SAF Sustainability Guidance for Airports

A summary of the Sustainable Airports Platform outputs in 2022

This initiative is linked to ALIGHT project, which has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957824

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Executive summary

Airports have generally not played a determining role in the Sustainable Aviation Fuel (SAF) value chain, but this situation is changing fast. A growing number of airports globally are leading several initiatives to support the SAF economy, such as supporting research and development, regional studies, and providing financial incentives. Airports play a crucial role in the SAF economy since they are the intersection node of several stakeholders of the aviation sector – fuel producers, traders, airlines, governments, and society. Airports, however, do not yet have a common ground when speaking about SAF.

Airports are also increasingly coming together in initiatives such as the Sustainable Airports Platform, a collaborative network linked to RSB membership and EU-funded ALIGHT project aimed to increase awareness of SAF among airports and develop best practices that the wider airport community can utilise to design their own strategies to engage in the SAF sector. This guidance is the main output of this platform and summarises the learnings created during the meetings and discussions held during 2022. It aims to support the wider airport community to better understand the role they can play to support SAF development, and how SAF can, in turn, help the community meet their sustainability and decarbonisation goals.

The guidance starts with an assessment of the current role of airports in the SAF value chain (Chapter 1), identifying key challenges and opportunities and showcasing best practices developed by leading airports, such as the development of research and development studies, including feedstock assessments, to identify SAF potential, the creation of SAF incentive schemes at airports, and the support of SAF production, among other actions.

In Chapter 2 we present the results of a research that investigated how SAF is currently being included in airports' sustainability strategies, showing that about a third of the world's 32 busiest airports include SAF in their strategy documents, with some airports already describing clear interventions to support SAF and improve distribution, while others still presenting SAF as an opportunity without detailing any specific intervention. This demonstrated how there is a growing interest and commitment by airports to play a role in the SAF economy, even though this role may still be in the process of being defined.

Chapter 3 describes how SAF delivers significant greenhouse gas (GHG) emission reductions compared to fossil jet, and specifically how these reductions can be linked to airports' own decarbonisation goals. It recognises the challenge for airports to reduce Scope 3 emissions, which account for the majority of airport's emissions and are outside the airport's direct control and management.

In Chapter 4 the role of airports as interface with passengers is recognised, along with the opportunity to leverage this position to improve passengers' awareness on SAF. The results of a passenger survey conducted by Rome Airport are presented, showing that while only less that 10 percent of travellers know what SAF is, at least half of all respondents want to learn more about SAF and aviation decarbonisation in general. This chapter also presents a brief communication strategy developed via consultation with airports and other stakeholders that participated in the Sustainable Airport Platform, which highlights key messages that airports can use to educate passengers and airlines on SAF.

The guidance then presents the benefits of SAF beyond GHG emission reductions in Chapter 5, and introduces the SAF Sustainability Toolkit for Airports which is found in Annex II. SAF sustainability is navigated by using the RSB 12 Sustainability Principles and Criteria as guidance. These principles have been developed by the Roundtable on Sustainable Biomaterials (RSB) in collaboration with a global and diverse set of members, including industry, research organisations and civil society. They describe how to produce bio-based and circular fuels and materials in an environmentally, socially and economically responsible way and include aspects such as legality (i.e., land rights), environmental criteria (i.e., conservation, soil, water management) and social criteria (i.e., food security, labour rights).

Introduction

The commercial global aviation industry accounts for approximately 2 percent of global greenhouse gas emissions with 781 million metric tons (Mt) of CO2 emitted in 2015. Aviation's share of total global emissions is forecast to grow to 5 percent by 2050, due to increasing demand for air transport services globally. It is thus imperative for the aviation sector to address its environmental impact if it wants the growth to be a sustainable one. Therefore, the sector has committed to several emissions goals, including reducing net aviation emissions to 50 percent below 2005 levels by 2050 via technological, operational, and economic measures. Sustainable Aviation Fuels (SAF) are expected to be the largest contributor to such decarbonization (see Figure 1).

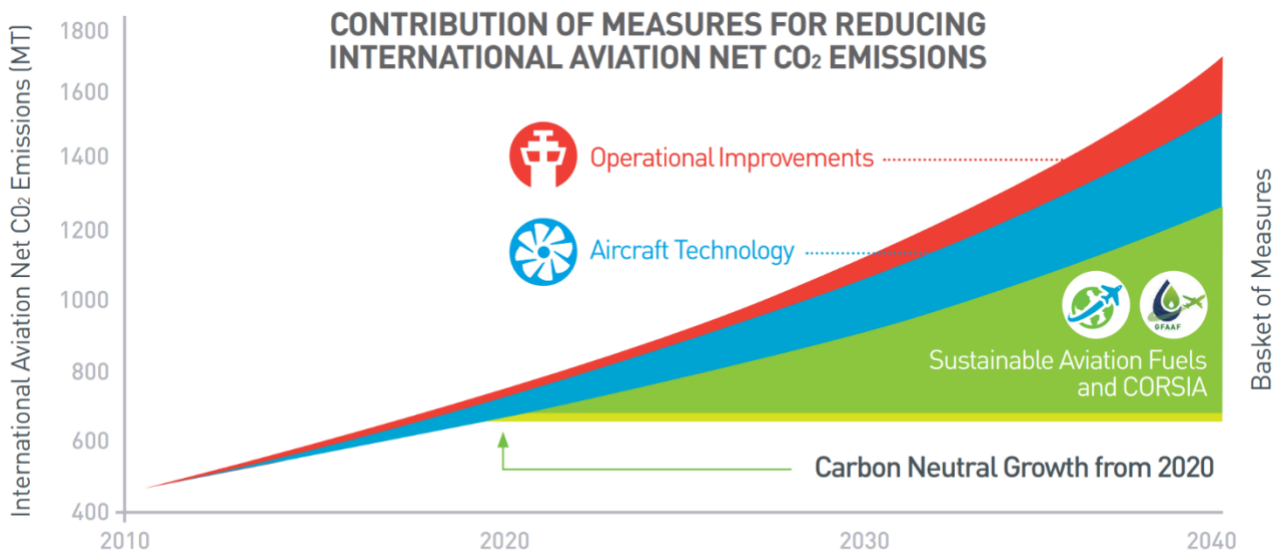


Figure 1: Contribution of measures for reducing international aviation emissions[1]

The sector can go beyond decarbonization to stimulate the development of a new and truly sustainable bio-based and circular economy: one that advances the use of innovate feedstocks and novel technologies to ensure that SAF production doesn't just help the aviation industry lower its Greenhouse Gas (GHG) footprint, but also protects and enhances communities and ecosystems.

With these ambitious goals, SAF production quickly needs to scale up and its demand must be promoted, aiming at a large-scale market penetration and level playing field in comparison of fossil jet fuel.

In this context, airports have a critical role to encourage the use of SAF, since they are the intersection node of several stakeholders of the aviation sector – fuel producers, traders, airlines, governments, and society.

[1] Source: CORSIA brochure, https://www.icao.int/environmental-protection/Documents/CorsiaBrochure_8Panels-ENG-Web.pdf

Today, only a few airports have a consistent supply of SAF, due to challenges such as limited SAF production sites and the cost of SAF distribution and transportation, availability of blending facilities and quality control at airport infrastructure. SAF is generally blended with fossil jet before it is delivered to an airports' fuel farm, where it is then fuelled into aircrafts (see Figure 2). There is also still some uncertainty on the role airports could and should play within the SAF value chain and to promote and incentive SAF offtakes.

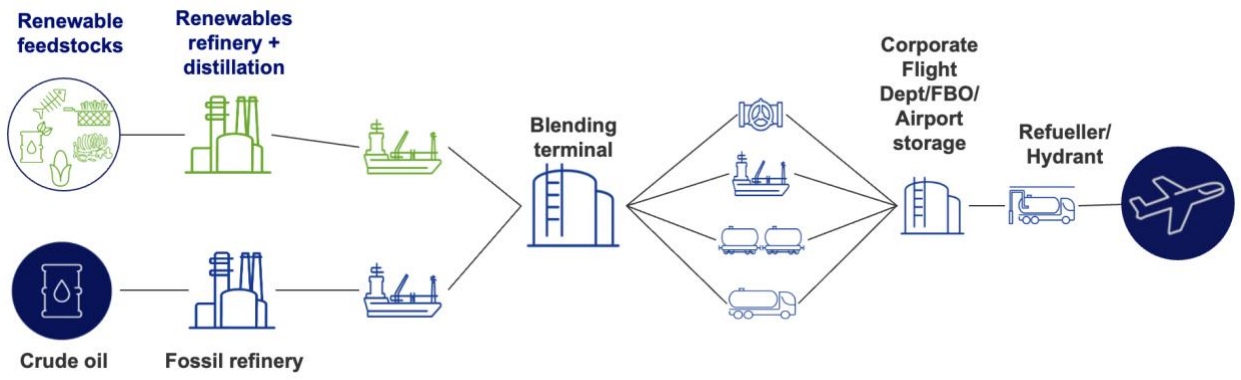


Figure 2: Overview of a SAF supply chain from production, blending and airport distribution. Credit: Neste

There are several benefits for airports in distributing SAF, such as better climate and public health benefits due to SAF's purity and clean burning properties. SAF has near-zero sulphur and aromatic components, which significantly decrease particulate emissions by up to 65%[2]. These so-called non-CO2 benefits lead to improved air quality at airports, which has an impact on local communities as well. Moreover, SAF can support airports' own decarbonization goals as its reductions can be partly allocated to airports' Scope 3 emissions (as explained in section 3). Lastly, an enabling role can position airports as leaders in aviation decarbonization and demonstrate their support to airlines committed to use SAF.

It is within this framework that airports globally have been mobilizing to play an increasing influential role in the SAF value chain. However, whilst there is no doubt that airports are a crucial element in the journey to decarbonize aviation, there are still questions around models, activities and collaborations that airports can develop in support of SAF.

Therefore, and linked to the goals of project ALIGHT, the Roundtable on Sustainable Biomaterials (RSB) launched a Sustainable Aviation Platform (SAP) in response to this need and to create a space for ALIGHT partner airports and other airports with more experience in SAF to collaborate in developing and exchanging knowledge on sustainability and the role of airports in the growing SAF economy. The SAP was used to identify the key sustainability priorities for airports and co-create the knowledge and tools that are summarised in this report.

[2] Source: https://www.euractiv.com/section/aviation/opinion/the-benefits-of-sustainable-aviation-fuel-go-beyond-co%E2%82%82/

The platform hosted a series of virtual meetings, expert presentations, and both online and offline discussions on topics such as the current and aspirational role of airports in the SAF value chain; how SAF contributes to airports' own decarbonization goals; how airports can communicate SAF to the millions of passengers walking through their buildings; and how sustainability information about SAF can be shared across airport staff.

The SAP run throughout 2022 and several airports, value chain and research stakeholders participated (see Figure 3), including:

Airports:

- Copenhagen airport*
- Rome airport*
- Vilnius airport / Lithuanian Airports*
- Warsaw airport / Solidarity Transport Hub*
- Seattle airport / Port of Seattle
- San Francisco airport
- Amsterdam Schiphol airport
- Avinor / Norwegian airports group
- Paris airport / Groupe ADP

SAF value chain:

- SkyNRG
- Shell
- The Boeing Company
- Boom Aviation
- Singapore Airlines

Other:

- Roundtable on Sustainable Biomaterials (RSB)*
- Nordic Initiative for Sustainable Aviation (NISA)*
- International Air Transport Association (IATA)*
- University of Parma*
- Danish Technological Institute*
- BMGI Consulting*
- University of Pavia
- Sintef

Stakeholders marked with * are Alight project partners.

The calendar and main topics discussed in the SAP are shown in the table below (Table 1):

Table 1: Calendar meeting of the Sustainable Aviation Platform

Meeting	Topic	Date
1st	**Current role of airports in SAF value chain**	March 2022
2nd	**Airports' sustainability strategies and SAF contribution (Scope 3)**	April 2022
3rd	**Review GHG targets and protocols (SBTi, etc) from the point of view of airports**	May 2022
4th	**Communicating SAF Sustainability to passengers**	June 2022
	SAF awareness survey at Rome Airport	May-June 2022
5th	**Role of airports in RSB's Book & Claim system for SAF**	July 2022
6th	**SAF sustainability beyond GHG reductions**	September 2022
7th	**Sustainable Airport Platform session at the RSB Innovation Meeting (Boston, USA)**	October 2022
8th	**SAF Sustainability Guidance launch and Agenda for 2023**	November 2022

The knowledge generated through this engagement related to SAF awareness, communication, and sustainability is summarised below and is meant to be utilised by the airport community globally as a guidance to improve understanding of SAF sustainability and guide decision-making around the role airports want to play in the SAF economy.

1 Current role of airports in the SAF value chain

Airports can play a critical role to encourage the use of SAF. However, only a few airports currently have a consistent supply of SAF, and there is still some uncertainty on the role airports could and should aspire to play within the SAF value chain. As a first step, it is important to identify the key challenges and opportunities around SAF from the point of view of airports, and to learn from airports who have successfully led SAF initiatives.

1.1 Challenges

According to a survey conducted on behalf of the Sustainable Airports Platform, the participants overwhelmingly agreed (89%) that introducing SAF at airports poses a significant challenge.

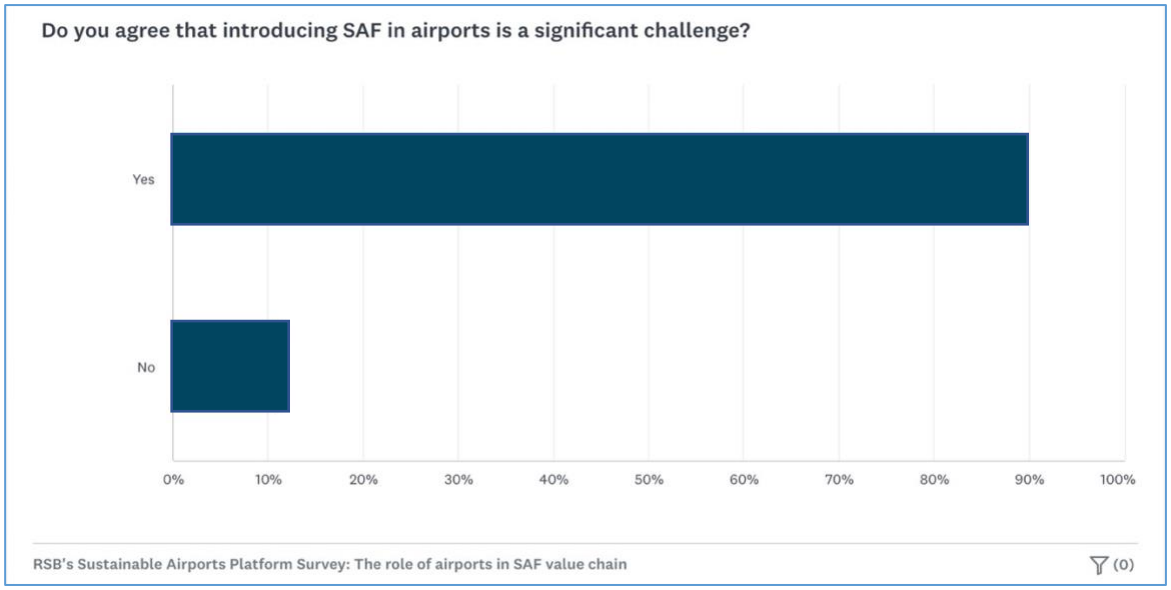


Figure 3: Results survey Sustainable Airport Platform

Challenges can be grouped into three main categories: costs and availability of SAF, uncertainty around the role of airports, and the required infrastructure for introducing SAF in airports.

Cost and availability of SAF

- Limited supply volumes of SAF make it more difficult to distribute across airports globally.
- Airports located in incentivised markets (e.g., California) benefit from greater access.
- Distribution at airports depends primarily on airlines' demand.

- It is unclear what role airports could and should play in the SAF value chain, and especially around what key responsibilities belong to airports, infrastructure owners, fuel providers and users.
- There are knowledge gaps around SAF among airports' staff.
- Currently, airports play a minor role, but this should be expanded in the future.
- However, innovative ways can be created for airports to support SAF deployment.
- It is unclear how SAF should be accounted for / reported by airports.
- In some geographies (e.g., USA), airports are prohibited from using their own funds to bridge the SAF price premium.

- A key challenge is industry infrastructure rather than infrastructure at the airport.
- Access to the conventional fuel supply line can be challenging; SAF integration with pipeline operators and oil majors can be timely and costly, which is a key barrier for smaller SAF players (co-processed SAF will not have this issue as it can use existing infrastructure without the need to be blended).
- Blending of SAF should be better optimised. The Airports Council International (ACI) is currently working on a paper around SAF blending issues and solutions.
- Another issue is the gap between supplier monopolies vs. lack of local supply at most airports.

1.2 Opportunities

Although relevant challenges have been identified, there are also many opportunities that have been found for airports to support the development of SAF.

As discussions continue, the role airports will become clearer and better understood by all relevant stakeholders, and airports will continue to develop new ways to play a role in SAF distribution.

Cost and availability of SAF

- Airports can help bridge the price premium of SAF by:
  - Subsidising SAF (i.e., airport's SAF incentive schemes), and
  - lobbying policymakers for incentives or other enabling regulations (e.g., mandatory quotas, cap-and-trade mechanisms).
- Airports can support regional SAF development by:
  - providing loans or direct financial support to SAF production facilities, and
  - supporting studies that are relevant for SAF market development (via participation in research consortia or using own funds), such as feedstock availability assessments, new production technologies, etc.

- Raise awareness with regulators around new economic development pathways, incentives and programmes that could accelerate SAF development and access to capital.
- Help aggregate SAF demand from airlines.
- Organise and/or support awareness campaigns targeted at passengers.
- Use SAF for airports' own GHG reporting.

- Support permitting of an environmental review for onsite fuel consortium / fuelling farms.

1.3 Examples of airport's SAF initiatives

Airports can aggregate SAF demand across airlines and play an integral role in their regional economy. Bold leadership from airports will accelerate industry sustainability and SAF adoption (Klauber et al, 2017).

In this section some successful initiatives are shared from leading airports across Europe and the United States on how they have supported the regional development of SAF. This can serve as an inspiration for other airports who could replicate and adapt these initiatives to their own circumstances.

1.3.1 Port of Seattle

The Port of Seattle (the port) as the operator of Seattle-Tacoma International Airport (Sea-Tac) has been a leader in supporting research and development of SAF (Leavitt et al, 2018). It has been an early champion of SAF research, with the 1st initiative to identify how airports could support SAF development realized in 2008. The goal was to understand the SAF landscape, in collaboration with state agencies.

After completing a collaborative effort to define a 'flight path' to create a SAF industry in Washington State, the port decided to shift towards a market development role. This role involves developing adequate infrastructure to receive, store and handle SAF, and participating in programs to reduce the incremental cost of SAF relative to fossil jet fuel.

In 2017, the Port of Seattle set a goal to power every flight fuelled at Seattle-Tacoma International Airport (SEA) with at least 10% blend of SAF (WSU,2020). To help achieve these goals, airlines operating at SEA signed an MOU with the Port of Seattle (Port of Seattle, 2018).

Moreover, SEA worked on several initiatives to promote SAF, such as:

- **Financing and leading feasibility studies**, which have been incredibly useful to SAF producers and suppliers. Studies included:
    - Infrastructure feasibility study – evaluated sites for storage and blending infrastructure along pipeline; identified sites to accommodate pipeline, rail, barge and truck delivery of SAF and allow for integration with SEA's fuelling infrastructure, with the goal to accommodate an initial 30 to 50 million gallons of unblended neat SAF per year.

- Large-scale regional feedstock assessments – resulting in the identification of Municipal Solid Waste (MSW) as potential feedstock for SAF production in Washington State; currently supporting a financial feasibility assessment on the production of SAF from MSW in collaboration with local authorities.

- **Attracting SAF production facilities**: developing business case for near term production
- **Supporting the financing of SAF price premium** through the creation of a buyers' alliance at the airport ("Airline SAF Group") in collaboration with San Francisco Airport.

SEA does not yet have steady supply of SAF but are stepping up their commitment to achieve this in the near term.

1.3.2 Amsterdam Schiphol airport

Schiphol airport started facilitating the first SAF commercial flight with KLM and SkyNRG in 2011. Schiphol benefits from having several SAF industries active in the area.

Since 2013, the airport collaborates with KLM's Corporate Biofuel Programme, from which the airport learns about supply and understand how to support SAF production and is has invested in SkyNRG's Direct Supply Line (DSL-01) SAF production facility in the Netherlands to develop a large scale SAF supply at Schiphol airport by 2025.

Schiphol is also the first airport to implement an airport-led incentive scheme that supports airline with reducing the price premium of SAF, and which 15 airlines currently benefit from.

Lastly, the airport is currently leading another EU-funded project called TULIPS, which is a collaborative project between airports, airlines institutes and industrial partners aimed to accelerate the deployment of sustainable aviation technologies that will contribute to decarbonization of aviation sector. It will develop large scale uptakes and an EU clearing house design, and also support a passenger awareness programme to identify how passengers can contribute to SAF premiums.

1.3.3 Avinor (Norwegian airports' group)

Norway has been an early mover in the uptake of SAF. In 2016, Avinor Oslo Airport became the first international airport to mix SAF into the regular fuel supply system and offer it to all airlines that refuelled there (Avinor, 2021). The project proved SAF can use ordinary logistics and infrastructure for fuel deliveries to airports. In 2017 this scheme was also expanded to include Bergen Airport.

Norwegian airports benefit from a strong political support for SAF and sustainability in the region. Norway is the first country in the world with a SAF blending mandate, which is set at of 0.5 percent since 2020.

Avinor has been involved in several initiatives to support SAF, including:

- Research project with stakeholders including airlines and NGOs to identify feedstock potential for SAF, with focus on local biomass including forestry residues and algae.
- Research and development using national and/or EU funding to develop the demand side of SAF.
- Involvement with SAF suppliers for pre-purchase agreements
- Participation in projects to support SAF deployment at airports, including project ITAKA, which supported the development of SAF made with used cooking oil and camelina feedstocks, and project TULIPS (mentioned above).

Currently Avinor is running own project in partnership with several regional airlines, industry players and the local labour union to develop:

- a common knowledge base around SAF,
- a roadmap to achieve independence from fossil fuel by 2050, and
- a programme to identify ways to collaborate to bridge the SAF price premium.

1.4 Main ideas

The following ideas can be extracted from the previous sections and replicated by other airports in the EU and globally to support SAF development:

- Support, with human and financial resources, local and regional assessments of the sustainable availability of feedstock for SAF production.
- Collaborate with other airports and value chain partners and research institutions in projects to support SAF development.
- Engage with supply chain partners such as SAF producers and suppliers to identify optimal blending and airport delivery infrastructure or develop adequate infrastructure at airports' fuel farms.
- Communicate the benefits of SAF to travellers.
- Organise SAF demand aggregation initiatives.
- Advocate for SAF incentives to local and regional policymakers.
- If this role is allowed within an airports' jurisdiction, provide financial support to airlines and clients to purchase SAF via mechanisms such as incentive schemes.

2 SAF in airports' sustainability strategies

The goal of the second meeting of the SAP was to identify to what extent, if at all, SAF is part of airports' sustainability strategies. Research showed that, although SAF was on the radar of airports worldwide, many have yet to integrate it into their sustainability strategies. In this section it can be seen the methodology and results obtained.

To identify the extent to which SAF is part of airports' sustainability strategies, a diverse selection of the world's top (or busiest) airports was investigated through desktop research. Initial data published by Airports Council International (ACI, 2022) was used to select the world's top airports. This revealed 80% of the world's busiest airports were in the USA, and the remaining 20% in China.

To ensure better global representation, further research was conducted using previous data from ACI to select the busiest airports in each region – North America, Asia, Europe, Australasia, South America and Africa – as well as airports in the Sustainable Airports Platform, resulting in the following 32 airports:

Table 2: Selection of busiest airport per region

North America	Asia	Europe	Australasia	South America	Africa
Atlanta, US (ATL)	Guangzhou, CN (CAN)	Istanbul, TR (IST)	Sydney, AU (SYD)	Mexico City, MX (MEX)	Cairo, EG (CAI)

Dallas/Fort Worth, US (DFW)	Chengdu, CN (CTU)	Amsterdam, NL (AMS)	Melbourne, AU (MEL)	São Paulo-Guarulhos, BR (GRU)	OR Tambo, SA (JNB)
Denver CO, US (DEN)	Dubai, AE (DXB)	Frankfurt, DE (FRA)	Brisbane, AU (BNE)	El Dorado, CL (BOG)	Addis Ababa, ET (ADD)
Chicago IL, US (ORD)	Doha, QA (DOH)	Paris, FR (CDG)	Auckland, NZ (AKL)	Cancún, MX (CUN)	Cape Town, SA (CPT)
Los Angeles CA, US (LAX)	Hong Kong SAR, HK (HKG)	London, GB (LHR)	x	x	x
San Francisco, US (SFO)	x	Rome, IT (FCO)	x	x	x
Seattle, US (SEA)	x	Copenhagen, DK (CPH)	x	x	x
x	x	Oslo, NO (OSL)	x	x	x

An analysis of each airport's sustainability strategies was then conducted to identify any mention of SAF and related activities. The detailed

The research demonstrates that only 12 of 32 top (or busiest) airports showed evidence of SAF in their sustainability strategies – or only 4 of the 7 airports in North America, 1 of the 5 airports in Asia, 6 of the 8 airports in Europe, 1 of the 4 airports in Australasia and none in either South America or Africa. A full breakdown can be found in Annex I of this report.

Of those airports that have made SAF part of their sustainability strategies, public commitment has been made regarding the following areas:

- Advocacy of SAF,
- Partnering with airlines,
- Developing incentive schemes,
- Setting goals and targets, and
- Supporting research.

Many of these commitments are however still quite vague. This could be due to complicated decision-making structures surrounding airport authorities, inadequate or unavailable data regarding airports and their sustainability strategies, or the prioritisation of other responsibilities and solutions to the climate crisis. Nevertheless, this emphasises the need to further research and expand on the role that airports can take in developing SAF economies.

This demonstrates the need for initiatives like Alight and other projects that are being launched in the market which helps to support airports in playing a role in the growing SAF economy and showing sustainability leadership.

3 SAF contribution to airports' decarbonization goals

SAF as an alternative, non-petroleum-based aviation fuels, is produced from renewable sources of both biological (plant or animal material) and nonbiological origin (e.g., municipal waste or waste CO2). The GHG emissions of SAF are calculated using a life-cycle assessment (LCA) approach, which includes all activities related to the cultivation and harvesting of the biomass feedstock (or collection of residues), transport, processing stages, SAF production, and distribution to the airport. Carbon dioxide absorbed by plants during the growth of biomass is roughly equivalent to the amount of carbon dioxide produced when the fuel is burned in a combustion engine, which is simply returned to the atmosphere. Waste materials benefit from a zero GHG intensity at the point of origin as the carbon emissions are allocated to the primary products (see Figure 4).

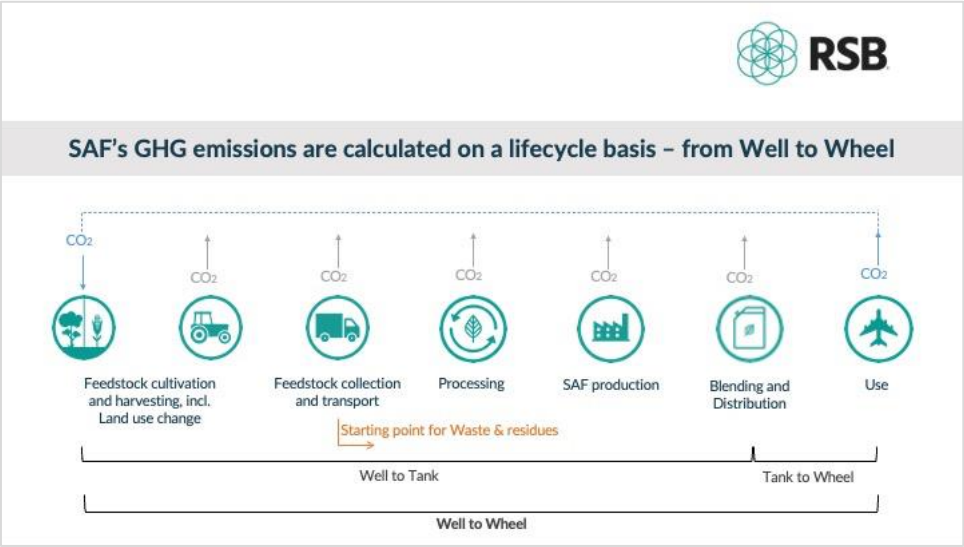


Figure 4: The GHG Life-cycle assessment boundary for SAF

When these elements are accounted for, the use of SAF has been shown to provide significant reductions in overall GHG lifecycle emissions compared to fossil fuels, up to 80% in some cases. It is generally known that such emission reduction is used by airlines – who burn SAF in their aircrafts' engines – to meet national, regional or international GHG reduction obligations (i.e., the European Union's Emission Trading Scheme, or soon, ICAO CORSIA) as well as their own voluntary decarbonization goals. However, airports can also benefit from this reduction as explained below.

Airports' GHG inventories typically divide airport emissions into three categories. These categories, or "scopes," are based on the amount of control an airport has in reducing the emissions (see Figure 5).

- Scope 1: emissions from airport-controlled sources
- Scope 2: related to energy indirect emissions, emissions from purchase electricity, heating, or cooling.
- Scope 3: is related to emissions from third parties, aircraft, or passenger access to the airport.

The vast majority of an airport emissions are within the Scope 3 category and are therefore not under the direct control of airport's management. This makes it particularly difficult for an airport to significantly decarbonize.

Airports' Scope 3 emissions are primarily made up of aircraft landing and take-off cycles (up to 1,000 metres elevation or for the whole departing flight, depending on the level of certification), and passenger, greeter/fareweller and staff travel to and from airport (Baxter, 2021). Some estimate these emissions to account for 80-90% of an airport's total footprint.

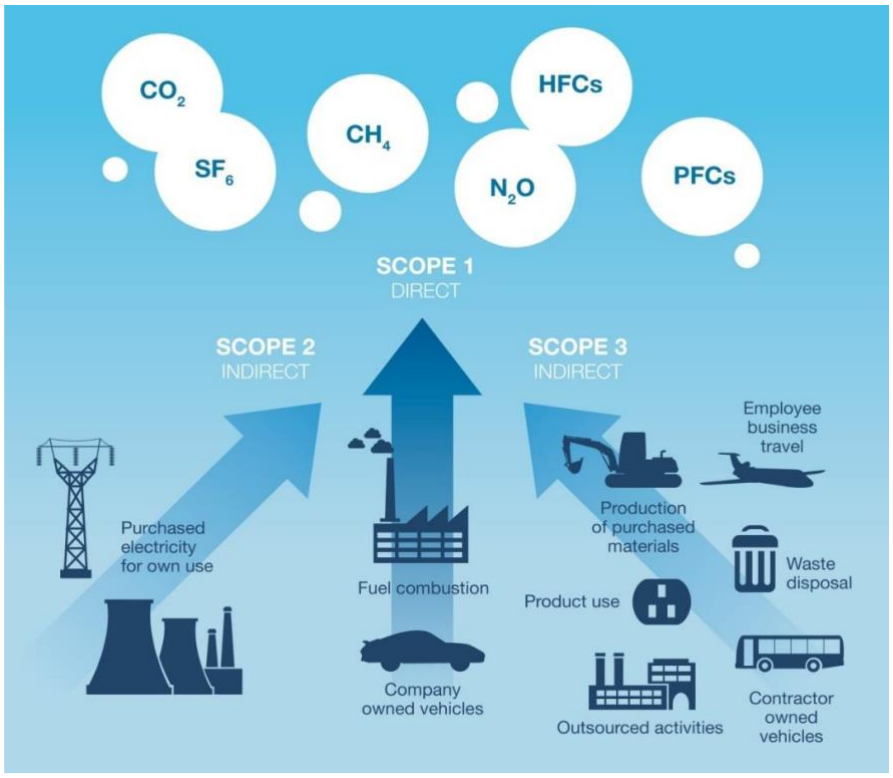


Figure 5: Scope of airport emission (Ricardo, 2020)

Airports can pursue low-cost energy efficiency measures like improving building insulation to reduce Scope 1 emissions. These kinds of measures simultaneously reduce GHG emissions and operating costs. Airports can also purchase renewable energy for Scope 2, install renewable energy systems that are compatible with airport operations, reduce energy consumption, monitor the efficiency of heating, ventilation, and cooling systems, and purchase low or zero-emission vehicles and GSE (FAA, 2022).

But in the case of Scope 3 emissions reducing them is complex, however, because this process requires the collaboration and support of a wide range of various stakeholders and third parties, each with their own agenda and climate targets to meet (ICF, 2022).

However, airports can influence tenant and passenger GHG emissions. Airports can work with tenants on energy efficiency measures; expand airport recycling programs; and work with municipalities on improving public transportation for airport passengers. The development of

multimodal hubs to encourage access to public transport, and the provision of charging stations for electric or hydrogen vehicles are some of the incentives already in place.

With regards to the Scope 3 emissions from aircraft fuel use, the use of SAF by airlines landing and taking off can significantly contribute to the airports' Scope 3 emission reduction. Airports are therefore further incentivized to develop alliances with airlines and other partners to promote SAF usage.

3.1 Rome Airport experience

Rome Airport is at the forefront of airport decarbonization, and in 2021 obtained level 4+ certification – the highest of its kinds – through the Airport Carbon Accreditation (ACA). ACA is a global carbon management certification programme for airports that is based on the GHG Protocol standards[3]. It independently assesses and recognizes the efforts made by airports in managing and reducing their carbon emissions through six levels of certification aligned with Paris Agreement (see Figure 6).

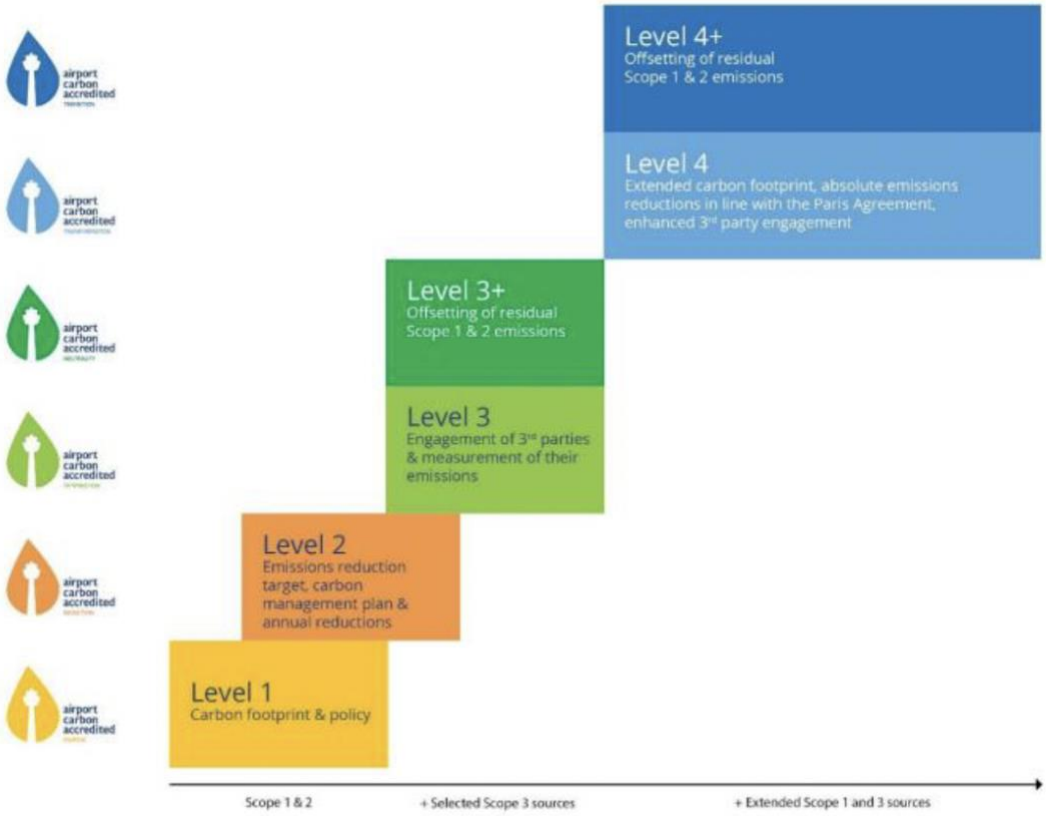


Figure 6: ACA's six levels of certification

[3] https://ghgprotocol.org/

In order to lower emissions Rome airport has been implementing several low-carbon strategies and initiatives to reach 2030 Net Zero Scope 1 and 2:

SCOPE	ACTIONS	IMPACT	OWNER / STAKEHOLDER
Scope 1 - *Direct GHG emissions(1)*	Substitution of the entire vehicle fleet with electric cars by 2029	Cancellation of car fuel's emissions	ADR
	Disposal of the cogeneration plant fuelled by methane and significant reduction of the working hours or alternatively the fuelling by bio-methane of cogeneration and of heating furnaces since 2030	The cogeneration plant will become property of ADR e will be dismissed in 2029 (end of life) or upgraded and fuelled by bio-methane	ADR
	Procurement of Biodiesel for emergency generators of electricity Procurement of bio-methane related to the heat generators	Substitution of diesel used in backup electronic group-set with biodiesel made with "biomass". Substitution of gas used into heat generators with bio-methane	ADR
Scope 2 - *Indirect GHG emissions(2)*	Construction in the next years of 2 large photovoltaic farms inside airdrome perimeter, for a total power of ca. 60MW	Production of green energy with photovoltaic farms. In this way the working hours of the cogeneration plant will be reduced, before disposal in 2029 or fuelled by bio-methane	ADR
	Installation (on top of the existing thermic storage of 20 MW and 60 MWh) of an electric storage up to 30 MW and 90 MWh	Storage of the green electricity produced, to be used when necessary	ADR

SCOPE	ACTIONS	IMPACT	OWNER / STAKEHOLDER
Scope 3 - *All other indirect emissions(1)*	Availability for airplanes of SAF (Sustainable Aviation Fuel) by 2024 as committed by EU funded project ALIGHT	Reduction of emissions produced by airplanes during cruise, landing, taxing and take-off	Suppliers (Oil Companies), Re-fuelers, Airlines
	Installation into the airport of ca. 500 charging points for electric vehicles by 2025 to improve electric mobility (roughly 100 air side and 400 land side)	Reduction of emissions made by vehicles used by passengers and operators to reach the airport and within the airport	ADR, Passengers, Handlers
	SESAR program projects	Taxi time optimization and airplanes movements optimization to reduce fuel consumption	ADR, ENAV, Airlines
	Expansion of airport rail station	Improve public transport share for passengers and employers	Ferrovie dello Stato, Lazio Region, ADR
	Working groups with stakeholders to increase use of green energy, green mobility and SAF (Sustainable Aviation Fuels)	Reduction of emissions made by third parties	ADR, Airlines, Tenants, ENAV, Handlers, Car sharing, Rent a car, Bus, Taxi

Figure 7: Overview of interventions by Rome Airport to decrease its GHG emissions across Scopes.
Source: Rome Airport presentation at the Sustainable Airport Platform meeting on 11 April 2022

3.2 SBTI (Science Based Target Initiative) for airports

The Science Based Targets initiative (SBTi) is a collaboration between the CDP, the United Nations Global Compact, World Resources Institute and the Worldwide Fund for Nature (WWF). It aims to mobilize companies to set science-based targets in line with the Paris Agreement, i.e., to limit warming to well-below 2°C above pre-industrial levels and pursue efforts to limit warming to 1.5°C and boost their competitive advantage in the transition to the low-carbon economy.

The initiative developed an Aviation Science-Based Target Setting Guidance in 2021 under the leadership of WWF and with support from the International Council for Clean Transportation (ICCT) and Boston Consulting Group (BCG). While this guidance is primarily targeting airlines, there are several learnings that can be applied to airports.

Science-based targets help companies determine how much and how fast they need to reduce their GHG emissions to fulfil the targets defined within Paris Agreement objectives. The boundary for GHG inventories and targets should be as comprehensive and accurate as possible. Emissions not covered by a target cannot be responsibly managed or reduced.

In preparation to set a science-based target, companies need to complete an inventory of all seven major greenhouse gases in accordance with the GHG protocol standards

Firstly, for airport to set science-based targets they must consider how they define their organizations boundary, what operations, energy consumption and consequent emissions is the airport actually directly responsible for. Secondly, airports must determine which emissions are directly attributable to the airport (Scope 1 and 2), and which ones are instead outside of the airport's control but under its influence (Scope 3). Scope 1 and 2 emissions require a 4.2% linear annual reduction, while Scope 3 a 2.5% linear annual reduction. It is crucial for airports to reflect on the emission allocation across scopes. For example, spaces that the airport leases out for, for example, fast food and retail which have control of their own energy consumption will not fall under the airport's direct emissions. Instead, the emissions from those facilities will be allocated into the airport's scope 3 category, even though they are physically operating within the airport site. Thirdly, airports need to account for the emissions from aviation activity. These emissions are attributed to airports when they occur within the airport's service provision boundary. As seen in the previous chapter, the emissions related to aircraft landing and take-off cycles (up to 1,000 metres elevation), and passenger, greeter/fareweller and staff travel to and from airport are to be allocated and reported by airports as opposed to airlines.

Initiatives like the SBTi provide a clearly defined pathway for companies and financial institutions to manage GHG emissions, helping prevent the worst impacts of climate change and future-proof business growth.

4 SAF communications by airports

A staggering 4,5 billion passengers took 42 million flights worldwide in 2019. This is an average of 115 thousand commercial flights every day[4]. Whilst the covid pandemic has halved these numbers, global air travel is expected to be back to pre-pandemic levels in a matter of years. With hundreds of thousands of people walking through airports daily, it is beyond questions that airports have an incredible opportunity to communicate with passengers.

Passengers have however not yet been a focus with regards to SAF communications so far. Messaging around SAF safety and sustainability has generally been shared across industry platforms and policymakers. With SAF becoming a reality across the world, however, it is clear how communicating its benefits to passengers is becoming crucial to gain full support from the wider public, also considering that SAF is still a premium product that may impact the cost of flight tickets.

The following activities have been developed under the Sustainable Airports Platform (SAP) umbrella to support airports to effectively communicate about SAF to passengers:

- A passenger survey at Rome airport to assess the level of awareness around SAF
- A brief communication strategy for airports, informed by a survey among SAP airports to identify key communication needs
- A communication toolkit for airports

4.1 Rome Airport passenger survey

Between May and June 2022, a sample of 400 passengers was interviewed at Rome Fiumicino Airport with the goal of assessing the level of awareness of SAF and answer two questions specifically: to which extent are passengers aware of aviation decarbonization efforts, and the role SAF plays?

Of the 400 passengers surveyed, 60 percent were women while 40 percent men, and two thirds were of Italian nationality. The majority of respondents were ages 26-55 years old, 20 percent of them were travelling for business purposes while the remaining 80 percent for leisure, and only 7 percent were frequent flyers.

The overwhelming majority did not know what SAF is, yet nearly a fifth was aware of the decarbonization efforts of the aviation sector. Out of those who knew about SAF, the majority rightly understood SAF to be a sustainable or less polluting fuel (see Figure 8).

[4] Source: https://www.aljazeera.com/economy/2021/12/9/visualising-the-global-air-travel-industry-interactive

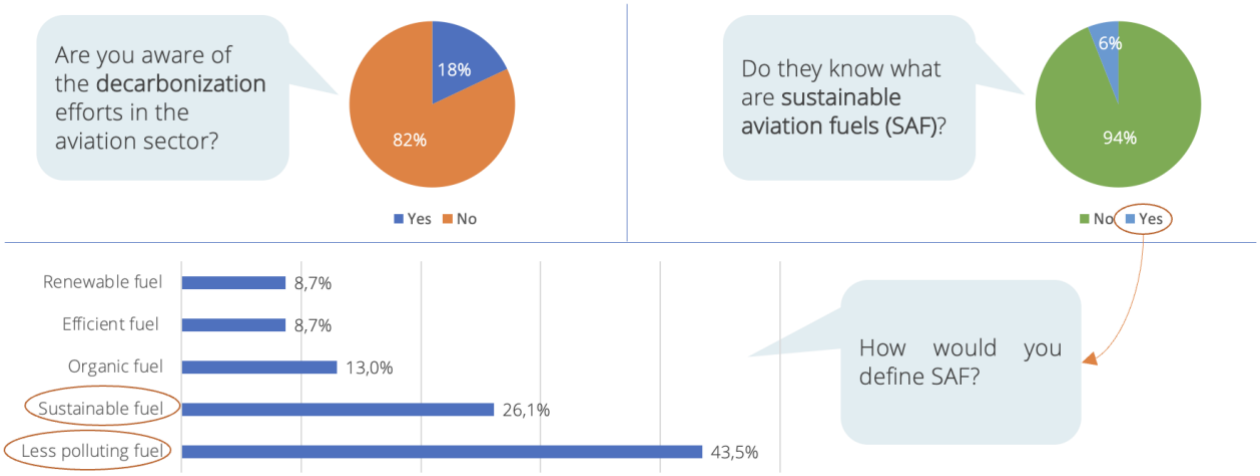


Figure 8: Rome Airport Passenger Survey / SAF Awareness levels

When asked about the price premium of sustainable aviation fuels, respondents agreed government should play a key role in subsidizing the cost of SAF, while also agreeing to pay a premium on their flight ticket (see Figure 9).

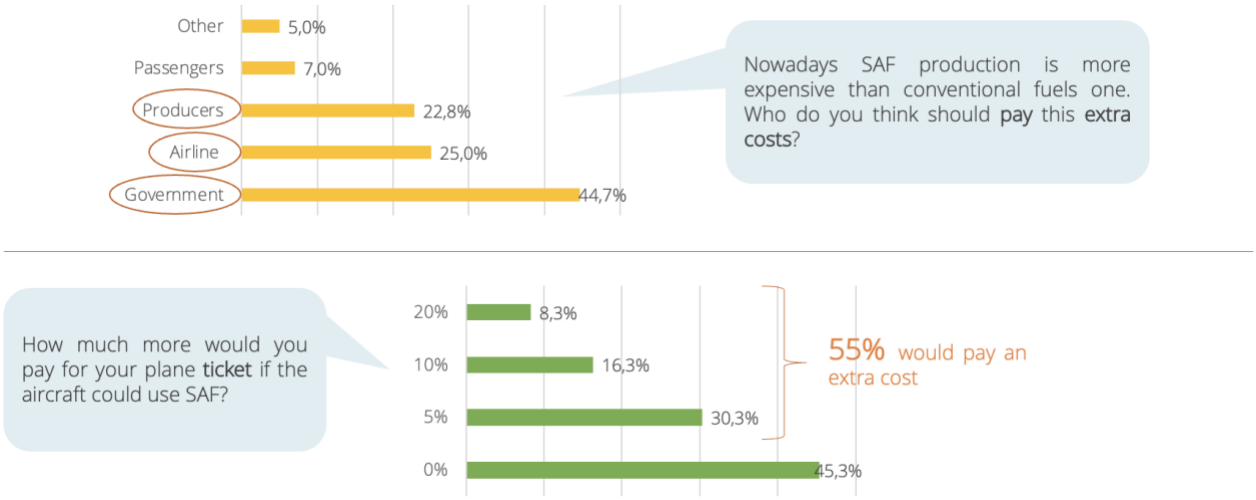


Figure 9: Rome Airport Passenger Survey / SAF premium

At least half of respondents confirmed their interest in learning more about SAF and other decarbonization projects in aviation, pointing at communications on the airplane and at the airport as the best places for such information to be shared (see Figure10).

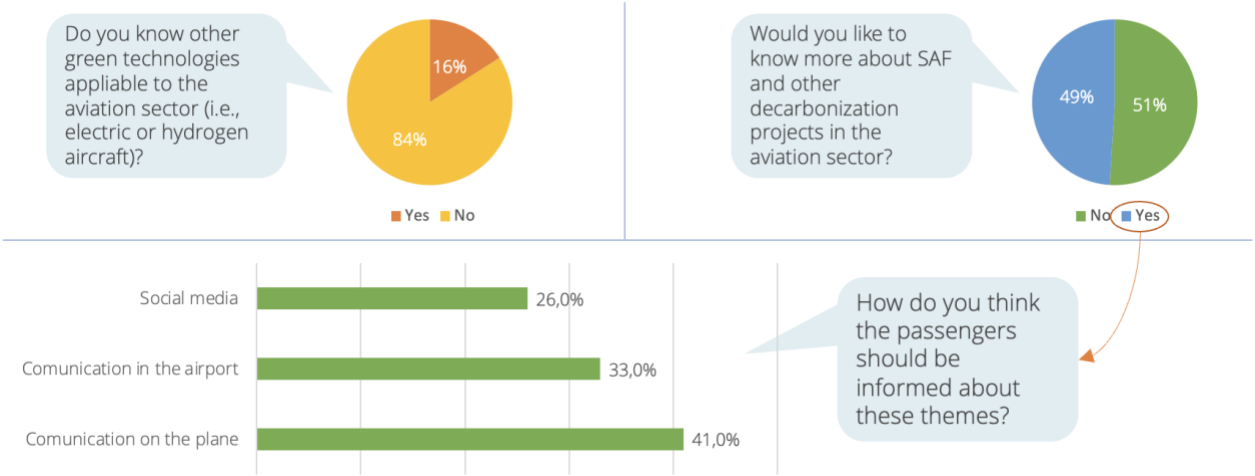


Figure 10: Rome Airport Passenger Survey / SAF communications

Fellow Alight and SAP partner airports have been invited to replicate this survey on a yearly basis to allow for a consistent analysis of SAF awareness levels across regions and time.

4.2 SAF Communication Strategy for airports

During the SAP engagement, airports have been asked to participate in a brief survey to identify what airports need to communicate SAF and SAF sustainability to passengers. The survey was led by the RSB communications team and focused on these four areas:

- Key audiences: to whom should we send the message
- Key messages: what should we communicate to them
- Key channels: how should we communicate
- Key materials: what do we use for communication

The goal of this survey was to gather insights and information from airports that the RSB used to develop the SAF communication strategy for airports.

Respondents agreed that the key audiences for airports' SAF communications are passengers, especially business passengers, and airlines. These audiences should be educated around the basics of SAF (i.e., what it is made of, why it is necessary) first and foremost, but also about its safety and sustainability. Social media were selected as being the most effective channel of communication.

RSB developed a brief communication strategy which is summarized in the Table below:

Table 3: Key audiences and key messages extracted from survey

Key audience 1: Passengers	Key audience 2: Airlines and investors
Key messages:	Key messages: To align with global goals (Paris agreement, SBTi, etc), the aviation sector is required to

SAF has direct air quality benefits at the airport, reduces greenhouse gas emissions, and supports regional economic development • Leisure passengers support SAF solutions at policy and service level • Business passengers demand SAF contributions from employers • Corporates develop understanding of SAF value proposition (Scope 3 reduction + branding)	reduce average carbon intensity significantly - airports play a key role • Demonstrate to customers and investors a willingness to act • Create future resilience and competitive advantage in a low carbon economy • Improve fuel supply security
Materials	
SAF factsheet and FAQ; Passenger facing article; 3-5 simple infographics	

At this moment RSB is working to finalize the communication toolkit based in these outputs. It is expected that the tool is shared with all SAP member airports by early 2023.

5 SAF Sustainability Toolkit for airport staff

Finally, another area that requires development is the skill set of airports' own staff to navigate the often-complex SAF sustainability landscape. Many leading airports who already work in SAF initiatives, including those involved in Alight project and the Sustainable Airports Platform, have a very good contextual and technical understanding of SAF and its sustainability implications. A SAF Sustainability Toolkit could therefore really benefit the vast majority of airports globally who haven't yet started working on SAF, and also help leading airports in cementing their knowledge.

The main aim of the SAF Sustainability Toolkit is therefore to equip sustainability teams at airports with comprehensive, non-technical information around SAF sustainability to facilitate SAF sustainability discussions and decision-making. The Toolkit, which can be found in Annex II, includes aspects described in the Table below (Table 4):

Table 4: Main features of the SAF Sustainability Toolkit

Sustainable tool main features	Content
Information about SAF and its benefits	General information about what SAF is and most common SAF feedstock and pathways used
Key sustainability areas for SAF feedstocks, based on the RSB's 12 Sustainability Principles and Criteria	Feedstock-related sustainability risks and requirements. There is a table that summarizes the relevant principles associated with the feedstock types used to produced SAF, as well as the RSB principles associated with processing the feedstocks to produce SAF.
SAF GHG intensity	Factors contributing to a SAF GHG emission intensity / reduction and a calculator to estimate GHG emissions.

Airport GHG calculation	Methodologies to calculate airport GHG emissions
SAF policy incentives	Summary of most relevant SAF policies incentives

5.1 SAF Sustainability beyond GHG reductions

When talking about Sustainable Aviation Fuels and sustainability, the conversation leads primarily to the identification of the GHG emission reduction potential of SAF. As seen in previous chapters, SAF is a low carbon alternative fuel for aviation produced from renewable resources, which include bio-based and circular feedstock, and which can achieve up to 80% GHG emission reductions compared to conventional, fossil jet fuel.

It is however important to understand that using renewable resources like biomass could have serious impact on the environment and societies. As such, the letter S in Sustainable Aviation Fuels should include wider sustainability considerations than GHG emissions only.

In collaboration with a global and diverse set of members, including industry, research organisations and civil society, the RSB has developed a set of sustainability principles which describe how to produce bio-based and circular fuels and materials in an environmentally, socially and economically responsible way. Because of the RSB's unique decision-making structure based on consensus among all relevant stakeholders, the so-called RSB Principles & Criteria are recognized as best-in-class in addressing key sustainability issues in a comprehensive way.

Figure 11: RSB's 12 Sustainability Principles and Criteria

These principles help companies identify and manage sustainability issues in a specific context and reduce sustainability risk across the value chain. Compliance is generally verified via a third-party certification system, which guarantees that the SAF operations meets all the relevant requirements, and that the SAF can carry specific sustainability claims.

More information on each of the RSB's 12 Principles and Criteria is found in the table below:

Table 5 RSB's 12 Principles and Criteria

Principle	Explanation
1. Legality	Operations follow all applicable laws and regulations of the country in which the operation occurs and with relevant international laws and agreements.
2. Planning, Monitoring and Continuous Improvement	Operations shall undertake an impact assessment process to assess impacts and risks and ensure sustainability through the development of effective and efficient implementation, mitigation, monitoring and evaluation plans.
3. Greenhouse Gas Emissions	Biofuels contribute to climate change mitigation by significantly reducing lifecycle GHG emissions as compared to fossil fuels.
4. Human and Labour Rights	Operations do not violate human rights or labour rights and promote decent work and the well-being of workers
5. 5 Rural and Social Development	In regions of poverty, operations contribute to the social and economic development of local, rural and indigenous people and communities.
6. Local Food Security	Operations ensure the human right to adequate food and improve food security in food insecure regions
7. Conservation	Operations not only avoid negative impacts on biodiversity, ecosystems, and conservation values, but conservation values and ecosystem functions are enhanced
8. Soil	Operations implement practices that seek to reverse soil degradation and/or maintain soil health.
9. water	Operations maintain or enhance the quality and quantity of surface and ground water resources, and respect prior formal or customary water rights.
10. Air quality	Air pollution from the operations is minimised along the supply chain.
11. Use of technology, inputs and management of waste	Use of technologies to maximise production efficiency and social and environmental performance and minimise the risk of damages to the environment and people
12. Land rights	Operations respect land rights and land use rights

RSB's sustainability approach is already recognised for the sustainable certification of SAF under the European Union Renewable Energy Directive (EU RED) and by ICAO CORSIA.

6 References

(ACI 2022): (URL) https://aci.aero/2022/04/11/the-top-10-busiest-airports-in-the-world-revealed/

(AVINOR, 2020): (URL) https://avinor.no/globalassets/_konsern/miljo-lokal/miljorapporter/aviation-in-norway-sustainability-and-social-benefit-2020.pdf

(AVINOR, 2021): (URL) https://avinor.no/globalassets/_konsern/om-oss/rapporter/en/programme-for-increased-productrion-and-uptake-of-sustainable-aviation-fuels-2021.pdf

Baxter, Glenn. "Achieving carbon neutral airport operations by 2025: the case of Sydney airport, Australia" Transport and Telecommunication, 2021, volume 22, no. 1, 1–14

(EASA SAF Workshop, 2022): Meyn, S. "Airport role in SAF implementation" January 26,2022

(FAA, 2022): (URL): https://www.faa.gov/airports/environmental/air_quality/carbon_emissions_reduction

(ICF, 2022): (URL) https://www.icf.com/insights/aviation/tackling-scope-three-to-decarbonizing-airports

Klauber, A; Benn, A; Hardenbol, C; Schiller, C; Toussie, I; Valk, M; Waller, J. Innovative Funding for Sustainable Aviation Fuel at U.S. Airports: Explored at Seattle-Tacoma International. Rocky Mountain Institute, SkyNRG, July 2017.

(Leavit et al 2018): Leavitt, E; Meyn, S; Purcell, A. and Stanton, L. "*Moving toward sustainable aviation fuel at Seattle-Tacoma international airport"* Journal of Airport Management, 12 (4), 391-398 (2018)

(Marzi et al 2022): Marzi, E.; Morini, M.; Gambarotta, A. "*Analysis of the Status of Research and Innovation Actions on Electrofuels under Horizon 2020*". *Energies* 2022.

(Ricardo, 2020) : Airport Carbon Footprint 2020 Scope 1, 2 & 3 ED14694

(RSB, 2016): https://rsb.org/wp-content/uploads/2020/06/RSB-STD-01-001_Principles_and_Criteria-DIGITAL.pdf

(WSU, 2020): (URL): https://www.portseattle.org/sites/default/files/2020-07/PofSeattleWSU2019_final.pdf

7 ANNEX I – SAF strategies of the world's busiest airports

NORTH AMERICA

Airport Name	Yes/No	Extent	Link
Atlanta, US (ATL)	No	"While aircraft are the most significant sources of greenhouse gas emissions for ATL — contributing 80 percent of total emissions — our focus has been to reduce the emissions associated with non-aircraft related activities and sources."	Website
Dallas/Fort Worth, US (DFW)	Yes	"DFW has committed to an ambitious goal to achieve net zero carbon emissions by 2030. Investments required to achieve the target include partnerships to remove barriers to the widespread adoption of SAF."	Report
Denver CO, US (DEN)	No	n/a	Report
Chicago IL, US (ORD)	No	n/a	Report
Los Angeles CA, US (LAX)	Yes	Los Angeles World Airports "is committed to supporting Sustainable Aviation Fuel" and aims to "[p]artner with airlines and fuel suppliers to encourage more SAF use at LAX and VNY"	Report
San Francisco, US (SFO)	Yes	"SFO is taking the lead in making widespread use of SAF a reality, on its own campus… SFO continues to convene a SAF Coalition to advocate for additional incentives at the state and federal level to further decarbonize the industry and help SFO hit its goal of 5% SAF by 2025.	Website
Seattle, US (SEA)	Yes	"The Port of Seattle became the first United States airport operator to set a specific timetable and goals for transitioning all airlines at SEA to commercially competitive sustainable aviation fuels. The goal is to power every flight fuelled at SEA with at least a 10% blend of sustainable aviation fuel (SAF) by 2028."	Website

ASIA

Airport Name	Yes/No	Extent	Link
Guangzhou, CN (CAN)	No	n/a	n/a
Chengdu, CN (CTU)	No	n/a	n/a
Dubai, AE (DXB)	No	Although not part of their sustainability strategy, Dubai have signed the World Economic Forum's Clean Skies for Tomorrow 2030 Coalition, agreeing to accelerate the supply and use of sustainable aviation fuel (SAF) to 10% by 2030.	Website
Doha, QA (DOH)	No	n/a	n/a

Hong Kong SAR, HK (HKG)	Yes	Airport Authority Hong Kong (AAHK) "is supportive of the use of SAF and maintains a watching brief on the sector. AAHK will work with airlines seeking to use SAF to enable uptake."	Report

EUROPE

Airport Name	Yes/No	Extent	Link
Istanbul, TR (IST)	No	n/a	n/a
Amsterdam, NL (AMS)	Yes	Amsterdam Airport aims to "[m]ake sustainable aviation fuels mainstream...Schiphol Group participates in the research and development of sustainable aviation fuels, including feedstock and scale-up opportunities. The Dutch aviation sector is committed to ensuring sustainable aviation fuels comprise 14% of all aviation fuels used at our airport locations by 2030."	Report
Frankfurt, DE (FRA)	No	Although not part of their sustainability strategy, plans are in place for Fraport to be supplied with SAF starting in 2023.	Article
Paris, FR (CDG)	Yes	Groupe ADP show "[s]upport for the development of sustainable aviation fuels. About half of the decarbonisation efforts by 2050 are based on their deployment. We are a member of the consortium of 5 sustainable aviation fuel production projects on French territory, and we are advocating an appropriate support mechanism that promotes their deployment as soon as possible."	Report
London, GB (LHR)	Yes	London Heathrow "aims for 11% SAF to be in use by airlines by 2030, delivering a carbon saving of over 7.5%. This is a result of Government ambition to achieve a 10% SAF blend in the UK by that date, plus the effect of Heathrow's landing charges incentivising its use... Heathrow offers its passengers the option to reduce emissions with Sustainable Aviation Fuel (SAF) and certified reforestation projects."	Report
Rome, IT (FCO)	Yes	"Fiumicino airport is the first airport in Italy to make SAF (Sustainable Aviation Fuel) available, a blend of traditional Jet with a biogenic component, the latter capable of reducing CO2 emissions by 60-90%."	Website
Copenhagen, DK (CPH)	Yes	"Copenhagen Airport By 2050, total airport operations have no or minimal impact on local air quality due to improved operations, new technology and sustainable fuels... We also continued to push for the establishment of an Aviation Climate Foundation, that will finance the transition to sustainable aviation fuels via a passenger climate contribution."	Report
Oslo, NO (OSL)	Yes	According to operator Avinor, "By 2030, 30 per cent of all aviation fuel sold in Norway should be sustainable biofuel."	Website

AUSTRALASIA

Airport Name	Yes/No	Extent	Link

Sydney, AU (SYD)	Yes	Sydney are part of Bioenergy Australia's Sustainable Aviation Fuel Alliance for Australia and New Zealand (SAFAANZ) working group alongside aviation industry peers and fuel producers and aim to "[s]upport 10% Sustainable Aviation Fuel globally by 2030."	Report
Melbourne, AU (MEL)	No	n/a	n/a
Brisbane, AU (BNE)	No	Although not part of their sustainability strategy, Brisbane have signed the World Economic Forum's Clean Skies for Tomorrow 2030 Coalition, agreeing to accelerate the supply and use of sustainable aviation fuel (SAF) to 10% by 2030.	Website
Auckland, NZ (AKL)	No	n/a	n/a

SOUTH AMERICA

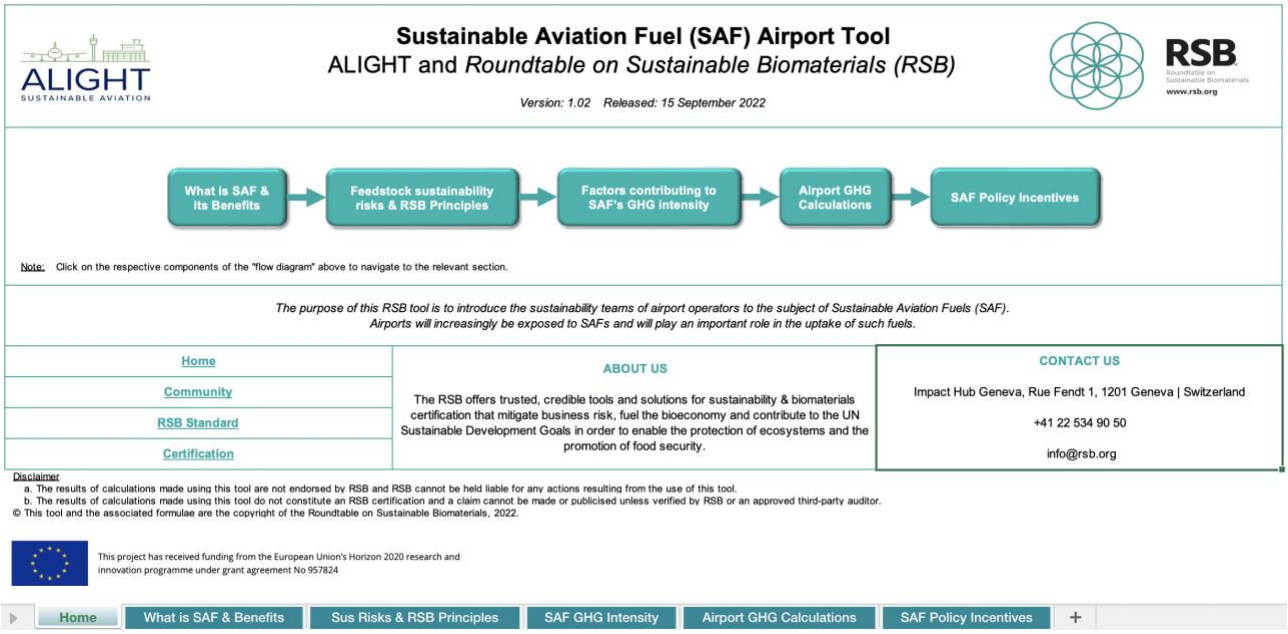
Airport Name	Yes/No	Extent	Link
Mexico City, MX (MEX)	No	n/a	n/a
São Paulo-Guarulhos, BR (GRU)	No	n/a	n/a
El Dorado, CL (BOG)	No	n/a	n/a
Cancún, MX (CUN)	No	n/a	n/a

AFRICA

Airport Name	Yes/No	Extent	Link
Cairo, EG (CAI)	No	n/a	n/a
OR Tambo, SA (JNB)	No	n/a	n/a
Addis Ababa, ET (ADD)	No	n/a	n/a
Cape Town, SA (CPT)	No	n/a	n/a

8 ANNEX II – SAF Sustainability Toolkit for Airports

Screenshot provided below. The full excel toolkit is available as separate document.



Sustainable Aviation Fuel (SAF) Airport Tool

ALIGHT and *Roundtable on Sustainable Biomaterials (RSB)*

Version: 1.02 Released: 15 September 2022

What is SAF & its Benefits → Feedstock sustainability risks & RSB Principles → Factors contributing to SAF's GHG intensity → Airport GHG Calculations → SAF Policy Incentives

Note: Click on the respective components of the "flow diagram" above to navigate to the relevant section.

The purpose of this RSB tool is to introduce the sustainability teams of airport operators to the subject of Sustainable Aviation Fuels (SAF). Airports will increasingly be exposed to SAFs and will play an important role in the uptake of such fuels.

Home

Community

RSB Standard

Certification

ABOUT US

The RSB offers trusted, credible tools and solutions for sustainability & biomaterials certification that mitigate business risk, fuel the bioeconomy and contribute to the UN Sustainable Development Goals in order to enable the protection of ecosystems and the promotion of food security.

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957824

Home | What is SAF & Benefits | Sus Risks & RSB Principles | SAF GHG Intensity | Airport GHG Calculations | SAF Policy Incentives | +

9 About RSB

The Roundtable on Sustainable Biomaterials (RSB) is a global membership organisation that drives the sustainable transition to a circular bioeconomy.

RSB's sustainability framework has been developed by its multi-stakeholder membership, and is a uniquely robust and credible foundation for supporting innovative solutions to the climate crisis. RSB uses this foundation to develop projects, new knowledge and solutions that equip key decision-
makers to deliver positive impacts for people and the planet.

For more information, see: www.rsb.org
Or contact: info@rsb.org