



# 2022\_RECOMMENDATIONS

## SUSTAINABILITY OF THE AVIATION INDUSTRY



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# SUSTAINABILITY OF THE AVIATION INDUSTRY

### Introduction

In November 2021, ICAO released the first edition of its publication, *Innovation Driving Sustainable Aviation*. The publication highlighted work on the development of aircraft technologies, the improvement of aviation operations and infrastructure, and the development of environmentally friendly fuels. The goal of ICAO and the ICAO Global Coalition on Sustainable Aviation is to ensure a sustainable future for the industry. As a result, the thrust of most of the publication is on “the feasibility of a long term global aspirational goal for international aviation (LTAG).” However, as John Maynard Keynes, the eminent British economist, is reputed to have stated, “In the long run, we are all dead.” The thrust of this statement implies that if we cannot move quickly to solve short term issues, the long run no longer matters.

With Keynes’ thoughts in mind, Hermes wishes to propose how best to ensure the development of “quick fixes”. What can the aviation industry do over the next five years to ensure a sustainable long run future? Developing short term solutions for the aviation industry is a heavy lift, given its fixed infrastructure, attention to safety, and the long time to market for aviation technology. However, quick fixes will certainly be needed given aviation’s “bad press” and the movement to stifle the industry after the impact of COVID-19.

Accordingly, Hermes – Air Transport Organisation is inviting aviation associations to submit position papers which address the following questions:

- 1. What are the regulatory impediments to increasing sustainability?** How can regulations be improved to incentivise and facilitate the aviation industry to be more efficient and sustainable?
- 2. How can industry participants better cooperate to improve sustainability?** For example, how can airlines, airports and air navigation providers cooperate to improve sustainability over the next five years?
- 3. What are the industry’s best practices, already in place, that improve sustainability?** How can these best practices be fully implemented throughout the industry?

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**Sustainability of the aviation industry**

(Interview with Juan Carlos Salazar, Secretary General, ICAO)



## 1. How do you define sustainability in aviation?

Sustainability as a policy concept has its origin in the United Nations Brundtland Commission Report of 1987. Sustainability was defined at that time as “meeting the needs of the present without compromising the ability of future generations to meet their own needs,” and this is still the most widely used definition. Sustainability also refers to an integrated approach that takes into consideration environmental and social concerns along with economic development, something we see reflected very directly in the UN 2030 Agenda for Sustainable Development. Adopted by all United Nations Member States in 2015, this agenda provides a shared blueprint for global peace, prosperity, and environmental stewardship.

As part of the UN system, ICAO is committed to promoting and implementing Agenda 2030, and our Strategic Objectives for international aviation connectivity help to drive benefits and progress which directly support the achievement of 15 of the 17 specific Sustainable Development Goals (SDGs) which compose it. This includes SDG 3 on Health, SDG7 on renewable energy, SDG9 on infrastructure and innovation, SDG11 on human settlements safety and resilience, and SDG13 on climate change.

One of ICAO’s five comprehensive Strategic Objectives is to minimize the adverse environmental effects of civil aviation activities. Our environmental efforts focus on aviation noise, local air quality and climate change. ICAO Member States are strongly committed to these objectives, and to-date they’ve adopted aspirational goals to achieve a 2% annual fuel efficiency improvement through to 2050 for international aviation, and carbon neutral growth for the air transport sector from 2020 onwards.

Another ICAO Strategic Objective related to sustainability is the Economic Development of Air Transport which fosters the development of a sound and economically viable civil aviation system.

## 2. What are the key features of a sustainable aviation industry?

A sustainable aviation industry is one which demonstrates an unwavering commitment to minimizing its adverse climate, environmental, and social impacts. A sector that is not afraid to take up new challenges, raise its climate ambition and transform itself, whether via its technologies and practices, its economic model or its policies.

A sustainable aviation sector must also be proactive in embracing change and innovation so that sustainability is continuously improved and so that crises like the one we are now confronting can be leveraged as an opportunity to do better. More concretely, it must be a sector that sets ambitious short, mid and long term goals, that elaborates precise roadmaps to achieve those goals, and that drives actions and solutions, starting today.

### **3. How can the aviation industry best reduce its environmental footprint?**

There is an incredible wave of technological innovation taking place today, and very clearly the world has become collectively inspired to achieve advances in aid of its greener, more sustainable future. Aviation is no exception to this rule.

While aviation faces greater challenges than other modes of transport in adopting and applying some of the advances now being made, by as early as 2024 we may already see fully electric aircraft certified for passenger operations, and manufacturers and airlines are already partnering with innovators on hydrogen and electric technology.

It is evident today that there is simply too much motivation and dedication in this direction for these efforts not to be successful. This brings to mind as well the very concrete and detailed commitments we've seen amongst industry groups to progress our sector to its net-Zero emissions future, not to mention the importance of the many coalitions being formed with academic and other researchers to accelerate these advances.

In terms of more specific recent actions by States through ICAO to mitigate aviation's environmental footprint, countries have already adopted environmental standards and practices addressing noise, aircraft CO<sub>2</sub> emissions, and gaseous pollutants and non-volatile particulate matter emitted by aircraft engines.

This regulatory framework was developed to ensure that only the most effective and green technologies are implemented in new aircraft designs entering the market, and we're continuously on the lookout for new opportunities to make the associated provisions more ambitious.

More generally, with respect to CO<sub>2</sub> emissions reduction, countries have also adopted a Basket of Measures through ICAO which includes activities and solutions focused on new airframe and engine technologies, optimized operational measures, increased production and availability of Sustainable Aviation Fuels (SAF), and emissions offsetting under the CORSIA initiative.

ICAO is fully committed to helping States and industry realize their environmental goals, and has prepared a full spectrum of measures available for the aviation sector to address this global challenge.

### **4. How will investments in sustainability impact the efficiency and profitability of aviation?**

It's a misnomer to characterize sustainability and profitability as conflicting priorities. Modern aircraft are already over 80% more fuel efficient than the first jets to enter service because fuel costs have always been one of the most important considerations in terms of airline profit-ability.



We in ICAO believe that in this century the successful manufacturers and operators will be those who most quickly deliver more sustainable and efficient new forms of passenger air travel without any sacrifices in terms of current safety, security, or efficiency performance. It is an extremely challenging balance, but this is where cutting-edge technologies and tools will really be making their mark.

There are very high expectations being placed on our sector today to green our operations and make aviation more sustainable, and we're working at a very high pace to help achieve those outcomes. This was clearly in evidence at the UNFCCC COP26 meeting where ICAO showcased the efforts and increased ambitions of the aviation sector in this area. This is a key moment for action, and without any delay.

##### **5. What are the industry's best practices, already in place, that improve sustainability?**

Since 2020, ICAO has been organizing Stocktaking Seminars in order to bring together Member States, industry leaders, researchers, innovators and civil society advocates, and to share information on their ambitious plans, solutions and policies for emission reduction in international aviation. Aircraft technologies, operational improvements, sustainable aviation fuels (SAF), and many other developments have been showcased at these events.

With respect to current options and best practices, a wide variety are already in place today and ready to be used. Aircraft are lighter and more fuel efficient, their trajectories can be optimized using Performance-based Navigation and other operational measures to reduce fuel burn, and new infrastructure at various airports is allows aircraft to use solar power while at their gates or take advantage of electric taxiing options.

SAF are available now. As part of the implementation of CORSIA and a means to reduce airline's offsetting requirements, in 2021 ICAO adopted the first-ever internationally harmonized SAF sustainability criteria that cover all three pillars of sustainability, with environmental, economic and social themes.

In order to monitor the latest innovations from aviation stakeholders, the ICAO tracking tools of aviation CO2 emissions reduction initiatives are set up to regularly provide a spectrum of information on measures to reduce the environmental footprint of aviation, including details on the most ambitious actions being taken.

Best practices nationally and regionally can also be appreciated using the information in ICAO's State Action Plans for aviation emissions reduction, which countries compile and submit to us to advise on their national progress. To-date over 120 States representing nearly 98% of global international aviation traffic have voluntarily submitted their Plans to ICAO, so as you can see there is some tremendous momentum at play to address these challenges and green our sector.

## **6. How can these best practices be more fully implemented throughout the industry?**

High-level political will and ambition always come first when it comes to changing practices and implementing climate action.

It's therefore essential for public and private decision makers to set a clear path, bold goals, and detailed roadmaps. Strong financial support from public and private stakeholders is similarly decisive to support that change. Investment drives results, and the right policies need to be in place to backbone these evolutions, at the State level but also internationally to scale up results and avoid competitive distortions for businesses.

And to ensure that no country is left behind in the green transition, capacity building, assistance and training are just as crucial in order to facilitate everyone's engagement.

ICAO is working hard today to increase related awareness and organize numerous online events and seminars, bringing the stakeholders to roundtable discussions and exchanges. We are also facilitating implementation of the best practices available, supporting the aviation decarbonisation transition taking place.

## **7. What are the regulatory impediments to increasing sustainability?**

One of the impediments we face is that it takes time for a brand new aircraft to enter into the market. From its design to its first test flight, from its certification to its serial production, the process is a long one, and even more so when we consider the need for entire fleets to be renewed.

A key factor in these timelines is that they allow us to safeguard safety objectives, which are always an underlying priority at ICAO. So when new aircraft concepts emerge, including those powered by electricity and hydrogen, one of the main challenges we face is how to embrace their green innovations as quickly as possible, reducing regulatory impediments by streamlining processes and without any compromises to current air transport safety, security, and reliability.

Aircraft certification procedures are an especially important part of this process, and I've been very encouraged to see that the European Union Aviation Safety Agency announced in 2020 the first type certification worldwide of a fully electric aircraft for use in pilot training.

Another lever of action is the international standards making process, and it is a key goal of mine to transform ICAO to become a more efficient enabler of latest innovations. The ICAO Council's Committee on Aviation Environmental Protection (CAEP) is one of the ICAO technical bodies currently looking into the issue.





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**8. How can industry participants, including airports, airlines, and air navigation providers, cooperate to improve sustainability?**

Recently, the global air transport industry jointly adopted a long-term climate goal of net-Zero carbon emissions by 2050, confirming the commitment of airlines, airports, air navigation providers and aircraft and engine manufacturers to reduce sectoral CO<sub>2</sub> emissions.

States are also developing their sustainability roadmaps, stretching beyond the aviation sector, and these serve to increase the cooperative approach towards sustainability.

In parallel, ICAO is currently exploring the feasibility of a long-term global aspirational goal (LTAG) for international aviation CO<sub>2</sub> emissions reduction, as requested by the 40th Session of the ICAO Assembly in 2019. This prioritized work will be heavily reliant on these new partnerships and commitments, and is being conducted with tremendous support from the States and all the stake- holders. Its results with scenarios and means of implementation will be considered and deliberated on at the 41st session of the ICAO Assembly Session in September and October of this year.

Additionally, there are numerous partnerships between the stakeholders aimed at jointly reaching our environmental goals, and ICAO has organized its Global Coalition for Sustainable Aviation to serve as a forum to facilitate and accelerate their progress.

**9. Sustainability is often thought of as a long-term goal, but what three key changes can the aviation industry implement within the next five years to increase sustainability?**

2022 is a key year for us at ICAO. As I've mentioned, ICAO is currently exploring the feasibility of a climate LTAG for international aviation. Detailed studies have been conducted through a three year technical process to assess the attainability and impacts of any goals proposed. I am working to assure a constructive dialogue during the Assembly, a coherent and synergistic approach, and of course a successful outcome.

Last year we received a crucial piece of information that permeates our work on Climate Change: the outcomes of the IPCC Six Assessment Report. There is a clear call from the scientific community for zero carbon for 2050 from all sectors to keep the impacts of climate change on check. For the aviation sector, it is therefore very important to ensure that we address in our work on the feasibility of a long-term aspirational goal, possible scenarios and means of implementation towards this scientifically driven goal in terms of technology, operations, fuels and clean energy.

In terms of concrete actions available now, along with the fleet renewals already taking place, aviation stakeholders can immediately begin using drop-in SAFs made from renewables or biomass. Forty-four airports are distributing SAF currently, and more are coming, and 22 States have adopted related policies or have them under development. New announcements on progress in this area are



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being made every month, as reflected in the ICAO Global Framework for Aviation and Alternative Fuels (GFAAF). Technologies are being validated, the supply chain is ready, and airports infrastructures are in place, and more than 360,000 commercial flights have used SAF already. This momentum needs to be amplified, and the sooner the better for aviation and our world.

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## **Sustainability of the Aviation Industry**

(Presented by JAA Training Organisation)

*A submission by the JAA Training Organisation (JAA TO) upon invitation of Hermes - Air Transport Organisation's call for position papers on **Sustainability of the Aviation Industry**.*

*By Tiago Ludgero*

## Introduction

Commercial aviation has seen significant advancements in sustainability since the late 1950's: aeroplane design, flight speed and travel times, safety standards, traveller capacity, performance optimisations and fuel efficiency, industry innovation and environmental impact. Most of these improvements were made possible due to technological (r)evolutions, seeking to alter the environmental footprint. Next to industry innovations, legislation trying to implement new standards and regulations, incentivise the air transport community to reach common sustainability goals. Aviation's highest bodies, international manufacturers, trade associations, airport councils and community initiatives call for further improvements and solutions making air transport more efficient, sustainable and innovative. The global reach and omnipresence of aviation has potential to blueprint other sustainability efforts in connected sectors and markets.

Established in 1983, the Committee on Aviation Environmental Protection (CAEP) assists the International Civil Aviation Organization (ICAO) Council regarding aviation environmental impact and has since advanced various agendas by formulating new policies and promoting the adoption of new Standards and Recommended Practices (e.g. Air Transport Action Group (ATAG) Commitment to Action on Climate Change 2008, ICAO CAEP/ et seq.). In equally ambitious terms, the International Air Transport Association (IATA) FlyNetZero2050 resolution advocates for the progressive reduction in emissions while accommodating the restarting and growing flight demand. Along those lines, sustainable blueprints for a green recovery are necessary (e.g. ATAG Waypoint 2050). After hesitant adoption, the civil air transport industry started to agree on the general need to reduce CO<sub>2</sub> emissions and improve overall sustainability factors. This evolving industry commitment defines goals for the short-, medium- and long-term taking into account strategic operations, economic feasibility, infrastructure demands, global market dynamics and technology trends

The next decades will see more technological innovations which should enable industry stakeholders to transform operations, aircraft configurations and parts of the global aviation supply chain into more sustainable alternatives that help to reduce the environmental footprint. Due to the interconnectedness of the air transport system, safety-, environmental-, economic- and operational challenges remain. The following essay explores industry best practices and solutions that can path the way to a sustainable aviation future.

## International framework landscape

To reap the full innovative potential, interorganisational initiatives and supranational, collaborative agreements need to further provide the necessary regulatory framework which fosters and accelerates economic, ecologic and societal sustainability in the aviation value chain. To this point, regulatory framework incentives have been provisioned along three types of operations:



- Air Traffic Management Operations (flight sectors and traffic flow activities)
- Airport Operations (ground-based system and ground movement management)
- Air Operations (flight and aircraft maintenance)

### *ATM Operations*

In 1999, the European Union (EU) launched a pan-European air transport initiative with the objective to reform the Air Traffic Management (ATM) and Air Navigation Services (ANS) to better deal with continued air traffic growth – the Single European Sky (SES). Seeking to move European aviation to operations in a safe, cost efficient and environmentally friendly way, the SES (additionally the Single European Sky ATM Research (SESAR) and the Free Route Airspace) features pragmatic legislative approaches to improve the airspace capacity and efficiency in ATM and ANS to better design, plan, manage and reduce the fragmentation of European airspace between Member States and technologies. The benefits of the SES could potentially be huge; tripling the airspace capacity, reduce ATM cost by 50%, improve safety tenfold and reduce environmental impact by 10%. Joint programmes like SESAR manage the technological and industrial dimensions of the SES aiming to improve ATM performance by modernizing and harmonizing systems through innovative technology and operational optimization. SESAR’s development costs remain high estimated to be around EUR 3.7 billion which slow down progress and adoption. Next to financing, current implementation efforts are stalling in the reticence of stakeholders’ regarding scopes of responsibility, performance based targets and needed regulatory updates or agenda-setting (e.g. European Green Deal).

### *Airport Operations*

The industry-wide initiative NetZero2050 with commitment of ACI Europe illustrates the airport industry’s ambitions and call to Members for reducing carbon emission and ultimately become carbon neutral. 235 airports across Europe committed to Net Zero by 2050 at the latest and more than 90 airports are set to achieve Net Zero by 2030. Additionally, 338 airports committed to the Airport Carbon Accreditation (ACA) programme further devote their efforts into reducing energy and fuel consumption through the design of new energy-efficient infrastructure, investing in low energy vehicles and equipment and switching to zero-carbon energy and fuel sources. While the ambitions in the ACA programme are high, large discrepancies in resources and facility equipment exist. Uneven access and distribution in the deployment of Sustainable Aviation Fuels (SAF) or charging infrastructure for electrified aircraft operations is and will become a challenge. In spite of all the efforts made by ACI, domestic politics and policy will continue to exert influence on airport infrastructure. On another note, Airport Collaborative Decision Making (ACDM) aims at improving the overall efficiency of airport operations by optimizing the use of resources and improving the predictability of air traffic. It has economic capacity, safety, and environmental benefits.



In pursuit of the technological progress towards greater sustainability, the aeronautical industry has made huge investments. Mainly, the National Aeronautics and Space Administration (NASA) and US Federal Aviation Administration (FAA) cultivated a competitive environment in which commercial aviation companies implement and advance technology concepts that are based on those initial state-funded R&D programs, like CLEEN (Continuous Lower Energy, Emissions and Noise), AST (Advance Subsonic Technology), UEET (Ultra-Efficient Engine Technology), ERA (Environmentally Responsible Aviation) and Clean Sky One and Two. The resource-rich US approach created a unique competitive enterprise landscape that incentivises and awards private investments and pioneer R&D engineering for the advancement of the civil air transport sector. EU and pan-European initiatives seek to close the gap in its own fragmented markets.

The road to aviation sustainability inevitably incorporates reducing the impact on climate change by minimising greenhouse emissions. In achievement of all related objectives, the aviation industry must reduce the amount of fuel burn, produce efficient, aerodynamic aircraft designs and gradually adopt evolutionary aircraft technologies that can be incorporated into the green configurations, retrofits, serial upgrades and newly designed components and systems. Some of these industry practices include:

- **Manufacturer design concepts** that use innovative materials and technology for sustainable airplane manufacturing, maintenance and operations. These processes and R&D includes strut-braced wings architecture, blended wing bodies, double-bubble and Parsifal box-wing aircrafts. Improvements in structure and materials, like additive 3D manufacturing and (recyclable) composites advance material use in engines and can contribute to the circular economy. New design information allows for quicker and more flexible production, reduces material waste compared to traditional approaches and it also results in much lighter parts reducing aircraft weight and fuel use. 3D printed parts are already flying on the Airbus A320 Neo and A350. Composite materials have been used in aerospace for decades, 50% of the Boeing B787 and 53% of Airbus A350 are made of composite material.

- **Aerodynamic technology** has progressed continuously throughout the past decades to achieve reduction of fuel consumption, and therefore CO<sub>2</sub> emissions, by the reduction of aerodynamic drag, intervention of propulsion and multi-disciplinary optimization. These aerodynamic technologies concern new aircraft configurations, aerodynamic process tools and capabilities, and aerodynamic products. Advances in aerodynamic tools, capabilities and processes such Computational Fluid Dynamics (CFD) and wing tunnel testing, mark today's standard for the development and evaluation of new aerodynamic technologies. New aircraft configurations such as more integrated wing engines, pilot configurations, and the integration of new propulsion system have increased the aerodynamic efficiency even further. R&D in materials science and engineering technology produce ever new material structures and aerodynamic products that can for example increase the effective wingspan or maximize effective span extension due to composite materials.

- **Fuel efficiency** considerations use configurations that change the engine air flow and thus the pressure and temperature. New turbofan technology has been moving towards improving the propulsive efficiency with higher engine bypass ratio (BPR) and lower fan pressure ratios (FPR).

These widely used higher BPR and lower FPR designs generate more thrust and support an airplane's fuel optimisation.

- **CO<sub>2</sub> emission** is directly proportional to fuel burn and therefore any reduction efforts demand focusing on improving weight and engine size which can influence the engine specific fuel consumption. There are three fundamental technology paths to reduce the fuel consumption of propulsion systems: increased thermal efficiency (by reducing component losses or by increasing the overall compressor pressure ratio), increased property efficiency (by increasing the engine bypass ratio PVR), and minimised engine weight and drag.

- **Thermal efficiency** is largely determined by the overall pressure ratio (OPR), the turbine inlet temperature (TIT), and the performances of the individual component compressor turbines and combustion chambers. With increasing OPR performance the TIT also rises. This average increase in TIT has been around 19°K/year, which is substantially higher than the increase in operating metal temperature of around 5°K/year. To avoid performance penalties, innovative cooling techniques, aerodynamic component designs, higher strength and higher temperature materials and improve computational analysis techniques are in development.

- **Aircraft noise** limits and reduction is addressed through ICAO initiatives and remains a main priority globally in order to achieve key environmental goals. Millions of people in residential/urban communities are exposed to aircraft noise making the call for global standards for aircraft noise certifications and international and local regulatory framework so important. Despite new aircraft engines, air frame design technology and noise reduction schemes, international regulations like the ICAO Annex 16 Vol. 1 of the Chicago Convention on Balanced Approach to Aircraft Noise Management (noise at source) have undergone several changes in the Standards and Recommended Practices (SARPs) to reflect technological and societal standards.

## Green Future

Aviation industry's commitment to align with the Paris Agreement goal for global warming not to exceed 1.5°C produces great challenges for legislative and industry stakeholders alike. Benchmarks and innovations will be necessary to achieve the ambitious milestones, and air transport partners are required to cooperate short-, medium- and long-term on the optimisation of the entire aviation value chain for a sustainable aviation future. In ambition of the goal NetZero2050, radically new aircraft configurations and operations will be required to significantly reduce noise, fuel consumption and consequently CO<sub>2</sub> emissions. Airlines, airports and manufacturers and governing bodies need to cooperate on the continuous advancement of green solutions.

Mitigation and management of noise in aviation follows along the domains of technology, operational improvements, land use planning, noise communication and community engagement. Airports should participate actively in contributing to local planning policy to ensure sustainable land development and infrastructure schemes that consider acoustic insulation, land/property acquisition, wildlife management and other environmental factors. Going beyond the one-size-fits-

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all approach, information and communication campaigns to local communities allow for informed discourse about statistical noise values, aircraft noise certification and runway direction as well as grounding orders during sensitive times. ICAO Annex 16 aims to ensure that noise reductions offered by technology are reflected in reductions around airports.

Minimising CO2 emission is the second main objective (including nitrogenous emission and contrails). Currently, propulsion improvements (such as engine with high bypass ratio), aerodynamic improvements (such as laminar flow control systems and high-level devices) new structure and materials (lighter with better performances), and improvements in operations procedure supported an increasing efficiency of 1.5% per year between 2009 and 2020. The use of evolutionary technologies is the prime enabler to reach the next medium-term goals on aviation sustainability.

In the near future, significant technological contributions can be expected realising new disruptive designs, such as the hybrid wing body with layer ingestion, open rotor hybrid engines and aircrafts with hydrogen propulsion, hydrogen batteries and sustainable synthetic fuels (SAFs). The long-term commitment to action on climate change sets ambitious goals for civil aviation. For green, sustainable aviation future the involvement and effort of the entire air transport sector, manufacturers, airlines, airports, air navigation service providers, government and agencies is required. Aviation sustainability is the green deal for our future.

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## **Sustainability of the air transport industry**

(Presented by ACAO)



### [The importance of air transport for economic development](#)

The air transport sector is a key component of the world's economic and social system, facilitating trade, investment and tourism, and connecting countries around the world.

This sector's contribution to pre-pandemic global GDP was about US\$3.5 billion. In addition, the air transport sector contributed in the same period by providing 87.7 million jobs, which does not exceed 13% of the total associated and indirect opportunities which include tourism services, transportation, logistics, communications, and marketing of various products and consumer items. Total spending by air travelers reached \$902 billion in 2019, highlighting the aviation sector's role as a key partner in developing the tourism sector.

In the Arab world, the aviation sector is a major stimulus for the economy, with air transport contributing about 7.8% to Arab gross domestic product, double that of the world record, equivalent to \$181 billion. "In addition, the air transport sector has created nearly 6 million jobs."

The global aviation industry is also in line with the United Nations 2030 Agenda for Sustainable Development. Studies show that the worldwide air transport industry plays an essential role in supporting the goals of sustainable development, especially the goals of poverty eradication, by supporting airlines to maintain their employees and prevent the diversion of workers from the civil aviation sector, by eradicating hunger by asserting that the air carriers continue humanitarian cargo flights for areas affected by natural disasters and famine through the United Nations Humanitarian Air Service, the World Food Program, and good health, by continuing to transport medical assistance to countries affected by HIV and in need of medical aid, and by establishing partnerships to achieve the goals, by promoting partnerships between all the international aviation industry, airlines, the management of commercial companies and manufacturers, as well as business and producers, through the restoration of economic activity, business and business world gross product.

In this article, we will examine the most important aspects that may contribute to the sustainability of air transport activity.

### [Strengthening the Gains of the Aviation Sector in Managing the Coronavirus Pandemic](#)

The Coronavirus pandemic has led to an unprecedented global crisis and marked a significant turning point in human history. The civil aviation sector is the most affected by this crisis because its role lies in transporting people and goods worldwide for travel, tourism, business and trade purposes.

However, the international community mobilized all means and efforts to confront the spread of the coronavirus and limit its repercussions on various life-saving facilities.

We have seen how the worldwide civil aviation community has collaborated with the various international civil aviation agencies since the virus's introduction. Since the virus's emergence, civil aviation authorities and stakeholders have taken the initiative to assess its danger and implement measures to assist in maintaining flights, particularly in light of States' hasty decision to close their air, land, and sea borders in order to protect their citizens.

In accordance with the Chicago Convention on International Civil Aviation and its article 14, the General Secretariat of the Organization has initiated a mechanism to coordinate with international and regional organizations to follow up on the developments of the outbreak and its impact on air transport activity in various countries of the world and to implement urgent measures in the areas of safety and civil aviation security, as well as the facilities for securing flights, especially those that have been allocated for the persons repatriation and the transport of goods to meet the needs of peoples, including equipment and medicines for treating the infected persons and protecting citizens.

Given that the pandemic did not discriminate against any country, it was necessary to agree on global measures, overseen by the ICAO Council, that enabled the adoption of precautionary measures at airports and aircrafts prepared by the ICAO Council Task Force for the Aviation Sector's Recovery (CART), which is composed of experts and representatives from member states, international and regional organizations, and aviation industry institutions.

The CART Group's proposals also addressed flight security and safety, as well as financial and economic support for air carriers to enable them to continue operating.

To guarantee the optimal execution of these actions and recommendations, the ICAO Secretariat, guided by the ICAO Council, adopted a global and regional roadmap outlining the work to be done and the procedures and tools for action.

The roadmap established frameworks to assist the air transport industry and civil aviation authorities by organizing a variety of collaborative initiatives with international and regional organizations and stakeholders, including the following:

- Communication and coordination with all stakeholders.
- Establishment of regional working groups.
- Facilitate the implementation of programs in cooperation with WHO.
- An inventory of the needs of countries and the challenges they face in organizing flights.
- chain logistics support.
- organizing repatriation flights.

This road map, prepared by the ICAO Secretariat, sets out the framework for action at the central and regional levels, involving Member States, international and regional organizations and stakeholders, to optimize the implementation of the recommendations of the ICAO Council to manage the crisis resulting from the outbreak of the epidemic and the recovery and recovery of the civil aviation sector.

The spread of the coronavirus pandemic has led to an unprecedented crisis that the international community was not prepared to face. The mobilization achieved by the International Civil Aviation Organization and the aforementioned efforts to confront the crisis and to facilitate the recovery process deserve to benefit from it and work to put it in a stronger and sustainable legal framework so that we can be more prepared to face similar or more severe crises, relying on the Chicago Convention as a reference which covers the current situation.

### The importance of regional blocs in the recovery of air transport

Among the precautionary measures adopted by countries to counter the outbreak of the novel coronavirus (COVID-19), which affected the air transport sector, is the closure of borders in most countries of the world, especially those that are important markets for air and tourism transport activity, where they have been more severely affected in air transport activity, compared to other countries that practice this activity within the framework of regional blocs, which have an integrated market, as an example of that the European Union Market. There is also the Association of Southeast Asian Nations (ASEAN), bearing in mind that the idea of regional blocs developed among many countries to create similar markets, including the Arab region, Latin America and Africa. This latter is now working to activate the African common air transport market. This would also contribute to the revival of air transport among them and the revival of global air transport.

In light of the foregoing, efforts should be made to strengthen these blocs' roles in liberalizing air transport and mitigating the effects of various crises, particularly those linked to pandemics.

### Continued digitization of passenger and cargo air transport data

The actions of the ICAO Council's Aviation Recovery Task Force (CART) allowed passenger and cargo flights to continue. We highlight, among other things, recommendation No. 14 on the adoption of public health corridors in accordance with health requirements established by States to facilitate flights, recommendations No. 15 and No. 16 on the temporary lifting of restrictions and the adoption of additional procedures for the transport of dangerous materials, and the initiative of Latin American countries to temporarily liberalize Freedom Seven as a model experience.

These steps come at a time when supply chains have begun to experience several disruptions since the early days of the outbreak of the coronavirus pandemic, resulting in the inability to respond to the urgent and increasing demands for various goods, the high price of land and sea transport and the need to speed up the provision of some basic materials around the world.

These factors boosted demand for air cargo services to the point where it would surpass pre-pandemic levels by the end of 2021.

While civil aviation's public health, safety, and security procedures, as well as those developed by the CART Task Force, have played an important role in achieving these figures for air freight and the gradual increase in passenger traffic, there are still challenges to this trend, some of which can be overcome by strengthening the ICAO system of standards, particularly those associated with the Unified Electronic Passenger Transport Database, by including health data and establishing a similar database for cargo transport.

### Commitment to reduce the impact of emissions on climate

Action to achieve aviation sustainability goals is imperative, and even if the decline in air traffic due to the COVID-19 pandemic of aviation environmental impacts is reduced very significantly, the sector needs to prepare for eventual recovery and remain committed to reducing its emissions by

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reducing or compensating, which requires support for research and development aimed at introducing new sustainable aircraft technologies, the use of alternative energies, as well as the implementation of trade plans and compensation for such emissions, especially since, according to the International Civil Aviation Organization (ICAO), the expected impact on air transport costs is between 0.2 and 0.6 per cent of total international air transport revenue for 2025, and the expected increase in ticket prices will not exceed 3.0 per cent.

Further development of State legislation in line with the recent ICAO decisions is required to optimize environmental developments, emissions trading, market mechanism and associated actions.

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## **Sustainability of the aviation industry in Africa**

(Presented by AFRAA)

## 1. INTRODUCTION

Aviation provides the only worldwide transportation network, which makes it essential for global business and tourism. It plays a vital role in facilitating economic growth, particularly in developing countries. Air transport has become a driver of economic, social, and cultural development worldwide and has fundamentally changed how we travel, interact with others, and do business.

Sustainability has become a significant subject of concern within the aviation industry. Leaders are focusing on reducing the environmental impact through technological improvement, operational efficiencies and sustainable aviation fuels (SAF). Global warming, environmental degradation, climate change, and depletion of resources are becoming widespread. In response, industries are conducting businesses with an approach focused not only on economic development but also on society's well-being. The aviation industry has set long-term goals to achieve zero carbon emissions by 2050.

## 2. SUSTAINABILITY DEFINED

Sustainability is defined simply as “meeting the needs of the present without compromising the ability of future generations to meet their needs.” While curbing environmental impact on businesses is one sure way of not compromising the future, it seems as though everything about sustainability has been reduced to curtailing environmental impact. It is a narrow view of what appears to be a pervasive matter in every facet of human existence.

Before Covid-19 hit the industry in 2020, the global airline industry was growing, not shrinking. According to an article in Sustainability Accounting, Management and Policy Journal, “Over the past 50 years, global demand for air travel has risen by 9 percent per annum, and growth (at a reduced rate of 3-7 percent) is predicted for the next 20 years.” But is the industry growing at the same pace across all regions? What percentage of this growth can be attributed to Africa and the developing world?

In Africa, for instance, though the industry is growing, African airlines' share of global traffic has stagnated at around 2% for a very long time. In fact, in real terms, African airlines' market share for intercontinental traffic has shrunk from 60% some 40-50 years ago to just about 20% in recent times and still shrinking.

Any broad-based conversation about aviation industry sustainability must not ignore the fact that African and, to some extent, South American airlines are at risk. The survival of the aviation business in Africa is at a sustainable risk, and this must be part of any discourse on the future of aviation. Therefore, narrowing sustainability to only environmental impact is skewed. A broader and holistic look at sustainability will allow the world and all players to play their part in ensuring all have a stake and manage their stake sustainably.

Looking at other economic sectors, especially manufacturing paints a similar picture. While the developing world, excluding China and India, contributes very little to global emissions from the manufacturing industry, various attempts have been made to cap global emissions without

considering the future development needs of these countries. A fairer approach would compel the more major pollutant countries to set targets of cutting back on their emissions while setting limits beyond which the developing countries cannot grow their CO2 footprints.

According to Aviation Benefits Beyond Borders, the aviation industry has made significant progress in fuel and CO2 efficiency, halving the amount of fuel used per flight compared to 1990. Flights today generate just about 50% of the CO2 compared to the same flights back in 1990. This has been achieved through technological advancement and improvements in operations and infrastructure. African operators have contributed to these savings in small ways.

### 3. AVIATION SUSTAINABILITY IN AFRICA

Before the Covid-19 pandemic in early 2020, aviation in Africa supported over 63 billion US dollars in economic activity. It employed around 7.7 million people directly and indirectly, according to ATAG 2020 report on Aviation benefits. Aviation has the potential to open up markets, facilitate trade, link Africa to the rest of the world, and contribute to the socio-economic integration and prosperity of the continent. Realistically, jobs, better connectivity, trade facilitation, easy mobility, and continent integration, including managing the environment, are all sustainability measures Africa is keen to leave for future generations.

Therefore, the AFRAA perspective on aviation sustainability embraces all aspects of ensuring that the present and the future hold brighter prospects for the citizenry of Africa. Air travel connects people, countries, and cultures, providing access to global markets and facilitating the freedom to travel. Air travel connects developing countries to developed countries. It serves as a means of inclusion for remote areas and Island countries in which air travel is often the only efficient means of transportation. The affordability of air travel makes leisure and cultural experiences from traveling to different places accessible to most of the world's population. This, in turn, exposes the world to tourism, which significantly improves living standards, reduces poverty, and contributes to the UN Sustainable Development Goals (SDGs) in many nations. ATAG found that air transport in some way supports 14 of the 17 Sustainable Development Goals, from decent work and economic growth to quality education and reduced inequalities. According to IATA, 51% of international tourists travel by air. The percentage is even higher in Africa, where nearly 80% of international tourists arrive by air. In addition to tourists' travel, aviation also allows the speedy delivery of medical supplies and humanitarian and emergency relief.

Therefore, aviation sustainability in Africa would, in addition to addressing the industry's environmental impact, focus more on the survival and success of African airlines, airports, and all players in the value chain on the continent. To achieve this would require access to affordable and competitively priced capital; provision of infrastructure to support the growing industry; better connectivity and market access; facilitating mobility and cost competitiveness.

Aviation sustainability also means equity and fair play in the industry and among players. In circumstances where Africa is considered a high-risk region and interest rates for loan facilities and lease rates for equipment are way beyond the global average, sustainability is impacted adversely. During the Covid-19 pandemic, when the industry survival and sustainability went through a significant test, some regions and countries were more responsive in providing financial support to

keep their airlines going, protecting jobs and aviation-related economic activities. Of the total of over US\$256 billion in direct financial support received by airlines globally, Africa's share was a paltry US\$2.5 billion. The failure by African governments to provide the much-needed financial boost to the airlines throughout the devastating months of the Covid-19 pandemic has further weakened African airlines and threatened their sustainability.

#### 4. REGULATORY IMPEDIMENTS TO SUSTAINABILITY

The lack of harmonized regulations has robbed African aviation of growth and the much-needed connectivity since the 1960s. Though the continent was well ahead of many regions in adopting an air transport liberalization framework called the Yamoussoukro Decision (YD) in 1999, the failure to put in place regionally binding regulations, among other challenges, frustrated the opening of air borders to date. Following the adoption of the YD by 44 African countries, there was a need to establish common binding regulations and set up institutions to oversee the implementation and resolve disputes that may arise.

This would have surely guaranteed successful implementation. Unfortunately, leadership got excited about the agreement and failed to follow through and put in place the proper regulatory framework to back the decision.

Fortunately for Africa, the quest for aviation sustainability is now on the right track. African aviation sustainability renaissance began with the adoption of the African Union (AU) Vision 2063, a continental development roadmap. Among the flagship projects in this document are the Single African Air Transport Market (SAATM); the African Continental Free Trade Agreement (AfCFTA); and the Protocols on the free movement of people and goods – three inter-related projects aimed at liberalizing the air transport market, facilitating trade and the movement of people across borders.

To ensure the successful implementation of all three projects, conscious efforts are being made to put the regulatory framework and institutional structures in place. Efforts are also being made to disband or amend national regulations that may not align with the letter and spirit of the AU Agenda 2063 and these flagship projects.

The full implementation of the YD, AfCFTA, and facilitation of mobility through visa and passport protocols will certainly guarantee aviation sustainability in Africa. However, governments, DFIs, and other institutions should support the AU-led efforts to implement all the support regulations and structures. In addition, African airlines will need access to financing to invest in the modern, efficient fleet and relevant technologies that will make them competitive and sustainable. Investments in aviation and tourism-related infrastructure are also needed to boost the sector's full development.

#### 5. INDUSTRY COLLABORATION FOR SUSTAINABILITY

Aviation has traditionally been a business that collaborates and coordinates to provide transportation services. Historically, airlines work with governments, airports, civil aviation authorities, tourism organizations, safety/security institutions, and other sectors. At the states level, ASECNA is

testimony to what governments coming together to pull resources and channel them into the air navigation sector can achieve – economies of scale. In times past, the establishment of the Pan-Africa airline, Air Afrique, attested to what is achievable with collaboration. In recent times, Covid-19 has taught the aviation community that the health sector is an integral part of the aviation ecosystem and must be involved in decision-making. At some point in Africa, when airline safety was at an all-time low, it took governments, airlines, ICAO, AFRAA, AFCAC, ACI-Africa, the CAAs, and other players to collaborate come up with a roadmap whose implementation got aviation safety back on track.

Indeed, collaboration has seen the aviation industry agree on CORSIA to address the global environmental challenges instead of the earlier unilateral regional/country measures that would have been expensive and chaotic.

The importance of collaboration for the success and sustainability of the industry is not in doubt. What is, however, missing is the aviation sector to collaborate with industries that are not directly related to aviation but impact it. AFRAA believes that aviation “talks too much to itself” to the exclusion of other relevant players that influence the industry.

As the leading air transport body on the continent, AFRAA is conscious of this reality and has decided that in 2022, it will begin to change the narrative and establish broader consultation with all stakeholders for the industry's good. In furtherance of this, AFRAA is organizing in the second quarter of 2022 a "Laboratory" of relevant players to consult broadly on critical issues of the aviation, trade, tourism, financial and regulatory sectors. The LAB will bring together government, international development partners, aviation entities, trade and tourism organizations, the health sector, financiers, regional economic communities, and selected consumers of air transport services. In the view of AFRAA, the areas that need broader stakeholder engagement and collaboration include:

- Aviation regulations and policies – Create a regulatory framework favorable for the industry development and sustainability
- Market access and connectivity – Improve travel, trade, tourism, and regional integration
- Access to capital – Finance equipment and infrastructure investments
- High cost – Reduce the cost of operations and make travel affordable
- Environment – Enhance awareness and agree on actions to be taken on environmental sustainability
- Governance and management – Improved governance and management
- Human capital development – Increased human resource competency in the African aviation industry

After the broad-base engagement, the industry, through AFRAA, hopes to develop relevant solutions to revamp the sector and create a sustainable aviation development action plan for Africa.





Already, a Task Force has been established to organize the “Lab” to brainstorm and identify concrete projects suitable for attaining the Lab's broader objectives.

Going into the future, similar collaborative engagements would be needed to address many of the systemic challenges and align the actions of stakeholders. Through such collaboration, not only are we likely to attain consensus in many ways, but we will also realize the massive synergy that aviation needs to unlock its full potential.

## 6. FINDING AND ADAPTING INDUSTRY BEST PRACTICES

The delay in liberalizing the African air transport market can be partly attributed to the failure of the region to adopt best practices that worked elsewhere. While this may simplify an otherwise complex inter-state roadmap to market access, if Africa had emulated what the EU did to achieve a single market, better progress could have been made. The aviation industry abounds with many successes that can be "copied." Regarding regional safety, EASA has some valuable lessons that can help Africa. In the same way, Africa too can teach some parts of the world lessons on collaboration for synergy by referring to the ASECNA model for air navigation service provision. Similarly, the global airline alliances and other forms of commercial cooperation arrangements can be helpful to African aviation as it seeks to weave its way into sustainability. Caution must, however, be exercised in adopting models from elsewhere to ensure they are sustainable in the long term and fit the local dynamics.

The good thing is that, in aviation, best practices are not traded secrets. They can be easily accessed and learned from. Suppose the financing difficulties African airlines face are to be overcome. In that case, the continent will have to learn from other regions where airline ownership limits are relaxed, and foreign equity capital encouraged and not frowned upon. A deliberate policy to privatize state-owned airlines and invite foreign investors to take a stake will attract the capital required and the managerial expertise needed to run such airlines professionally. Airlines that are efficiently and profitably run are sure to be sustainable, provided the right regulatory environment is created to support business. This is the trend in many parts of the world, but we remain largely fixated on state-owned and run airlines in Africa. The acceleration to aviation sustainability will be realized if Africa allows the private sector to drive the commercial side of the business. At the same time, governments focus on enacting the enabling regulations to support the industry. The timing and focus on getting SAATM and AfCFTA implementation right will result in significant growth in air travel and regional trade.

## 7. CONCLUSION

To conclude, the aviation industry has rightly set ambitious long-term goals to achieve zero carbon emissions by focusing on developments in technology, operational efficiencies and sustainable aviation fuels. While these goals are laudable and demonstrate the industry's commitment to sustainability, the aviation world can do more by ensuring that all regions of the world have viable and sustainable aviation businesses in the first place. After all, if aviation supports 14 of the 17 UN SDGs, its beneficial contributions go beyond the environment and should be seen as a necessary socio-economic good for every region

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Particularly in the developing world, where connectivity and mobility are limited, costly, and local airlines cannot sustain their businesses, there is a need for stakeholder collaboration to address some of the bottlenecks. At the same time, the government supports the industry with the right laws that guarantee market access, capital access, and capacity development. A sector struggling to survive will find it difficult to focus on the long-term environmental goals that do not yield short-term visible results. This does not mean the environmental priorities are less critical; instead, they require resources that the industry, particularly in Africa and some other parts of the developing world, does not have. For instance, without access to competitively priced capital, some operators will continue to acquire and use old, high fuel consumption, and less efficient aircraft or ground equipment that emits comparatively more CO<sub>2</sub> and pollutes the environment. Such operators' actions may be driven by the dire need to provide the much-needed air connectivity at the expense of efficiency and the environment. It does not mean they are careless, just that their priorities are different. How to get all players to gain access to resources, develop their regulatory environment and learn best practices from each is a critical sustainability question that should concern all of us.

Finally, the efforts been made by African states under the leadership of the African Union to implement SAATM, AfCFTA, and facilitate the movement of people and goods are giant steps toward aviation sustainability in Africa. Any support from the international community to assist the realization of these projects will be progress towards improving aviation sustainability. AFRAA's role in leading multi-sectoral industry collaborative decision making and implementation through the "LAB" concept should result in the partnerships needed to drive an economic, social, and environmentally sustainable aviation industry in Africa. Unless and until the entire aviation ecosystem feels inclusive in the sustainability drive, the momentum will remain slow.

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POSITION PAPER

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## **Sustainability of the aviation industry**

(Presented by ERA)

## Introduction

For the past years, the aviation industry has been facing greater societal and political pressure due to its environmental impact. In fact, the sector is experiencing a new political environment in which climate matters are on top of the policy agenda at both international and European levels. This is indeed a key period for aviation climate/environmental policies. At European level, there are currently discussions ongoing on the Fit for 55 Package (Ff55) which looks at policies which are aligned to the EU's target to reduce CO<sub>2</sub> emissions by 55% by 2030, including a few relevant for the aviation sector like the EU ETS, ReFuel EU Aviation, and the Energy Taxation Directive. Whereas, at international level, ICAO will hold its 41<sup>st</sup> Assembly in autumn, in which it aims to agree on a global Long Term Aspirational Goal (LTAG) for the aviation industry.

However, throughout Europe especially, national measures are either being developed or proposed that could slow down the advancement of sustainability in the sector, such as proposals of EU/national "green" taxes and bans of the short haul routes. As such, in order to ensure the long-term sustainability of the sector, it is necessary that policy makers develop the right policy framework that will allow the sector to decarbonise.

**1. What are the regulatory impediments to increasing sustainability? How can regulations be improved to incentivise and facilitate the aviation industry to be more efficient and sustainable?**

### Outline of the Ff55

In July 2021, the European Commission published its proposals for the Fit for 55 Package (Ff55), which was welcomed by the European Regions Airline Association (ERA). Among the proposals, the EU Emission Trading System revision, the ReFuel EU Aviation Initiative and the Energy Taxation Directive are the legislative files with direct implications on the air transport sector, and therefore need to be carefully assessed in this legislative phase to ensure the long-term sustainability, both economic and environmental, of the sector. In the paragraphs below, ERA outlines its position on how the Ff55 proposals could be improved to ensure a more efficient and sustainable sector.

When it comes to the **EU ETS**, ERA supports the underlying objective of the regulation, to gradually reduce CO<sub>2</sub> emissions within the European economy, however, it is important to make sure that its revision does not impact disproportionately the smaller air carriers that provide vital regional connectivity.

The proposal suggests a complete phase out of allowances by 2027 and an increase of the yearly linear reduction factor of 4.2% from the original 2.2%. An increase of the auctioning level of allowances will not mitigate the CO<sub>2</sub> emissions from aviation as the environmental impact is determined by the "cap" of the scheme rather than by the free and auctioned allowances. Steeply reducing the free allowances and proposing a complete phase out by 2027 will have a negative impact on European carriers' competitiveness at the global level, due to the higher costs that they must encounter and thus hindering fair competition, especially in the period in which the sector is still recovering from the COVID-19 crisis and is facing huge financial pressures. A solution to this

could be to maintain some free allowances in proportion to the number of passengers transferring from EU hubs to non-EU destinations.

ERA also calls for aviation related EU ETS revenues gained from the auctioned allowances to be used towards the decarbonisation of the sector by, for example, supporting the uptake of SAF and R&D of new aviation technologies. Currently the dedicated Innovation and Modernisation funds lack an aviation focus. This would be a more effective way of reducing the air transport's carbon footprint not only in the short, but also in the mid/long term.

Furthermore, ERA fully supports the purpose of the **ReFuel EU Aviation initiative**: to reduce the environmental footprint of the aviation sector and to boost the supply and demand for sustainable aviation fuels. The aviation sector has been relying on different solutions to reduce its emissions, such as MBMs, technology development and operational improvements. However, these represent solutions for the long term. SAFs play a crucial role in the mitigation of aviation CO<sub>2</sub> emissions as they offer a short-term solution, therefore “quick wins” using existing aircraft and very little changes to the infrastructure at airports. Whilst ERA supports the targets of SAF supplied proposed by the European Commission, there are concerns on the supply at airports: given the scrutiny of the sector, particularly the concerns over short-haul flights, we believe that all airlines operating at any airport should be able to have access to SAF, whilst maintaining the exemption to supply SAF at smaller airports. While we understand that given the current low production it will be difficult to supply all airports with SAFs, we need to ensure access to SAFs to all interested players including regional airlines, which also wish to make use of SAF to reduce their environmental impact.

An additional concern is the patchwork of measures being created with **national blending mandates**. It is important to ensure that only a European approach is taken. Some Member States might go ahead with their own national blending mandates despite having an EU obligation in place. This will create a significant administrative burden on airlines and lead to confusion as well as a perception of a lack of unity. An EU approach is, among other things, supposed to address these concerns and having different additional national obligations calls into question the purpose of an EU-wide mandate.

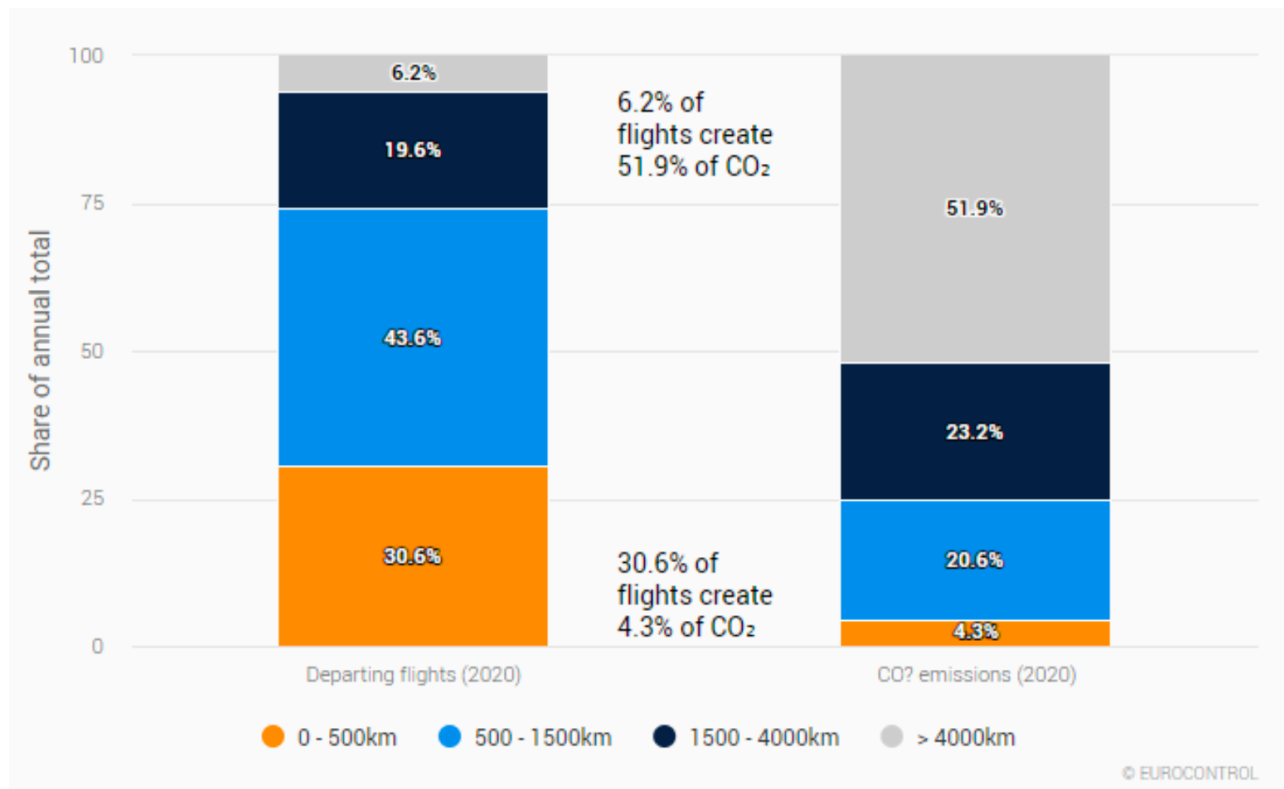
Finally, ERA is also concerned by the European Commission's proposal to start **taxing jet fuel**. While curbing demand by imposing a fuel tax on aviation may look like a promising approach to some, it raises important questions. One aspect to be emphasised is the impact of aviation tax on European regions. There is little doubt that regional communities across Europe have come to depend on air connectivity for their development, allowing them to be connected not only to their national capital, but also other European capitals, regions across Europe and increasingly, non-European markets (these regional routes also often represent the main input for other cross-continental routes). Taxing aviation involves risks as the economics of regional air connectivity are fragile and subject to volatile and changing market dynamics. ERA is understandably concerned that a fuel tax on aviation would hurt regional air connectivity in a disproportionate way: imposing a tax and generally higher costs leads to a risk of further connectivity loss in the regions. Additionally, a tax on jet fuel is unlikely to address the fundamental and crucial issue of the decarbonisation of aviation as funds would not be earmarked for the sector's decarbonisation. This is in addition to rocketing fuel prices and the energy crisis arising from the war in Ukraine.

**Short haul bans** as well can hinder the progress towards decarbonising the sector. Short haul is the testing ground, bans delay the green transition. Recent European national Government



announcements to ban short-haul routes in Europe could ultimately hinder, rather than help efforts for a more sustainable air transport future, as technological improvements for regional aviation, together with sustainable aviation fuels, offer the best and quickest solution to the decarbonisation of the sector by 2050.

Routes of less than 500km only represent a very small part of European air transport emissions (4.3 per cent<sup>1</sup>, see figure below); consequently, such measures will not provide substantial environmental impacts.



Regional aviation, in particular, has found itself at a crossroads between innovation and the political and public pressure to reduce passenger volumes, as recently there have been various announcements throughout Europe on the banning of short-haul routes in order to reduce the environmental impact of aviation. Yet, the regional sector is finding itself justifying its very purpose of existence: providing connectivity in European regions. ERA airline members connect parts of Europe where air transport is both vital and often the only mode of transportation available to inhabitants in remote regions, islands and dispersed areas.

Further to this, the short-haul segment is creating the necessary push towards the decarbonisation of the sector, providing the testing ground for new technologies that will enable the green transition to a more sustainable industry. Electric and hydrogen-powered aircraft, for example, will be made first available on short-haul routes already by 2035 and then on longer routes beyond 2050.

Building new rail infrastructures and networks has significant CO<sub>2</sub> impacts on the environment and is an environmental, financial and time-consuming exercise. Aviation is already advanced in its development of breakthrough technologies with limited to zero environmental impacts, and will be

ready to integrate these into the market within a much shorter timeframe than it will take to build a new rail network.

For further conclusions regarding banning of short haul flights and the factors to be considered in shifting to rail, please see the Oxera study published in March 2022: Short Haul Flight and Sustainable Connectivity [https://eraa.org/sites/default/files/era\\_report\\_240322.pdf](https://eraa.org/sites/default/files/era_report_240322.pdf)

The aviation sector is already focussing on solutions that are better placed to decarbonise the sector: improved ATM, improved technology, use of SAF and EU ETS/CORSIA. It is therefore important to improve ATM inefficiencies and invest in uptake of SAF and new technologies first before damaging regional air connectivity. It is therefore important that the EU and Member States focus on solutions that can actually provide CO<sub>2</sub> reductions, and not hinder the progress with initiatives like banning short-haul routes. For instance, improving air traffic management through proper implementation of the Single European Sky (SES) would lower CO<sub>2</sub> emissions of intra-EU flights by up to 10 per cent in a relatively short timeframe.<sup>2</sup>

#### SES 2+

The SES recast proposal (a.k.a SES2+) as put forward by the European Commission in September 2020 is an opportunity to reform the operation of Air Navigation Service Providers (ANSPs), deliver optimum trajectories, and implement effective regulation where necessary to ensure cost efficient services, reducing flight delays for airlines and ultimately benefitting consumers and the environment. The ambition and benefits of SES, which has been under discussion for nearly two decades, has yet to be realised, much to the frustration of the airspace user community. These benefits were expected to deliver an improvement in safety by a factor of 10, greater capacity and few delays and a 10 per cent reduction in EU aviation emissions as well as underpinning a million extra jobs annually from 2035.

Although there are recommendations and solutions stemming from SESAR, airspace users were aligned that the outcomes from the airspace architecture study or the wise persons group must be implemented. While we know this can be done as technologies allow, we are concerned with the lack of political ambition to implement. SES 2+ (even in its early stages) provides the framework to generate this political will for action. In doing so, SES 2+ and the seamless, digital single European sky will reap the benefits of existing solutions and ensure significant environmental benefit.

The current situation regarding the SES recast proposal is not positive, with significant differences between the Council and Parliament positions, and there remains a real risk that finding common ground on the various chapters will be difficult to achieve and therefore result in the file staying a state of stasis, or worse still, seeing the file being dropped altogether. This would be a travesty and a failure of statesmanship given the need to modernise the ATM system and move into a fit for purpose ATM infrastructure as the industry emerges and recovers from the impacts experienced due to COVID-19.

**2. How can industry participants better cooperate to improve sustainability? For example, how can airlines, airports and air navigation providers cooperate to improve sustainability over the next five years?**

Collaborating within the industry and with regulators is key to ensure long-term sustainability of the sector. This is especially true now as the policy frameworks which will guide the decarbonisation of European aviation is currently being decided upon (i.e. Ff55). In the past few years, the industry has in fact increased its collaboration on sustainability to ensure alignment between players and a common vision on decarbonising, as seen with the *Aviation Round Table* report and the *Destination 2050* Roadmap.

**Destination 2050 – A route to net zero European aviation**

In February of 2021, Europe's aviation sector (ERA, alongside A4E, CANSO, ACI Europe and ASD) unveiled its flagship sustainability initiative, *Destination 2050 – A route to net zero European aviation*. Driven by a new independent report which provides a vision and path for meaningful CO<sub>2</sub> emission reduction efforts in Europe and globally, it builds on the Paris Agreement and the European Green Deal and charts the path to how all flights within and departing the EU, UK and EFTA will realise net zero CO<sub>2</sub> emissions by 2050. Recognising that the whole European air transport ecosystem must act together decisively, the intention is to identify the measures which the members of the associations can apply to achieve this decarbonisation collectively.

In fact, the European aviation sector as a whole is committed to the reduction of its carbon footprint. In particular, Destination 2050 identifies four pillars through which the sector will be able to reduce its CO<sub>2</sub> impact, such as the development of sustainable aviation fuels (SAF) and clean technology, operational improvements, and market-based mechanisms (MBMs).

MBMs, like the EU ETS and the Carbon Offsetting Scheme for International Aviation (CORSA), play a crucial role in the decarbonisation in the short and medium term representing 27 per cent of the CO<sub>2</sub> reductions by 2030, while by 2050, as the sector can rely more on in-sector reductions offered by technology and SAFs, MBMs will be responsible for 10 per cent of the net CO<sub>2</sub> reductions. SAF is expected to reduce CO<sub>2</sub> emissions by 46 per cent by 2050, representing 80 per cent of the total fuel consumption in the aviation sector and new technologies, like (hybrid) electric and hydrogen powered aircraft are expected to reduce CO<sub>2</sub> emissions by 38 per cent. Finally, ATM and aircraft operations also play a key role and a quick win for the decarbonisation challenge as the solutions are relatively mature compared to the other solutions. These are expected to reduce CO<sub>2</sub> emissions by at least 6 per cent.

However, industry cannot undertake this decarbonisation journey on its own. Collaboration is key. To be successful, support from European and national policy makers is needed to create the right policy frameworks and, in some cases, to provide financial assistance to develop and apply new technologies.

Following the publication of the Destination 2050 report, the stakeholders involved have been calling for an EU Pact on Sustainable Aviation to be set in place. A first step to achieve this was the endorsement of the *Toulouse Declaration* of February 2022 – the first-ever public-private initiative supporting aviation's decarbonisation goals signed by 35 European countries and more than 100

represented through Destination 2050. This is a great example of cooperation to advance the decarbonisation of the sector. Now the Destination 2050 partners expect the Toulouse Declaration to be translated into a structured dialogue and concrete policy action, a process by which stakeholders can address the challenges to decarbonise (e.g. SAF production and uptake, increase of costs, zero emission aircraft) and find a common way forward.

### **Collaborative environmental management**

A further example of collaboration between stakeholders is Eurocontrol's Collaborative Environmental Management (CEM), of which some ERA member airlines are part of. CEM is a specification that formalises and facilitates collaboration between relevant stakeholders operating locally around airports, such as aircraft operators, airports, local governments and communities and ANSPs, which have the same objective of minimising the (local) environmental impact of the sector. Therefore, core operational stakeholders are brought together to increase common awareness and understanding of the interdependencies, trade-offs and constraints facing each other's business to develop shared sustainable environmental solutions.

### **Industry Consultation Body**

In January 2022, the Commission's Industry Consultation Body (ICB) published a position paper 'Improving the environmental sustainability of European ATM which discussed the ATM related measures that can contribute to the improvement of verifiable environmental sustainability of aviation in terms of climate impacts, pollutants and noise emissions.

With respect to the medium term, the ICB identified several solutions that have already been proved in the research and development stage but are in need of further industrialisation.

Initiatives such as system-wide information management (SWIM), (which is considered a key enabler for an integrated operation plan, the ICAO led flight and flow in a collaborative environment (FF-ICE) and trajectory based operations), initial trajectory sharing as per Common Project 1 AF-6, common airspace data service provision, virtual centres and 3D weather radar, are all considered as medium term goals for the industry.

### **3. What are the industry's best practices, already in place, that improve sustainability? How can these best practices be fully implemented throughout the industry?**

The aviation sector has always been concerned about its environmental footprint and has been reducing it since the 1980s by reducing its average fuel burn and developing new generation aircraft that are on average 20 per cent more fuel efficient than the model they replace. Additionally, the sector has been relying on additional solutions to tackle its environmental impact: offsetting, use of sustainable aviation fuels and operational improvements (ATM and ground ops).

Apart from regulatory requirements like the EU ETS and CORSIA, some airlines may decide to make use of voluntary **carbon offsetting programs** as part of their efforts to reduce their CO<sub>2</sub> emissions. These programs can be either used by the airlines themselves or by their passengers and allow the customer to compensate for their emissions by buying projects that reduce or remove CO<sub>2</sub> emissions elsewhere (e.g. reforestation or renewable energy projects). It is important, however, that the airlines that wish to make use of such programs ensure that the offsets offered are of high sustainability standards.



The airlines can also make use of **SAF** and go beyond of what is being mandated at both national and EU levels. SAFs are a relatively established technology and are ready to be used as drop-in fuels. However, the production is quite limited (current production capacity is sufficient for 0.1 per cent of worldwide jet fuel demand) and cost between 3-5 times more than conventional jet fuel. Nevertheless, given the potential of CO<sub>2</sub> reductions, there are many R&D projects/partnerships underway, which are also assessing the feasibility of raising the certification of aircraft from 50 per cent blend to 100 per cent use of SAF in the aircraft.

Finally, reducing fuel consumption is important to reducing the sector's impact and, apart from increasing aircraft efficiency via technology development, **operational improvements** are key to reduce fuel waste. A substantial amount of fuel is wasted due to inefficient routing. Better flight routing could reduce inefficient aviation operations growth. In fact, the introduction of free route airspace is estimated to have delivered 2.6 million tonnes of CO<sub>2</sub> emissions reductions since 2014 and the continuous climb and descent operation could reduce CO<sub>2</sub> emissions by 1.1 million tonnes per year<sup>3</sup>.

It also noted that several SESAR solutions are mature and available, but have not been fully deployed across Europe, but have been shown to deliver tangible benefits where they are in operation. These include Free Route Airspace (FRA) which includes full cross-border implementation, Performance Based Navigation (PBN), continuous climb and descent operations (CCO/CDO), Flexible Use of Airspace (FUA), extended departure and arrival management solutions (DMAN, AMAN and XMAN) and the collaborative decision making.

A list of additional best practices:

- Developing sustainability strategies
- Voluntary carbon offsetting
- Use of sustainable aviation fuels beyond mandated levels
- Reducing fuel consumption
- Cabin waste management
- Single Use Plastic
- Sustainable procurement
- Aircraft decommissioning and recycling

<sup>1</sup> EUROCONTROL Data Snapshot #4 on CO<sub>2</sub> emissions by flight distance

<sup>2</sup> [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_20\\_1708](https://ec.europa.eu/commission/presscorner/detail/en/ip_20_1708)

<sup>3</sup> <https://www.easa.europa.eu/eaer/topics/air-traffic-management-and-operations#:~:text=The%20introduction%20of%20Free%20Route,been%20implemented%20at%2028%20airports>





POSITION PAPER

R22-PP/05  
16/04/22

**What can the aviation industry do over the next five years to ensure a sustainable long run future?**

(Presented by ACI World)

**1. What are the regulatory impediments to increasing sustainability? How can regulations be improved to incentivise and facilitate the aviation industry to be more efficient and sustainable?**

While the aviation industry will continue to face challenges related to the COVID-19 pandemic, it is safe to say that we have entered a new phase. There are several reasons for optimism: vaccination rates have increased significantly, many countries have eased their travel restrictions and the dominant variant at the time of publishing has less severe symptoms, also indicating that immunization has made a positive impact.

Therefore, this is the opportune time to re-focus on action to tackle climate change, our biggest humanitarian threat. In 2021, the aviation industry committed to Net Zero carbon emissions by 2050, despite being one of the hardest sectors to abate emissions due to its dependency on fossil fuel. The International Civil Aviation Organization (ICAO) recently published a feasibility assessment report for a long-term aspirational goal for international civil aviation, which will be discussed at the upcoming 41<sup>st</sup> ICAO Assembly. ICAO also held several stocktaking seminars that have brought different stakeholders together to discuss potential solutions to support the decarbonization of the sector. It is clear that sustainable alternative sources of energy for aviation have never received so much attention from governments and industry players.

Indeed, achieving the Net Zero long-term goal requires immediate action as it will rely upon massive changes in both our economies and businesses. Technology, innovation, training, collaboration, policies, and regulations can be significant enablers, if appropriate, timely, and used in the right way. We cannot wait for certain technologies to mature to act, nor can we rely solely on solutions that come from within the sector.

Therefore, it is essential to increase collaboration within and outside aviation to identify existing best practices to reduce emissions and that could be easily replicated around the globe; and support the development of smart policies and a performance-based policy framework that can level the playing field and bring certainty to investors, without compromising new solutions, technologies, and innovations to prosper in parallel. States should support and facilitate a policy environment where aviation infrastructure and operations are adapted to and aligned with the global goal to reduce the sector's environmental impact and build resilience and preparedness to prevent, resist, respond, and recover from the inevitable impacts of climate change or other disruptive events.

Creating fertile grounds for all forms of investments in airports and the broader aviation ecosystem will be paramount. This means a policy framework that incentivizes airports and aviation stakeholders to build resilience and implement more efficient and innovative operating procedures, technologies, and methods that will permit the industry to thrive, reduce costs where possible, become more efficient as a whole, and continue its development, driving well-needed global economic growth.

An agile and performance-based policy framework will also help the industry recover quicker and strive to ensure the development of a more sustainable and resilient industry in the long-term. Environmental, economic, and social sustainability is at the heart of many industry concerns and

ensuring that the policy and regulatory machinery in place is structured to accompany the industry on the path to long-term sustainability is essential.

The most promising alternative in the short-term to reduce aviation emissions is Sustainable Aviation Fuel (SAF), a solution that requires minimal infrastructure adaptation from airports. SAF needs substantial investment to become a reality across the globe, hence the need for policy consistency and clarity on incentives, mandates, or other mechanisms to be considered from local, regional, and international perspectives.

**2. How can industry participants better cooperate to improve sustainability? For example, how can airlines, airports and air navigation providers cooperate to improve sustainability over the next five years?**

There are several collaborative approaches that aviation stakeholders can take. Increasing collaboration and information sharing among aviation stakeholders can greatly improve efficiency and reduce CO<sub>2</sub> emissions at several stages of the flight operation. Airport Collaborative Decision Making (A-CDM) showcases the importance of the relationships between airport operators, airlines, ground handlers, and air traffic controllers in sharing data to increase predictability in airport operations, thereby reducing delays and enhancing efficiency. The focus of A-CDM allows airport partners to share data on the state of their operation, so that each organization has a more complete operational picture across the entire airport system. Overall, A-CDM can achieve improvements in flow control and optimize the capacity of runways, terminals, gates, and airspace.

Other opportunities to increase airspace usage efficiency and avoid congestion—both with the potential to reduce emissions—are the Continuous Climb Operations (CCO) and Continuous Descent Operations (CDO). They are aircraft operating techniques enabled by airspace and instrument procedure designs that are facilitated by air traffic controllers (ATC). CCO and CDO allow aircraft to use a flexible and optimum flight path that can deliver significant environmental and economic benefits—reduced fuel burn, gaseous emissions, and fuel costs—without any adverse effect on safety.<sup>1</sup>

CCO and CDO operations allow aircraft arrivals or departures to descend or climb continuously, to the greatest extent possible. Aircraft applying CCO utilize optimum climb engine thrust and climb speeds until their cruising levels are reached. With CDO, aircraft engage minimum engine thrust, ideally from top of descent and in a low drag configuration, prior to the final approach. The use of these techniques results in time being spent at more fuel-efficient higher cruising levels, hence significantly reducing fuel burn, and lowering emissions and fuel costs.<sup>2</sup>

Aviation has a strong record of cooperation, however the challenge we face requires even closer and more efficient cooperation within the sector. Taking collaboration to the next level requires a new culture among aviation stakeholders that goes beyond specific projects. Such a culture prioritizes actions that could facilitate emissions reductions across the airport system and must be supported by leadership and incentivized to staff. Identifying and leveraging common areas of interest continues

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<sup>1</sup> EUROCONTROL

<sup>2</sup> EUROCONTROL

to be relevant. Decarbonization requires aviation stakeholders to not compete among themselves, but rather work together to identify solutions and achieve common objectives.

Governments must also collaborate closer with the aviation industry in a more proactive and less bureaucratic manner. For instance, the greatest source of emissions for airport operations is energy consumption, something not under their direct control. The availability of renewable energy at the grid is fundamental for the ability of airport operators to decarbonize. In addition, incentives to reduce aviation emissions are still underprioritized. For example, it is much more appealing for fuel producers to invest in biodiesel than in SAF. One policy that could disincentivize this trend and still promote decarbonization on the road and on the air is to give incentives to the electrification of road transport. Of course, the electricity available needs to be renewable as well.

Governments indeed need to support appropriate policies for aviation to achieve its decarbonization and thrive in a Net Zero economy. Creating SAF policies that will provide certainty to investment in production and will support bridging the gap of SAF premium prices—one of its main barriers—is an immediate action that governments can pursue and a point in common on which aviation stakeholders can collaborate. This provides good leverage that could bring the sector together on common solutions.

Airports can act as facilitators to the deployment of SAF on site. This role can only be filled with cooperation among different stakeholders, which could include the following:

- Airport operator
- Airline
- Ground handling operator
- Aircraft refuelling operator
- Conventional fuel supplier or aviation fuel consortium
- Fuel farm operator
- SAF supplier
- Customs
- Environmental Agency
- Local department for transportation
- Fire and rescue teams at the airport
- Logistic companies
- Environmental NGOs familiar with aviation and the sustainability certification schemes of alternative fuels

Based on previous experiences, four steps are suggested for airports to start their SAF journey at this early stage:

1. Familiarization with SAF
2. Identification of current suppliers
3. Creation of working groups: One of the outcomes of the working groups could be an infrastructure feasibility study and an activation plan.
4. Process test flight<sup>3</sup>

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<sup>3</sup> Upcoming ACI/ATI *Sustainable Aviation Fuel from and Airport perspective*

**3. What are the industry’s best practices, already in place, that improve sustainability? How can these best practices be fully implemented throughout the industry?**

There are several best practices that airport operators and other stakeholders can implement in the next five years to reduce emissions, most of them focused on energy efficiency, reduction of energy consumption, use of renewable energy, and electrification of ground vehicles. Below are some practical examples derived from case studies from selected airports:

- Installing solar panels (nearby fields, parking/terminal rooftops, etc.)
- Installing LED lighting in terminals and apron
- Electrifying ground service equipment and vehicle fleet
- Installing common use charging points for airside and landside vehicles
- Implementing sustainable taxiing
- Becoming single-use plastic free facilities
- Installing waste plants on site
- Smart buildings (sensors, energy efficient materials, etc.)
- Upgrading to HVAC systems and water systems for more energy efficiencies
- Undertaking reforestation projects

Case studies

1. Airport development and growth plan<sup>4</sup>

Airport development and growth plans should include sustainability goals since design conception. Atlanta airport has a long history of incorporating sustainability within its development and growth plans. In recent years there has been a particular focus on the development of Planning and Development (P&D) Sustainability Standards, a comprehensive set of standards for the planning, design, and construction of airport buildings and other civil infrastructure. These standards support the overall vision and goals of the airport as outlined in the ATL Sustainability Management Plan and are a key driver for sustainability within the airport’s 20-year masterplan, ATLNEXT. The tools and resources used in the project were:

- Autocase: A project life-cycle analysis tool focused on the “Triple Bottom Line” of financial, environmental, and social impacts generated throughout the useful life of an asset.
- Mindful Materials: A materials database that helps project design teams identify sustainably produced materials.
- Re-TRAC Connect: A tracking platform for construction waste, used to aggregate data and track where project waste is sent.

Benefits delivered:

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<sup>4</sup> ACI World Sustainability Strategy for Airports Worldwide





- LEED certification
- Energy consumption: Against the airport's minimum target of a 20% reduction in energy consumption, an average reduction of 44% has been achieved.
- Water consumption: Against the airport's minimum target of a 40% reduction in water consumption, an average reduction of 40.6% has been achieved.
- Waste management: Against the airport's minimum target of 90% of construction and demolition waste not being sent to landfill, an average of 87.3% has been achieved.

## 2. Net Zero<sup>5</sup>

Vancouver Airport (YVR) has taken an integrative approach to ensure that all pillars of sustainability are part of its overall business model and embedded in everyday decisions. YVR strives to balance its contribution in providing optimal access for the community to connect to the wider world, against the negative effects of aviation on the quality of life of local residents as well as the negative climate impact of air travel. As the airport recovers from the effects of COVID-19, its strategic position to integrate sustainability and focus on strengthening resiliency will provide greater certainty to its commitment to deliver economic, social, and environmental prosperity to the region.

The value creation from setting a Net Zero by 2030 goal spans across multiple arrays of return. With aviation being among the hardest sectors to decarbonize, action towards climate change within the airport community is even more critical. As long-standing leaders in sustainability, YVR places its contribution to climate action at the core of its strategic plan. Benefits from setting a decarbonization goal includes:

- Long-term cost savings from energy efficiency measures
- Demonstration of leadership within the sector to decarbonize, providing support for global, national, and sectoral alignment with global decarbonization goals, such as ACI World's global Net Zero by 2050 airport sector target and commitments made under the Paris Agreement
- Creation of business opportunities, partnerships and collaborations towards building the airport of the future
- Demonstration of YVR's accountability toward responsible risk management and resiliency to secure funding, incentives, and investments from both government and the private sector
- Strengthening YVR and the sector's social goodwill. With growing concerns over the devastating effects of COVID-19, climate change has taken the forefront as the next leading global risk. Passengers are becoming increasingly more concerned with the environmental effect caused by the aviation industry. Taking action now is required and is an expectation of the community

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<sup>5</sup> ACI World Sustainability Strategy for Airports Worldwide

### 3. Circular Economy<sup>6</sup>

As the main airport of the Netherlands and a major European hub, Royal Schiphol Group (RSG) has set its sights on becoming the world's most sustainable airport operator. A key focus of this approach is the implementation of circular economy principles—moving away from traditional procurement practices which minimize upfront capital expenditure (CAPEX) costs, use large amounts of natural resources, and fail to account for decommissioning, reuse, and recycling of assets. By applying circular economy principles across the entire business, RSG has realized both environmental and economic benefits while minimizing the use of scarce resources.

#### Light and Displays as a Service

- In collaboration with Philips, RSG has implemented a “light-as-a-service” concept within one of its lounges. Within this model, Philips retains ownership of the lamps and fittings, while Schiphol pays for the light produced.
- Philips adapted light fittings, making it possible to replace separate components easily and extending the overall lifespan. Energy-efficient lamps were installed, with Philips responsible for collecting and recycling lamps and fittings when they reach the end of their life.

#### Dismantling of Cargo Building 18

- RSG was faced with the need to remove a cargo building from its current location in order to allow changes to the airport's taxiway system. As the 2,000-ton steel structure was relatively new, traditional demolition was not deemed to be a responsible solution.
- The airport produced a materials passport which detailed the quantities and status of all the materials which made up the building, and this was used in a demolition tender to provide bidders with sufficient information to assess the potential for reuse. Ultimately the entire building was sold to a company based close to the airport, and it has now been dismantled and moved to its new location where it is being rebuilt.

### 4. Improving Passenger Processing<sup>7</sup>

Copenhagen Airport (CPH) has adopted technology to maximize the capacity of its airport infrastructure without having to incur the cost and environmental impact of constructing additional physical capacity. By ensuring passengers are kept up to date with the latest information, and by directing them intelligently to make optimal use of the available processing facilities, CPH is increasing its capacity in a sustainable manner, while also improving the airport's resilience and ability to respond to rapidly changing situations.

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<sup>6</sup> ACI World Sustainability Strategy for Airports Worldwide

<sup>7</sup> ACI World Sustainability Strategy for Airports Worldwide

The use of advanced IT systems such as Xovis and the CPH Airport App have enabled CPH to optimize its existing infrastructure by responding in real-time to passenger demand at each stage of airport processing. This has allowed the airport to increase its capacity and improve customer experience at a fraction of the cost of investing in new terminal buildings.

#### Security control at CPH

- Xovis uses sensor technology to monitor the number of people in these processing functions and to measure the rate at which passengers are being processed. It does this by tracking passengers throughout their processing once they are within the field of measurement. While the system can distinguish between individual passengers, even when standing at close proximity in large crowds, all tracking is done anonymously for data protection and confidentiality purposes.
- Information on the location and density of passengers obtained from the Xovis system is then fed into a dynamic queue management system provided by QMETRIX. This system analyzes the data and directs passengers to specific check-in or security processing queues to ensure optimal distribution of passengers and minimize the average processing time per passenger.
- Historical data from the Xovis system can be used to analyze trends in passenger numbers and behaviour, and to inform future airport planning decisions in a cycle of continuous improvement.

#### CPH's Smartphone App

- In addition to the Xovis system, CPH has implemented another information technology-based initiative to help optimize the flow of passengers in and around the airport, the CPH Airport app.

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POSITION PAPER

R22-PP/06  
22/04/22

## **Sustainability of the aviation industry**

(Presented by A4A)

2022\_RECOMMENDATIONS  
SUSTAINABILITY OF THE AVIATION INDUSTRY



POSITION PAPER

R22-PP/06  
22/04/22

## Introduction

The aviation industry is a critical engine of prosperity for national and international communities and airlines recognize that continued progress depends on protecting the environment and strengthening the sustainability of our economies. We acknowledge and embrace our responsibility to address environmental impacts associated with aviation, including reducing aircraft noise as well as greenhouse gas (GHG) and other emissions. Much continues to be done by airlines, aircraft, engine manufacturers and other industry stakeholders to transition aviation into an ever more sustainable industry. The efforts airlines are undertaking are designed to limit fuel consumption and continually improve environmental performance, responsibly and effectively, while allowing commercial aviation to continue serving as a key contributor to global, regional, national and local economies.

For several decades, the aviation industry has been keenly focused on reducing environmental impacts by driving and deploying technology, operations, infrastructure and sustainable aviation fuel (SAF). Airlines have dramatically improved their fuel efficiency and reduced their CO<sub>2</sub> and other emissions by investing billions in fuel-saving aircraft and engines, innovative technologies such as winglets and cutting-edge route-optimization software. At the same time, airlines have dramatically reduced aircraft noise. Government data shows that from 1975 to 2019 the number of people in the U.S. exposed to significant levels of aircraft noise decreased by 94 percent even as the number of passenger volumes quintupled and cargo traffic septupled.

Since 2009, Airlines for America (A4A) and our members have been active participants in a global aviation coalition committed to 1.5 percent annual average fuel efficiency improvements through 2020, with goals to achieve carbon-neutral growth beginning in 2020 and a 50 percent net reduction in CO<sub>2</sub> emissions by 2050, relative to 2005 levels. In March 2021, A4A and our carriers announced a significant strengthening of our goals, pledging to work in close partnership with all aviation stakeholders and government leaders to achieve net-zero carbon emissions by 2050. And on October 4, 2021 the International Air Transport Association (IATA) and its member airlines announced their commitment to achieve net-zero carbon emissions by 2050. With every credible analysis showing that achieving net-zero emissions will require transitioning to SAF, A4A carriers also pledged to work with the government and other stakeholders toward a rapid expansion of the production and deployment of commercially viable SAF to make 2 billion gallons available to U.S. aircraft operators by 2030. On September 9, 2021, as a complement to the federal government's announcement of a SAF "Grand Challenge," A4A and its members increased the A4A SAF "challenge goal" by an additional 50 percent, calling for 3 billion gallons of cost-competitive SAF to be available to U.S. aircraft operators by 2030.

These commitments continue a long history of working constructively and proactively to improve sustainability and address climate change. A4A, a founding member of the Commercial Aviation Alternative Fuels Initiative (CAAIFI) established in 2006, helped launch the nascent SAF industry together with our member carriers. We have also strongly supported international efforts on sustainability, including ambitious international agreements and increasingly stringent aircraft and aircraft engine standards addressing noise and emissions under the auspices of the International Civil Aviation Organization (ICAO). These include the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), a market-based measure designed to "fill the gap" should we not be able to achieve carbon-neutral growth in international aviation through industry and government investments in other measures, the ICAO Aircraft Carbon Dioxide (CO<sub>2</sub>) Emissions





Standard and ICAO's aircraft engine standards to control oxides of nitrogen and particulate matter emissions.

There is no single solution to unlock the full potential of sustainable aviation. It is clear, however, that the aviation industry must continue its efforts to work proactively over the next five years to ensure we remain on a path to achieving a sustainable long-term future. This requires an industry-wide effort in strong partnership with governments to adopt changes across a number of areas, each delivering benefits that together bring us to the shared goal of sustainable aviation globally.

### **Discussion**

Below is a summary of existing industry best practices, followed by an analysis of current regulatory obstacles and potential solutions to ensure improved sustainability practices over the next five years.

### **Existing Industry Best Practices**

A4A and our members have long been active participants in a global aviation coalition that committed to addressing climate change and pledged to work in partnership with all aviation stakeholders and government leaders to achieve net-zero carbon emissions by 2050 and make 3 billion gallons of cost-competitive SAF available to U.S. aircraft operators by 2030. Notably, these goals represent collective minimums and several A4A member carriers have individually announced even more ambitious climate and SAF goals. Moreover, these ambitious goals were adopted in the midst of the most severe economic crisis the commercial aviation sector has ever faced, demonstrating the strength of the airline industry's commitment to the environment and depth of our recognition that environmentally responsible growth is essential to the vitality of our sector.

We will continue to support efforts to establish technologically feasible, environmentally effective and economically reasonable aircraft and aircraft engine standards. As technology evolves, we will also embrace the increased stringency of such standards, including the ICAO effort to develop an "integrated" noise and CO2 emissions standard for aircraft.

A4A will also stand behind additional development of evolutionary and revolutionary airframe and engine technology advances. Improved engines and aircraft have been critical to the great strides airlines have made in addressing environmental impacts and we have devoted hundreds of billions of dollars to acquire and deploy these technologies. To ensure access to ever-improving technology, we will continue to work in close partnership with airframe and engine manufacturers and governments to aid ongoing research and development programs that are critical to advancing such technology.

Similarly, optimizing air traffic management systems globally is not only critical to ensuring aviation safety but also to increasing efficiencies and further reducing emissions and noise. This will be especially important as the industry recovers from the COVID-19 crisis and returns to growth. Airlines will continue to work in partnership with other aviation stakeholders and governments to support improvements to the air traffic management system.

We also strongly support the work ICAO is doing to position the ICAO Assembly in 2022 to adopt a Long-Term Aspirational Goal for international aviation climate action and, as demonstrated by our

own members' commitments, urge that such a goal reflect governments' agreement to work with industry on positive measures to support achieving net-zero carbon emissions by 2050.

Finally, as a member of the Air Transport Action Group (ATAG) A4A strongly supported the ATAG as well as the IATA commitments announced last year for the global air transport industry to achieve net-zero carbon emissions by 2050. As part of those announcements, both ATAG and IATA called for ICAO Member States to support the adoption of a Long-Term Aspirational Goal that is reflective of the aviation industry's commitments.

### **Regulatory Impediments to Increasing Sustainability**

Governments must implement supportive policies and programs that enable innovation, scale-up, cost competitiveness and deployment in the key areas – technology, operations, infrastructure,

and SAF -- while avoiding the implementation of policies that would limit the aviation industry's ability to invest in emissions-reducing measures. Thus, government actions hold many of the keys to unlocking innovation and increased sustainability and efficiency within the industry.

The successful scale-up of the SAF industry is perhaps the most important development that needs to occur. Simply put, the commercial aviation sector needs the SAF industry to scale up rapidly so that it can become a reliable provider of exponentially larger quantities of reasonably priced fuel to airlines. Successfully scaling up production of SAF in the quantities necessary to meet the aviation sector's climate goals will require government to take bold, ambitious steps and provide steadfast support.

This should include (but not be limited to) sustained implementation of positive incentives like a SAF-specific blender's tax credit, grants and loan guarantees to ensure that existing and prospective SAF producers can confidently devote the capital necessary to rapidly increase production from current levels, as well as enhanced support for SAF research and development.

In the European Union, there are concerns surrounding the "Fit for 55" package of measures aimed at driving sustainable transport, including aviation. The proposed SAF blending mandate in the RefuelEU Aviation proposal is--in our view--premature and not commercially viable when measured against available SAF production. There is strong demand for reasonably priced SAF, yet only prohibitively priced SAF is currently available on the market. Ultimately, while we believe it is premature to impose a mandate, if one is to be imposed we maintain it needs to be accompanied by positive measures that will enable the SAF industry to meet both volumetric and price requirements, including positive incentives to support the expansion of commercially viable SAF production at scale and encourage robust competition, particularly on prices. The RefuelEU Aviation proposal may also interfere with airlines' freely negotiated fuel purchasing arrangements and, more importantly, effectively grants SAF producers monopolistic pricing power. The blending mandate that has been proposed will create undue costs for the airline industry and hamper the adoption of SAF.

The mandate comes at a time when the aviation industry is working hard to recover from the impacts of a global pandemic and resuming the air transportation services critical to enable a full economic recovery. Considering this, avoiding the implementation of policies that would limit the aviation industry's ability to invest in emissions-reducing measures is essential in the progression of effective sustainability within the industry.



The COVID-19 pandemic hit aerospace manufacturers particularly hard, constraining available resources and the risk appetite for research and development investment. The availability of government resources and positive government support will determine whether the aviation industry can achieve the airframe and engine technology improvements needed to reach our aggressive climate goals.

### **Recommendations for Improving Aviation Sustainability Over the Next Five Years**

Achieving sustainability ultimately rests upon the cooperation of several actors both within and outside the field of aviation. Governments, for instance, play a pivotal role in supporting this transition: it is paramount that they implement supportive policies and programs that enable innovation, scale-up, cost-competitiveness and deployment in aviation while avoiding policies that would limit the aviation industry's ability to invest in emissions-reducing measures. Within this framework, government support is needed for cooperative programs, deployment of electric Ground Support Equipment (GSE), ensuring cross-sector synergistic innovation and optimizing air traffic management systems.

Again, rapid scale-up of cost-competitive SAF production is critical. Achieving net-zero carbon emissions by 2050 will require that all or virtually all of aviation's energy needs are fulfilled with SAF. This requires getting on a trajectory of exponential growth in SAF production now, and that, in turn, requires that governments support the nascent SAF industry with positive, bold actions of the type described above. Historically, airframe and engine technology advancements by industry have been the primary contributor to improved environmental performance in aviation and further advancements will be required, however government resources are crucial to support foundational research and mitigate risk to spur manufacturer investment in cleaner technologies. Examples of necessary policy support include, for instance, support for the U.S. Federal Aviation Administration's (FAA) Environmental Research and Development Programs; a new grant program administered by DOT/FAA for projects that develop, demonstrate, or apply low-emission aviation technologies; and, lastly, establishing a new NASA initiative, additional to existing programs, to build upon and accelerate previous or ongoing work to develop and demonstrate new technologies in aircraft propulsion concepts.

Electrification is also a proven means of lowering emissions for many types of airport GSE. The deployment of electric GSE requires access to reliable electric infrastructure and in some cases other infrastructure improvements. Thus, government funding to support the acquisition of eGSE and enabling the installation of the necessary airport infrastructure would help accelerate deployment. Funding to support commercialization of eGSE and other low/zero-carbon GSE in more demanding applications would also support sustainability. Complementary to this, support for necessary airport infrastructure is essential. This could be done through the provision of funding to airlines to acquire low-carbon GSE and install infrastructure that displaces traditional GSE.

While the focus must remain on the aviation sector, synergistic innovations in other sectors to support deployment of cleaner energy and carbon removals that can be leveraged by airlines are also critical. These include emerging technologies and proven nature-based solutions that remove and sequester carbon. For instance, emissions avoidance and sequestration opportunities must be maintained in the short to medium term, with aviation's use of them tied to ensuring environmental integrity through, for example, rigorous emissions unit criteria, such as those established under CORSIA. Indeed, due to the emissions levels required to meet aggressive carbon emissions

reduction goals, sources of removals associated with aviation activity and offsets from other sectors will need to evolve dramatically.

Finally, the network of airspace routes is vital for moving people and goods around the world safely and securely. For this reason, airspace modernization and efficiency is pivotal to the green transition. Airspace modernization will enable airspace capacity increases, which can serve a number of purposes: help reduce traffic delays in periods of high demand, provide scope for integration of new airspace users, and/or provide the opportunity for mitigating noise impacts on the ground. Lastly, airspace modernization will also have a positive environmental performance inasmuch as it will aid in lowering carbon emissions and noise levels.

### **Conclusion**

The aviation industry has already established practices aimed at reducing the environmental impacts of aviation and achieving net-zero emissions, but further measures are necessary to ensure sustainability in the long-term.

Airlines have worked diligently across this portfolio, as active participants in global aviation coalitions committed to addressing climate change as well as establishing concrete goals to achieving net-zero carbon emissions and working to make substantial quantities of cost-effective SAF available. While working to achieve these goals, A4A will continue to support the development of airframe technology advances, improvements to the air traffic management system, and ICAO's work to adopt a Long-Term Aspirational Goal for international climate action. However, these actions cannot meet our global needs in isolation. While existing regulatory impediments, tied to the global need for greater governmental support and resources for infrastructure and innovation, such as an inefficient airspace, the scale-up of SAF, the need for a SAF-specific blender's tax credit and the lack of positive incentives for the aviation industry remain, there will, ultimately be insufficient emissions reductions.

For this reason, modernization of airspace and cooperation among both industry and governmental actors is imperative to achieve the ambitious climate goal that we have committed to. This must be interlinked with synergistic innovation across all sectors.

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POSITION PAPER

R22-PP/07  
02/05/22

**Sustainability of the aviation industry: “Air Cargo Operational Freedom, the need for a unique economic regime for all-cargo services”**

(Presented by TIACA)



A quick google search of the word sustainability brings up over 1.3 billion entries and is playing an increasingly larger and more important role in our work, social and private lives. This is particularly true of global industries which have varying impacts on many different countries. The Air Cargo industry is probably one of the most global industries and therefore comes under increased scrutiny for how we conduct ourselves as individual businesses and collectively as a community.

Sustainability has also come into even more focus as a result of the pandemic and the air cargo industry has challenged itself to transform to ensure it is taking every sustainable consideration into account.

For many, the term sustainability is often limited to the environmental aspects, which are critically important for protecting the planet however TIACA believes that true sustainability can only be achieved when you look holistically at how we individually and collectively impact People, Planet and enhance global Prosperity, the three Ps.

This paper shall tackle one aspect of operational activity which is currently limited by restrictive and outdated economic regulatory regimes and calls upon national and international regulatory bodies to effect the change necessary to facilitate enhanced operational efficiency which also results in enhanced support of global supply chains and the subsequent economic benefits. Furthermore, enhanced asset utilization and efficiency leads to better service offering and reduced environmental impact.

Specifically, the introduction of a multilateral approach to all-cargo service liberalization and reduction of barriers to open market access would facilitate greater access to global capacity, enhance operational efficiency, increase asset utilization and reduction of subsequent environmental impact.

The pandemic has exposed the inefficiencies that still exist in air cargo networks, which are caused by outdated policies. It has also supported the long-held argument that the passenger and cargo industries are completely different business models. As such, they require unique and specifically tailored regulatory frameworks.

The air cargo industry has a unique role to play in ensuring the global community has adequate support and opportunity to improve national economies and the lives of its citizens.

We live in a global community and the air cargo industry is a leading driver of a successful global economy, connecting people and things. This is equally true for developed and developing nations.

The Covid pandemic demonstrated the role that air cargo plays in supporting society by safely and securely transporting medical supplies, perishable goods, high tech equipment, consumer needs and almost everything else that can fit inside an aircraft. We also saw the great innovative spirit of air cargo by reconfiguring grounded passenger aircraft into makeshift freighters to address the overwhelming global demand for capacity.

Cargo services were vital during the pandemic, looking back to early 2020, as Governments around the world scrambled to close their international borders in response to the first wave of the COVID-19 spread across the planet, they soon realised that air cargo operations would be vital to fight it. Air cargo was the only way to bring much-needed emergency supplies to hospitals around the globe, but also to keep business of all sizes in operation, and support exponential e-commerce growth.

Quarantines and other health measures designed to limit infection spread through passenger traffic caused severe disruptions in cargo flows, to everyone's detriment. It should be noted that pre-Covid cargo volumes were transported approximately 50% on dedicated air cargo freighters and the remainder in the bellies of passenger aircraft, providing much needed global network connectivity.

Passenger services were grounded and the belly-hold capacity that would otherwise have been supplied by passenger airlines evaporated. Cargo traffic continued to move only thanks mostly to all-cargo airlines and express carriers that continued to operate as well as some passenger aircraft operated in cargo only configurations. At the height of the shutdown of the global passenger industry, approximately 2,500 passenger aircraft were deployed for cargo only operations.

In a State Letter addressed to contracting States, the then Secretary General of ICAO, Dr Fang Liu, recognised that 'There is an urgent need to ensure sustainability of the global air cargo supply chain and in maintaining the availability of medication, and equipment such as ventilators, masks and other health and hygiene-related goods, which are necessary to assist in reducing the public health risk of the spread of COVID-19.'

The consequences of the pandemic require flexible supply chains. The pandemic and subsequent economic crisis will cause many industries to consider changes to their supply chains in order to make them more resilient. This could include relocating and diversifying production centers, modifying distribution channels, and reevaluating the value-proposition of safe, fast, and efficient air cargo to their businesses. In response to their customers' needs, cargo operators and the broader air cargo industry will need to adapt.

The pandemic has also moved e-commerce into the mainstream. Millions of people around the world shopped on-line for the first time because they did not have access to traditional retail outlets. Even as shops open again, many will keep resorting to on-line purchases. E-commerce is just another form of trade and is projected to reach USD 5 trillion in value in 2021 according to a report published by e-marketer.com, Global e-commerce forecast 2021.

Recent data, April 2022, released by Airports Council International (ACI) illustrates the starkly different impact on passenger and cargo volumes arising from the Covid pandemic. The following charts reflect the growth or rather contraction in the case of the passenger side of the industry for the full year 2021.

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**SUSTAINABILITY OF THE AVIATION INDUSTRY**



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**INTERNATIONAL PASSENGERS\***

2021	2020	2019	Airport	2021	% change vs 2020	% change vs 2019
1	1	1	DUBAI, AE (DXB)	29 110 609	12.7	-66.3
2	6	14	ISTANBUL, TR (IST)	26 466 169	66.0	-33.1
3	2	3	AMSTERDAM, NL (AMS)	25 488 783	22.1	-64.4
4	5	8	FRANKFURT, DE (FRA)	22 697 490	34.8	-64.0
5	4	6	PARIS, FR (CDG)	22 616 995	18.7	-67.6
6	7	15	DOHA, QA (DOH)	17 701 978	41.4	-54.4
7	3	2	LONDON, GB (LHR)	17 624 931	-14.7	-76.8
8	31	26	ANTALYA, TR (AYT)	17 148 111	160.4	-40.3
9	10	11	MADRID, ES (MAD)	15 337 775	38.8	-65.9
10	28	61	CANCÚN, MX (CUN)	13 261 951	94.5	-19.7

\* International passengers enplaned and deplaned

The Top 10 airports measured in terms of international passengers enplaned and deplaned shows all airports contracted with levels of contraction varying between -19% and -76%.

Conversely, the Top 10 airports measured in international freight loaded and unloaded reflects 9 showing growth from between 6% and 29%. See chart below;

**INTERNATIONAL FREIGHT (METRIC TONNES)\***

2021	2020	2019	Airport	2021	% change vs 2020	% change vs 2019
1	1	1	HONG KONG SAR, HK (HKG)	4 986 256	12.8	6.0
2	3	3	INCHEON, KR (ICN)	3 273 004	18.6	22.9
3	2	2	SHANGHAI, CN (PVG)	3 245 548	9.9	14.9
4	4	6	TAIPEI, TW (TPE)	2 793 584	20.2	29.0
5	7	7	TOKYO, JP (NRT)	2 591 255	32.3	27.0
6	6	5	DOHA, QA (DOH)	2 589 283	20.7	19.1
7	5	10	ANCHORAGE AK, US (ANC**)	2 438 809	9.8	25.5
8	8	4	DUBAI, AE (DXB)	2 319 185	20.0	-7.8
9	9	9	FRANKFURT, DE (FRA)	2 194 653	20.7	11.9
10	10	12	MIAMI FL, US (MIA)	2 040 547	17.9	19.6

\* International freight loaded and unloaded in metric tonnes

In a recent working paper submitted to the ICAO Air Transport Regulation Panel, ATRP/16- WP/7 14/3/22, the ICAO Secretariat recognized the following;

#### AIR CARGO OPERATIONS DURING THE COVID-19 PANDEMIC

2.1 The COVID-19 pandemic and the associated public health risk mitigation measures, including travel restrictions and border closures, resulted in unprecedented depressed travel demand and significant disruptions to businesses and supply chains in global air transport. In the second quarter of 2020, passenger demand for international air transport dropped by over 90 per cent. The concomitant drop in supply removed cargo capacity provided by belly holds at a time when air cargo operators depended on that capacity to transport approximately 50 per cent of air cargo globally. At the beginning of 2022, the demand for international passenger services is still below 70 per cent below the level of the same period in 2019.

2.2 The air cargo operations at this critical period of the pandemic have made it apparent that all-cargo services operate under different conditions and uses different business models from passenger services. Air cargo services have shown their vital role in advancing economic benefits and transporting quickly and reliably critical medical goods, when they are most needed.

The working paper further espoused;

2.3 It would be prudent to match this operational demand with specific regulatory framework that facilitates safe, secure, efficient, expeditious and sustainable air cargo growth. It was in this context that Recommendation 16 of the report of the ICAO Council Aviation Recovery Task Force (CART) encouraged Member States to consider the temporary lifting of restrictions to air cargo operations, including but not limited to, granting extra-bilateral rights, in particular for all-cargo services, to foreign airlines to facilitate the transportation of essential goods, supplies and COVID-19 vaccines.

We now need to focus on what is required within air cargo to maximize the opportunities and create the most efficient and effective industry possible for the post pandemic environment. We need to ensure the right work force but we also need to ensure we have the right regulations that balance control and facilitation. We also need the right work procedures and practices and of course we need to wholeheartedly embrace the opportunities that a fully digitalized environment presents.

In order to support the air cargo industry through what will be quite a period of transformation, TIACA has developed a Sustainability roadmap, released in November 2021 to coincide with the COP26 discussions regarding transport, aviation and supply chains.

The Roadmap looks at the 17 United Nations Sustainable Development Goals and maps how air cargo contributes to their attainment. The value of air cargo is proudly showcased and indications of where the industry needs to go from here is also covered.

Sustainability strategies and verified credentials will no doubt in future become the license to operate and as the air cargo industry has shown throughout its 110+ year history, the tougher the challenge the more it will collaborate to overcome.



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As previously stated, contrary to passenger services, all-cargo operations never stopped during the pandemic. They played a vital role in delivering essential medical equipment and, later, vaccines to fight the pandemic, while the flow of cargo transported on passenger airliners simply stopped. This has exposed the distinct nature of all-cargo operations.

In addition, cargo operations will need to adapt to a changing economic environment after the pandemic, as manufacturers adapt their supply chains to make them more resilient, for instance by diversifying production centres around the world. Flexibility in all-cargo operations will be essential to meet this new demand and make sure resources are used in the most efficient way.

According to the International Air Transport Association (IATA), see chart below, the total global value of inbound tourism by air in 2019, pre covid, was USD 850 billion, during the same time frame the value of air cargo exports was USD 6.489 trillion, nearly 8 times as valuable for national economies. The projected numbers for 2021 were USD 354 billion for tourism and USD 7.467 trillion for air cargo, more than 20 times as valuable.

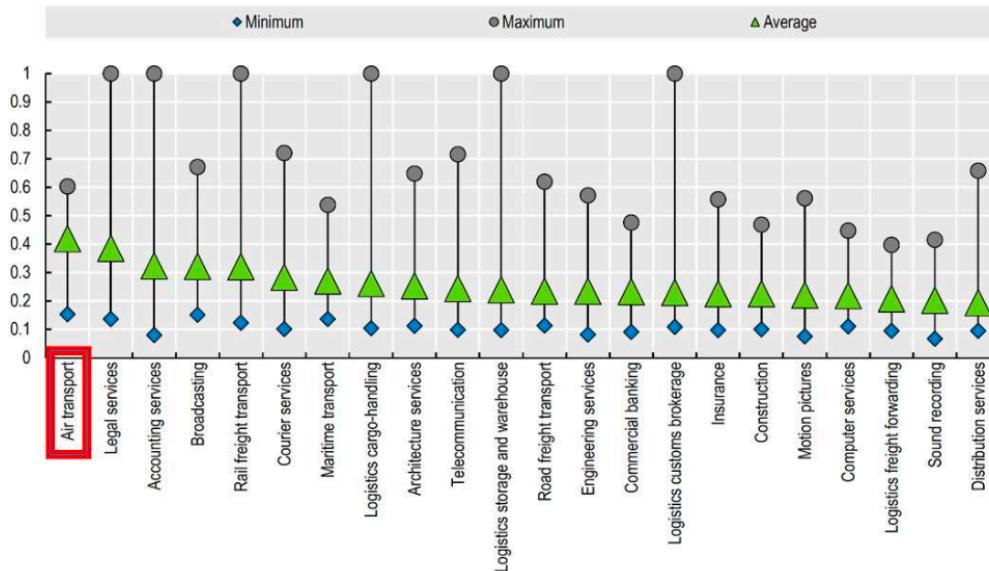
Worldwide Airline	2019	2020	2021E	2022F
<b>Industry</b>				
Unique city pairs	22104	15473	18788	
Compared to 1998	116%	51%	83%	
Transport cost, US\$/RTK (2018\$)	77.6	70.5	72.8	75.5
Compared to 1998	-56%	-60%	-58%	-57%
Value of trade carried, \$billion	6,489	5,964	7,467	8,007
% change over year	-2.6%	-8.1%	25.2%	7.2%
Value of tourism spend, \$billion	850	310	354	626
% change over year	6.5%	-63.5%	14.2%	76.8%

Note: RTK = Revenue Tonne Kilometers.. The total number of 'routes' or airport pairs is much higher due to multiple airports in some cities and connections are counted both ways..

Yet, at the same time, according to the OECD, air transport is, on average, the most restricted service there is, more so even than broadcasting or maritime transport. This results in significant inefficiencies that have ripple effects across the economies of all contracting States.



Figure 3. STRI, minimum and maximum values by sector, 2021



The International Air Cargo Association (TIACA) and the Global Express Association (GEA) submitted a Statement to the ICAO High-level Conference on COVID-19, October 2021, drawing lessons from the COVID-19 pandemic and making the case for a more liberal all-cargo regime world-wide.

The paper highlighted and underscored the need to:

- (i) draw lessons from the COVID-19 pandemic, which has highlighted the differences between passenger and all-cargo operations;
- (ii) anticipate the requirement for flexibility in international supply chains, as the world economy adapts to the consequences of the pandemic;
- (iii) bear in mind the positive trade effects of all-cargo operations for all contracting States; and
- (iv) take necessary steps to formulate an open, flexible, and distinct regulatory regime for all-cargo operations under the auspices of ICAO.

#### DIFFERENT BUSINESS MODELS

The proposal for a dedicated all-cargo services economic regime is based on the fact that all-cargo and passenger services operate with different business models, addressing different challenges and different business needs.

For all-cargo airlines and express carriers, flying cargo is their only business. Unlike most passengers, cargo – express or not – travels one way. Without the necessary traffic rights, freighter airplanes risk travelling empty half the time, or at least their capacity would be underutilised, and resources would be wasted.



Furthermore, as the pandemic amply demonstrated, cargo traffic poses different health risks than passenger traffic – and provides different benefits to people, governments and economies.

Logically, different business models call for different regulatory approaches.

This is further deemed necessary when you consider the accepted industry forecasts for when passenger volumes and subsequent global network connectivity may recover.

The IATA / Tourism Economics Air Passenger Forecast, issued in March 2022, indicates that international passenger numbers may not return to 2019 levels until 2025. By that time, air cargo volumes, which have already exceeded the 2019 levels, may be 20-25% higher, placing additional stress on capacity and network demands if the industry remains under the traditional and now outdated economic regime.

Passenger numbers, share of 2019	2021	2022	2023	2024	2025
Industry-wide	47%	83%	94%	103%	111%
International	27%	69%	82%	92%	101%
Domestic	61%	93%	103%	111%	118%

Source: IATA/Tourism Economics Air Passenger Forecast, March 2022

#### OPEN MARKETS FOR ALL-CARGO SERVICES LET BUSINESS THRIVE

Where countries have adopted a more liberal policy, all-cargo services, whether traditional or express, have thrived as a result – and they have, in turn, helped generate valuable activity, jobs and other benefits for the many businesses that they serve. Air cargo typically accounts for about 35 per cent of international trade by value, as reported by IATA, and generates significantly greater income than inbound tourism for most States as reflected earlier.

However, there remains many countries that still follow a more restrictive approach in permitting market access to all-cargo air services. The current situation, globally, presents a very mixed landscape for cargo operators.

We must make sure we create the foundations of a resilient global air-cargo network that is ready for the next crisis. Let us make sure that ICAO and other regulatory bodies step up to this challenge and make it a top priority to define an open, flexible and distinct regulatory regime for all-cargo services around the world.

Such a regime must include the whole range of traffic rights, including fifth and seventh freedoms, so as to allow all-cargo operators the ability to optimise the use of their fleets by picking up cargo where and when there is demand for the service and transporting it to where and when the client requests it, with their dedicated fleet, through the most efficient routing; and to make efficient business decisions by allowing them flexibility in the routing of their cargo, and in handling their own fleets.



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Such policies, in practice, support both all-cargo and passenger carriers and facilitate the commercial aviation sector fulfilling its global mission to be an economic force for good in support of the global economy and the United Nations 17 Sustainable Development Goals.

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## **Sustainability of the aviation industry**

(Presented by the European Commission - DG MOVE)

In the past decade, the EU has adopted a number of essential policy instruments to address the environmental footprint of aviation. These instruments, are grouped in a so-called “basket of measures”, namely market-based measures such as emissions trading, research and development for greener aircraft design and technology (CO<sub>2</sub> standards, Clean Sky), more efficient air traffic management operations (Single European Sky and SESAR), and the use of sustainable aviation fuels.

CO<sub>2</sub> emissions from aviation in the EU have been included in the EU emissions trading system (EU ETS) since 2012. Under the EU ETS, all airlines operating in Europe, European and non-European alike, are required to monitor, report and verify their emissions, and to surrender allowances against those emissions. Aircraft operators receive tradeable allowances covering on average, almost half of emissions from their flights. It is estimated that between 2013 and 2019, a net saving of more than 160 Mt CO<sub>2</sub> has been achieved through the inclusion of aviation in the EU ETS. The auctioning of allowances to the aviation sector has moreover generated revenues which have been used in part for climate- and energy-related purposes including the Innovation Fund for demonstration of innovative low-carbon technologies. The EU ETS also contains incentives to promote the use of Sustainable Aviation Fuels (SAF). For the time being, the scope is limited to intra-EEA flights, with a “stop-the-clock” provision, as regards outbound to and incoming flights from non-EEA countries, in the EU ETS Directive which is valid until the end of 2023. This provision was intended to provide momentum for a global market-based mechanism.

In 2016, the EU played a leading role in the adoption by the International Civil Aviation Organization (ICAO) of the first ever sectoral scheme regulating CO<sub>2</sub>, the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). All EU Member States will participate in the pilot-phase of the scheme, which will start in 2021, with the aim to offset growth in emissions beyond 2020 levels, without prejudice to the upcoming revision of the EU ETS Directive as regards aviation. Depending on participation and quality of offsets used, at global level, the ICAO CORSIA scheme could mitigate up to 2.5 billion tonnes of CO<sub>2</sub> and generate up to approximately USD 40 billion of climate financing by 2035. The Commission is assessing different policy options for a legislative proposal to implement further aspects of CORSIA in the EU, through amending the EU ETS Directive.

The EU has also adopted new standards for aircraft CO<sub>2</sub> emissions, which entered into force in 2019. These standards, which follow the global standards adopted by ICAO in 2017, provide additional requirements into the design process to focus on fuel efficiency. Also the adoption of new aircraft engine non-volatile Particulate Matter (nvPM) standards in ICAO was supported by the EU.

To develop the green and cutting-edge aircraft technology of the future, the EU relies on the Clean Sky Joint Undertaking. With a budget of EUR 4 billion and composed of over 600 entities from 27



countries, the Clean Sky 2 initiative (2014-2024) was designed to build on the Clean Sky 1, which aimed to develop technologies with reduced CO<sub>2</sub>, NO<sub>x</sub> and noise emissions.

The Single European Sky framework aims to make European skies more efficient, and can deliver important environmental benefits. The SESAR project, sponsored by the EU and the aeronautical industry, contributes to develop and deploy innovative ATM solutions with a potential to further reduce emissions. In 2013, the Commission proposed to complete the SES through amendments that could allow to decrease emissions up to 10%. However, with no progress on this proposal, the Commission presented an amended proposal on 22 September 2020, which is expected to facilitate discussions between the co-legislators.

Recognising the need for long-term sustainability of aviation and the commitment to continue efforts to reduce aviation sector's negative environmental impacts, the European associations collectively representing the entire European aviation called for an EU Pact for Sustainable Aviation. Through collaboration between all stakeholders in the aviation eco-system and policy-makers, the Pact is to contribute to the implementation of the European Green Deal, by reaching the objectives of significant CO<sub>2</sub> emission reductions by 2030 and net-zero CO<sub>2</sub> emissions by 2050 from all flights within and departing from the EU. The Pact will also consider the feasibility of making 2019 the peak year for CO<sub>2</sub> emissions from European aviation while enabling the sector to continue delivering its social and economic benefits.

### **Zero- and low-emission vehicles and renewable and low carbon transport fuels**

Substantial emission reduction has been achieved in the aviation sector by improving the fuel efficiency of aircraft engines and design. The sustained policy and industrial efforts to improve aviation sustainability have allowed to reduce noise from aircraft and fuel burn per passenger by respectively 14% and 24% between 2005 and 2017. However, the overall sustained growth of air traffic (+60% over the same period) has continued to outpace the environmental improvements. Substantial public and private investments and adequate policy frameworks are needed to accelerate the decarbonisation of air transport.

New aircraft models provide 20% to 25% of improved fuel efficiency compared to the previous generation. Promoting fleet modernisation by an earlier retirement from circulation of old aircraft and their replacement with a significantly more fuel-efficient aircraft can generate significant CO<sub>2</sub> per each flight in the transition until breakthrough clean aircraft are developed and commercially available for deployment. Ensuring the capacity of European industry to increase the environmental performance of aircraft would have an important impact on the greening of global air transport as European aircraft today represent 45% of the worldwide commercial fleet and European engines power 70% of single-aisle aircraft in the world.

In the longer-term, new disruptive technologies need to be developed and deployed in the market, notably to unleash the full potential of sustainable fuels and otherwise provide for new clean methods of propulsion and power generation in aircraft.

This requires considerable investment in research and innovation, such as envisaged under the Horizon Europe programme by the proposed set-up of a Clean Aviation partnership with the aviation industry and further investment in collaborative research in clean aviation technology. The partnership should follow in the footsteps of the Clean Sky Joint Undertaking, which had a participation of 1.7 billion EUR from the EU budget. The priority focus should be on the development of technologies that can generate the largest impact on overall aviation emissions, notably hybrid and full electric propulsion, ultra-efficient aircraft configurations, and the development of sustainable alternatives such as the emerging potential of hydrogen powered aircraft. Accompanying measures would be necessary to develop infrastructure and production capacity for hydrogen.

The stimulus for the development of new technologies should be seen in conjunction with the measures taken relating to innovation, production and deployment of sustainable aviation fuels (SAF). This is because in order to decrease significantly its emissions, the aviation sector will especially need to rely on the use of liquid SAF in the years to come. Indeed, whereas other transport modes have access to various sources of energy including renewable energy, aviation is still almost exclusively reliant on liquid fossil fuel, due to the physical properties of flying.

Decarbonising air transport sector, next to addressing the challenges related to aircraft emissions reductions (including air and noise pollution), would also require investments into airport infrastructure and operations to optimise air traffic management and strengthen the integration of airports into a genuinely multimodal network. It would necessitate improving airports' energy efficiency, ensuring the supply and infrastructure for sustainable aviation fuels, and hydrogen for hydrogen-powered airport operations and related services as well as renewable energy generation on-site, together with electrification and greening measures of airside activities such as groundhandling, ground traffic operations and aircraft on the ground, and other measures reducing environmental impacts.

In June 2019, as part of the aviation industry ambition, vision and roadmap, ACI EUROPE and its members (203 airports) committed to net zero carbon emissions from airport operations fully within their own control by 2050 at the latest, reducing absolute emissions to the furthest extent possible and addressing any remaining emissions through investment in carbon removal and storage. Three airports have already reached this target, while several others have announced to reach it before 2030.

So far, 162 European airports (representing 67.2% of European air passenger traffic) have volunteered to join the Airport Carbon Accreditation programme, which provides a common framework for carbon management with the primary objective to encourage and enable airports to implement best practices. 51 airports are carbon neutral suggesting good progress towards the ACI EUROPE target of 100 carbon neutral airports by 2030 and confirming the importance airports place on carbon neutrality. In November 2020, the programme added further obligations, namely

alignment with the Paris Agreement, extended carbon footprint covering all significant operational emissions from third parties, including airlines, and enhanced stakeholder engagement.

### **Fuel supply**

The deployment of vehicles, vessels and aircraft as well as infrastructure and services needs to happen everywhere in the EU, in an interoperable manner. However, there are a number of issues that prevent the uptake of sustainable transport fuels: limitation of appropriate supply, lack of a suitable refuelling/recharging network and low or fragmented demand for the sustainable fuels and vehicles/vessels, influenced also by pricing and tax regimes.

The lack of appropriate supply is particularly relevant for certain fuels, namely sustainable biofuels, e-fuels, clean hydrogen, and biogas. Apart from electricity from renewable sources there is still considerable lack of availability of renewable energy sources for transport: the EU share of renewable energy in transport reached 8.3% in 2018.

Air and waterborne transport must have priority access to sustainable liquid and gaseous fuels, since suitable alternatives do not exist for these modes, and these fuels are the furthest from mass production and use.

Sustainable aviation fuels (SAF) are fully compatible with current aircraft technology and already certified up to 50% of the fuel used in a flight. Although they have the potential to make an important contribution to tackling GHG emissions in aviation (emission savings can go up to 80% compared to conventional jet fuel), this potential is still largely untapped. Current production and use of SAF is below 0.1% of total jet fuel consumption in the EU. While the Renewable Energy Directive and the EU Emissions Trading Scheme contain some mechanisms intended to reward the use of SAF, these measures have so far limited impact to boost SAF supply and demand.

As a concrete deliverable of the European Green Deal, the Commission adopted the “ReFuelEU Aviation” initiative, to boost the sustainable aviation fuels market. Several Member States also intend to promote SAFs in their national legislations (such as Finland, France, Germany, the Netherlands, Spain and Sweden).

### **Airport charges, slot allocation and groundhandling services**

The existing framework on airport charges, airport slots allocation and groundhandling services can also play an important role in making the sector more sustainable.

Airport charges are paid by airlines to airports for the use of facilities and services, which are exclusively provided by the airport managing body and which are related to landing, take-off, lighting and parking of aircraft and processing of passengers and freight. While the Directive requires that airport charges are non-discriminatory, it permits modulations for environmental issues provided that they are relevant, objective and transparent. The 2019 evaluation of the Directive showed that only 61% of airports modulate charges on account of noise and only 20% of airports do

so on account of NO<sub>x</sub> emissions. The 2019 evaluation did not find any airports that would modulate airport charges on account of CO<sub>2</sub> emissions. The planned revision of the Airport Charges Directive could aim to ensure the setting of airport charges is strategically aligned with the Green Deal Communication and environmental ambitions of the EU.

Current rules concerning the allocation of slots do not contain measures that would align slot allocation with environmental objectives. However, the Slot Regulation states that slot-coordinators shall take into account industry rules, such as the Worldwide Slot Guidelines in the slot allocation process. In their 11th version, published June 2020 the guidelines state that slot coordinators should try to ensure that due account is taken of environmental factors in the allocation of available slots. Environmental concerns could also be considered in local rules which apply to specific airports. However, their scope is quite limited with only a local impact.

Groundhandling is an essential service provided for airport users and often represent important costs for them. It involves ground administration and supervision, handling of passengers, baggage, mail, freight, and ramps, aircraft services, fuel and oil handling, aircraft maintenance, flight operations and crew administration, surface transport and catering services. Groundhandling services generate GHG and air pollutant emissions at airports. These are caused by usage of diesel fuel for airport vehicles and ground support equipment (GSE), fossil fuel for electricity and heating, jet fuel for auxiliary power units (APUs) that power aircraft at airport gates, and other sources. Airport operators can implement several measures to reduce the environmental impact of groundhandling services, including provision of electric buses for passenger transport, pre-conditioned air fixed power units to avoid GPU/APU (which run on diesel or kerosene), centralised de-icing pads to avoid contamination of groundwater, and alternative fuels for ground support equipment. Ground support equipment could also be pooled for use by all groundhandling service providers. Under this approach, either by agreement or as mandated by the airport, groundhandling equipment at the airport is owned centrally by the airport itself or by a leasing company on behalf of the airport. Such equipment can consist of for example electric lower deck loaders, electric conveyor belt loaders, electric passenger steps, main deck loaders, electric baggage tractors, power tractors and cool container dollies. The groundhandlers are then required to use the (modern and environmentally friendly) equipment to serve the aircraft, which they are contracted to handle.

The Groundhandling Directive leaves it to the Member States to ensure the adequate level of environmental protection. Member States may make the groundhandling activity conditional upon obtaining the approval of a public authority independent of the managing body of the airport. The criteria for such approval can include environmental protection. The Directive allows the limitation of the number of groundhandling service providers in case of four categories of groundhandling services: baggage handling, ramp handling, fuel and oil handling and freight and mail handling. In case such a limitation is applied, the providers need to be selected in a public tender and the Member States may establish standard conditions or technical specifications covering also environmental aspects.



The Groundhandling Directive is currently being evaluated. This evaluation will closely examine issues related to the environmental and climate impact of groundhandling activities (particularly noise and emissions) and to climate change mitigation/adaptation policies employed by and/or incumbent (and enforced) upon groundhandling service providers and airports.

### **Regulatory oversight of air navigation services**

The Single European Sky has contributed to certain improvements in the performance and modernisation of the European ATM sector but it has not yet generated the expected paradigm change in terms of performance by ANSPs and has not sufficiently reduced fragmentation of the European ATM system. Currently, the Commission is the de-facto economic regulator of monopolistic air navigation service providers. It adopts implementing Decisions, based on the advice from the independent Performance Review Body (PRB). Those Decisions are adopted under qualified majority voting of Member States that are at the same time the owners of the regulated entities. To increase the efficiency and effectiveness of the economic regulation, the Commission proposed in its recent SES2+ amended proposal to establish a fully independent European regulator. Furthermore, economic regulatory oversight of air navigation services that are provided under monopolistic conditions is not effective. Where National Supervisory Authorities (NSAs) lack independence from entities that exert ownership rights over regulated service providers, conflicts of interest inevitably hamper service quality and price.

Defragmentation of the European airspace requires economic regulation and monitoring across borders where and as long as competitive supply of services does not prevail. Presently, economic regulation lacks the necessary independence from the entities that exert ownership rights over the regulated undertakings. Users lack trust and confidence in national economic regulatory bodies, they do not lodge complaints and the national supervisory authorities generally hesitate to take stringent decisions and do not apply penalties to enforce them. National economic regulators have no procedures to exchange dossiers, to handle cases jointly. They do not exchange information on cases, there is no joint investigation, and site inspections of service providers are not foreseen in Union legislation on economic regulation.

According to a survey at the level of the National Supervisory Authority Coordination Platform-Performance Working Group, airspace users do not lodge complaints with NSA on aspects of economic regulation. Economic regulators have to be able to impose penalties where a regulated entity does not abide by their decision or does not give access to requested information. Although Single European Sky legislation foresees the instrument of penalties, most national economic regulators have not used it. Similarly, judicial appeals against decisions of regulators or air navigation service providers have rarely occurred.

Effective regulation can ensure transparency and effective stakeholder consultation. Airlines should understand what they pay for and they should be able to curb excessive surpluses of service providers, as long as air navigation services are not provided on market conditions. Surpluses of



regulated undertakings in excess of surpluses in competitive sectors can indicate monopolistic pricing and ineffective price regulation. Conversely, where air navigation services previously provided under monopolistic service provision were shifted to be provided under market conditions, the competent authorities witnessed a significant drop of the price with the same or better service quality.

There are also challenges related to automation and traffic management in the European airspace. Digitalisation holds promise to substantially improve the situation. Progress has been achieved on the research and innovation side through the SESAR project. However, today Air Traffic Management (ATM) still relies to a large extent on an outdated technology.

Scalability of ATM - in a safe, efficient and effective way - remains one of the most important challenges for the sector. Today this is not fully achievable due to the fragmented and monopolistic nature of ATM in Europe.

A true network oriented approach to ATM in Europe is also missing. The local approach to Air Navigation Services provision is less effective and leads to congestion and capacity crisis whereas experience shows that more effective network coordination decreases delays and congestion.

The shortcomings of the current ATM system lead to a number of environmental challenges. The congestion above Europe in 2018 and 2019 led to environmentally sub-optimal flight paths in terms of CO<sub>2</sub> emissions, when pilots had to fly around congested airspace sectors. The way the ATM services are charged is also not optimal from the environmental perspective. Under the current system, airspace users optimise their routings by minimising not only the sum of fuel costs, but also the route charges. This may lead to choosing to fly longer routes because the charges are lower in a certain charging zone. The overall “benefit pool” of ATM sector is at least 11.6 Mt of excess CO<sub>2</sub> emissions that ATM can directly influence.

Challenges of automation and smooth integration into a smart transport system are also relevant for the deployment of drones – a growing business in Europe, delivering services in all environments (from mapping, infrastructure inspections, delivery of goods and e-commerce, to mention just a few), with a potential to reduce congestion, accidents and make mobility cleaner.

These ATM challenges are addressed through the Single European Sky framework and in particular through its technological pillar, the SESAR project. SESAR aims to establish the ‘digital European sky’ that will allow the optimal use of the European airspace through innovative technological and operational solutions based on a high degree of digitalisation and automation. The digital European sky addresses air and ground operations offering solutions for civil and military airspace users, airports, air navigation service providers. More efficient flight trajectories will also allow modern aircraft to fully exploit their greener and quieter technologies.

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R22-PP/09  
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## **Sustainability of the aviation industry**

(Presented by IFATSEA)

*“Through the perspective of the Human Pillar in CNS&ATM Systems and services”*

Everyone within the aviation community agrees that the impact of the COVID-19 pandemic on the aviation industry since March 2020 has been significant, with levels of activity across the industry falling severely compared to those of 2019. This has affected all parts of the industry: airlines, airports, manufacturers, ground handlers and Air Traffic Management (ATM). Not only the aviation community was affected, but also citizen’s connectivity and freedom of movement was also severely curtailed, with significant impacts on other sectors that rely on air transport.

- The shared goals are Safety efficiency and regularity of the Aviation services delivery, including passenger comfort and security.
- There is no other than ICAO and the states to continue to assume the leading role with consultation with the aviation industry and users that should address decision-making. There is no lack of decision making frameworks at the time. Trusting a leading role to the industry that is driven by economic for profit motivations, is not sustainable as it was shown by the COVID-Crisis.
- With regard to cooperative arrangements that could be put in place to guide individual state actions and the aviation industry, it is clear that the contrasting objectives of public health and business interests are of contrasting nature but Public health must be prioritized for obvious reasons. After all Airlines were subsidized by their governments in this crisis time.

Although Air Navigation Service Providers had been deprived of almost all their revenue, they managed to maintain available and fully operational the critical infrastructure of CNS (communication Navigation Surveillance) facilities ensuring their high performance figures rendering feasible and safe the movements even of the reduced number of aircraft.

***IFATSEA firmly believes that in order to have a healthy, safe, resilient, and sustainable ANS industry, the existing Performance baseline of the Air Navigation Services, in all aspects, must be ensured and maintained at all times, including times of Crisis.***

Article 28 of the Chicago convention, states that the provision of ANS is the responsibility of the State. Based on that, one can assume that the State will share some of the burden of the cost (and potentially for the creation of the relief funds) and this is exactly what was done.

Starting from the financing of ANSPs, IFATSEA in its communication in May 2020 to all aviation organizations, ***proposed the creation of a Relief Fund within each ANSP budget***, that

being subsidized by a percentage of its revenue during the normal periods, and aiming at financing it in cases of experiencing of extraordinary situations. This would effectively mean that this amount would be used during crisis times and only for this, in order to sustain operations.

Since many years, in EUROPE, there is a cost recovery mechanism of what is anticipated to be spent at the next Reference Period. Currently this is not covered by regulation or the next RP and that is now, 3 years later, is being discussed more and more.

At European level, the trend to proceed with the ultra-fragmentation of ANSPs and establishing competition and thus cost reduction through the SESI++ regulation, has been proved as a non-successful model, especially after the Covid-19 crisis experience.

Moreover, the change in the architecture of the CNS/ATM systems and services from an integrated one to a distributed one (e.g. over SWIM) and geographically separated functional elements turns the existing integrated ANSPs to a fragmented ecosystem that may prove too complex to handle and sustain during economic or technical crises.

Also, the short vision selected by some ANSPs in Europe towards their ANS staff, with huge reductions of salaries, layoffs of experienced professionals, the halting of recruitment and training, resulting in some cases to a reduction of operational staff by up to more than 15%, will certainly have negative impact on performance of ATM/ANS system as a whole in the incoming years. The same goes for the halting of modernization projects necessary for the anticipated air traffic by 2030.

Indeed, there are studies proving that the privatization model promoted in the SESII package, showed unexpected weaknesses during the pandemic. Indeed, ANSPs, borrowing time after time and having to pay back interest, which is not eligible for reimbursement, is not the way to go forward. Revisiting the concept of Privatization may contribute to the Sustainability of the ANS system.

EUROCONTROL in the link referenced Ref. (1) below, states the following:

*“What to do about air navigation service providers (ANSPs), usually paid for their services by those who use them, who are required to keep up a service capability even when there is virtually no traffic? Who pays the bills to keep such services in place and prevent even greater long-term damage to the industry?”*

Also, it goes on stating: *“Nonetheless, this crisis has highlighted important limitations in the current operational, financial and regulatory arrangements for ATM in coping with and adapting to the shock and unexpected events”*.

The impact can provide a catalyst for change recognizing the ATM industry may be subject to further disruptions and needs to be able to adapt to uncertainty and the challenges of delivering a more sustainable economic aviation ecosystem.

These are interesting and demanding questions. IFATSEA together with the SESAR Deployment Manager in their domain of expertise have produced a working paper named *“Objectives of a*

*robust and resilient CNS infrastructure*”, which was elaborated in early 2022 in support of the activities under the scope of the CNS Advisory Group in Europe.

This working paper follows a rationale leading to the objectives of a Robust and Resilient CNS infrastructure, essential from IFATSEA’s point of view to increase robustness of the ATM network. And as it was said above it reiterates “the *baseline of the Air Navigation Services must be ensured at all times and not be taken for granted.*”

### **Regulatory developments:**

Efficient regulation is characterized by not burdening the optimum operation of the regulated entities while at the same time ensures that the constituents parts of the ANS provision, including those foreseen in AAS (Air space Architecture Study by SESAR) will be within technical and operational, interoperability and performance envelopes. This of course includes adherence and compliance to their functional and non-functional specifications, whenever these will be available, because currently they are not.

It is useful to see how the regulatory context in ICAO and Europe, has been changed during the past few years which will probably unveil additional and unforeseeable weaknesses:

- ICAO Annex 19 (dealing with the Safety Management has removed direct reference to the CNS/ATM systems and Providers and does not clearly mandate the need for them to implement an SMS. Can they proceed without implementing one for example to minimize cost? Is this acceptable? Will/is this case audited by USOAP
- Additionally, and still within the ICAO documentation framework, namely in ICAO Annex 10, very little if any, exists for performance standards for Radar and ATM fusion and Flight Plan Data processing which has impact on standardization towards the global alignment, harmonization and interoperability of air navigation systems.
- In Europe, the new Common requirements EU 2017/373, again does not mandate that CNS/ATM providers implement a Safety Management System anymore but to only supply a report of the so called, Safety Support assessment. On the contrary, the previous regulatory framework required compliance of CNS providers with the SMS of its ATSP. The obvious conclusion leads to expectation that future ADSP units, a conceptual notion and building element of the Airspace Architecture Study (AAS), which are essentially Radar and Flight Data processing systems, together with Safety Nets software (which in the future will highly depend on Artificial intelligence algorithms and automation) will be kept outside the Safety envelope in contradiction to the findings of the EC ADSP Study. Can we afford this safety wise? All this when we rely more and more on Automation applications which are running in the said CNS&ATM systems.
- The regulatory environment, including **Standardization** and harmonization are crucial activities and enable the promotion of requirements and Safety standards that



in turn promote Sustainability and Resilience. The question on how to regulate complex concepts like Software Safety Assurance of the safety critical Software (following the repealing of EU 482/2008) implementations is a demanding one, and thus cannot be left unanswered. However, it remains unanswered.

So the lack of standards for all the CNS/ATM systems and their interoperability requirements supporting all future concepts, in a distributed, geographically separated environment of the service provision and the data layers, if successfully addressed, **will undoubtedly constitute a significant enabler, together with the Human pillar, for sustainability**, avoiding impacts on airport capacity and delays derived from ATM inefficiencies.

In this case, ATSEP, behind the scenes will have to tactically deal with the new technologies concepts and particularities resulting from different distributed architectures due to the potential geographical separation of the ATM/ANS Service delivery context. New tasks like ensuring the service delivery to clients will have to be elaborated within the data chain e.g.

#### **Sensors (Data Production) - Data processing -> Data presentation**

The data flows, integrated, correlated and synchronized with Communication interactions between different providers but **under the same Contingency measures** will be a task of huge complexity and safety criticality. All this while maintaining and operating the current legacy and state of the art CNS&ATM Systems.

#### **The Human pillar as an enabler to Sustainability**

**The Human pillar-lack of ATSEP Regulation:** While training and competence requirements are listed in EU regulation 373 and ATSEP are **authorized maintain**, to put into and remove from operation CNS/ATM systems, a more unified and harmonized approach starting from the European ANSPs must be elaborated e.g. Licensing system tailored for ATSEP as it is mentioned in the ADSP study by EC ( Legal, economic, and regulatory aspects of ATM data services provision & capacity on demand as part of the future European Airspace architecture Ref.( 2 ) ) and ensuring a pan European common level and rigor of ATSEP training and competence, like the ATCOs' one.

**Standard Training Devices (STDs) and Simulators for ATSEP and ATCO:** It appears imperative that the training for these ATSEP towards distributed systems architectures will have to be done with modern training tools already existing for other industries. For example, the new SESAR based **distributed System of Systems** will have to be translated in Digital Twins and simulated train take place for ATSEP in this new environment for Qualification Training before assuming real time technical responsibilities of the CNS&ATM system they will serve. Contingencies will have to be simulated for both ATSEP ATCO and other professions before assuming duties. This training must also include Cybersecurity training for tactically and strategically be prepared for cybersecurity crises also. It goes without saying that ATSEP in the different countries cannot be of different Training and Competency qualitative and quantitative

levels. It is now more than ever that ATSEP professionals be subject to specifically tailored Licensing Scheme according to ICAO.

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- The ATSEP Licensing scheme will be within the **authorization context of the regulation** and **ensure uniform levels of ATSEP, identified as a safety critical profession by an EU study (Ref: (4), competence across Europe**. This will also constitute an **improvement towards efficiency, resilience, and sustainability**. In fact, ANS is the only safety critical industry where its technical professionals are not under a Licensing scheme.

*IFATSEA firmly believes that ensuring resilience and robustness of the ATM infrastructure should be a top priority.* Only ensuring that the nominal service base of CNS/ATM systems and services availability and continuity, is properly protected will allow, as today, react quickly and effectively based on trusted technical situational awareness to avoid service disruption and allowing all ATM network nodes to operate at full capacity and with minimum delay.

Everybody talks about Digitalization and Automation, including applications that are running on Artificial Intelligence algorithms that will be **incorporated in a hybrid environment** of geographically separated CNS/ATM data chain instances, deployed at Sensor geographically fixed sites or even space based. Installed also in processing elements called ADSPs functions or entities, that are integrated today within each ANSP but geographically and culturally, as concerns the Human, separated in the future.

All these issues are still essentially absent from the research agendas of any technical shared awareness on the **ATSEP Working Positions**, with no foreseen, for the time being, specific related R&D integration.

We are designing a system without clearly defined coordination of monitoring and Control concept, on which the new concept of operations can be properly sustained and contained at service degradation times.

*In the document Ref. (3) **ATM Automation: Guidance on human technology integration CAP 1377** it is stated for the ATSEP WP for Systems Monitoring and Control (geographically distributed)*

*“The (ATSEP WP for) SMC system should give the ATSEP the opportunity to adjust and mitigate potential risks and failures of their systems. In addition, it can provide continuous monitoring enabling assessment of the safety level achieved and identifying areas for future improvement.”*

So, it is imperative that we take the view and perspective of a **Total System approach** instead of developing individual potentially interoperable technical solutions of very high complexity, albeit without a defined technical monitoring and control through the ATSEP WP.

This is contrary to all other safety critical industries where the Systems Monitoring and Control suites (SMC) is implicit.

So this concept (ATSEP WP) that enables to maintain the ATM Technical System Resilience, Continuity, and sustainability, that drives performance and saves cost and improves the environmental footprint, is not considered, or rather starts to be considered following intense IFATSEA efforts, position papers and argumentation.

There starts to be a glimpse of hope that the technical part of ATM and its people will be recognized for their contribution into the efficiency of providing ATS to the final user and indeed directly to the pilot when we are talking of Navigation.

**There are procedures, processes, and CNS/ATM systems such as Flight Inspection that are taken for granted** It was the Covid crisis that revealed their importance again. More specifically, during the pandemic when mobility of people and consequently ATSEP, came about, the validity of certification of the **Periodicity** of CNS systems e.g Navigation, came close to expiring and that would severely impact the performance if not the safety of the system. This is also true for the **Regional Safety Oversight Cooperation System (Ref.6) that produced Guidance booklet for the safety risk analysis and management applicable to the periodicity for ground and flight testing of radio navigation aids.**

To address this ICAO also produced a state letter ((see **Ref.5**) exactly for this reason, the expiration of periodicity checks, as required a very technical paper with relates to the requirements from ICAO Annex 10 volumes and ICAO Doc 8071 and more.

This procedure of flight inspecting Nav aids and the lack due the mobility restrictions of the associated ATSEP personnel both on the ground and in the air, impacted negatively the Continuity of Navigation service provision, the implementation of the associated procedures, the AIP requirements and the capacity of airports as it constituted (where it actually happened) as a forced stopping of the associated service due to the expiration of their periodicity.

*Therefore, the Continuity of the **provision of CNS services must be retained and improved so sustainability (including business wise) and Resilience can be sustained.***

**Cybersecurity:** The *transversal issue of Cybersecurity* could also be addressed here, as cascaded failures of the interconnected systems are becoming a reality. **ATSEP being responsible for addressing the impact of the cyber-attack both tactically and strategically,** have to be efficient and effective on their role. This can be achieved through their competence levels and schemes (according with EU 373/2017) together with supporting associated tools, that need to be properly defined at requirements phase, from an technical-operational point of view.

**These cyber tools for the ATSEP WP do not exist at the moment.**

This constitutes a latent safety and business hazard, as the impact of a cascaded failure of ANS systems can be a reality and will not be able to be contained, as the tools have not been thought off yet. So IFATSEA **recommends developing these tools proactively in order to ensure the Functional System Resilience.**

*Developing the necessary cyber-toolbox for the ATSEP Working Position, can be a major contributor to the Resilience of ANS service delivery Continuity.*

As a final word, the proposed way to go is by :

*ensuring the Continuity and nominal performance of the CNS/ATM systems and services, applying efficient regulation, standards and specifications with competent front line actors like ATSEP, ATCO, AIM, AIS and Pilots, while avoiding experimenting with business models based on competition.*

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## Sustainability of the Aviation Industry

### Introduction

In November 2021, the International Civil Aviation Organization released the first edition of its publication, *Innovation Driving Sustainable Aviation*. The publication highlighted work on the development of aircraft technologies, the improvement of aviation operations and infrastructure, and the development of environmentally friendly fuels. Indeed, the aviation industry has made great strides advancing sustainability initiatives. However, key developments in aviation technology designed to improve sustainability, such as the electrification of aircraft, may not see large scale implementation for many years. With aviation's focus on safety, and given the industry's regulatory oversight, new technologies and improved systems often take decades to implement.

There is, however, increasing public pressure on aviation to move more quickly to sustainable practices. The substantial reduction in aviation activities during the Covid-19 pandemic has led environmentalists to call for a permanent reduction in aviation activity. Consequently, the industry needs to develop short term solutions to significantly improve sustainability. With this thought in mind, leading aviation bodies were asked by the Hermes Air Transport Organization to address the following questions:

1. What are the regulatory impediments to increasing sustainability and how can regulations be improved to make the industry more efficient and sustainable?
2. How can industry participants cooperate to improve sustainability, especially over the next five years?
3. What are the industry's best practices, already in place, that improve sustainability and how can these best practices be implemented throughout the industry?

Briefs were received from representatives of ten leading aviation organizations. The major points cited in these briefs are discussed below. Recommendations are then advanced based on a consensus view of the industry organizations.

### What Constitutes Sustainability?

In his interview in *The Magazine* published by the Hermes Air Transport Organization, ICAO Secretary General, Juan Carlos Salazar, uses the Brundtland Report definition of sustainability as, "meeting the needs of the present without compromising the ability of future generations to meet their own needs." He further defines sustainability as, "an integrated approach that takes into consideration environmental and social concerns along with economic development."



This idea that sustainability must incorporate social conditions and economic development, along with environmental considerations, is highlighted in the position paper presented by the African Airlines Association. The AFRAA brief warns that the aviation industry should not solely define sustainability based on curtailing environmental impacts. The brief states that this, “is a narrow view of what appears to be a pervasive matter in every facet of human existence.” Conversely, AFRAA states that sustainability should focus on the survival and success of airlines, airports, and all players in the aviation value chain. This focus is especially important in developing areas of the world, including Africa and Latin America, where industry participants are most at risk.

A wide view of sustainability is echoed in the position paper advanced by the European Regional Airlines Association. ERA notes that regional carriers are important in connecting remote areas to the rest of the world, and that regional routes are necessary to the sustained economic well-being of remote communities. The ERA brief states: “Recent European national Government announcements to ban short-haul routes in Europe could ultimately hinder, rather than help efforts for a more sustainable air transport future.”

The International Air Cargo Association also takes a wide view of sustainability. TIACA discusses the role that air cargo operators played during the Covid-19 pandemic when air passenger operations were restricted and maritime operations constrained. Air cargo operators were called upon to deliver cargo around the world to sustain international supply chains. As noted in the position paper:

*For many, the term sustainability is often limited to the environmental aspects, which are critically important for protecting the planet however TIACA believes that true sustainability can only be achieved when you look holistically at how we individually and collectively impact People, Planet and enhance global Prosperity, the three Ps.*

In summary, there is belief among key industry organizations that sustainability encompasses economic and social development, in addition to environmental concerns.

### **Key Initiative – Sustainable Aviation Fuels**

The initiative outlined most often as a means for achieving short term sustainable outcomes is the increased use of sustainable aviation fuels. These sustainable fuels include biofuels and synthetically manufactured aviation fuels. Mr. Salazar, in the ICAO brief, states: “SAF are available now ... In 2021 ICAO adopted the first-ever internationally harmonized SAF sustainability criteria that cover all three pillars of sustainability, with environmental, economic and social themes.”

The ERA notes that SAFs are, “a relatively established technology and are ready to be used as drop-in fuels,” but cautions that production is extremely limited with current capacity only sufficient for 0.1 percent of demand. Moreover, SAF costs are high at between 3 and 5 times the cost of conventional jet fuel.

The brief submitted by the European Union (DG MOVE) states:

*Sustainable aviation fuels (SAF) are fully compatible with current aircraft technology and already certified up to 50% of the fuel used in a flight. Although they have the potential to make an important contribution to tackling GHG emissions in aviation (emission savings can go up to 80% compared to conventional jet fuel), this potential is still largely untapped.*

The Airports Council International position paper states that, “incentives to reduce aviation emissions are still underprioritized” and notes: “Creating SAF policies that will provide certainty to investment in production and will support bridging the gap of SAF premium prices—one of its main barriers—is an immediate action that governments can pursue and a point in common on which aviation stakeholders can collaborate.”

Finally, the Joint Aviation Authorities Training Organization cautions: “Uneven access and distribution in the deployment of Sustainable Aviation Fuels (SAF) or charging infrastructure for electrified aircraft operations is and will become a challenge,” to the implementation of sustainable policies in aviation.

In summary, there is belief across the aviation industry that the increased use of sustainable aviation fuels is an effective method to the short run reduction in carbon emissions. The technology is already developed. However, current policies do not incentivize the use of sustainable fuel and access is currently limited and unevenly deployed.

### **Other Key Initiatives**

Several other initiatives were advanced to improve the sustainability in the aviation industry:

- JAA TO cites improved air transport management, such as the Single European Sky (SES) initiative, as a “safe, cost efficient and environmentally friendly way” to improve sustainable aviation. According to JAA TO: “The benefits of the SES could potentially be huge; tripling the airspace capacity, reduce ATM cost by 50%, improve safety tenfold and reduce environmental impact by 10%.” Other initiatives outlined in the JAA TO position paper include improved manufacturing design that “allows for quicker and more flexible production, reduces material waste compared to traditional approaches and it also results in much lighter parts reducing aircraft weight and fuel use,” better aerodynamic technology that can, for example, increase effective wingspan, better fuel efficiency, for example by using new turbofan technology, increased thermal efficiency, and improved noise standards.
- DG MOVE cites several ways to increase sustainability: Environmental conditions could be better incorporated into the determination of airline charges at airports; slot allocation rules could be aligned more closely with environmental goals; and groundhandling operations could be accomplished with reduced environmental impacts. DG MOVE also points to increased coordination and cooperation in air traffic management as a means to achieving sustainable outcomes: “The local approach to Air Navigation Services provision is less

effective and leads to congestion and capacity crisis whereas experience shows that more effective network coordination decreases delays and congestion.”

- Based on its view that sustainability implies economic success for firms in the industry, AFRAA identifies “access to affordable and competitively priced capital; provision of infrastructure to support the growing industry; better connectivity and market access; facilitating mobility and cost competitiveness” as keys to sustainability. Important to the development of air transport in Africa is a competitive regulatory environment that improves connectivity across the continent.
- ERA cites voluntary carbon offsetting programs as a means for airlines to reduce their CO2 emissions. According to the ERA position paper: “These programs can either be used by the airlines themselves or by their passengers and allow the customer to compensate for their emissions by buying projects that reduce or remove CO2 emissions elsewhere (e.g., forestation or renewable energy projects).”
- ACI discusses continuous climb operations (CCO) and continuous descent operations (CDO) as methods for reducing carbon emissions. According to ACI: “CCO and CDO allow aircraft to use a flexible and optimum flight path that can deliver significant environmental and economic benefits—reduced fuel burn, gaseous emissions, and fuel costs—without any adverse effect on safety... The use of these techniques results in time being spent at more fuel-efficient higher cruising levels, hence significantly reducing fuel burn, and lowering emissions and fuel costs.” In addition, ACI lists several best practices for airports in increasing sustainability including installing solar panels and electrifying ground service equipment.
- TIACA believes that regulatory reform is key to increasing the efficiency of cargo operations and, thus, improving sustainability. TIACA believes that a reformed regulatory regime, “must include the whole range of traffic rights, including fifth and seventh freedoms, so as to allow all-cargo operators the ability to optimize the use of their fleets by picking up cargo where and when there is demand for the service and transporting it to where and when the client requests it.”
- The submission by the International Federation of Air Traffic Safety Electronics Associations (IFATSEA) also cites needed changes to the regulatory environment as a means of promoting sustainability. The brief states: “The regulatory environment, including Standardization activities are crucial activities and enable the promotion of requirements and Safety standards that in turn promote Sustainability ... The lack of standards for the CNS/ATM systems and their interoperability requirements of the future concepts ... if it is overcome, will , undoubtedly constitute a significant enabler, together with the Human pillar, for sustainability.”
- The brief of the Arab Civil Aviation Organization is concerned with actions that can be taken to recover from the unprecedented disruptions to the aviation system that occurred during the Covid-19 pandemic. ACAO supports harmonized approaches to restore the health of the aviation industry, such as the continued digitization of passenger and cargo data. Among the specific initiatives proposed include, “strengthening the ICAO system of standards, particularly those associated with the Unified Electronic Passenger Transport Database, by including health data and establishing a similar database for cargo transport.”

## Coordination of Efforts

Several of the position papers cite the importance of coordination of efforts across the industry and, indeed with stakeholders outside aviation, to improve the sustainability of the aviation industry. These stakeholders include destination management and marketing organizations; that is, organizations that facilitate travel and tourism. In its brief, AFRAA states: “The importance of collaboration for the success and sustainability of the industry is not in doubt. What is, however, missing is the aviation sector to collaborate with industries that are not directly related to aviation but impact it.” Along these lines, AFRAA says that it intends, “to change the narrative and establish broader consultation with all stakeholders for the industry's good.”

These views are echoed in the ERA brief. ERA states that collaborative efforts promoting sustainability are needed: “Collaboration is key. To be successful, support from European and national policy makers is needed to create the right policy frameworks and, in some cases, to provide financial assistance to develop and apply new technologies.” ERA provides the example of the Toulouse Declaration of February 2022 – “the first-ever public–private initiative supporting aviation’s decarbonization goals signed by 35 European countries and more than 100 industry stakeholder groups in Toulouse, including the five leading European aviation associations.”

## Recommendations

As the aviation industry moves beyond the Covid-19 pandemic, it faces unprecedented pressure to increase sustainable practices. Although the industry has been progressing steadily on increasing sustainability through the use of new technologies and the implementation of best practices, many future developments will take considerable time to implement given the industry’s regulatory oversight and focus on safety. With this in mind, Hermes asked leading industry associations to provide recommendations for improved sustainability with a focus on short-term initiatives. Based on the position papers submitted, Hermes Air Transport Organization makes the following recommendations:

1. Develop incentives to roll out the use of sustainable aviation fuels. The technologies have been developed; however, the supply is currently very limited. Governments need to develop incentives that will increase capacity and drive down production and distribution costs. Efforts should be made to distribute the sustainable fuels in an equitable manner so that all industry participants can benefit from its use.
2. Reform economic regulations to increase the sustainability of aviation. Although there has been much talk of reform, there are still many impediments to efficient and equitable aviation operations. In the short run, it may be advantageous to engage in reform on a regional basis or within industry sectors. In particular, regulatory reform could be put into place to allow air cargo operators to operate efficiently with international hubs that facilitate global supply chains.



3. Facilitate air traffic management and control to improve efficiency in air operations. For example, efforts should be paid to procedures that increase operating efficiency and the reduction in fuel usage.
4. Increase the dialog among aviation organizations and other stakeholders. It became clear during the Covid-19 pandemic of the importance of aviation to sustaining supply chains. Moreover, the limitations placed on air travel imposed precipitous losses to both tourism and business sectors. Clearly, it would be beneficial for a consortium of organizations interested in promoting best practices and sustainability in the aviation industry to work together towards these objectives.

### **2022 Hermes Recommendations Committee**

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