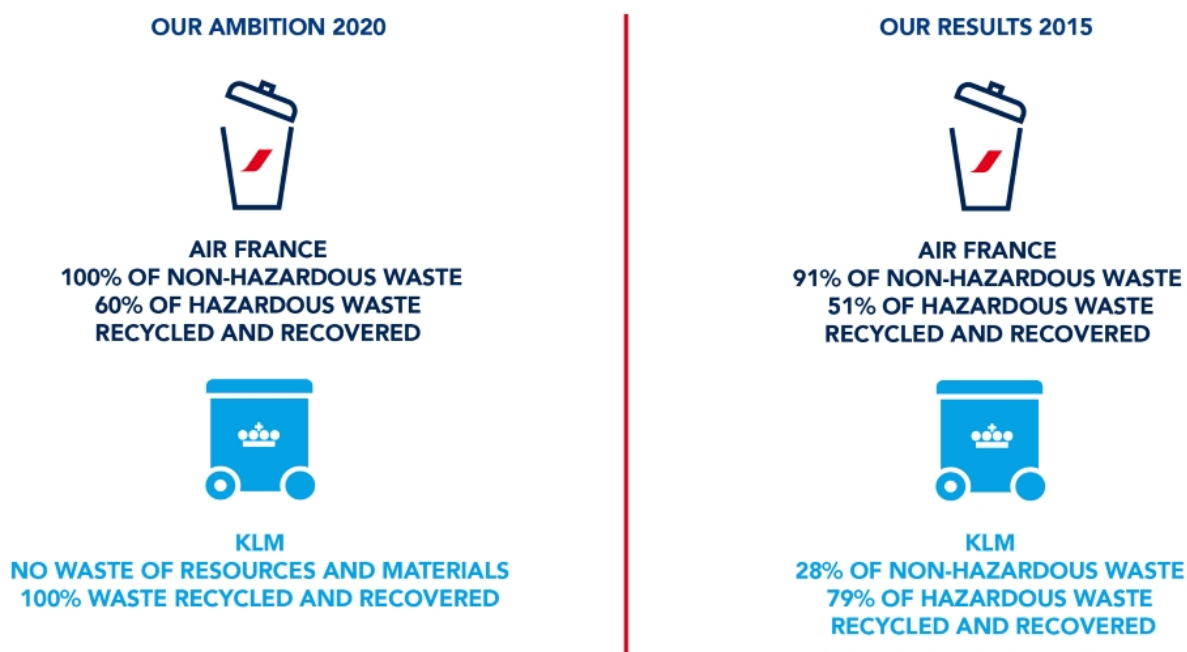


# Waste and circular economy

Our business produces a variety of waste: from the sheet of paper used in an office, to aircraft engine parts, staff uniforms and the cups our passengers use onboard. We aim to minimize waste and to recycle and reprocess whenever possible throughout the supply chain.



At the heart of this commitment are the “Four Rs” of the circular economy: Rethink, Reduce, Reuse and Recycle. Our ambition is to take sustainability into consideration at every phase of the lifecycle of more of our products and services. This begins with design, and goes on to cover every other process along the way.

## WORKING TOGETHER TO ACHIEVE A KEY GOAL

As a transport provider, we can be a catalyst in the value chain through procuring more sustainable and circularly produced goods.

We handle a variety of different types of waste, particularly waste originating from flight and maintenance activities, both of which are subject to strict regulations. These regulations can vary between destinations but can also be highly specific, such as the regulations on food waste from intercontinental flights, which has to be incinerated within 24 hours. Reducing waste also provides also a financial opportunity: several initiatives have demonstrated considerable economic benefits.

We work closely with our suppliers and other parties to contribute towards the use of sustainable materials and resources throughout the value chain.

Everyone can recycle, produce less waste and adopt good practices. The results of the CSR survey among the Air France employees showed that the handling of waste was their main environmental consideration.

## BREAKDOWN OF RECOVERED NON-HAZARDOUS WASTE AT AIR FRANCE-KLM



### 4R EXAMPLES

#### Redesign

Onboard catering produces about 70% of all non-hazardous waste. The key to managing this

onboard waste sustainably is through preventing waste by redesign and by separating the waste correctly.

- KLM has been separating onboard waste with cup-collecting compartments in trolleys on all European flights since 2013. This not only makes recycling easier, it also saves space by stacking the cups. Glass, cans, aluminum lids and PET bottles are also separated when collected, and recycled.
- Since the introduction of new crockery in Business Class at Air France, a significant number of glasses have been broken. In order to reduce this, dividers have been introduced to separate the glasses when they are stacked, thus reducing impacts and breakage.
- Half of the 700 tons of waste produced by Air France's Headquarters comes from its restaurants. To ensure better handling of this bio-waste, employees are asked to sort waste.

## Reduce

Suppliers are also key to reducing waste. For example they can reduce the amount of packaging they use. Less packaging means less weight on-board and less CO<sub>2</sub> generated.

- Waste has been reduced by decreasing the amount of packaging of KLM catering products. The redesign of cardboard packaging for sandwiches led to a 50,000 kg reduction in the use of cardboard.
- On late night flights, customers do not consume all of the catering products carried on-board. At Air France and KLM, the amount of products carried is adjusted on a regular basis to reduce waste, on-board weight, production costs and transport.
- At KLM's Ground Services division, manuals are no longer available in hard copy, but instead are provided digitally. Which gives us the opportunity to constantly update the information provided. This has resulted in a paper saving of over 375,000 sheets of paper annually. Crew briefings (40,000 per year) are now available digitally as well.



- At Air France, 4,000 pilots have been equipped with iPads instead of hard copy manuals: this has resulted in a paper saving of over 20 million sheets of paper annually and a 25 kg weight reduction on every flight, amounting at 1,800 tons of CO<sub>2</sub> saving.



- Air France and KLM have implemented Follow Print on all workstations. Using Follow Print, print jobs are printed only on request of the user at the printer, with an identification code and confirmation of the jobs to be printed. Through the implementation of this system, print quantity was reduced at Air France by 8% in 2015 compared to 2014 (including a 25% reduction of color printing). A 15% reduction of prints are expected at KLM in 2016.

## Reuse

Air France and KLM have programs for aircraft maintenance waste. Where possible the principle of cradle-to-cradle is applied to bring waste back into a new production cycle with the goal of streamlining and controlling all technical waste flows. The process includes procedures to reuse and recover spare parts.

- 130 tons of aircraft parts and metal were recycled in 2015 through the KLM's ScrapPlaza program. Each year, KLM assesses which waste streams can be re-used or recycled. In 2015, the program focused on the plastics waste stream and investigated reuse opportunities for plastic cabin components. Orange waste bins (iconic for separating plastics in the Netherlands) were placed in all maintenance buildings.
- In October 2015 KLM opened the plastic repair shop, where aircraft components that were previously replaced immediately, are repaired and given a new life. Additionally, the repairs can be carried out quickly. The shop managed to repair 70 back rests within one shift during a Boeing 777 FC check.
- A re-use campaign has been organized as part of improvements to Air France's mid and long haul cabins. 250 Business Class chairs and 572 Economy chairs were recovered, and sold on to third parties. 7,000 onboard entertainment system items were also recovered.

## Recycle

Air France and KLM are also working on initiatives to recycle and upcycle waste into new uses.

- Air France recycles a significant proportion of reusable equipment, like trays, drawers, blankets and trolleys. Items designed with eco-design approaches, which take the entire life cycle of products into account, are favored. Four families of materials are recycled: Plastic, metal, textiles and paper. Most textiles are recycled and used in the manufacturing of insulation materials for cars; plastics are mostly reused in the production of new materials such as Air France's drawers and serving trays.
- Air France is reconditioning certain items under a range of non-aeronautical products, marked in company colors. For example, old life vests have been used to make purses; these are available to buy onboard Air France flights.



- Since 2013, used KLM uniforms and old Business class carpeting were recycled into fibers used to manufacture the carpets for the New World Business Class. All used carpets are recycled in collaboration with carpet manufacturer Desso, as part of the Take Back™ program. In 2015, 43 tons of used carpet was given a new life.





- KLM and the Design Academy Eindhoven commissioned a challenge for students to upcycle elements from the interior of a KLM World Business Class aircraft into new products. The assignment was to design a prototype of a product that would be useful for travelling, and would consist for at least 70 percent of recycled materials. The eight winning designs were exhibited in a spectacular display in the Bijenkorf department store in Amsterdam.

## PARTNERS IN THE CIRCULAR ECONOMY

We work with various partners to promote the circular economy in closing loops and to identify wider potential scope for recycling. In 2015, we continued contribution to feasibility studies to set up circular economy initiatives in the area surrounding Paris-CDG and Schiphol airports.

We aim to integrate the circular economy in our operations to optimize environmental and financial performance regarding waste treatment. Actions such as reducing the amount of minerals used (such as Titanium and Nickel) in producing aircraft parts, or by giving a new lease of life to used products have an impact on the environment, generate both savings and additional revenue.

KLM separates 19 waste flows, paper, wood and glass being the main ones after residual waste. A few other flows may be smaller but represent considerable financial value. For instance, good progress has been made in closing the loops of materials in aircraft components, packages with polystyrene and carpets by reusing and recycling them.

As a member of the aviation industry's Strategic Committee on the circular economy, Air France Industries has contributed to the industry's roadmap, which was presented to the French government in May 2015. At Air France Industries' Engines, Equipment and Services department, the Reverse project means that used equipment has now five possible destinations: re-use, dismantling and re-certification, being sold as seen, reconditioning as a non-aeronautical product, treatment as waste.

Air France supports the [Circular Economy World Tour project](#), which aims at identifying 100 initiatives in 20 countries, and promoting circular economy best practices.