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OPERATIONAL IMPROVEMENTS: A STIMULUS FOR EFFECTIVE CORSIA IMPLEMENTATION AND AVIATION DECARBONIZATION

(Presented by Malaysia)

EXECUTIVE SUMMARY

This information paper outlines Malaysia’s multi-pronged strategy to advance ICAO’s Long-Term Aspirational Goal (LTAG) while navigating the recovery of the sector. It highlights immediate benefits of operational improvements as a foundational decarbonization measure and details incremental steps to scale the supply of sustainable aviation fuels and carbon credits that meet the requirements of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). Malaysia’s experience offers a model for other States seeking to balance economic recovery with climate action.

<i>Strategic Goals:</i>	This working paper relates to the Strategic Goal - <i>Aviation is Environmentally Sustainable</i>
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<i>Financial implications:</i>	Promoting operational improvements can lead to significant cost savings for operators.
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<i>References:</i>	Annex 16, Volume IV Doc 9501, <i>Environmental Technical Manual</i> , Volume IV
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1. INTRODUCTION

1.1 Malaysia fully endorses the Long Term Aspiration Goal (LTAG) of achieving net zero carbon emissions by 2050, as was adopted during the 41st ICAO Assembly session in 2022. To translate this ambition into action, Malaysia is pursuing an accelerated decarbonization strategy for its aviation sector, leveraging all pathways available.

1.2 This pursuit is set against a complex recovery landscape. Although Malaysia has a robust aviation sector, the industry's recovery from the pandemic remains incomplete. Airlines now face the dual challenge of balancing financial sustainability with the need to implement emissions-reduction measures.

1.3 Complicating this picture is a fast evolving landscape with multiple moving targets. These include changing sectoral growth estimates, sustainable aviation fuel (SAF) pricing and production volumes as well as availability of CORSIA emissions units, which are in turn, influenced by on-going the United Nations Framework Convention on Climate Change (UNFCCC) global negotiations. Navigating this transition has required a clear-eyed view of these challenges.

1.4 This paper shares Malaysia's experience in fostering a more collaborative approach between regulators and industry to stay abreast of these developments and introduce measures that help advance decarbonization objectives without stifling the industry's hard-won recovery. It also requests ICAO and ICAO Member States to consider taking further actions to strengthen the capacity of the industry to respond appropriately so as not to lose critical momentum that has been built thus far.

2. BACKGROUND

2.1 Malaysia's collaborative approach to advancing its aviation decarbonization agenda was initiated through a series of consultative meetings with industry stakeholders in 2023. The consensus that emerged was that a better solution was needed to bridge information gaps among stakeholders. While Malaysia is both a CORSIA Participating State and a signatory to the UNFCCC's Paris Agreement, the interlinkages between these commitments were not well understood nor had they been translated into practical implementation measures.

2.2 The first initiative undertaken by the Civil Aviation Authority of Malaysia (CAAM) was the establishment of a National Task Force on Environmental Sustainability in Civil Aviation. The task force's mission was to identify opportunities for collaboration between policymakers, regulators and industry to drive progress in each of the four pathways to decarbonize aviation. Sub-task groups were formed to lead discussions in three areas: (i) advancing operational efficiencies, (ii) developing Malaysia's SAF production potential and (iii) preparing for CORSIA offsetting. The latter two subtask groups were led by industry as airlines tended to be closer to real time developments on the ground, particularly in cross-sectoral areas.

2.3 A guiding document in the form of the Malaysia Aviation Decarbonisation Blueprint (MADB) was published thereafter to provide task force members with a strategic

direction to align to, taking into account national priorities and context. The main activities of the subtask forces in advancing their objectives are summarised below:

2.3.1 Operational Efficiencies

2.3.1.1 Operational improvements provide a direct and verifiable method for reducing an operator's total emissions, thereby lowering future CORSIA offsetting requirements. They are available to all operators, regardless of fleet size or type and do not require the same magnitude of capital investment associated with new aircraft or SAF.

2.3.1.2 A list of measures was identified in Malaysia's earlier State Action Plan for implementation. However, without an established monitoring and reporting system in place, CAAM lacked visibility on how airlines were performing on each of these measures. As an example, Malaysia is the only country in Southeast Asia that has operationalised Required Navigation Performance - Authorisation Required (RNP-AR) procedures so that airlines can take advantage of more direct and fuel-efficient flight paths. However, its utilisation was found to be suboptimal.

2.3.1.3 In 2024, Malaysia published its fourth State Action Plan, titled the Malaysian Green Skies Initiative and Action Plan, to reiterate its focus on improving operational efficiencies and introduce a new Airline Operational Efficiency Reporting Form which airlines are required to submit annually to CAAM to quantify their fuel savings from specific measures and their implementation rates. This has allowed CAAM to analyse the data and identify bottlenecks that prevented airlines from utilising the procedures.

2.3.1.4 Malaysia established cross-stakeholder operational efficiency working groups under its Green Skies Initiative and Action Plan, creating a structured forum for airlines, CAAM, and ANSPs to coordinate measures and share data. The CAAM Stakeholder Engagement Committee (CSEC), provides a structured and collaborative framework for airlines, regulators, and service providers to implement operational improvements, integrate new mitigation measures, and align efforts toward achieving net-zero emissions by 2050 through enhanced stakeholder engagement, data sharing, and technical innovation.

2.3.1.5 Below is a summary of the findings for 2024 which were translated also into fuel savings and emissions avoidance.

Fuel Efficiency Measure	Fuel Savings (kg)
Continuous Climb Operations	8,913,000
Direct Routing	4,628,087
Reduced Acceleration Altitude	4,231,567
Continuous Climb/ Descent Operations	5,822,839

One Engine Taxi-Departure	1,740,000
Midnight/Short STAR	2,592,000
One Engine Taxi-Arrival	2,370,148
Reduced Flap Landings	1,596,000
Other Measures	8,446,005
Total Fuel Saved	40,339,646 kg
Total CO2 Avoided	127,473 tonnes
Estimated Cost Savings	USD 36 Million

2.3.1.6 To find solutions and to promote the benefits of the measures to reduce fuel use and CO2 emissions, CAAM leveraged on capacity building assistance from the EU Aviation Safety Agency (EASA) to host an EU-ASEAN workshop in June 2025 focusing on operational improvements and efficiency gains. This forum brought together EU and North American experts to share problem-solving approaches. The workshop also facilitated the exchange of best practices in fuel efficiency and examined cutting-edge Air Traffic Management R&D.

2.3.1.7 These discussions were brought to the working level by CAAM's subtask force on operational efficiencies. A direct outcome is the resumption of direct engagement sessions between pilots and air traffic controllers with a view to increase utilisation of more direct flight paths and landing approaches. Additionally, the subtask force is developing a national roadmap for Performance-Based Navigation (PBN) implementation and has initiated a data-driven monitoring program to track fuel savings from these new procedures, ensuring that the theoretical benefits discussed at the workshop translate into tangible reductions in fuel burn and emissions at the operational level.

2.3.2 SAF Development

2.3.2.1 Malaysia has taken a major step in scaling up global production of SAF with the prospect of two SAF refineries coming online within the next three years with planned production output of 900,000 tonnes per annum.

2.3.2.2 Under the SAF subtask force, national consultations have commenced to gather the industry's views on ways to increase uptake, covering a broad range of areas from incentives and mandates to mechanisms on cost recovery and other related measures aimed at lowering long-term price of SAF, including identifying alternative feedstock.

2.3.2.3 Meanwhile, national oil company PETRONAS has made available SAF supply at KLIA airport starting August 2025 to cater to voluntary uptake by Malaysian and international carriers.

2.3.3 CORSIA Offsetting

2.3.3.1 Malaysia's initial readiness to meet CORSIA offsetting requirements was hindered by two primary challenges. First, a general lack of awareness among stakeholders on how carbon pricing instruments functioned as these were not operational in the country. Second, even within the small community of carbon market participants, there was limited familiarity with how CORSIA operated, especially the dynamic nature of the scheme's eligibility criteria which are revised for each phase and new requirements such as host country authorisations. These uncertainties have deterred project developers from investing in the supply of eligible credits.

2.3.3.2 The subtask force on CORSIA began by organising biannual meetings bringing together aviation and environmental sector stakeholders, including Malaysia's Climate Change Department, carbon registry implementing agencies, carbon exchanges and project developers, to align understanding on CORSIA and how CORSIA implementation can work alongside meeting Malaysia's Nationally Determined Contribution.

2.3.3.3 Malaysian experts were nominated to the ICAO Committee on Aviation Environmental Protection working group on CORSIA to bring forth these perspectives on implementation challenges, while a model was developed to estimate Malaysia's CORSIA offsetting requirements and provide greater clarity for policy making and for markets to respond. Malaysia also sought EU capacity-building assistance to co-host two regional workshops on CORSIA and Carbon Markets in 2024 and 2025 respectively to translate latest UNFCCC negotiation outcomes within the CORSIA context.

2.3.3.4 Through these efforts, the subtask force was able to develop a three-year outlook on CORSIA offsetting requirements for the industry and the associated cost of climate transition, building confidence for policymakers to allow airlines to introduce carbon fees to airfares to fund decarbonization activities.

2.3.3.5 With better understanding of CORSIA's potential to attract climate finance, Malaysia is currently assessing the feasibility of submitting its national emissions unit programme for CORSIA eligibility. In parallel, the drafting of the national carbon market policy and climate change bill also takes in view the aviation sector's CORSIA compliance requirements.

3. CONCLUSION

3.1 Achieving the aviation sector's net zero ambition requires a concerted, multi-faceted effort that leverages all available decarbonization pathways. This global endeavour must account for the varying capacities of ICAO Member States, providing the necessary support for adopting new measures, particularly in complex and unfamiliar areas like carbon markets.

3.2 While scaling SAF production is crucial, it is important to simultaneously maximise readily available solutions. Operational improvements represent a proven, scalable and economically viable strategy that should form the foundation of any decarbonization plan. Furthermore, enhancing air traffic management efficiency delivers permanent emissions reduction across the entire system. As Malaysia's experience demonstrates, a structured, data-driven approach can yield quick wins on reducing fuel use and emissions, while also strengthening the financial sustainability of airlines - a critical benefit for those still in recovery.

3.3 To accelerate the sector's decarbonization, ICAO Member States must implement policies that not only increase the utilisation of SAF and CORSIA-eligible emissions units but also expand their supply. This entails supporting R&D to certify new SAF feedstocks and production technologies, incentivising carbon project developers to generate a greater supply of high quality carbon credits and establishing national mechanisms to facilitate CORSIA compliance. These steps are essential to provide market certainty and enable airlines to effectively manage their transition pathways.

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