IN-DEPTH

Quantifying International Catering Waste

A global assessment of waste volumes and emissions scenarios from passenger airline operations

November 2026

This study quantifies global International Catering Waste (ICW) generated from passenger airline operations and assesses the greenhouse gas emissions associated with different waste management pathways.

Drawing on passenger traffic data, waste generation rates and waste composition audits, it estimates ICW volumes by region, evaluates current disposal practices, and models emissions outcomes under alternative recovery and recycling scenarios.

The analysis provides a global evidence base on the scale, composition and emissions profile of ICW.

About

IATA commissioned WRAP to conduct research and modelling work to estimate global volumes of International Catering Waste and the associated emissions of different recovery scenarios.

IATA is the trade association for the world's airlines, representing over 370 airlines accounting for some 85% of global air traffic. We support many areas of aviation activity and help formulate industry policy on critical aviation issues.

WRAP is a global environmental action NGO transforming our product and food systems to create Circular Living. We examine sustainability challenges through the lens of people's day-to-day lives. We transform the systems that provide the products we consume. We catalyse action from policy makers, businesses, NGOs and citizens to make it happen.

Document Reference:

IATA, 2026. Quantifying International Catering Waste: global volumes and emissions scenarios.

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1. Background

IATA has been working to reduce waste and increase recycling across the air transport value chain, as these represent opportunities to improve resource efficiency, reduce environmental impacts and contribute to broader climate goals.

Every year, airlines generate millions of tonnes of cabin waste, including food waste, packaging, paper, plastics, glass and metals. Many of these materials have substantial recovery potential, creating opportunities to improve circularity across passenger operations. While airlines continue to invest in waste prevention, resource efficiency, material substitution and recovery initiatives, operational realities and complex regulatory requirements continue to constrain progress.

International Catering Waste (ICW) regulations limit airline's ability to increase recycling of catering waste. In some jurisdictions, ICW is classified as biohazardous waste and must undergo specialised handling and disposal procedures, reducing its recycling potential. In others, no specific regulations governing ICW exist[1]. More effective ICW regulations could increase material recovery rates and support more efficient waste management.

Given the absence of widely accepted estimates of global ICW volumes and associated emissions, this study models global ICW by region, establishes current waste management practices and develops associated emission scenarios.

2. Methodology

The analytical approach draws on previous research examining the climate impacts of ICW, including *Pennington et al. (2025), Beyond the Runway - Quantifying the Climate Impact of International Catering Waste*, and adapts elements of that methodology to develop global and regional volumes and emissions estimates.

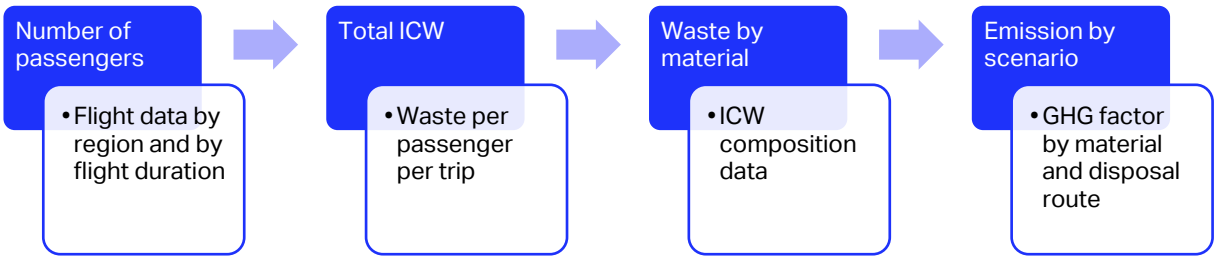
Total segment passenger estimates for 2025 are obtained from IATA[2]. Regional share of passenger traffic is taken from 2025 IATA revenue passenger kilometre (RPK) data. Together, these datasets provide a regional breakdown of passenger trip data in 2025, including Africa, Asia Pacific, Europe, Latin America and the Caribbean, the Middle East and North America. The flight data is then apportioned into the number of international passenger trips classified by flight length (i.e., short-haul, medium-haul, and long-haul flights) using data from ICAO, OAG, and BTS (detailed in the assumptions section).

Total ICW is calculated by combining passenger data with waste generation rates per passenger per trip. These rates are grouped by flight length and are sourced from the Aviation Sustainability Forum (ASF)[3]. Pilot waste composition data from ASF is applied to apportion total ICW into relevant waste types, including organics, paper, plastic, glass, and metal.

Waste management pathways are set up to model greenhouse gas emissions in each ICW disposal scenario. This study uses the WRAP Carbon Waste and Resources Metric (CarbonWARM2) emission factors[4]. CarbonWARM2 provides a standardised, life cycle-focused approach to comparing emissions from waste treatment approaches such as landfill, incineration, and anaerobic digestion. The metric allows modelling of the climate impacts of different waste management scenarios and the potential greenhouse gas savings of different treatment options. Figure 1 shows an overview of the steps taken and the data requirements.

[1] **Chart of the Week, 28 February 2025. ICW regulations prevent efficient waste management.**
[2] **IATA (2025). Global Outlook for Air Transport – Trade, AI, and the energy transition.**
[3] **Aviation Sustainability Forum. Cabin Waste Composition Audit 2023/2024. Update for IATA Sustainable Cabin Briefing – May 2024.**
[4] **WRAP (2025). Carbon Waste and Resources Metric (CarbonWARM2).**

Figure 1: Schematic diagram of modelling ICW emissions



Source: IATA Sustainability and Economics

A total of six ICW management scenarios are set up in this study:

- Scenario 1: all ICW to managed landfills
- Scenario 2: all ICW incinerated
- Scenario 3: baseline practices (a mix of landfill and incineration by region)
- Scenario 4: 25% recycling
- Scenario 5: 50% recycling
- Scenario 6: 75% recycling

For Scenario 3, desk research was conducted to gather insights into current ICW management practices across different countries and regions. To align with ICW regulations, it is assumed that the waste is treated through managed landfill disposal or incineration. The proportion of waste directed to landfill and incineration is estimated using available data on ICW management practices at country level (or based on municipal solid waste management practices where information is unavailable). The findings are extrapolated to the regional level and presented in Table 1.

Table 1: Regional baseline ICW management practice assumptions for Scenario 3

Region	Percentage landfilled	Percentage incinerated
Africa	100%	0%
Asia Pacific	50%	50%
Europe	50%	50%
Latin America and the Caribbean	100%	0%
Middle East	90%	10%
North America	90%	10%

Source: IATA Sustainability and Economics

For Scenarios 4 to 6, it is assumed that organics are recovered through anaerobic digestion, and paper and card, plastics, glass, and metals are recycled through closed-loop recycling (see assumption section for details). All unrecycled waste is either landfilled or incinerated according to baseline management practices set out in Scenario 3.

3. Data and assumptions

3.1. Passenger and waste

Total segment passenger numbers are estimated at approximately 5 billion from the IATA 'Global Outlook for Air Transport December 2025' report[5]. The total is apportioned into the six regions according to IATA RPK regional share data.

The percentage of international flights in each region is then applied using IATA RPK international share data. International flight share is around 63% globally, and 83%, 52%, 89%, 53%, 96%, and 35% for Africa, Asia Pacific, Europe, Latin America and the Caribbean, the Middle East, and North America.

Flight numbers are further apportioned into short-haul, medium-haul and long-haul flights. This is defined according to IATA flight-haul classification: under 3 hours, 3 to 6 hours, and over 6 hours[6]. Using an average passenger aircraft speed of 860 km/h[7], the distance ranges are classified as follows: under 2,580 km, between 2,580 and 5,160 km, and over 5,160 km. Table 1 details the proportion of flight types by region. Regional data are estimated using country or region-level flight statistics. Regional OAG statistics are used for Africa, Europe, and Latin America, while data from the United States Bureau of Transportation Statistics are applied for North America. Due to data limitations, OAG Africa statistics are used as a proxy for the Middle East given their comparable route distances and shared long-haul corridors. Similarly, OAG Europe data is used as a proxy for Asia Pacific given their dominant short-haul international markets and long-haul intercontinental operations.

Table 2: Proportion of flight type by region

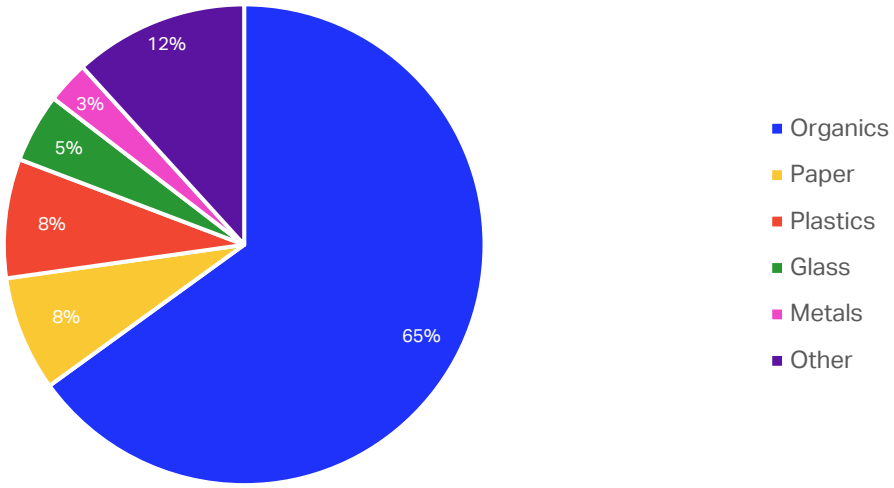
Region	Short haul	Medium haul	Long haul
Africa[8]	22%	21%	57%
Asia Pacific[9]	69%	5%	26%
Europe[10]	69%	5%	26%
Latin America and the Caribbean[11]	29%	55%	16%
Middle East[12]	22%	21%	57%
North America[13]	30%	20%	50%

Source: IATA Sustainability and Economics, OAG, US BTS

ICW generation rates per passenger and waste composition are assumed to be consistent across all regions. The data are taken from the 2024 ASF pilot cabin waste audits. Waste generation for short, medium, and long-haul flights is assumed to be 0.76, 0.75, and 1.18 kg per passenger, and ICW is categorized into organic (65%), paper (8%), plastics (hard) (8%), glass (5%), metal (aluminium) (3%), and other non-recyclables (12%)[14]. It is also assumed that operators do not back-haul ICW and that all ICW is managed locally at the destination.

[5] **IATA (2025). Global Outlook for Air Transport – Trade, AI, and the energy transition.**
[6] **IATA Standards Implementation Guides – 21.1 Implementation Guides - FHT Flight haul type.**
[7] **World Aviation - What's the speed of an airplane?**
[8] **OAG. Africa's Aviation Market – Monthly airline data updates for the African market.**
[9] **OAG. European Aviation Market – Monthly airline data updates for the European market. [Europe proxy].**
[10] **OAG. European Aviation Market – Monthly airline data updates for the European market.**
[11] **OAG. Latin American Aviation Market – Monthly Latin America airline data updates.**
[12] **OAG. Africa's Aviation Market – Monthly airline data updates for the African market. [Africa proxy].**
[13] **Bureau of Transportation Statistics. Database Name: Air Carrier Statistics (Form 41 Traffic) – All Carriers.**
[14] **Aviation Sustainability Forum (ASF). Cabin Waste Composition Audit 2023/2024. Update for IATA Sustainable Cabin Briefing – May 2024.**

Chart 1: ICW composition



Source: IATA Sustainability and Economics, ASF

3.2. Emission factors

A single set of emission factors (i.e. WRAP CarbonWARM2) is used across all geographies to model ICW emissions for each disposal and treatment scenario. This keeps emission calculations, system boundaries, and scope consistent across all regions. This approach assumes that differences in regional conditions, such as energy mix, regulatory and infrastructure standards, do not significantly affect ICW emissions by disposal route. Additionally, any variation in transportation emissions between regions is assumed negligible when compared to overall emissions and therefore has not been separately accounted for in detail.

Table 3: Emission factors by material type and treatment route (tonne CO2e per tonne)

Material	Landfill	Incineration	Closed-loop recycling (co-mingled)	Anaerobic digestion
Organic	0.696	-0.059	NA	-0.062
Paper	1.160	-0.194	-0.097	NA
Plastics (hard)	0.004	1.729	-0.589	NA
Glass	0.004	0.023	-0.443	NA
Metal (aluminium)	0.004	0.023	-5.920	NA
Other	0.622	0.567	NA	NA

Source: WRAP

3.3. Disposal routes

The disposal and treatment routes modelled in this study are landfill, incineration, dry recycling, and anaerobic digestion. Assumptions for each management route are detailed below.

For the landfill disposal route, it is assumed that all ICW is disposed of in managed landfills. All landfills are considered to operate with the same methane capture rates, disregarding potential variations in landfill design or operational effectiveness that could influence methane recovery performance.

Energy-from-waste technology and operational practices are assumed to be consistent across all regions for ICW incineration.

When modelling for dry recycling waste, it is assumed that all dry recyclables are collected together (co-mingled collection) on flights and sent to closed-loop recycling systems. This assumes that materials recovered from this waste stream are recycled back into similar products or uses without loss of quality or diversion to other processes.

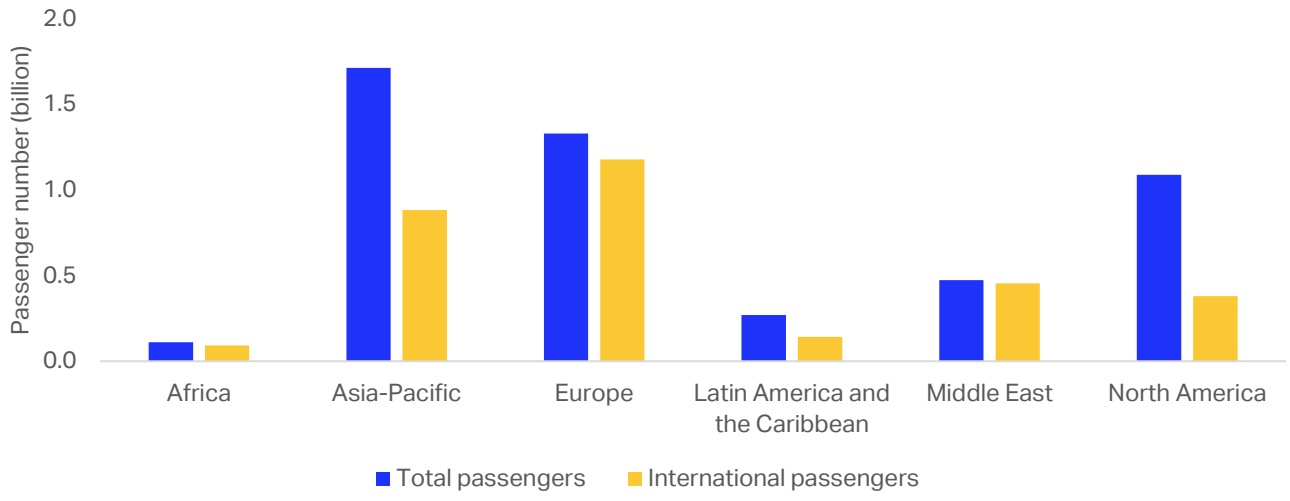
Finally, for the anaerobic digestion of food waste, the same fugitive methane emission and energy generation rates are applied for all regions. This assumes that emissions from unintended methane leaks and the efficiency of energy recovery processes are the same across all regions, despite potential variability due to operational, environmental, or technological factors.

4. Results and discussion

4.1. Passenger numbers

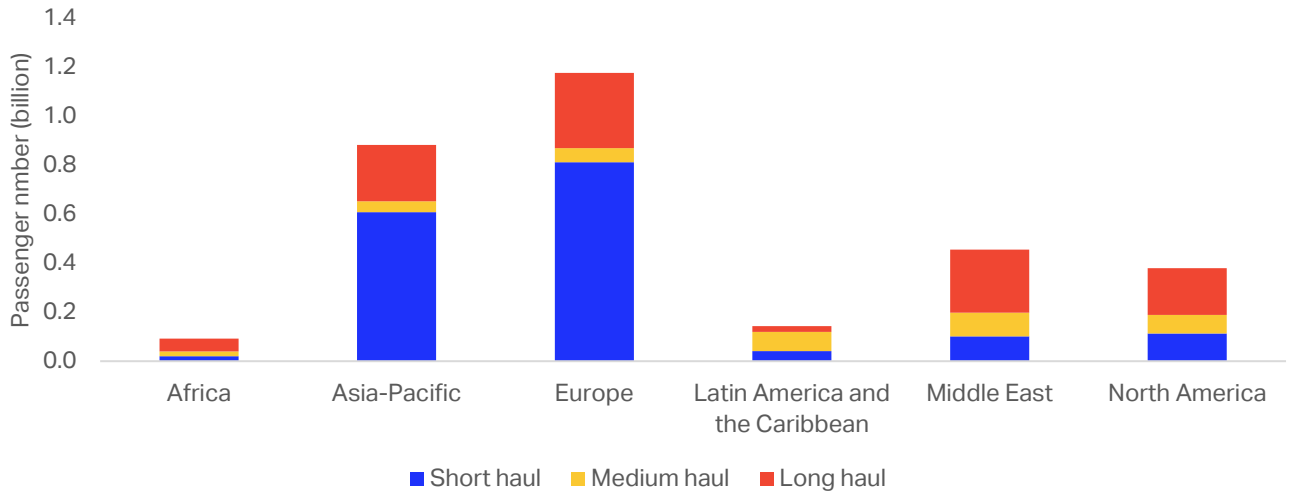
Total segment passenger numbers for 2025 are estimated at 4.98 billion, with international passengers making up around 63% (3.13 billion passengers) of total trips. Asia Pacific makes up the most total passengers (34%), while Europe makes up 38% of all international travel (Chart 2). Focusing on international flights, over half (54%) of all international passengers flew short-haul, 12% flew medium-haul, and 34% flew long-haul (Chart 3).

Chart 2: Total and international passengers by region



Source: IATA Sustainability and Economics

Chart 3: International passenger numbers by region

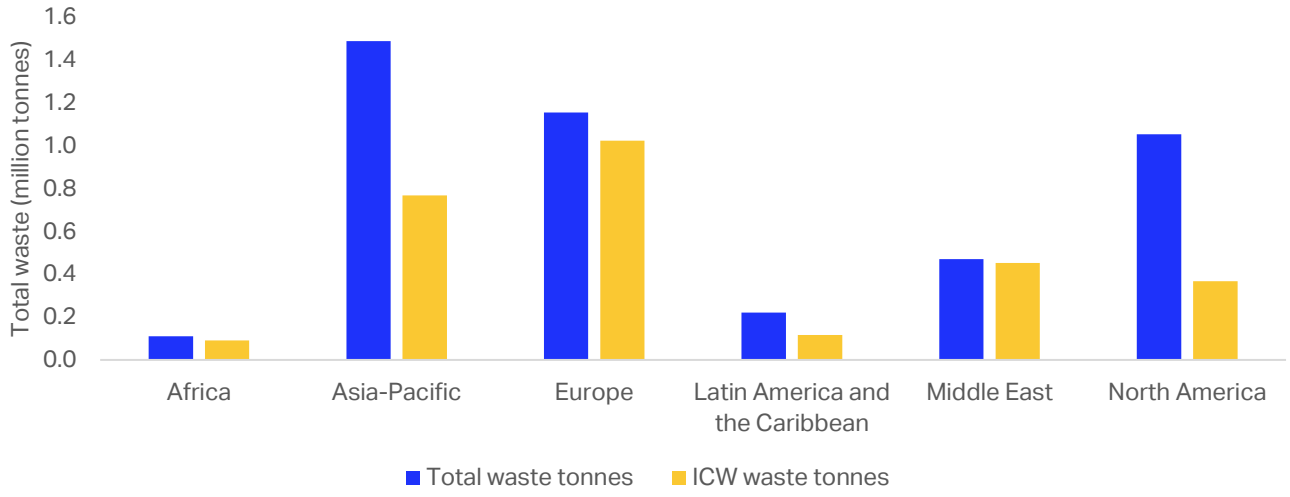


Source: IATA Sustainability and Economics

4.2. ICW tonnes by region and by material

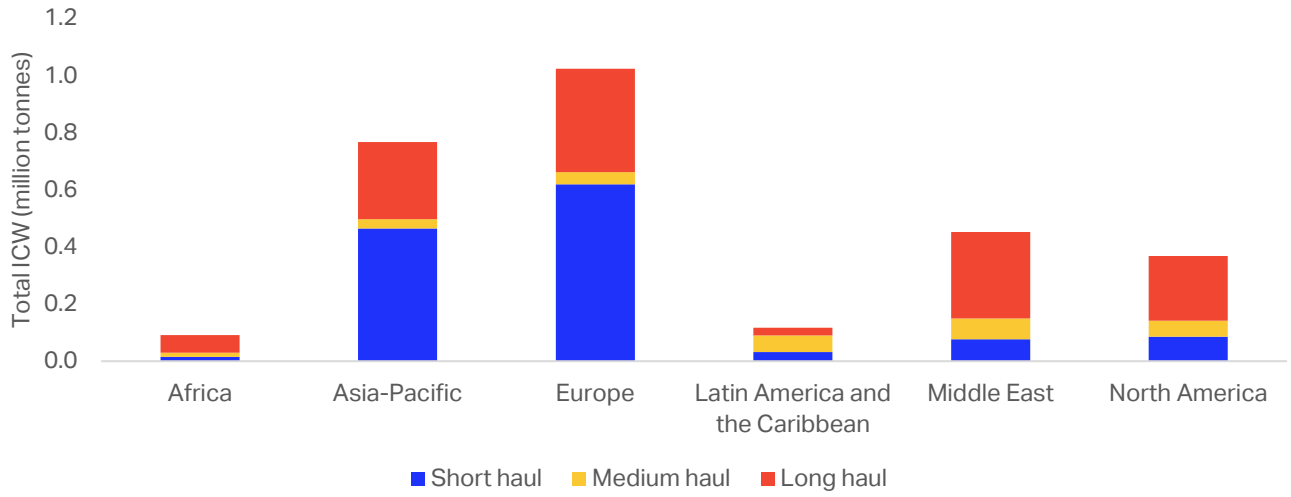
Total waste is modelled to be around 4.5 million tonnes (Chart 4). Cabin waste generated from international flight operations makes up about 2.8 million tonnes, with short-haul passengers contributing the highest proportion of the waste (46%). ICW is mostly generated in Europe (36%), followed by Asia Pacific (27%) and the Middle East (16%) (Chart 5). In terms of material compostition, the majority of ICW is organic waste, followed by paper and plastics (Chart 6).

Chart 4: Total waste and International Catering Waste by region



Source: IATA Sustainability and Economics

Chart 5: ICW tonnes by region



Source: IATA Sustainability and Economics

Chart 6: ICW tonnes by material



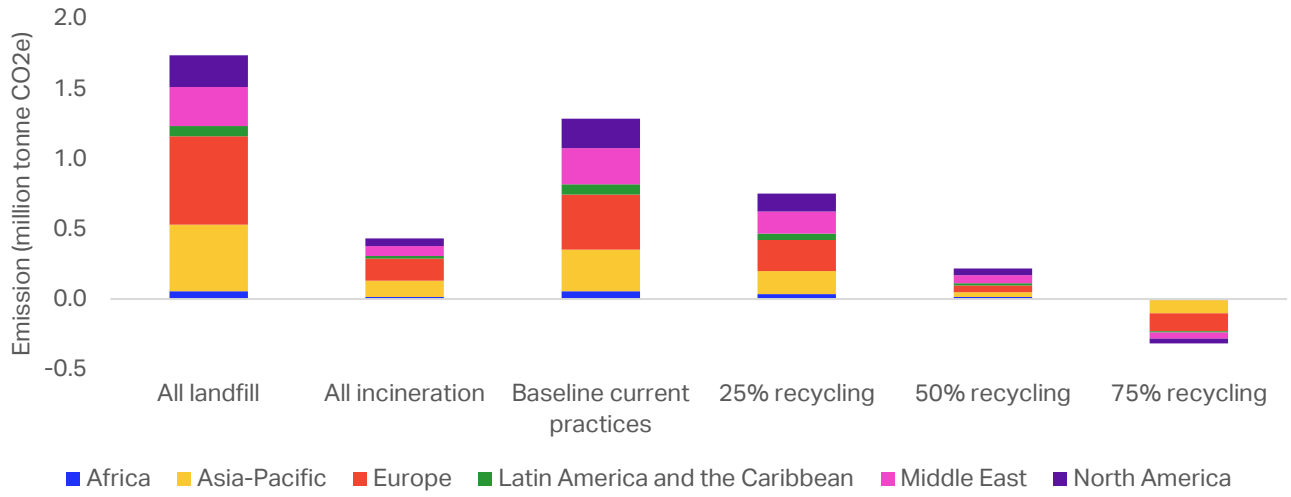
Source: IATA Sustainability and Economics

4.3. Emission scenarios

Greenhouse gas emissions are modelled to be the highest when all ICW is landfilled or incinerated. Recycling of dry mixed materials and anaerobic digestion of organic waste lowers overall emissions. Total ICW emissions are modelled to range from around 1.7 million tonnes CO2e for all waste to landfill (Scenario 1) to -0.3 million tonnes CO2e for 75% recycling of ICW (Scenario 6) (Chart 7). Europe, the Middle East and Asia Pacific contribute to the majority (80%) of all ICW treatment emissions, indicating substantial emissions reduction potential.

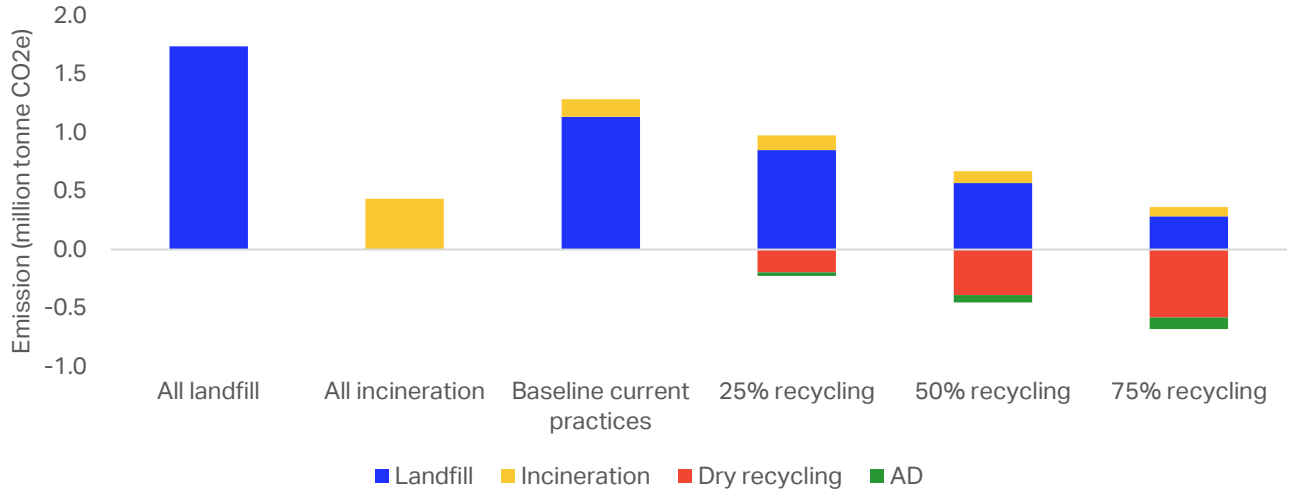
Overall, landfill is modelled to have the highest emissions, followed by incineration. Anaerobic digestion of organic waste has a slight net negative effect on emissions, while closed-loop recycling has the largest impact on emission reductions (Chart 8).

Chart 7: Emission scenario by region



Source: IATA Sustainability and Economics

Chart 8: Emission scenario by treatment pathway



Source: IATA Sustainability and Economics

5. Limitations

This study provides a high-level analysis of global ICW by region and the associated emissions from ICW management. Potential emission reductions from recycling of ICW are also modelled. This study provides an initial assessment of global ICW emissions to inform future analysis and policy decisions and comes with a number of caveats and limitations.

Firstly, it is assumed that global ICW composition and generation rate by flight length are consistent across all regions. In reality, the quantity and composition of ICW will vary based on airline service provisions and management practices. The proportion of international flights and short, medium, and long-haul flights will also

vary by country and region. Furthermore, there are inconsistencies in interpretation between EU Member States on whether intra-EU flights operating solely within the EU are international flights[15].

Regional variations in operational and technological factors will also affect ICW-related emissions. ICW disposal routes and management practices vary greatly by country. This study applies a single set of emission metrics across all regions for consistency. Differences in ICW management and transportation will affect greenhouse gas emissions. Differences in regulatory and operational practices may lead to variation in emissions outcomes between regions.

Furthermore, landfill methane capture rates can vary due to differences in infrastructure and regulations. This will affect the quantity of avoided emissions from electricity or heat generation from the recovered gas. Similarly, fugitive methane emission rates can differ widely with high uncertainties for anaerobic digestion facilities.

Further research is required to reduce uncertainties and increase data granularity associated with regional variability in ICW management practices and emissions. In particular, improved data on passenger numbers, waste composition and emission factors would enhance the accuracy of modelling outputs.

6. Conclusions

International catering waste is estimated at approximately 2.8 million tonnes in 2025, representing around 63% of the 4.5 million tonnes of total cabin waste generated across all passenger flights. Europe, Asia Pacific and the Middle East account for nearly 80% of global ICW generation, indicating that action in these regions could deliver the greatest impact.

The analysis highlights significant resource recovery opportunities. Approximately 88% of ICW consists of technically recoverable materials. This indicates that a substantial proportion of ICW could potentially be diverted from disposal through improved segregation and treatment systems.

Waste management routes have a substantial influence on greenhouse gas emissions. Baseline ICW management practices are estimated to generate around 1.3 million tonnes CO2e annually. Increasing recycling and recovery rates significantly reduces emissions, with 25% recycling reducing emissions to around 0.75 million tonnes CO2e, 50% recycling reducing emissions to 0.22 million tonnes CO2e, and 75% recycling lowering emissions to approximately -0.32 million tonnes CO2e.

Overall, the study indicates the potential environmental benefits that could be achieved through policies and operational changes that enable higher rates of recycling and recovery of international catering waste.

[15] **FCC (2018). International Catering Waste – A case for smarter regulation.**