMPROVING OPERATIONAL EFFICIENCY**

### **Weight reduction on board**

The lighter the aircraft, the less fuel it consumes. **A reduced onboard weight of 1kg means a CO<sub>2</sub> reduction of around 69 tons each year.**

All Air France-KLM divisions are continuously working to reduce weight onboard. Onboard products are chosen and adjusted notably in line with their weight, in order to reduce fuel consumption.

A few examples of actions taken -

- **Lighter seats** - By installing **lighter seats** that still offer optimum comfort on board its Airbus A319 and A320, Air France **reduced its CO<sub>2</sub> emissions by 3,700 tons** in 2016 and 2017.
- **The introduction of the digital press offer** - 6 million fewer magazines and newspapers taken on board Air France flights, representing a saving of 940 tons of paper per year, corresponding to a **CO<sub>2</sub> reduction of 3,000 tons per year.**
- **Optimizing the quantity of water onboard** - Twice a year, flights to new destinations are analyzed in order to optimize the quantity of (non-drinking) water onboard. **Adjustments made in 2019 allow the company to save 1,400 tons of fuel or to eliminate over 4,000 tons of CO<sub>2</sub> emissions per year.**
- **Fully-electronic flight preparation and follow-up** - Following the digitization of Air France pilots' documentation, Transavia France is one of the first airlines to use a fully-electronic flight preparation and follow-up solution. Between 2015 and 2017, Transavia reduced the equivalent of 20kg of paper per flight thanks to the "Electronic Flight Bag" (EFB) system, i.e., 840 tons of paper per year, or 21 Boeing 737-800. Since the beginning of 2018, the EFB system has been replaced by an even more efficient application developed by the start-up AvioVision, Aviobook. Through this collaboration, Transavia pilots also bypass the paper flight plans and can manage and finalize their flight directly from the application.



## Optimizing flight operations

Flight and route optimization relies on the pilots applying the most fuel-efficient procedures possible throughout the different flight phases in order to reduce CO<sub>2</sub> emissions.

Air France pilots apply several procedures to generate significant CO<sub>2</sub> savings -

- For instance, by switching off an engine during taxiing on arrival at Paris-Charles de Gaulle, Boeing 777s **generate up to 700 kg fewer CO<sub>2</sub> emissions** on each of their taxi phases. As for the Airbus A380, by switching off 2 of their engines, they **can eliminate up to 1,200 kg of CO<sub>2</sub> emissions** during this same operation.
- Or by using connected tools during the flight that allow them to optimize flight levels and routes, and have up-to-date weather information.

Similarly, Transavia France was the first airline in France to implement the SkyBreathe solution, in association with OpenAirlines. SkyBreathe allows pilots to closely monitor the application of best fuel-saving practices for each flight, such as for example, the continuous descent approach or taxiing with one engine after landing.

Transavia has also signed a contract with the start-up Safety Line to implement OptiClimb, an artificial intelligence solution that optimizes the aircraft's climb profile.

The flight and route optimization application with these two start-ups generates 80kg less fuel per flight. This saving represents a reduction of 10,000 tons of CO<sub>2</sub> for 2018.

## PROMOTING AND USING SUSTAINABLE ALTERNATIVE FUELS

Air France KLM supports the development of sustainable alternative fuels, a promising path for more rapidly reducing CO<sub>2</sub> emissions at source. **Air France was among the first airlines, with KLM, to validate this technical solution** by operating between 2014 and 2016 partly biofuel-powered flights between Toulouse and Orly. **The current challenge is to progress from a research and development stage to industrial production.** To this end, two major factors still need to be resolved - securing a sustainable biomass supply and economic viability.

In December 2017, Air France signed a Green Deal with the French government and four major industrial groups (Airbus, Safran, Suez and Total). This commitment aims to promote the emergence of sustainable aviation biofuel industries in France, in economically viable conditions, that fully integrate circular economy principles. The Air France-KLM group, through KLM and the lead role of the Dutch government, recently announced its commitment to a sustainable biofuel production unit in the Netherlands, which should be operational as from 2022.

The Air France group is also a partner of the French Aeronautical Federation's first *Fab'Lab* and the first two-seater electric aircraft used in Toussus-le-Noble since end-2018.



## CHOICE OF ELECTRIC POWER FOR GROUND OPERATIONS

Air France is reducing the local emissions generated by its activities by using electric power-generated equipment and vehicles.

- **50% of ramp vehicles are already electric.**
- By the end of 2019, the replacement of the diesel engines of 12 conveyor belt vehicles with electric motors, with a new type of lithium-ion batteries from recycled car batteries will allow to reduce **CO<sub>2</sub> emissions by 3 tons per year** and per conveyor belt.

Air France is also reducing its electricity consumption notably through more modern equipment, the use of sustainable energy for buildings, offices and warehouses and the integration of this objective in supplier contracts.

- Initiatives have been launched at all Air France sites. At Valbonne, an energy-efficient system has enabled the database center to reduce its annual electricity consumption by 2% and reuse the energy to heat the buildings.
- Another example, at Paris-Charles de Gaulle, the Hélios building, one of the aircraft maintenance facilities, dedicated to aerostructures, is designed to respect the principles of low environmental impact construction.

## OFFSETTING CO<sub>2</sub> EMISSIONS

Air France offsets its greenhouse gas emissions through European and international emission trading schemes, implemented industry-wide -

- **EU emissions trading scheme** - Since 2012, the group has been subject to the application of the European greenhouse gas emissions trading scheme (EU-ETS), whose scope is limited to intra-European flights until end-2023. The EU-ETS should be considered as a first step to achieving a global system whose main principles have been approved by the ICAO.
- **A global carbon offsetting scheme as from 2021** - As from 2021, for international flights, airlines have agreed to reduce their greenhouse gas emissions as from 2021 via a carbon offsetting and reduction scheme for international aviation (CORSIA), developed by the International Civil Aviation Organization (ICAO).

**Air France also involves its customers in reforestation programmes -**

**85,500 trees already planted since the launch of the new Trip and Tree by Air France programme.** This programme allows Air France customers to take action for the planet and reduce the environmental impact of their trip by planting trees.

# CONSUME LESS, RECYCLE MORE

Eliminating plastic, managing waste more efficiently are just some of the actions needed. Because the planet does not possess infinite resources, Air France has committed itself over the years ahead to minimizing its consumption through key initiatives.

A reduction of **1,300 tons**  
of single-use plastic used on board each year as from end-2019

**90%**

of non-hazardous waste recycled and reprocessed in 2018

**57%**

of hazardous waste recycled and reprocessed in 2018



## ELIMINATE 1,300 TONS OF SINGLE-USE PLASTIC ON BOARD AIR FRANCE FLIGHTS

By the end of 2019, Air France will progressively replace plastic items used on board – cups, cutlery sets and stirring sticks will be made from sustainable materials. Moreover, since November 2018, Air France has replaced the plate and cutlery set used for the second meal on long-haul flights with a “BON APPETIT” bag. By the end of the year, these innovations will result in the elimination of over 1,300 tons of single-use plastic on board Air France flights.

Many different bio-based materials exist on the market to replace plastic. Wood, cornstarch, bamboo, sugarcane waste are just some of the options available. When designing new items and rethinking a replacement with an alternative material, Air France takes several factors into account – resistance, use on board, customer expectations, traceability and food safety guarantee, quantity required, transport and also budget.

On World Environment Day, Air France is exploring several alternatives aimed at reducing its impact on the environment. On June 5, the company operated a dedicated flight by Boeing 787-9, between Paris-Charles de Gaulle and Detroit. On board, Air France replaced most of the single-use plastic items distributed to customers with products made from bio-based materials, in keeping with airline rules and health regulations. Some of these will be permanently replaced on board all the company’s flights as from the end of 2019, i.e. –

- 100 million plastic cups replaced with paper cups ;
- 85 million plastic cutlery sets replaced with items made from bio-based materials and packaging;
- 25 million plastic stirring sticks replaced with wooden stirrers;

**These innovations will result in the elimination of over 1,300 tons of plastic by the end of the year.**

In addition, since 2015, the company no longer supplies plastic drinking straws on board, representing an annual saving of 1.3 million units.

On Transavia flights, the company is committed to progressively and significantly reducing single-use plastic on board its aircraft. By end-2019, plastic items will be replaced by alternative solutions on its regular flights. In total, 7 million single-use plastic items will no longer be distributed, i.e., 41 tons of plastic, representing the weight of an empty Boeing 737-800. Transavia will be the first low-cost airline in France to eliminate single-use plastic items from on board its aircraft –

- The company has replaced plastic stirring sticks with FSC (Forest Stewardship Council)-certified wooden stirrers since June 2019;
- Mid-June 2019, Transavia will replace plastic bags with FSC-certified kraft bags with bio-based inks and adhesives in compliance with REACH legislation;
- End 2019, the cups used to serve hot drinks will be made from FSC-certified paper cardboard without plastic laminate coating;
- End-2019, the cold beverage cup and cutlery will be replaced with sustainable alternatives.



## RECYCLE OR REPROCESS HAZARDOUS AND NON-HAZARDOUS WASTE

From the sheet of paper used in an office to an aircraft engine part, from used staff uniforms to the cups our passengers use on board, Air France's business generates different types of waste. Air France's ambition is to minimize waste and recycle or reprocess this waste, whenever possible, throughout the supply chain. Hazardous waste (primarily products used for aeronautical maintenance) forms a minority, and is processed according to specific standards. Thus -

- Every year, **13 million headsets are repackaged, re-used and recycled;**
- A permanent recycling system is now in place for Air France uniforms and overalls. In total, **since September 2018, 7.5 tons of textiles have been collected and recycled at the Roissy site;**
- Since 2007, Air France has set up with one of its partners a procedure for collecting reusable plastic. Over five years, **237 tons of reusable plastic have thus been recycled;**
- **In 2018, more than 400 tons of aircraft parts and metal were recycled** at Air France Industries and KLM Engineering & Maintenance;
- The paper version of the in-flight Air France Magazine is recycled, **representing approximately 700 tons of paper per year;**

To avoid product destruction and promote reuse, Air France has signed a framework agreement with the association Agence du Don en Nature (ADN) that collects and redistributes new non-food items of everyday necessity, to combat exclusion in France. 51 pallets of crockery and close to 1,500 Air France bags were donated to ADN in 2017 and 2018 respectively.

→ **Air France has set itself a target of recycling or reprocessing 100% of non-hazardous waste and 60% of hazardous waste by 2020.**

### Saving water

Avoiding water wastage and reducing water consumption requires better management of our processes, more accountable teams and the factoring in of environmental criteria in the design and realization of tools and workstations.

Maintenance activities involved in washing aircraft and engines use the most water.

This is why AFI KLM E&M use the EcoShine process to clean the exterior of aircraft. Using recyclable wipes, this method **divides by 80 the amount of water necessary, i.e., 150 litres to clean a Boeing 777 instead of 12,000 litres previously.**

# REDUCING THE NOISE FOOTPRINT

Noise is one of the priority stakes in Air France's environmental policy, acting to reduce the noise footprint of its operations by taking the necessary measures in dialogue with the local communities.

Noise footprint reduced by **47%**  
at the 10 main French airports compared to 2005.



This noise abatement has been possible thanks to several company initiatives -

- Withdrawal from the fleet of the Boeing 747s, its noisiest aircraft (in 2016);
- Since 2003, return of 720 annual slots to Paris-Charles de Gaulle airport (i.e. two per day) between midnight and 05:00;
- Modification of the A320 fleet to equip it with noise-reduction kits designed to reduce their noise footprint.

In addition to these noise footprint reduction measures, the Air France group makes a significant contribution to the soundproofing work carried out on the homes of people living in the vicinity of French airports via a soundproofing grant financed by the French Tax on Air Transport Noise Pollution paid by airlines. Generally, this financial aid covers 80% of the total cost of soundproofing work, and even 95% in the case of grouped operations. For 2018 alone, the Air France group contributed €18 million to the French Tax on Air Transport Noise Pollution.

Transavia France pilots also resort to noise-abatement flight techniques, such as the continuous descent approach. A continuous descent approach reduces noise by 6 dBA compared to a conventional step descent approach. The continuous descent application rate is 27% at Orly, 74% in Lyon and 78% in Nantes.

# AIR FRANCE, AN IMPORTANT CONTRIBUTOR TO THE FRENCH ECONOMY

Air transport is an incredible way of bringing people together, promoting open-mindedness and exchange for all citizens of the world. Air France must therefore adopt a responsible attitude and a clear environmental strategy. By acting in this way, the group is meeting the expectations of its customers, its staff and its stakeholders.

## Leading

private sector employer in the Paris region; d'euros d'achats annuels

More than **350,000** jobs  
generated by the Air France group's activities in France;

## 1.1%

of French GDP generated by the company's activity;

## 2.4 billion

euros in annual purchases

## 2 billion

euros in taxes and duties each year in France



### 350,000 jobs generated by the Air France group's activities in France

The Air France group is the leading private sector employer in the Paris region, generating more than 350,000 jobs in France. Air France also contributes to indirect job creation and economic activity by working with local partners and supporting projects with high social and economic added value for the benefit of future generations and local communities. Air France's average global impact is estimated at 346 euros per year and per inhabitant\*.

### Every year, the Air France group contributes 1.1% of French national GDP

By creating jobs and activities and fostering exchange, through its supply chain and its 2.4 billion euros in annual purchases, the Air France group contributes to sustainable economic growth in France and the regions where it operates.

**As the main customer of French airports**, Air France makes a major economic and social contribution to the French national territory. The Air France group is present throughout the country, operating at **44 domestic airports and French Overseas Departments**.

Air France is a signatory of the SME pact and sources 21% of its purchases from French SMEs. The company also plays a role in developing open innovation and collaborates with start-ups.

Lastly, actively committed for over 30 years in promoting the employment of people with disabilities, Air France has assigned multiple projects to **companies working in the protected and sheltered sector**, with a **19 million euro procurement contract** in 2018.

### Air France contributes close to two billion euros in taxes and duties each year in France

Air transport is a means of transport that finances all the infrastructures it uses (airports, flight operations services, etc.) In 2017, Air France thus paid 984 million euros in French taxes and duties.

Air France also positively contributes to French public finances, as in addition to the general taxation system to which the company is subject in France, Air France pays every year in excess of €600 million in specific air transport taxes and €300 million in other types of taxes.

\* Source: Casteran / EM Strasbourg study conducted in 2016 on the contribution of the Air France group including its subsidiaries on its territory.



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