The annoy story of airline food, why so much ends up in landfill and why banning single-use plastics could make everything worse

By Luisa Bider
July 16, 2018

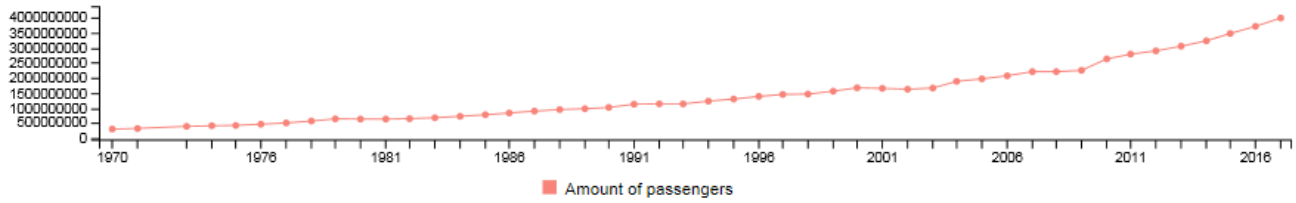
"Would you like the chicken or the pasta today?" the flight attendant asks, a smile shaping around his lips, before he reaches into the double trolley with equally swift and cautious movements. He retrieves a small white tray, jam-packed with all kinds of goods, each in its individual plastic container: A small salad, a piping hot meal wrapped in orange-coloured aluminium foil, bread, cheese, butter, and a dessert. Along with this, tomato juice and a gin and tonic are handed out in plastic cups.

How could something as simple as this ever be bad?

What is the reason for every object on the tray being covered in plastic?|

Airlines must plan for food safety, hygiene, freshness and weight – and they have to have enough meal choices for all of their passengers. Therefore, the reasoning for all the plastic makes sense at first sight.
But when looking at the amount of all this packaging – a single airline like Emirates prepares 180,000 meals a day – the scale of the waste problem unfolds itself in a staggering way.

According to an audit of 17 flights led by the International Air Transport Association (IATA) in 2012/2013, an average flight produces 354.71 kg of waste – that is the weight of 101 bricks – and the average passenger produces 1.43 kg of waste on a flight.
Based on 3.69 billion passengers in 2016, this translates to an annual cabin waste volume of 5.26 million tonnes.



The number of passengers carried in air transport worldwide has more than doubled since 1970. Along with the passengers, the amount of waste produced on these flights is set to double by 2036. Source: The World Bank

Along with the passenger numbers which are expected to double to 7.8 billion by 2036, the amount of waste is set to double to annually 10.52 million tonnes of cabin waste by 2036. That's the weight of 17,840 fully loaded Airbus A380-800Fs.

Of course, projecting numbers from an audit led in 2012/2013 to today's amount of passengers means these numbers are only rough estimates. Unfortunately, there have not been any further audits since then. Jon Godson, Assistant Director of environment at IATA, says that this is because of the low incentives for airlines to undertake such audits: "Not only is cabin waste auditing a resource intensive activity, but because airlines don't see the costs of cabin waste, there is no financial incentive to undertake these audits."

A number of factors have traditionally discouraged airlines and other actors from seeking proactive solutions.

Three billion dollars worth of untouched food and drink were wasted last year. |

These include low landfilling costs, lack of suitable facilities and stringent regulations. The situation is now improving slightly. Increasing public awareness of environmental issues and progressive increases in landfilling charges seem to be slowly driving airlines to seek changes to be made.

Based on the estimate of 1.43 kg of waste generated per passenger and the World Bank average cost for solid waste management , Godson estimates that cabin waste costs close to 750 million dollars a year.
But also the wasting of the food itself is costing the airlines immense amounts of money. According to Godson, from the 15 billion dollars the in-flight catering sector costs yearly, almost three billion dollars – or 20 per cent – of untouched food and drink was wasted last year.

Just your typical wasted foods on a flight

During the month of May 2018, two flight attendants working for a Swiss airline volunteered to keep track of all the food they wasted during their flights. They counted the wasted food on a total of 13 flights, of which 5 were longhaul and 8 were shorthaul. The results of their collection showed that an overall average of 16 sandwiches and 10 litres of beverages are wasted on a flight. Differences between long-haul and short-haul exist: For example, as sandwiches are the main food served on shorthaul flights, more were wasted on short-haul flights. The same is the case for meal trays and hot meals: These are mostly served on long-haul flights. Therefore, the amount of the wasted meal trays and hot meals was much higher on long-haul flights than on short-haul flights.

The amount of wasted food counted by two flight attendants during longhaul and shorthaul flights. The data is based on 13 flights (5 longhaul, 8 shorthaul) flown during May 2018.

Although the data of the 13 analysed flights is not representative, it gives a good overview of the amount of food generally wasted during a flight.

Sophie flew from Hong Kong to Zurich and threw away...

37 untouched trays (including salad, bread, dessert)

30 bread rolls

26 hot meals

11 litres of soft drinks

4 fruits

4 sandwiches

2 bags of salad

2 litres of wine and champagne

Nathalie flew from Zurich to San Francisco and threw away...

45 sandwiches

30 bread rolls

20 packs of butter

10 untouched trays (including salad, bread, dessert)

20 ice creams

13 litres of soft drinks

7 litres of milk

Nathalie and Sophie work as flight attendants. For this story, they counted all the foods and beverages they threw away on a total of 13 flights in May 2018. These are two example flights from the dataset.

The worst part? Almost all cabin waste is sent to be incinerated or to landfill.

International cabin waste, meaning all waste arriving from outside the EU, is regarded as category 1 waste. Category 1 waste is classified as “high risk” and must be destroyed. Along with international catering waste, carcasses of animals used in experiments and cows’ spinal cords are included in the same category. "The regulations were brought in as a kind of emergency measure related to a large foot and mouth outbreak in the UK in 2007 and they were never risk-based," Jon Godson explains.

A coffee cup coming from a flight from the US will be treated as hazardous waste because it might have had milk in it.

Recycling of category 1 waste is only possible under the circumstances that it is collected and handed over in separate bags, and that it did not come in to contact with animal products. A coffee cup coming from a flight from the US, for example, will be treated as hazardous waste because it might have had milk in it.

But what about recyclables? Surely, at least plastic and glass bottles, aluminium cans and cardboard boxes from the flights are recycled and don't end up being incinerated or sent to landfill? The answer to that question: Not really.
"We try to separate recyclables into different compartements as much as possible", Nathalie, one of the flight attendants interviewed for this article, says. "But whether they're actually recycled in the end – who knows."

While East Midlands and Gatwick airports have started tagging rubbish bags in order to identify which ones can be recycled , elsewhere it’s common practice for waste from inside and outside the EU to get thrown together and processed collectively as international catering waste. Jon Godson remarks: "Some places are further ahead than others – while some airports in the US, the UK and New Zealand have made great steps towards the use of recycling, most of Europe still incinerates everything – No matter if it's Domestic, European, or International waste." He explains that this is due to an unfortunate combination of space issues – airports would have to put in separate waste separation facilities – and regulations. "I was over at Schiphol [the main airport in Amsterdam] the other day, and there were two guys that were just taking cans out of the bar carts and putting them in the rubbish containers. The regulator wouldn’t even allow them to tip the coke out into the drain because it's regarded as hazardous. It all ends up getting incinerated."

Banning single-use plastics for airlines could increase climate change

On May 28, 2018, the European Commission proposed banning single-use products such as cotton buds and plastic straws in an effort to reduce marine litter. This could have far-reaching effects on the waste footprint of airlines, with large amounts of cabin waste consisting of plastics. Jon Godson points out that this proposal poses new, extensive problems: "Whilst we would love to see the airline industry move towards a more sustainable solution such as one which uses biodegradable materials, it wouldn't make much of a difference at this stage, as the regulator is going to be forced to incinerate it anyways."

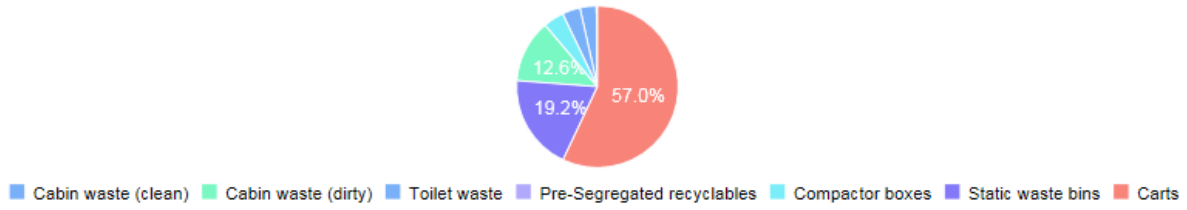
But couldn't all the plastic cups, cutlery, bottles and discarded packaging be replaced by ceramics and glass? "That would mean an increase in weight and therefore in fuel burn", Jon Godson says. "Plus, these glasses and ceramics would need to be washed, using loads of hot water – and thus, more CO2." He feels as if the entire aviation industry was not regarded when suggesting these new regulations, as the ban would not only conflict with current catering waste policies, but it would also have an impact on environmental protection: "We might be able to avoid marine plastic, but we'd still have a a net disadvantage for the environment, because you would be increasing CO2 emissions and climate change across the board."

Replacing single use plastics with glass and ceramics would lead to an increase in weight and therefore fuel burn. Image: Luisa Bider

Apart from the fact that it is more appropriate environmentally to use single use plastics under the current legislation, the new EU regulation would also have a dizzying impact logistically. "As we are an international industry, this would have an impact on how aircrafts are loaded across the world. It would mean that not only EU catering establishments would have to change to new materials, but every catering establishment across the world, as they all operate internationally. You would have different types of loadings of the aircraft and you could end up with pockets of different materials all over the place. That in turn calls for more appliances and better organisation."

What is all this waste made up of?

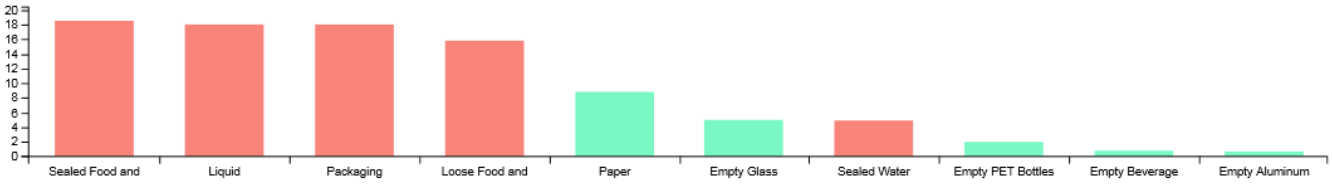
The results of the 2012/2013 IATA audit showed that 17.3% of the total weight of cabin waste comprised of recyclable materials. This doesn't mean that these 17.3% actually were recycled, though. In fact, only 0.2 % of the total weight was made up by pre-segregated recyclables. Many of the items were found in compactor boxes, meaning they had been in contact with category 1 waste. In order to be able to be recycled, the items must be stored in separate compartments during the flight. As this is not officially implemented in most of the cabin crew's procedures, it is entirely up to the crew's "galley master" and the space conditions to start pre-segregating the recyclables. According to a paper by Li X et al., on board sorting and collection programmes could achieve a recycling rate of as much as 45% to 58% of the total galley and cabin waste from in-flight services.



The different streams of waste and their contribution to the total weight of waste analysed in the 2012/2013 IATA Audit. The content of carts – meaning food and beverages – made up the largest contribution to the weight and pre-segregated recyclables made up the smallest contribution to the total weight of waste collected. Source: International International Air Transport Association (IATA)

The results of the 2012/2013 IATA audit further showed that 57 % of the waste collected came from what was inside the carts loaded to the aircraft. Food and beverages accounted for the most significant contribution to total weight from the analysed flights, representing 39.2% of the total weight. Half of these foods and beverages were sealed.

The largest contribution to the total weight of cabin waste is made up by sealed food and beverages.



The cabin waste composition as seen in the 2012/2013 IATA audit. Sealed food and beverages made up the largest part of the weight (18.5%), followed by liquids (18%) and packaging (18%). Recyclable materials are displayed in green colour. Source: International International Air Transport Association (IATA).

With the largest part of the waste being sealed food and beverages, questions around the possible redistribution arise. Many charities around the world already work together with restaurants and catering services to redistribute the uneaten goods. When it comes to airline catering, though, there is only one.

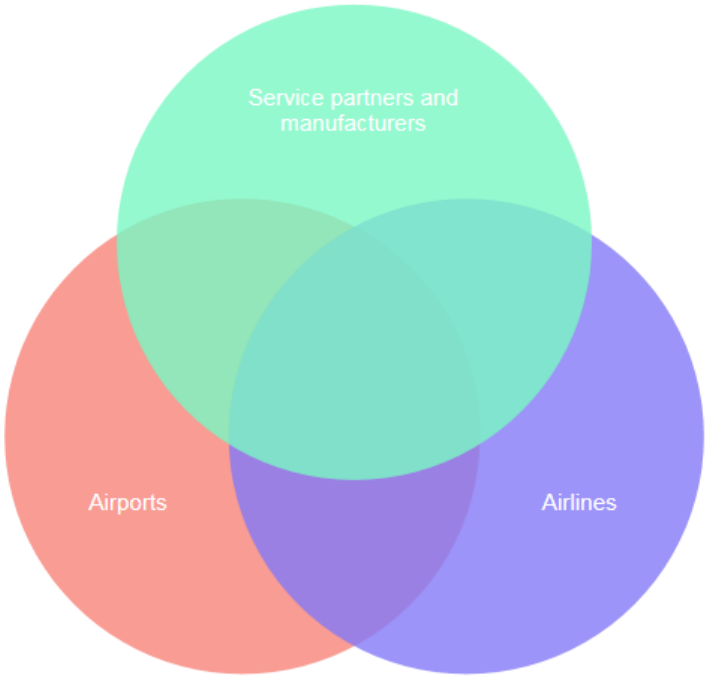
While current legislation regarding waste categories as well as trade legislations forbid the donation of these meals to charity internationally, a charity in Australia has started to collect meals from airlines' domestic flights. On average, OZHarvest collects 12,000 kg of rescued food every month from eight Australian airports. This equates to 500,000 kgs a year which is over 1.5 million meals to people in need.

OZHarvest collects and redistributes 12,000 kg of rescued food every month from eight Australian airports. |

OzHarvest drivers collect the food directly from airport catering centres where volunteers sort the rescued food, which mainly consists of dry goods like muesli bars, muffins, pretzels, pre-packed sandwiches and wraps, drinks and fresh fruit. "The airline partnerships involve an incredible amount of work and together we are constantly looking at innovative ways to reduce waste or excess food along the supply chain", Fiona Nearn, public relations officer at OzHarvest, says. When asked if OZHarvest is looking into expanding their offer to international flights as well, Fiona Nearn declines. "Whilst we would love to be able to rescue more food, custom and quarantine regulations currently prevent collection from International flights."

With no possibility to expand this offer to International flights because of current custom and quarantine regulations, there have to be other solutions. After all, waste is costing the airlines more and more money – and having a horrific impact on our environment.

When looking at the different facets of the problem, there are three main areas that contribute to the way things are dealt with today: The airports, the airlines and the service partners and manufacturers.



The three actors in the issue of cabin waste management and the problems they share. Hover over the different areas to see the problems and the shared problems. Venn Diagram created D3 and Ben Federickson's "A Better Algorithm for Area Proportional Venn and Euler Diagrams"

The regulations have to be changed

Currently, IATA is finalizing a risk assessment report on the topic of waste categorization. The purpose of the report is to indicate that cabin waste isn't a problem for animal health and that it doesn't cause disease outbreak.
For the report, IATA commissioned animal hygiene experts to look at the risks associated with international catering waste. One of these is the classification of milk and milk products. Godson explains: "There is no scientific justification for milk products being classified as international catering waste on a variety of reasons, one of them principally being that all milk and dairy products served on an airline are heat treated."

Another issue is that of the dose. "You have to feed hundreds of litres of contaminated milk to a calf in order for it to catch foot and mouth disease. That isn't going to be possible if the milk in question is coming from a recycled cup. Thus, our fundamental issue here is that we can have all the controls in place to minimize disease, as we do for human health, but if the regulator allows livestock to be fed aluminium drinks cans, paper and plastic cups, then they've probably got larger problems than worrying about international catering waste."

If the regulator allows livestock to be fed aluminium drinks cans, paper and plastic cups, then they've probably got larger problems than worrying about international catering waste.

Once the report is finalized, IATA will approach airlines and regulators to sensitize them. Their goal is to reach a mutual recognition between states that have the same controls, so that waste coming from states with the same regulations will be able to recycle their waste. This is already the case between the US and Canada. "Because Canada and the US have the same regulations, it's non-regulated between them, which means their waste is not incinerated and can be recycled." The same should be possible between the US and Europe and between New Zealand and Australia, where health regulations are exactly the same as well.

These airlines must be doing something, right?

While IATA is trying to challenge the current regulations so that solutions are more sustainable in the long term, different projects are already working within the current regulations to try and improve their cabin waste problem. Whether it's Gatwick having introduced a waste-to-energy plant, Virgin Atlantic introducing plastic-free headset wrapping or Emirates introducing eco-friendly blankets made from recycled plastic bottles, most airlines are introducing solutions to try and improve the situation. The most comprehensive of these is the "LIFE Zero Cabin Waste" project. Co-funded by the European Union and carried out by Iberia airlines, it seeks to recover 80% of the waste that is now sent to landfill. It seeks not only to improve the recycling of both recyclable and organic waste from catering services on Iberia planes, but also to achieve a more efficient management system with a lower environmental impact than is currently the case. "Our goal is that potentially recyclable items, bottles, cans, cups that have not been in touch with animal origin products, are separated before they are placed in the bin, and recycle them as if they were Cat. 3 residues." says Marina Garcia Aedo, contact person of LIFE Zero Cabin Waste project. "Moreover, we are meeting with the different Spanish public entities that who are competent in residues legislation." They are training crew and staff, implementing equipment adjustments such as recycling trollies, executing a collection and separation protocol, processing waste fractions, and implementing a pilot treatment for Cat. 1 waste. By the end of 2019, the project's model will also be implemented at Heathrow airport.

The LIFE Zero Cabin Waste initiative aims for a reduction of greenhouse gas emissions of 4,340 t CO2 eq. per year. That is equal to more than 340 national flights from Madrid to Barcelona. Of the 716.5 tonnes of carbon dioxide equivalent generated through cabin waste in 2016, 91 % of the emissions of category 1 waste were produced in the landfill stage, mainly due to the decomposition of organic matter. In comparison, "only" 72 % of the CO2 emissions of the category 3 waste is generated in the landfill stage – this is because more parts of this can be recycled.

More solutions for the future

Another project IATA is currently working on is a Zero Waste handbook. "We currently have 32 different initiatives in there, and it's heavily focused on waste minimisation", Jon Godson says. Ideas reach from replacing hand towels with air blade technologies to introducing more trolleys like the ReTrolley.

The Retrolley allows cabin crew to presort cabin waste and reduce the waste volume by manual compaction. It was developed by a group of design students from the University of São Paulo and the help of Airbus' "Fly Your Ideas" competition.

According to Jon Godson, another big point that should be focused on in the future is the planning and stocking of food on flights. Concerns around customer satisfaction often lead airlines to stock more food than required on board flights – Airlines are often doing a best guess of how much passengers will buy or consume. "Better passenger profiling regarding preferences over even small things like sugar, jam or marmalade could make a big difference", Jon Godson says.

This is something that could be done by tracking passengers' data. By tracking consumption over time, airlines could predict which meal type passengers are most likely to order on-board and adjust their stock lists accordingly. A new business model is shaping around this option, with companies like Travel Data Daily offering big data consulting for airlines.

Another solution is the pay-as-you-go approach, where travelers order meals before a flight. This is already the status quo for most low-cost carriers (LCCs) around the world. With passengers pre-ordering meals using an app or website, airlines can simultaneously meet demand and minimize waste.

All in all, solutions are out there, and new ideas and initiatives are arising frequently. Especially now that airlines seem to be more aware of their obligations due to public awareness of environmental issues and progressive increases in landfilling charges, the days of thoughtless waste disposal could be seen to be come to an end. However, with the current legislation making it impossible to recycle international catering waste, all involved parties' leeway is extremely limited. Along with the impending ban on single-use plastics in the EU, this highlights that the only way of making meaningful advances to improve the current situation is by changing current legislation. With the finalization of IATA's risk assessment report, this could be approached in the new year. Until then, the responsibility of recycling rests solely on the shoulders of individuals that decide to pre-segregate or recycle a part of the waste. Sadly, even the most conscientious workers can barely make a dent in the sheer size of the problem. It's up to bigger players to actually make a change.

to the top

About

Words, code, photos and visualisations by Luisa Bider. This article was produced as a part of the MA/MSc Digital Journalism programme at Goldsmiths, University of London.

Thanks

- Jon Godson
- Marina Garcia Aedo
- Sandra Keller
- Alican Salor
- Carla Ammann
- Leandra Gubser
- The Noun Project ("stewardess" by sandra, "Money" by Rafael Martins, "Sandwich" by sumhi_icon, "coffee to go" by myiconfinder and "feeding" by Becris)
- Icons made by Freepik from www.flaticon.com is licensed by CC 3.0 BY
- C3.js
- Typed.js

Projects

- Twitter analysis with Python
- Data Dashboard for the London borough of Lewisham
- Data-driven feature on the closure of London LGBT venues
- Multimedia article on seat neighbors (German)