ICAO EUR/NAT and ACI EUROPE

REGIONAL GREEN AIRPORTS SEMINAR

Hosted by the Ministry of Transport
Republic of Kazakhstan

Setting the Scene

Overview of the latest work of ICAO on Climate Change mitigation

ICAO Secretariat

ICAO AND ENVIRONMENT

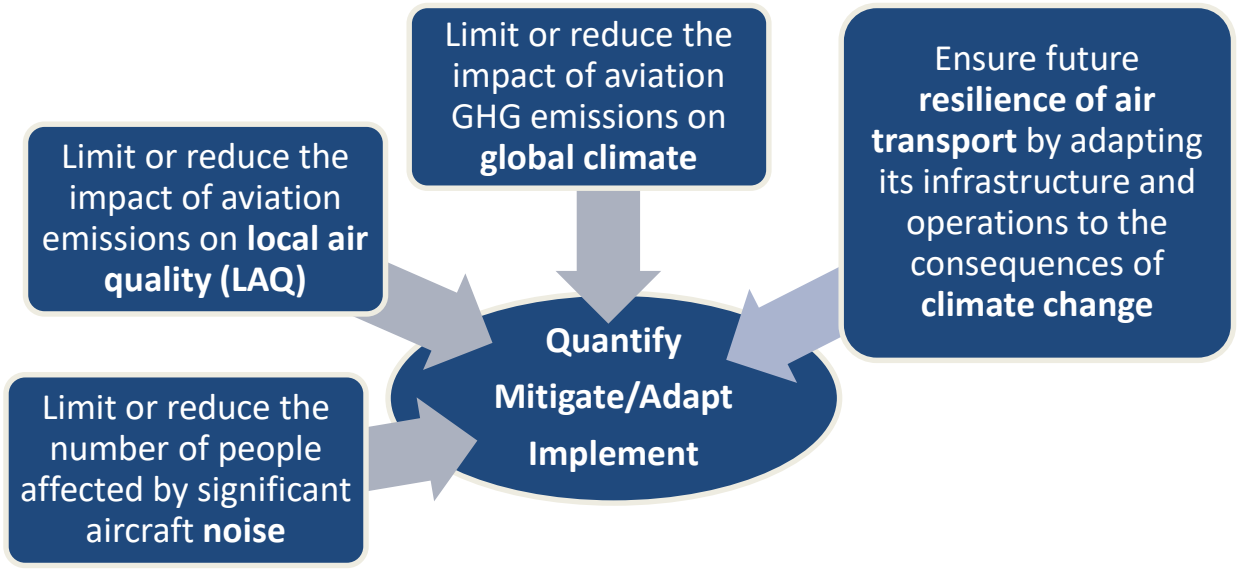
ICAO STRATEGIC OBJECTIVE

Minimize the adverse effect of global civil aviation on the environment

SUSTAINABLE DEVELOPMENT GOALS

ICAO's environmental work contributes to 14 out of the 17 United Nations SDGs

ICAO ENVIRONMENTAL GOALS

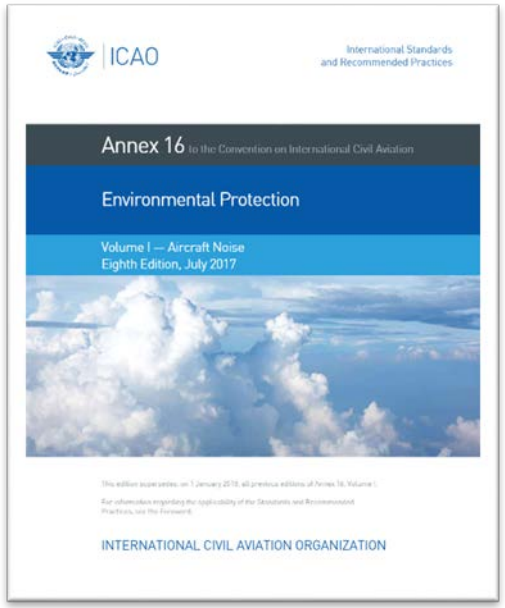


41st ASSEMBLY RESOLUTIONS

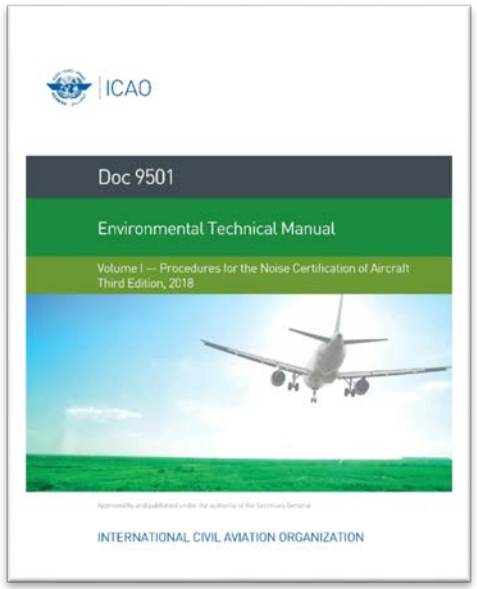
- **A41-20:** General provisions, noise and local air quality
- **A41-21:** Climate change
- **A41-22:** Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)

AIRCRAFT NOISE

Annex 16 - Environmental Protection - Volume I - Aircraft Noise

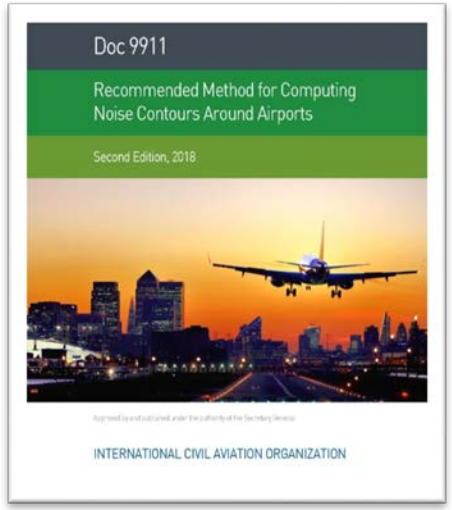


Environmental Technical Manual - Volume I - Procedures for the Noise Certification of Aircraft (Doc 9501-1)



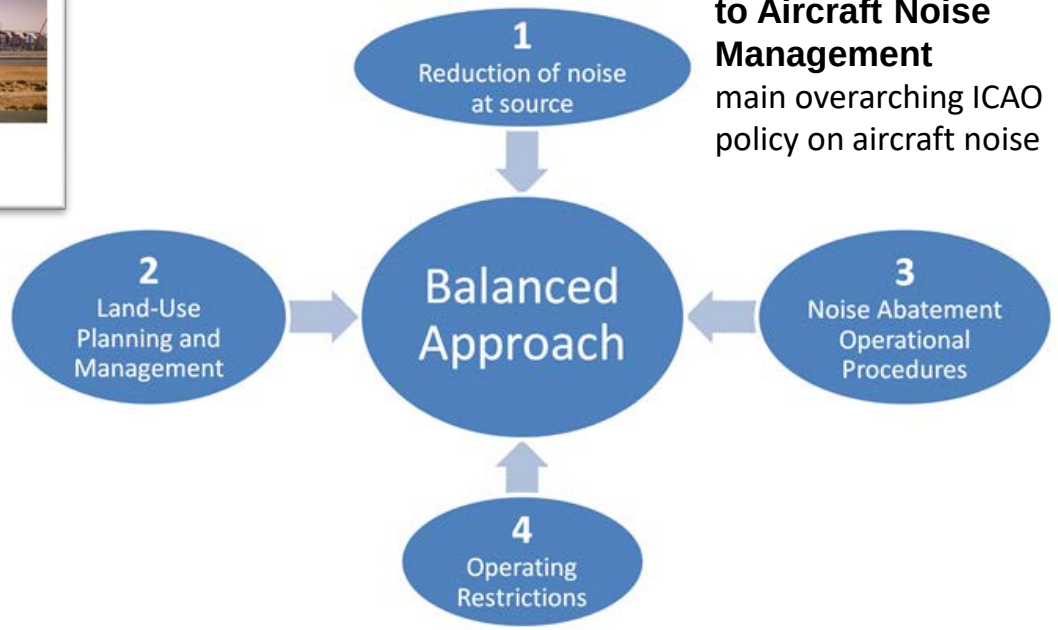
Airport Planning Manual - Part II - Land Use and Environmental Management (Doc 9184 - Part 2)

on land use and environmental management on and around an airport



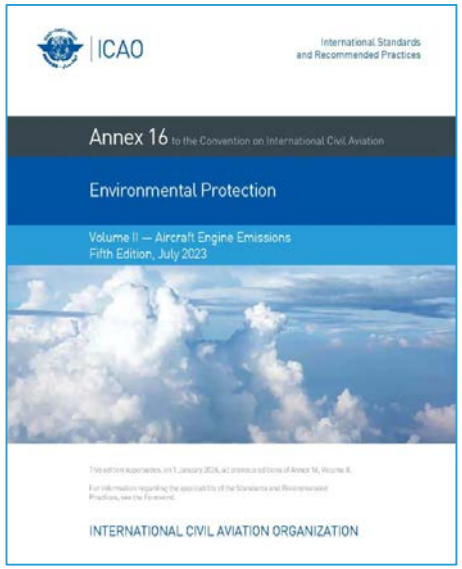
Recommended Method for Computing Noise Contours Around Airports (Doc 9911)

Balanced Approach to Aircraft Noise Management
main overarching ICAO policy on aircraft noise

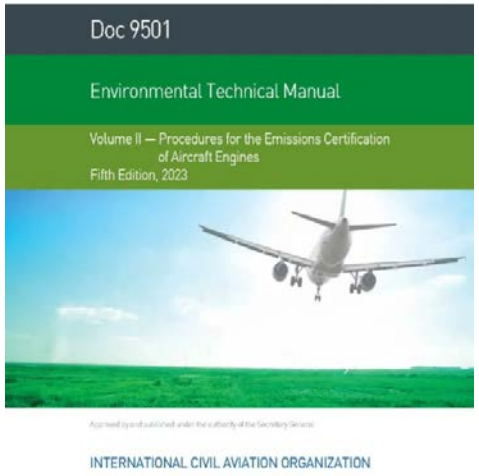


AIRCRAFT ENGINE EMISSIONS

Annex 16 - Environmental Protection - Volume II – Aircraft Engine Emissions

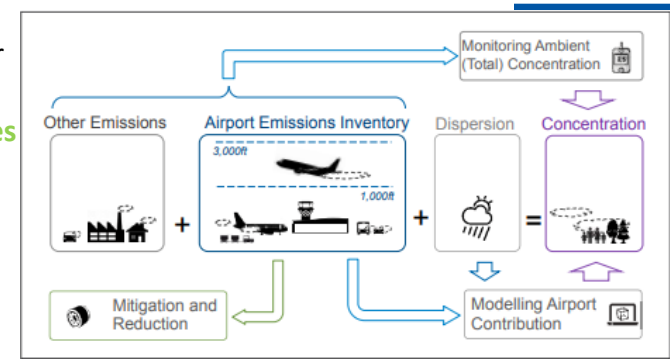


ETM - Volume II - Procedures for the Emissions Certification of Aircraft Engines (Doc 9501-2)



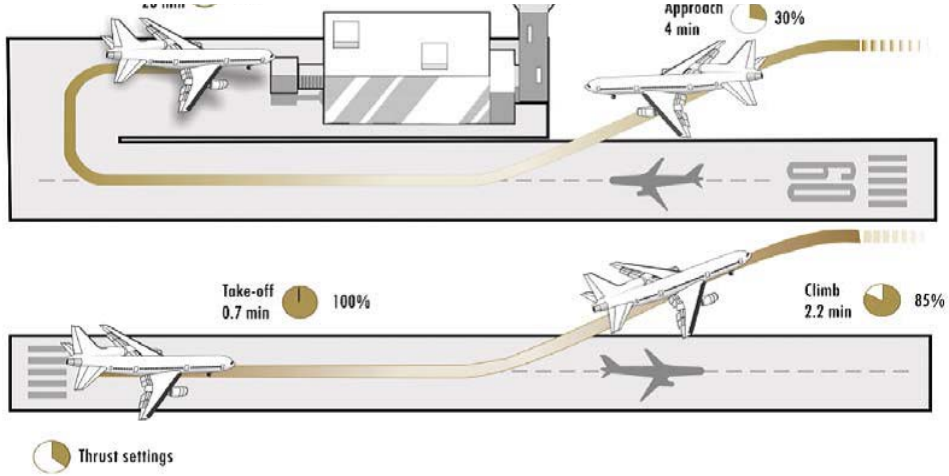
Airport Air Quality Manual (Doc 9889)

provides guidance and essential information for ICAO Member States to implement **best practices with respect to airport-related air quality**



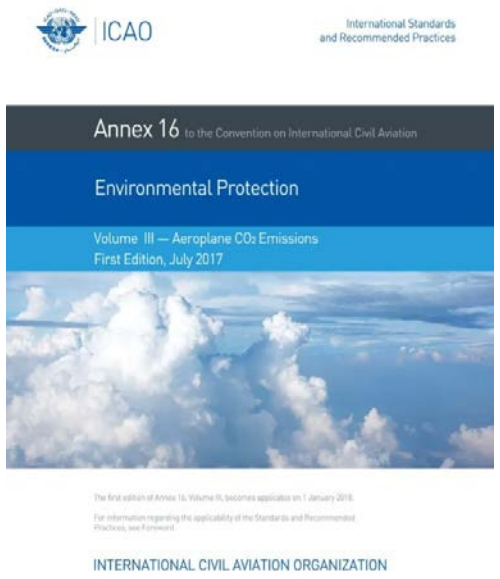
Local air quality elements and their interactions (figure courtesy of E. Fleuti, Zurich Airport

Engine certification process based on the LTO cycle – the LTO cycle represents pollutant emissions in the vicinity of airports

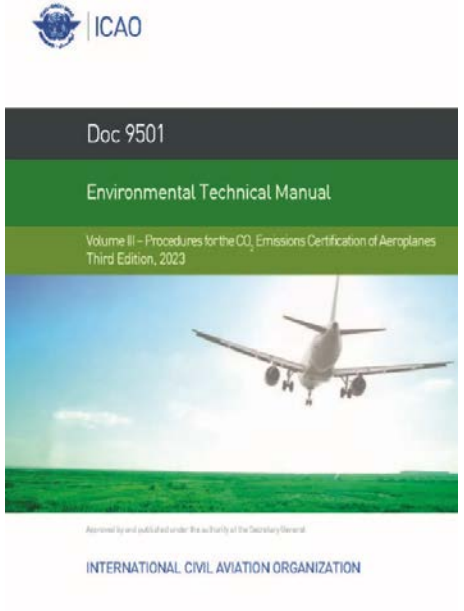


AEROPLANE CO2 EMISSIONS

Annex 16 - Environmental Protection - Volume III - Aeroplane CO_2 Emissions



Environmental Technical Manual - Volume III - Procedures for the CO_2 emissions certification of aeroplanes (Doc 9501-3)

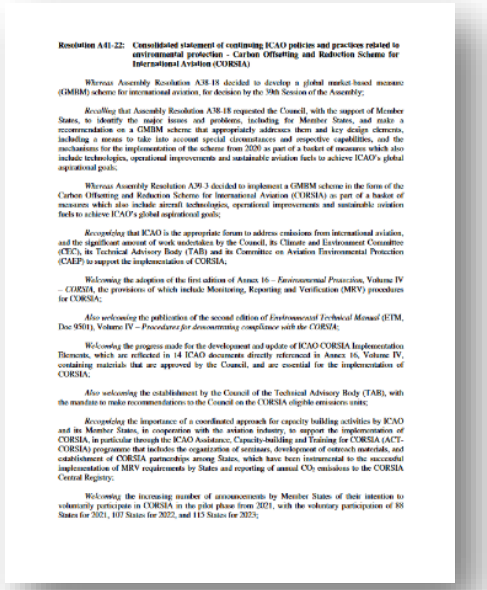


New Standard was adopted by the ICAO Council in March 2020.
The new Standard is applicable from 1 January 2023 onwards **to new type and in-production engines**

ICAO Regulatory Framework for CORSIA Implementation

Assembly Resolutions in force (A41-22)

Adopted by 2022 Assembly



Resolution A41-22: Consolidated statement of continuing ICAO policies and practices related to environmental protection – Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)

Whereas Assembly Resolution A38-18 decided to develop a global market-based measure (GMBM) scheme for international aviation, for decision by the 39th Session of the Assembly;

Recalling that Assembly Resolution A38-18 requested the Council, with the support of Member States, to identify the major issues and problems, including for Member States, and make a recommendation on a GMBM scheme that appropriately addresses them and key design elements, including a means to take into account special circumstances and respective capabilities, and the mechanisms for the implementation of the scheme from 2020 as part of a basket of measures which also include technologies, operational improvements and sustainable aviation fuels to achieve ICAO's global aspirational goals;

Whereas Assembly Resolution A39-3 decided to implement a GMBM scheme in the form of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) as part of a basket of measures which also include aircraft technologies, operational improvements and sustainable aviation fuels to achieve ICAO's global aspirational goals;

Recognizing that ICAO is the appropriate forum to address emissions from international aviation, and the significant amount of work undertaken by the Council, its Climate and Environment Committee (CEC), its Technical Advisory Body (TAB) and its Committee on Aviation Environmental Protection (CAEP) to support the implementation of CORSIA;

Welcoming the adoption of the first edition of Annex 16 – *Environmental Protection*, Volume IV – *CORSIA*, the provisions of which include Monitoring, Reporting and Verification (MRV) procedures for CORSIA;

Also welcoming the publication of the second edition of *Environmental Technical Manual* (ETM, Doc 9501), Volume IV – *Procedures for demonstrating compliance with the CORSIA*;

Welcoming the progress made for the development and update of ICAO CORSIA Implementation Elements, which are reflected in 14 ICAO documents directly referenced in Annex 16, Volume IV, containing materials that are approved by the Council, and are essential for the implementation of CORSIA;

Also welcoming the establishment by the Council of the Technical Advisory Body (TAB), with the mandate to make recommendations to the Council on the CORSIA eligible emissions units;

Recognizing the importance of a coordinated approach for capacity building activities by ICAO and its Member States, in cooperation with the aviation industry, to support the implementation of CORSIA, in particular through the ICAO Assistance, Capacity-building and Training for CORSIA (ACT-CORSIA) programme that includes the organization of seminars, development of outreach materials, and establishment of CORSIA partnerships among States, which have been instrumental to the successful implementation of MRV requirements by States and reporting of annual CO_2 emissions to the CORSIA Central Registry;

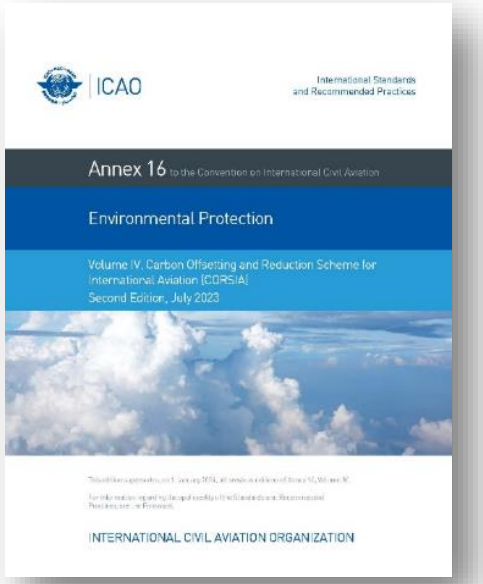
Welcoming the increasing number of announcements by Member States of their intention to voluntarily participate in CORSIA in the pilot phase from 2021, with the voluntary participation of 88 States for 2021, 107 States for 2022, and 115 States for 2023;

- Overall ICAO policy on CORSIA

Annex 16, Volume IV

2nd Edition

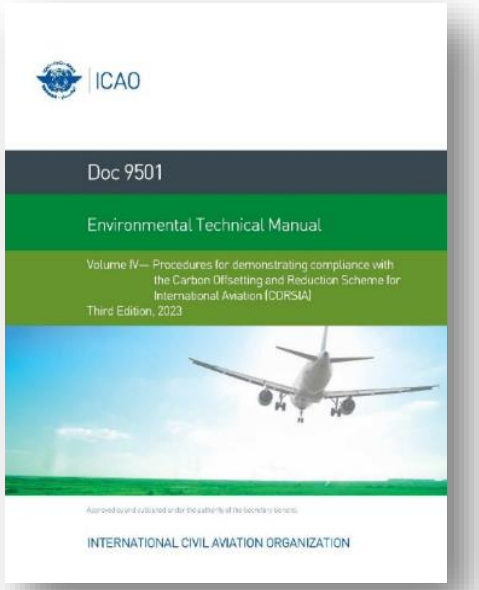
Applicable from 2024



- Standards and Recommended Practices (SARPs) on CORSIA

Doc 9501 (ETM), Vol. IV

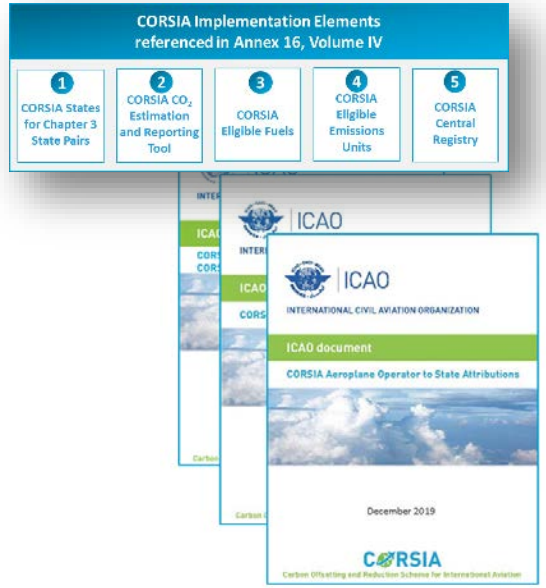
3rd Edition to support 2nd Edition of Annex 16, Volume IV



- Guidance to support CORSIA SARPs implementation

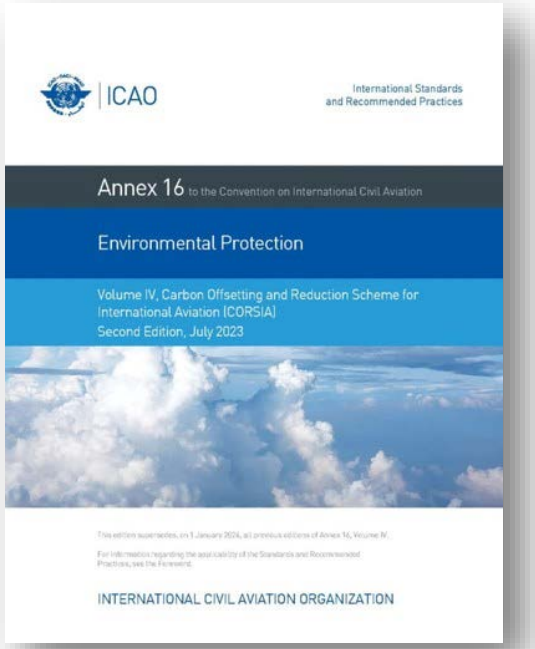
CORSIA Implementation Elements and ICAO CORSIA documents

Regularly updated/approved by Council



- 14 ICAO CORSIA documents directly referenced in Annex 16, Volume IV - Essential for CORSIA implementation

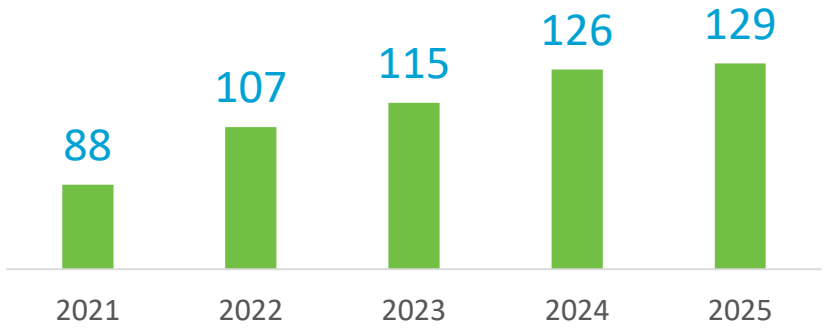
CORSIA IN NUMBERS



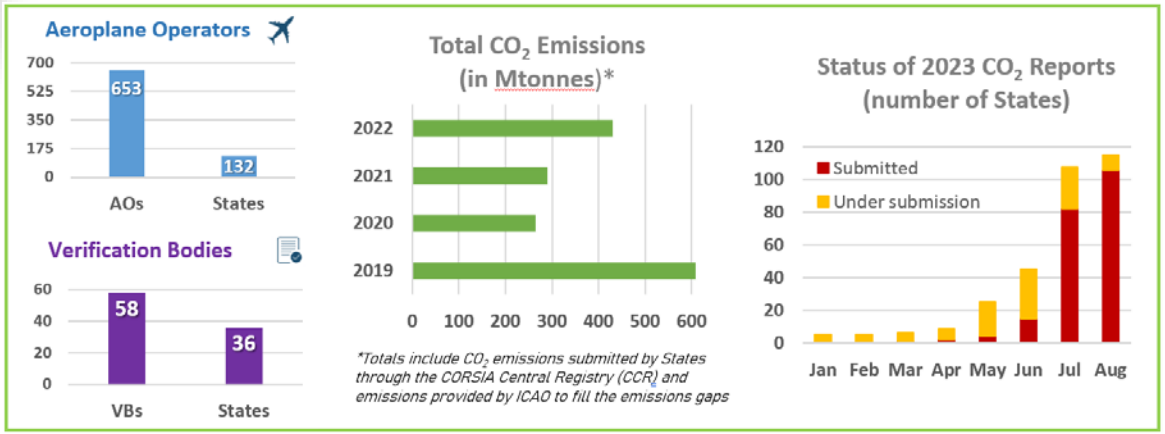
Second Edition of Annex 16, vol. IV

129 States in CORSIA

Participating States



CORSIA Central Registry (CCR)



A collective long-term global aspirational goal (LTAG) of net-zero carbon emissions from international aviation by 2050 (Resolution A41-21 Para 7)

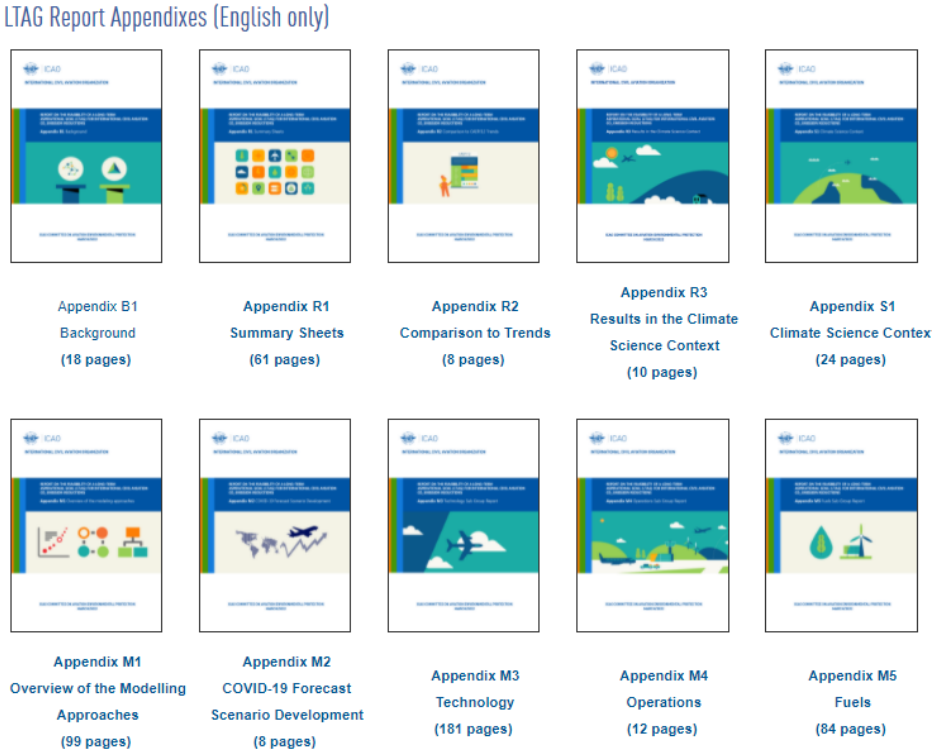
- Need for monitoring of LTAG progress, including through the Stocktaking, the 2050 ICAO Vision, etc. and the consideration of monitoring methodologies (A41-21, para 9)

- Continue to assess progress on SAF, LCAF and other cleaner energy sources for aviation as part of the Stocktaking, CAAF/3 (A41-21, para 28. f))

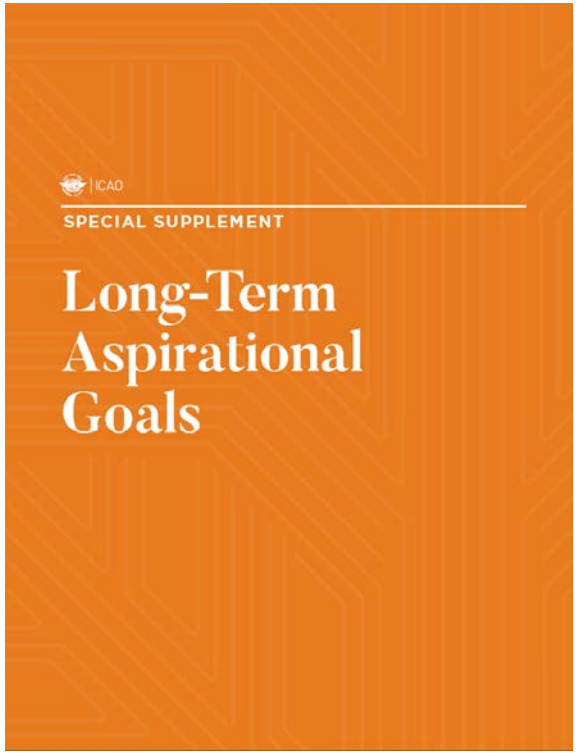
ICAO LTAG NET-ZERO 2050
Long-term global aspirational goal for international aviation

ICAO LTAG REPORT AND SUPPORT PUBLICATIONS

LTAG Report

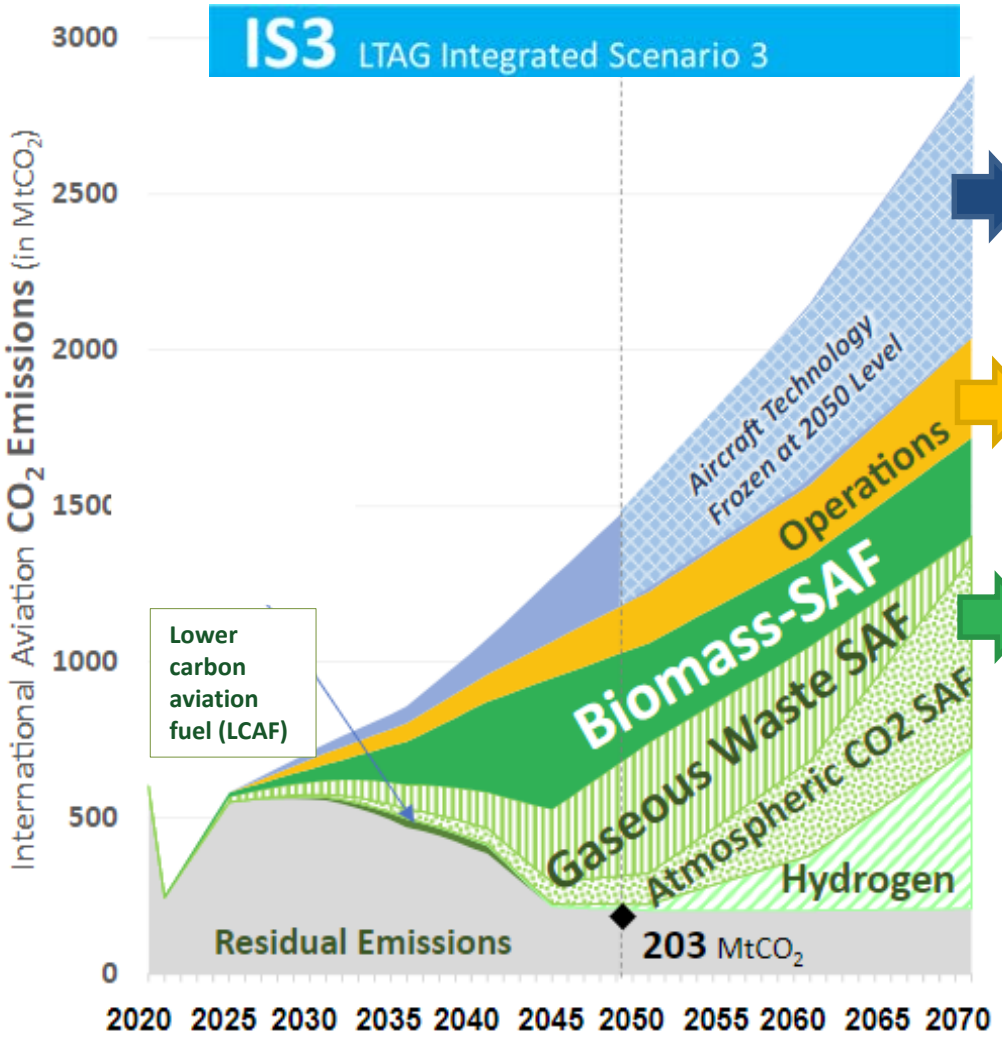


Appendixes to LTAG Report



2022 ICAO Environmental Report Special Supplement on LTAG

Contributions from technology, operations, and fuels towards decarbonization



Advanced tube and wing, unconventional airframe/propulsion concept aircraft, non-drop-in fuels such as battery electric etc.

Improvements in the performance of flights across all phases

Sustainable aviation fuels (SAF) and other cleaner energy have the largest impact on residual CO_2 emissions, driving overall reductions by 2050

Contributions from hydrogen may increase in the 2050s and 2060s if technically feasible and commercially viable

Significant costs and investments will be needed

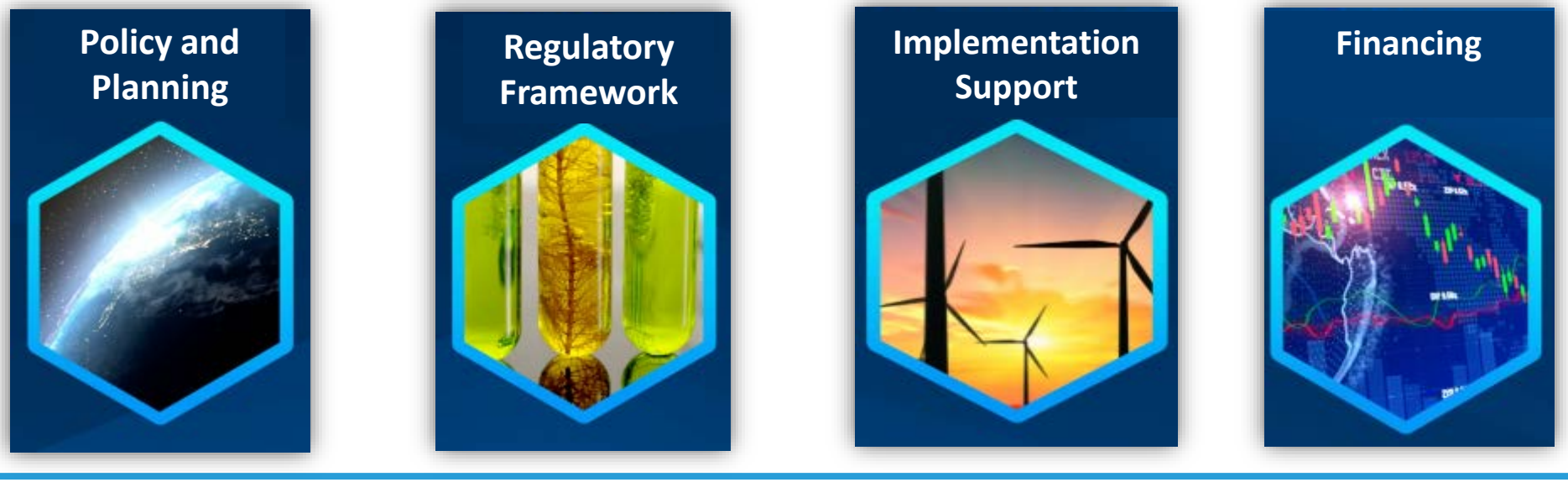
CAAF/3 OUTCOMES

Special Environment Report

Collective global aspirational Vision to reduce CO2 emissions in international aviation by 5 % by 2030, through aviation cleaner energy use

Each State's special circumstances and respective capability will inform its ability to contribute to the Vision

ICAO GLOBAL FRAMEWORK FOR SAF, LCAF AND OTHER AVIATION CLEANER ENERGIES



- Supports global scale up of aviation cleaner energies – Collective Vision to reduce 5% CO2 by 2030
- Provides clarity, consistency and predictability to all stakeholders on 1) policy and planning, 2) regulatory framework, 3) implementation support, and 4) financing – 4 Building Blocks
- Monitors the implementation progress on emissions reductions and means of implementation
- Aspiring to have cleaner energy production facilities in all regions by CAAF/4 (no later than 2028)
- To update the Vision at CAAF/4 on the basis of market developments

CAAF/3 GLOBAL FRAMEWORK – 4 Building Blocks

1. Policy and Planning

- Global aspirational **Vision** to reduce international aviation CO_2 emissions by **5% by 2030**
- Each State's **special circumstances and respective capabilities**
- **CAAF/4** no later than 2028, with a view to update Vision
- **Collaborative effort** across different stakeholders, and encourage **State policies, action plans and roadmaps**
- Implementation **monitored** and periodically **reviewed**

2. Regulatory Framework

- **CORSIA eligibility framework as accepted basis** for SAF, LCAF and other aviation cleaner energies
- Increase the **number of SCS**, additional fuel production **pathways / life-cycle values**
- Parameters for **fuel accounting methodologies**, leveraging on CORSIA MRV system
- **Study of fuel accounting systems** to determine any possible ICAO role

3. Implementation Support

- **Robust, targeted and tailored** capacity -building and implementation support
- **Building on ACT-CORSIA and ACT-SAF programmes**
- Facilitate **partnerships**, and exchange of best practices
- Develop **policy toolkit/guidance** and support **State Action Plans**
- Support **feasibility studies**, **pilot projects**, which may facilitate access to investment
- Support **access to technology**

4. Financing

- **Advocacy and outreach** for greater investment in aviation cleaner energy projects, including UN and international financial community
- Welcome and request for **operationalization of ICAO Finvest Hub** to facilitate better access to public fund / private investment, to respond to Resolution A41-21, para 18. a)
- Expedite work to **consider the establishment of a climate finance initiative or funding mechanism under ICAO**, to respond to A41-21, para 18. b)

ICAO ROADMAP FOR IMPLEMENTATION OF CAAF/3 OUTCOMES AND LTAG

STK = Annual LTAG Stocktaking events

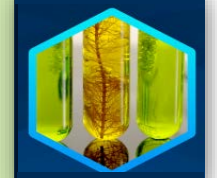
STK 2023 · STK 2024 · STK 2025 · A42 · STK 2026 · STK 2027 · STK 2028 · A43 · A44 (2031) to A50 (2049) · STK 2050

CAAF/3

Vision & Global Frame work

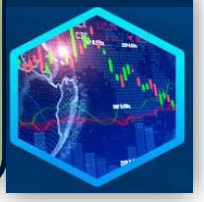
Policy and Planning

Regulatory Framework



Implementation Support

Financing



SAP = State Action Plans

LMR = LTAG Monitoring & Reporting

- Update SAP guidance
- LMR methodologies
- Update SAP guidance
- Update LMR methodologies
- Assess / monitor / report LTAG implementation
- New fuel pathways, new SCS, updated and new Tracker Tools
- Study of fuel accounting systems and LMR methodologies
- ICAO regulatory frameworks
- ICAO IT Platform (Cleaner Fuel Central Registry (CFCR))
- Training, guidance, templates, best practices, technical cooperation etc.
- 20 ACT-SAF feasibility studies & business cases
- + 30 ACT-SAF feasibility studies & business cases
- Extend ACT-SAF to ACT-LTAG
- Operationalize ICAO Finvest Hub
- Facilitating access to financing for projects through the ICAO Finvest Hub
- Study and report on a climate finance initiative or funding mechanism under ICAO
- Consider any further action on initiative or mechanism, as appropriate
- Advocacy & outreach on financing to aviation decarbonization projects

CAAF/4

Vision & Global Frame work Review

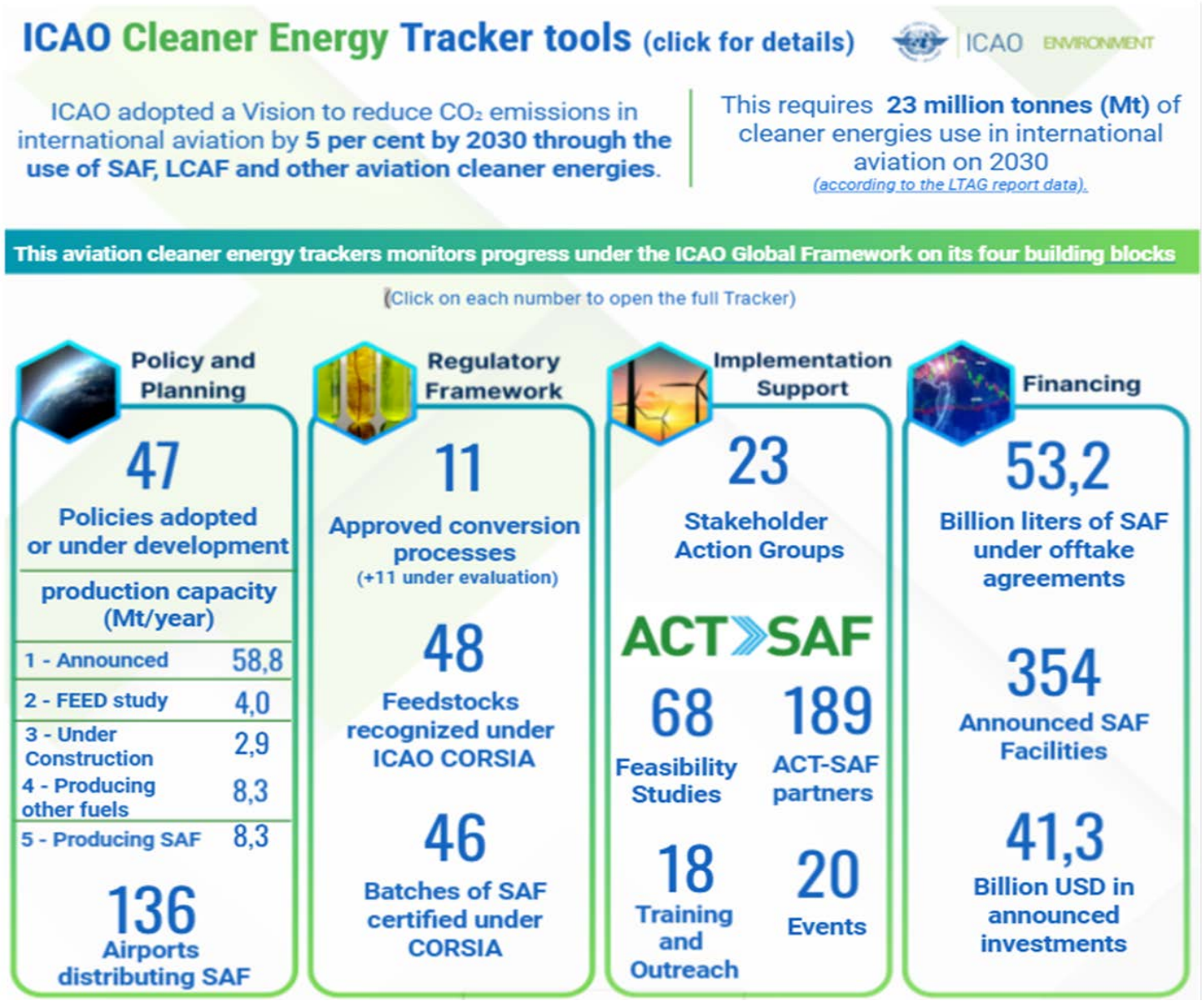
Key inputs for next decades

CAAF/5
CAAF/6
CAAF/7
...

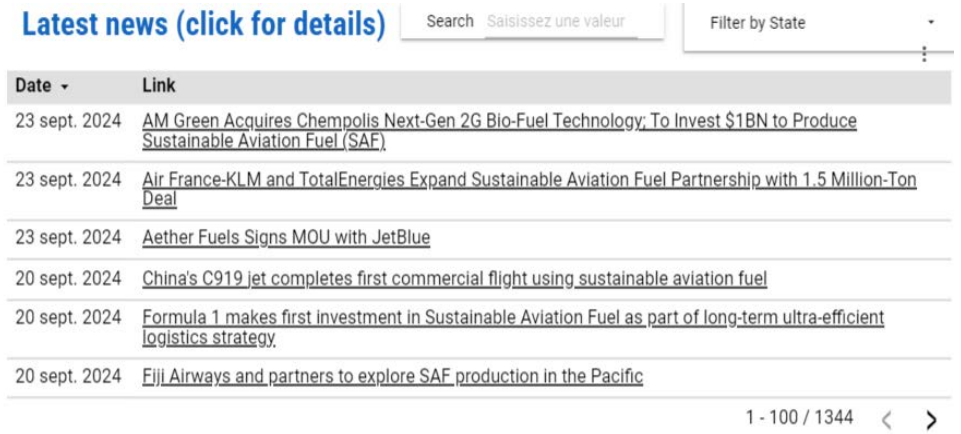
CORSIA Special Review by 2032

LTAG of net-zero carbon emissions by 2050

SAF TRACKING TOOL FOR MONITORING PROGRESS

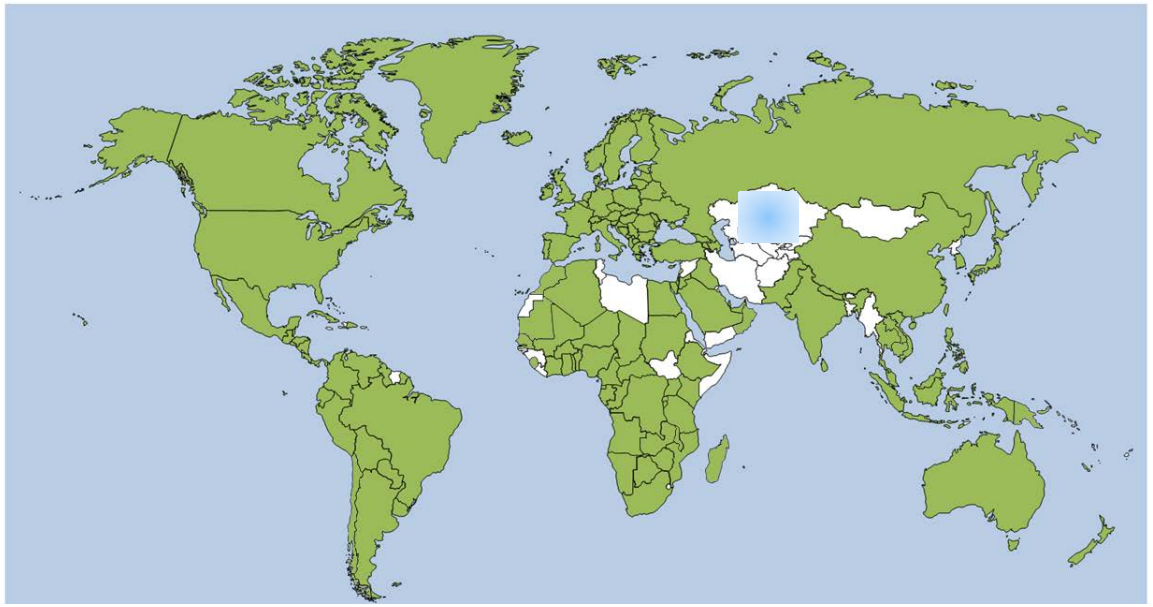


ICAO SAF tracking tools to monitor progress and facilitate information exchange

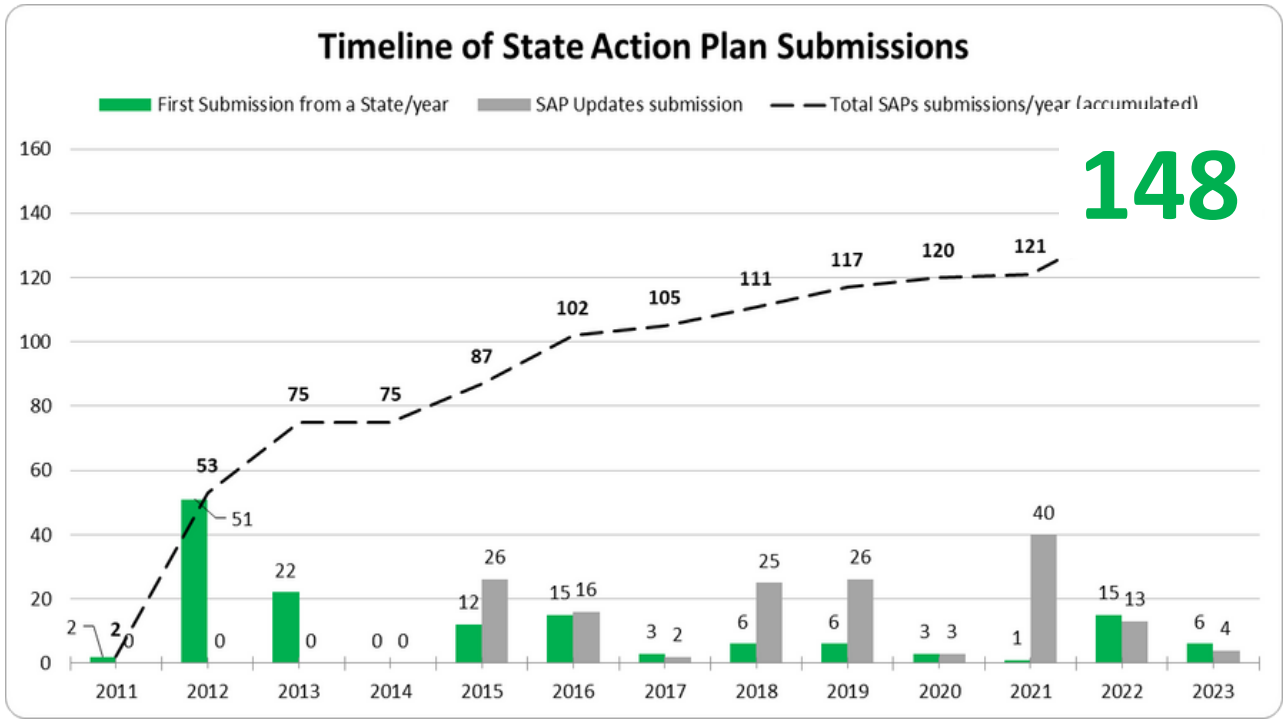


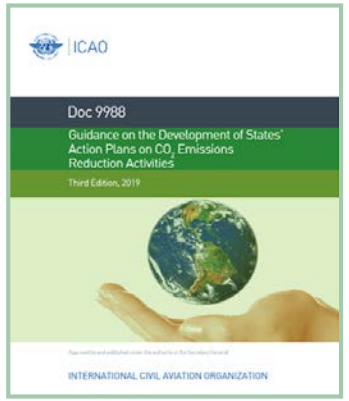
ICAO STATE ACTION PLANS INITIATIVE

148 States (98.99% of global RTK) have voluntarily submitted State Action Plans



Need for SAP updates in light of LTAG and Global Framework





Guidance on the Development of States' Action Plan on CO2 Emissions Reduction Activities (Doc 9988)

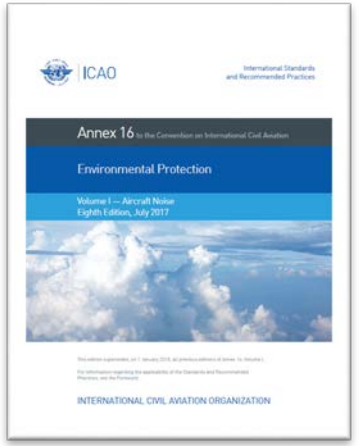
Updated version is now available !

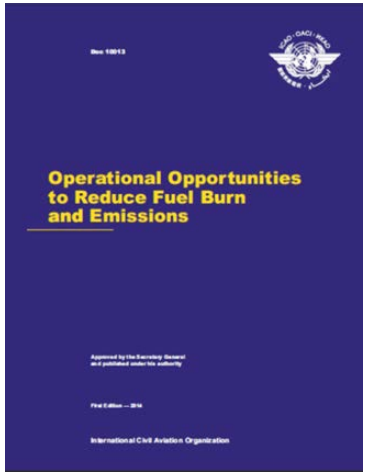
ICAO' WORK ON AIRPORTS

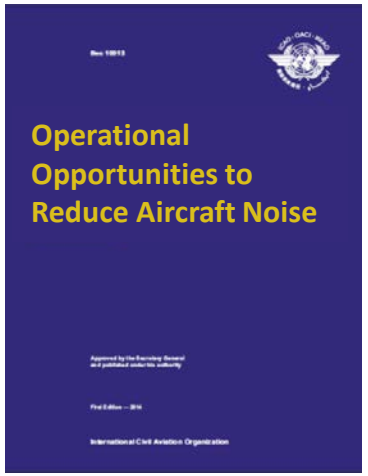
ICAO developed a range of guidance documents:

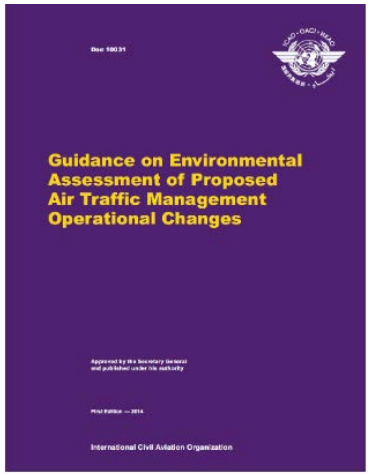
- ICAO Standards: Annex 14 and Annex 16
- guidance materials related to airports and operations (Airport Services Manual (Doc 9137); Aerodrome Design Manual (Doc 9157);

- practical and ready-to-use information to support the planning and implementation of airport infrastructure projects: Eco Airport e-collection









ECO AIRPORT TOOLKIT E – COLLECTION

ICAO fosters the **exchange of information on best practices for Green Airports**, covering such subjects as smart buildings, renewable energy, green mobility, climate change resilience resource and biodiversity protection, community engagement and sustainability reporting

With the aim of sharing and harmonizing best practices amongst airports. ICAO has developed **practical and ready-to-use information to support the planning and implementation of airport infrastructure projects**

The material is provided as general information only

Eco-Airport Toolkit e-collection (icao.int)

ECO AIRPORT TOOLKIT E – COLLECTION

Addressing Single-Use Plastics: an Overview for Aviation

Unmanned Aircraft Operations

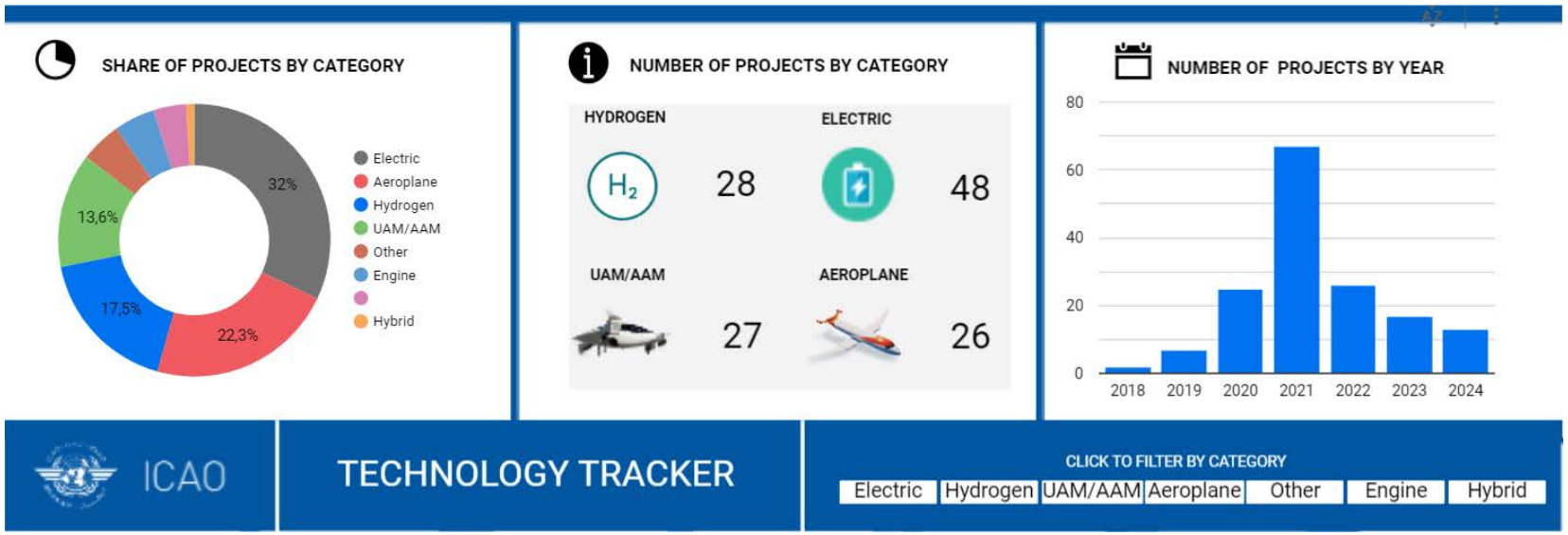
Innovation and Technology in Airport Sustainability-2023

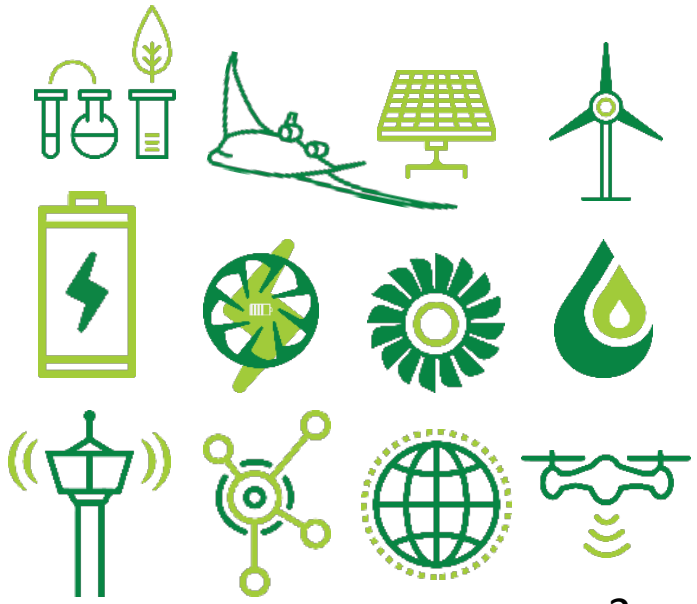
GHG Management and Mitigation at Airports

Eco-Airport Toolkit e-collection (icao.int)

ENV-driven Technologies – Emerging Topics

- **Environmental impacts of UAM/AAM:** - Noise impact and green energy sources implementation
- **Hydrogen-powered aircraft:** - Novel technologies, certification, fuel-farm, airport infrastructure
- **Electric-powered aircraft and battery management:** - Sustainable energy sources, battery production and recycling
- **Sustainable Aviation Fuels (100% SAF use):** - Multiple industry test flights and support for 100% SAF
- **Novel infrastructure (eVTOL vertiports and airport facilities):** - Integration of infrastructure and green energy sources
- **New innovative operational measures (e.g. formation flight):** - Integration with ATM and other CO2 reduction measures





SUMMARY

- ICAO leads SARPs maintenance and development on **Aircraft Noise**, **Local Air Quality** and **Climate Change & Aviation CO2 Emissions**.

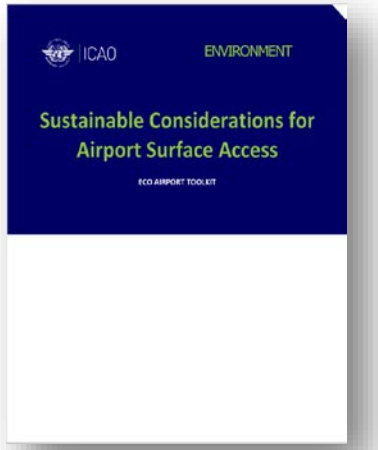
- Industry and Manufacturers are actively supporting the **ICAO ACT-SAF Programme,** and all stakeholders are encouraged to **become ACT-SAF Partners**.

- While aviation continues to play a pivotal role in global connectivity and economic growth, ICAO will continue to work in close **cooperation with its 193 Member States**, **industry, energy sector, financial institutions, and civil society** to ensure aviation's journey towards its **decarbonized and sustainable future.**

Thank You

ICAO 80

Guidance on Sustainable Considerations for Airport Surface Access



Publically available on the ICAO website
Sustainable Considerations for Airport Surface Access.pdf (icao.int)

- Customers appreciate convenient, affordable, and accessible means to access and leave the airport. Increasingly, they also expect airports to operate sustainability

- **Strategic planning and implementation of surface access is an important consideration for mitigating environmental impacts** and bring social and economic advantages

- The airport Master Planning process will generally consider the needs for access to the terminal curb, parking, rental car facilities, and other capacity constraints. Several sustainable solutions address the issues associated with airport surface access

Guidance on Climate Resilient Airports

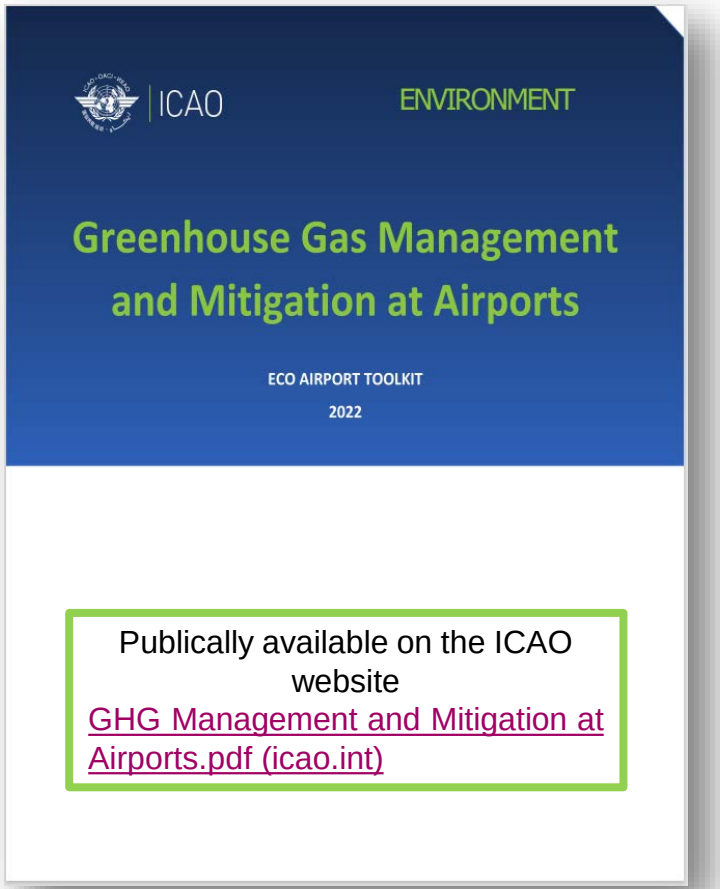
Publically available on the ICAO website
Climate resilient airports.pdf (icao.int)

- Climate change presents many challenges for aviation, and the impacts of changing climate are felt at airports worldwide. **Strengthening airports to be more resilient to the impacts of climate change has become a major theme of airport planning**

- A climate resilient airport is one that has taken steps to prepare for the challenges that climate change and severe weather bring.

- Provides recommendations and guidance on resilience planning (Master Plans)

Guidance on GHG Management and Mitigation at Airports



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GHG Management and Mitigation at Airports.pdf (icao.int)

Airports have a critical role to play in the sustainable development of the aviation eco-system. More work needs to be done. For instance, by continuing the research on the impacts of integrating new sustainable aviation fuels at the airport or exploring ways to produce renewable energy onsite

- **Airports are key stakeholders to improve practices on the ground**. Better airport traffic sequencing, allowed by the implementation of innovative e-tools such as Airport Collaborative Decision Making tools, help to improve the overall efficiency of airport operations, especially turn-around and pre-departure sequencing, thus avoiding unnecessary GHG emissions