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AGENDA ITEM 7: AVIATION AND ENVIRONMENT

PAKISTAN'S ACTIONS TO MITIGATE CO_2 EMISSIONS FROM AVIATION

(Presented by Pakistan Civil Aviation Authority,
supported by Civil Aviation Authority of Sri Lanka)

SUMMARY

The aviation industry plays a critical role in global economic development and connectivity, but it is also a significant source of carbon dioxide (CO_2) emissions, contributing to the growing challenge of climate change. In response, Pakistan has launched a series of initiatives to promote environmentally sustainable aviation and reduce its carbon footprint.

Under the National Aviation Policy (NAP) 2023, Pakistan has adopted both long-term and short-term strategies to address emissions. These include fleet modernization, enhancing operational efficiency, and promoting the use of Sustainable Aviation Fuel (SAF) - all aligned with international sustainability commitments.

A central pillar of Pakistan's strategy is the advancement of SAF, widely recognized as one of the most effective tools for lowering aviation-related CO_2 emissions in line with the International Civil Aviation Organization's (ICAO) Long-Term Aspirational Goal (LTAG). With its strong agricultural base, Pakistan has significant potential to develop SAF feedstock. However, like many developing countries, it faces financial and technological barriers to large-scale SAF production.

To accelerate global SAF adoption, ICAO is urged to provide enhanced financial assistance, targeted capacity-building initiatives, and greater flexibility regarding acceptable feedstocks and production processes, ensuring inclusive participation from developing nations.

In parallel, Pakistan continues to upgrade its aviation infrastructure by modernizing aircraft fleets, improving ground handling operations, and advancing air navigation systems.

PAKISTAN'S ACTIONS TO MITIGATE CO_2 EMISSIONS FROM AVIATION

1. INTRODUCTION

1.1 The aviation industry is a key driver of global connectivity, economic growth, and cultural exchange. However, it is also a significant contributor to greenhouse gas emissions, particularly carbon dioxide (CO_2), which plays a crucial role in climate change. Pakistan has initiated multiple steps across different domains to ensure that aviation based economic growth can be achieved in an environmentally sustainable manner.

1.2 Pakistan's National Aviation Policy (NAP) 2023 supports various long-term and short-term initiatives aimed at reducing aviation-related carbon emissions. These efforts include aircraft fleet age management, operational improvements, and the promotion of Sustainable Aviation Fuel (SAF) adoption to minimize environmental impact.

2. DISCUSSION

2.1 Sustainable Aviation Fuels (SAFs)

a) Multiple deliberations have established SAF as the most likely solution for reducing CO_2 emissions from international aviation, aligning with the Long-Term Aspirational Goal (LTAG) set by ICAO.

b) With agriculture being a cornerstone of Pakistan's economy, the country possesses significant potential feedstock for SAF production. However, financial constraints and technological limitations remain major obstacles to SAF development. A similar situation exists in most developing states with regards to SAF adoption, as highlighted in numerous ICAO forums. Pakistan also aims to join the ACT-SAF program and looks forward to receiving tailored support under the program.

c) Despite these challenges, efforts are underway to develop SAF in Pakistan. One such initiative is SAFCO, based in Punjab Pakistan, which has secured USD 86.2 million in funding from the Asian Development Bank (ADB) for waste-based feedstock processing into SAF. A brief summary related to SAFCO is listed at Appendix A.

d) ICAO must take effective measures to enhance financial support and capacity-building initiatives for Pakistan and other developing states, which continue to lag in establishing SAF facilities and supply chains.

e) Furthermore, ICAO should consider expanding the list of acceptable feedstocks and production processes while ensuring adherence to sustainability requirements to maximize the achievement of LTAG objectives.

2.2 Fleet / Equipment Modernization

a) As an environmentally responsible state, Pakistan strives to manage aviation sector growth in alignment with its economic priorities while mitigating its environmental impact. As stipulated in the National Aviation Policy 2023, fleet operational life restrictions ensure that aircraft used for most Commercial Air Transport (CAT) operations remain relatively young and fuel-efficient. This policy mandates the induction of modern aircraft while systematically removing older, less efficient models from service. These provisions have been included in regulations to ensure compliance by all operators.

b) Similarly, Ground Handling Agencies (GHAs) in Pakistan are encouraged to modernize their equipment by transitioning to electric vehicles (EVs). Some GHAs have already replaced their equipment at major airports with EVs, while others are actively working toward electrification of their fleet. Some estimates of CO2 emission reductions based on these actions are listed at Appendix B.

2.3 **Operational Improvements**

a) Airlines are encouraged to be adopt operational efficiency measures to reduce CO_2 emissions without compromising safety. A few examples of measures adopted by different airlines include:

i) Continuous descent operations where permitted by Air Navigation Service Providers (ANSPs)

ii) Idle reverse thrust landings,

iii) Optimized flap settings for takeoffs and landings, and

iv) Shortened flight routes, where permitted by Air Navigation Service Providers (ANSPs)

b) The Pakistan Airports Authority, which oversees ANSPs and airports, has implemented initiatives such as shortened flight routes (ANSP), quick exit taxiways, and automated low-energy LED installations at airports. Additionally, ground power at major international airports now based on electric power supplied by the airport instead of traditional diesel-based systems.

c) GHAs are also actively pursuing means to reduce their carbon footprint such as transitioning from traditional power to solar solutions are different airports in a systematic manner. Some estimates of CO_2 emission reductions based on these actions are listed at Appendix B.

3. ACTION BY THE CONFERENCE

3.1 The Conference is invited to:

a) Encourage ICAO to strengthen financial support and capacity-building initiatives for Pakistan and other developing states that are behind in establishing Sustainable Aviation Fuel (SAF) facilities and supply chains;

b) Recognize Pakistan's ongoing initiatives to reduce CO_2 emissions while ensuring that these measures do not hinder the sustainable growth of its aviation sector.

— END —

SAFCO – A Brief Summary

The SAFCO Sustainable Aviation Fuel (SAF) Project, supported by the Asian Development Bank (ADB) under project number 57298-001, aims to establish Pakistan's first commercial-scale SAF production facility in Sheikhupura, Punjab. Implemented by SAFCO Ventures through BioTech Energy Ltd., the project will utilize advanced HEFA-SPK technology to convert local waste-based feedstocks—such as used cooking oil, poultry feather acid oil, and soap stock acid oil—into sustainable aviation fuel. With an annual production capacity of up to 200,000 tonnes, the facility will help decarbonize aviation by achieving an estimated 80% lifecycle greenhouse gas reduction compared to conventional jet fuel. The project complies with key international standards, including ICAO's CORSIA criteria, the International Sustainability and Carbon Certification (ISCC), and the EU Renewable Energy Directive (RED II/III), ensuring full traceability and environmental integrity.

Beyond its environmental benefits, the project is expected to deliver significant socio-economic and strategic impacts. It will contribute to emissions savings of approximately 704,000 tonnes of CO_2 annually—equivalent to the carbon sequestration of around 41 million trees—while promoting green jobs, formalizing Pakistan's waste oil supply chain, and supporting rural SMEs.

The operation is assessed as fully aligned with Pakistan's Nationally Determined Contributions (NDCs), ICAO's long-term aspirational goals, and global decarbonization pathways for aviation.

INFORMATION ON GD SUSTAINABILITY
(EXECUTED PROJECTS)

Facility Solar:

KHI Import Cargo Phoenix

Capacity – 38.080 KW

Electricity generation / annum- 58,000 KWH

Cost saving / annum- 11,000 USD

Carbon emissions / annum-32 tonnes

Trees Equiv./annum- 700+ trees

LHE TGS

Capacity -14.7 KW

Electricity generation / annum- 22,000 KWH

Cost saving / annum- 3,500 USD

Carbon emissions / annum- 12 tonnes

Trees Equiv./annum - 260+ trees

LHE Export Cargo

Capacity – 21.29 KW

Electricity generation / annum- 32,000 KWH

Cost saving / annum- 5,000 USD

Carbon emissions / annum- 17 tonnes

Trees Equiv./annum - 390+ trees

GSEs Fueling Fleet Solar:

KHI Hybrid Fuel Bowser GSE

Solar Capacity Installed – 370 KW

(Idling) Diesel Fuel saving per annum– 2,000 L

Cost saving per annum- 1,900 USD

Carbon emissions / annum- 5 tonnes

Trees Equiv./annum - 100+ trees

MUX Towable Fuel Bowser GSE

Solar Capacity Installed – 370 W

LHE Towable Fuel Bowser GSE

Solar Capacity Installed – 370 W

PEW Towable Fuel Bowser GSE

Solar Capacity Installed – 370 W

Accumulative Electricity charging or generation / annum- 1600 KWH

Cost saving / annum- 300 USD

Carbon emissions / annum- 0.8 tonnes

Trees Equiv./annum - 19+ trees

EV GSE Fleet:

Current

Buggy Cart 02 prior (KHI)

Fork Lifters 11 (03 new+01 prior KHI, 04 new LHE, 03 new ISB)

Fork Lifters:

Induction of Electric fork lifters at KHI/ LHE/ ISB cargo facilities / replaced with diesel driven FLTs

No. of FLTs replaced – 10

Diesel Fuel saving per annum– 18840 Liters.

Cost saving per annum- Rs. 37,31,160

Carbon emissions / annum- 33.6 tons

Trees Equiv./annum = 660

Lighting automation at KHI Cargo facilities:

Installation of Motion Sensors at HQ/ Import cargo

Energy saving – 11,189 kWh

Cost saving per annum- Rs. 615,395

Carbon emissions / annum- 18 Tons

Trees Equiv./annum - 360+ trees

Installation of Motion Sensors at Export cargo

Energy saving – 1905 kWh

Cost saving per annum- Rs. 104,775

Carbon emissions / annum- 3.14 Tons

Trees Equiv./annum – 62+ Trees

Installation of Heat rejection film at HQ Front facade

Energy saving – 39748 kWh

Cost saving per annum- Rs. 21,86,140

Carbon emissions / annum- 65.58

Trees Equiv./annum – 1311+ Trees