



ICAO ESAF/ WACAF: Workshop on SAPs and Implementation/Monitoring of Selected Measures

**INTERNATIONAL
CIVIL AVIATION
ORGANIZATION**

Virtual, 15 Sept 2026



ICAO Secretariat

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Outline

Topics to be covered

- 1. SAP as an ICAO initiative**
- 2. Implementation and Reporting of Selected Measures**
- 3. ICAO SAP Tools: Focus on the EBT (Demo)**
- 4. Submitting SAPs to ICAO**

SAP as an ICAO initiative:

- ICAO Goals

- Status of development of SAPs

- Doc 9988

What is a State Action Plan?

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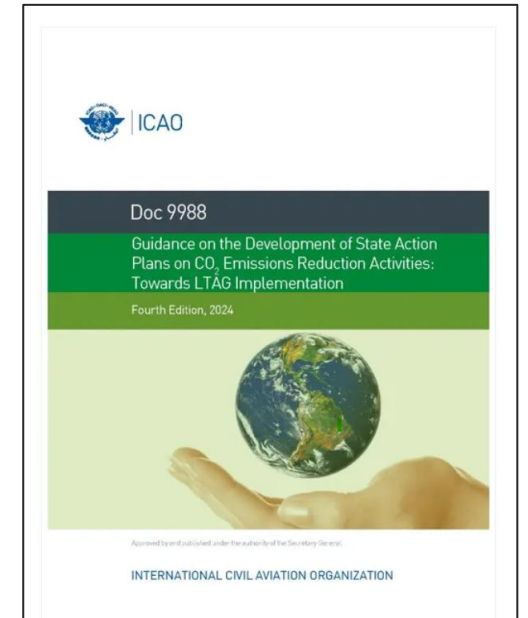
- State Action Plans are a voluntary strategic documents developed by States to outline their national long-term strategies in reducing CO₂ emissions from international aviation
- framework for setting emissions reduction targets, selecting mitigation measures, and engaging relevant national stakeholders
- It is a living document to be updated every 3 years



A State Action Plan is a living document that defines a State's actions to reduce their CO₂ emissions from international civil aviation.



Within a State it is a planning and coordination tool, and it provides a clear communication route to ICAO.



Background

- Resolution A37-19 (2010): *Resolution on Climate change* established the State Action Plan initiative
- Resolution A38-18 (2013), Resolution A39-2 (2016) , Resolution A40-18 (2019): reaffirmed this initiative.
- Resolution A41-21 (2022) and
- **Resolution A42-21 (2025)**: *Consolidated statement of continuing ICAO policies and practices related to environmental protection — Climate change → (...) Recognizing the need to further develop and update State Action Plans, including the quantification of CO₂ emissions reduction benefits with practical tools, for sustainable aviation and infrastructure with the focus on environment-driven innovations;*



Further encourages States to submit and update their **voluntary action plans** outlining respective policies, actions and roadmaps, including long-term projections

(A42-21 Para. 12)



Invites States to **prepare or update** action plans to submit them to ICAO **as soon as possible preferably by the end of June 2027** and once every three years thereafter

(A42-21 Para. 13)



Encourages to share information contained in action plans and **build partnerships** with other Member States

(A42-21 Para. 14)

The State Action Plan Process

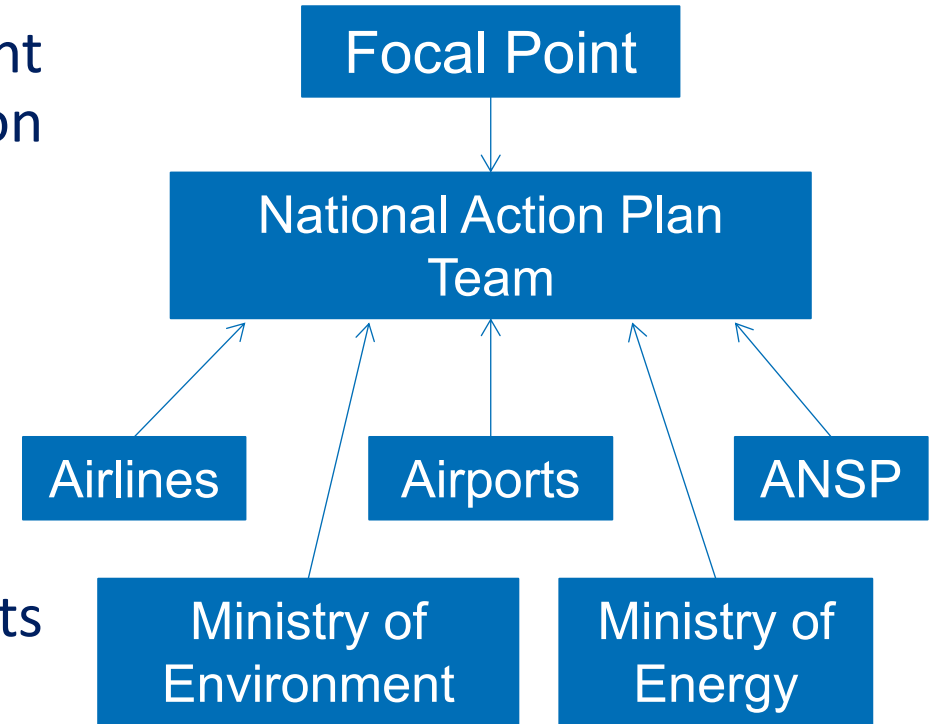
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→ The State:

- Designates a State Action Plan Focal Point and communicates their contact information to ICAO

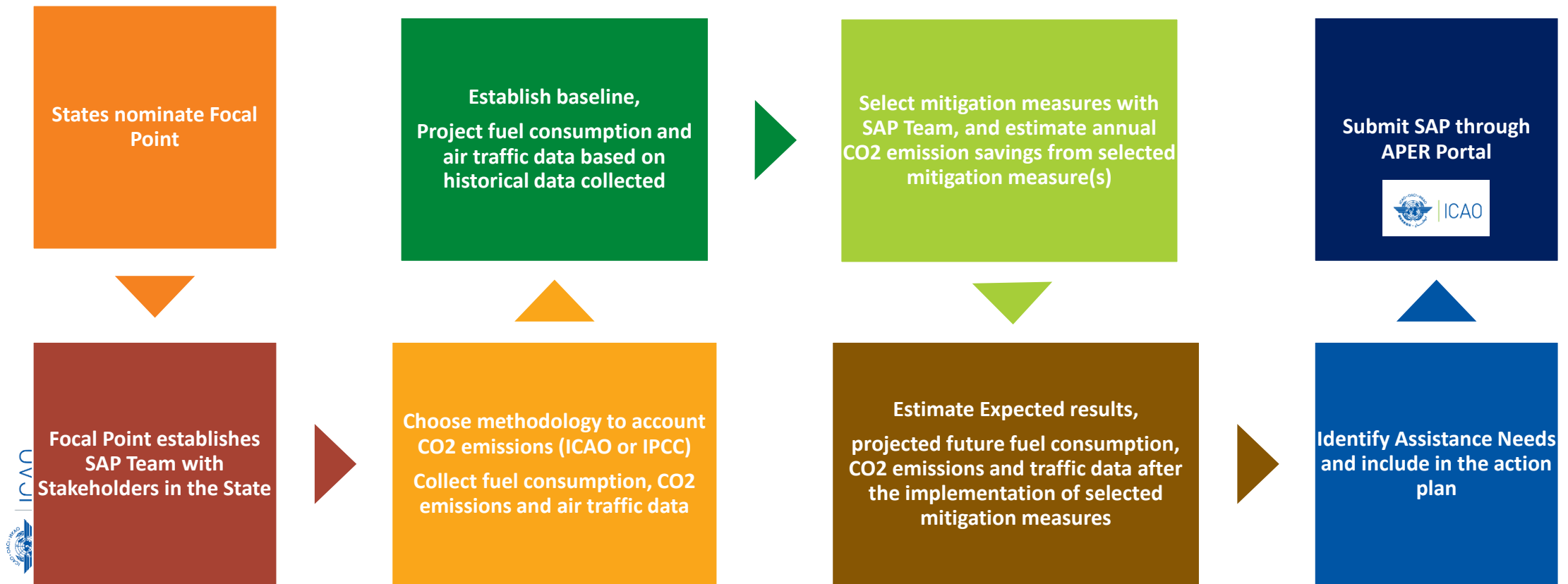
→ The Focal Point:

- Coordinates with ICAO
- Establishes a National Action Plan Team
- Develops the State Action Plan and submits the document to ICAO



What is the process of developing a State Action Plan?

State Action Plan Process



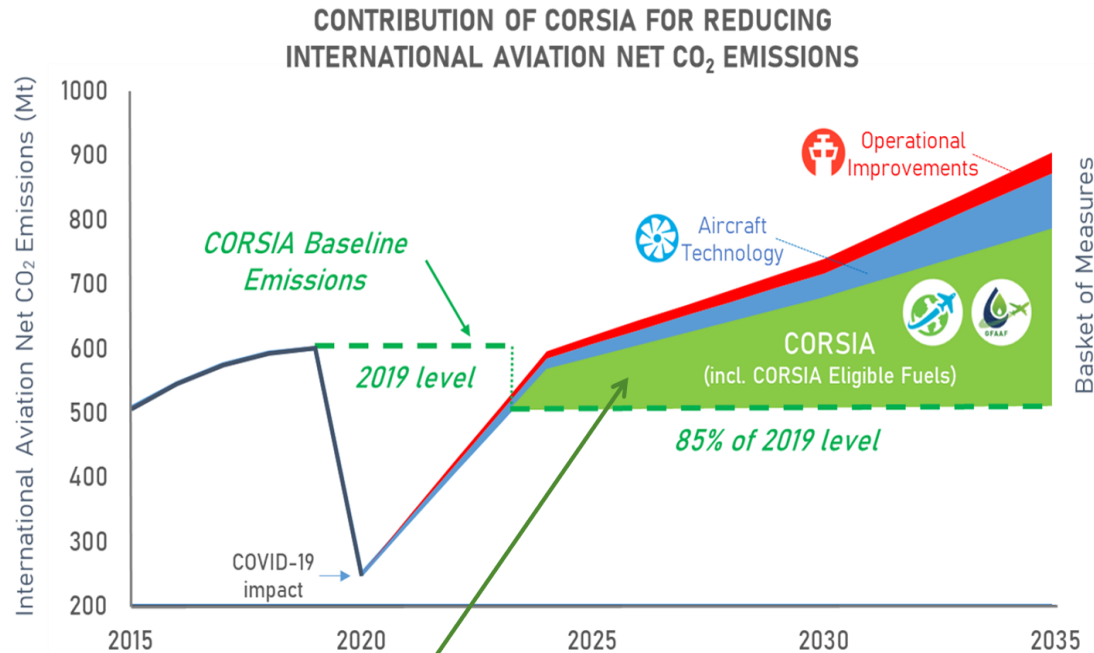
What does a State Action Plan contain?

9

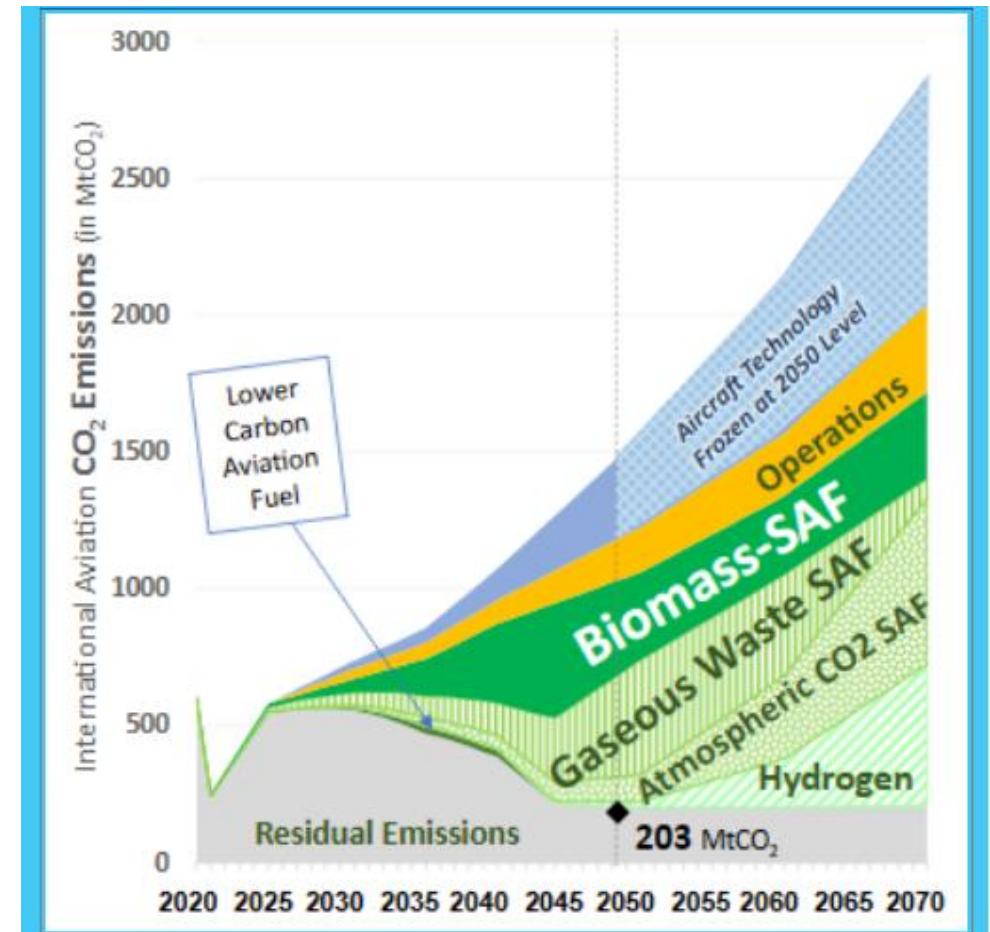
5 Basic Elements (Minimum Requirements)

- 1 **Contact Information** of the State Focal Point.
- 2 **Baseline** (without action) fuel consumption CO2 emissions and traffic (from the latest available year to 2050).
- 3 **Measures** to mitigate CO2 emissions (deriving from the ICAO Basket of Measures).
- 4 **Expected results** (fuel consumption, CO2 emissions, and traffic with the implementation of mitigation measures from the latest available year to 2050).
- 5 **Assistance needs** for example financial, technological or capacity building.

ICAO Goals and scenario



CORSIA addresses the remaining “emissions gap” to achieve CNG2020



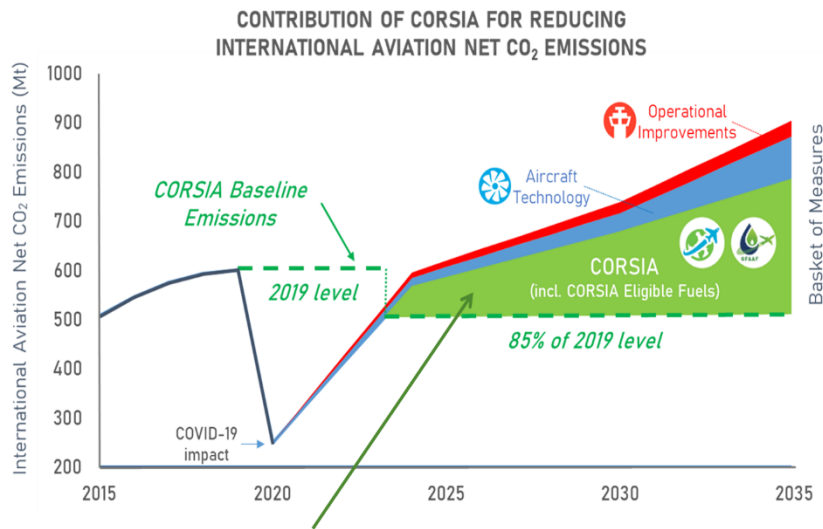
Long-term global aspirational goal (LTAG)

- The 41st ICAO Assembly adopted a long-term global aspirational goal (LTAG) for international aviation of net-zero carbon emissions by 2050 in support of the UNFCCC Paris Agreement's temperature goal.

SAP as an ICAO initiative

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→ The ICAO State Action Plan initiative is one of ICAO's most successful voluntary climate action programmes, demonstrating strong global commitment to aviation decarbonization.



CORSIA addresses the remaining "emissions gap" to achieve CNG2020

Tracking Global Progress Through State Action Plans

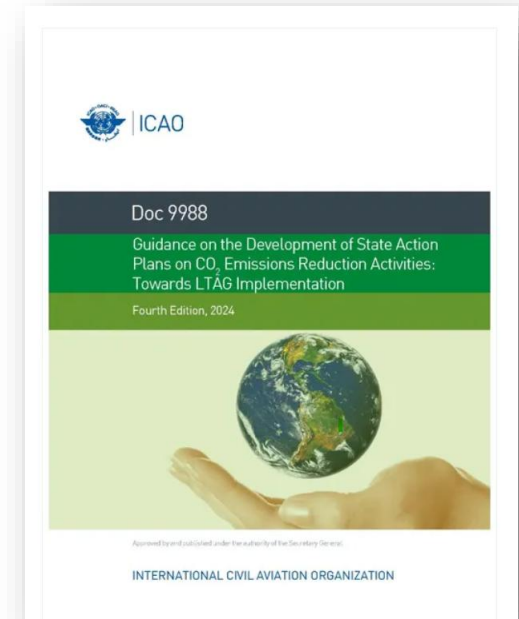
- The quantified information submitted in State Action Plans enables ICAO to compile global progress toward its aspirational climate goals, including:
 - 2% annual fuel efficiency improvement
 - Carbon Neutral Growth from 2020 onwards (85% of 2019 emissions)
 - Collective Long-Term Global Aspirational Goal (LTAG) of net-zero carbon emissions by 2050, and
 - 5% reduction in CO₂ emissions by 2030 through the use of aviation cleaner energies



Why State Action Plans are Important?

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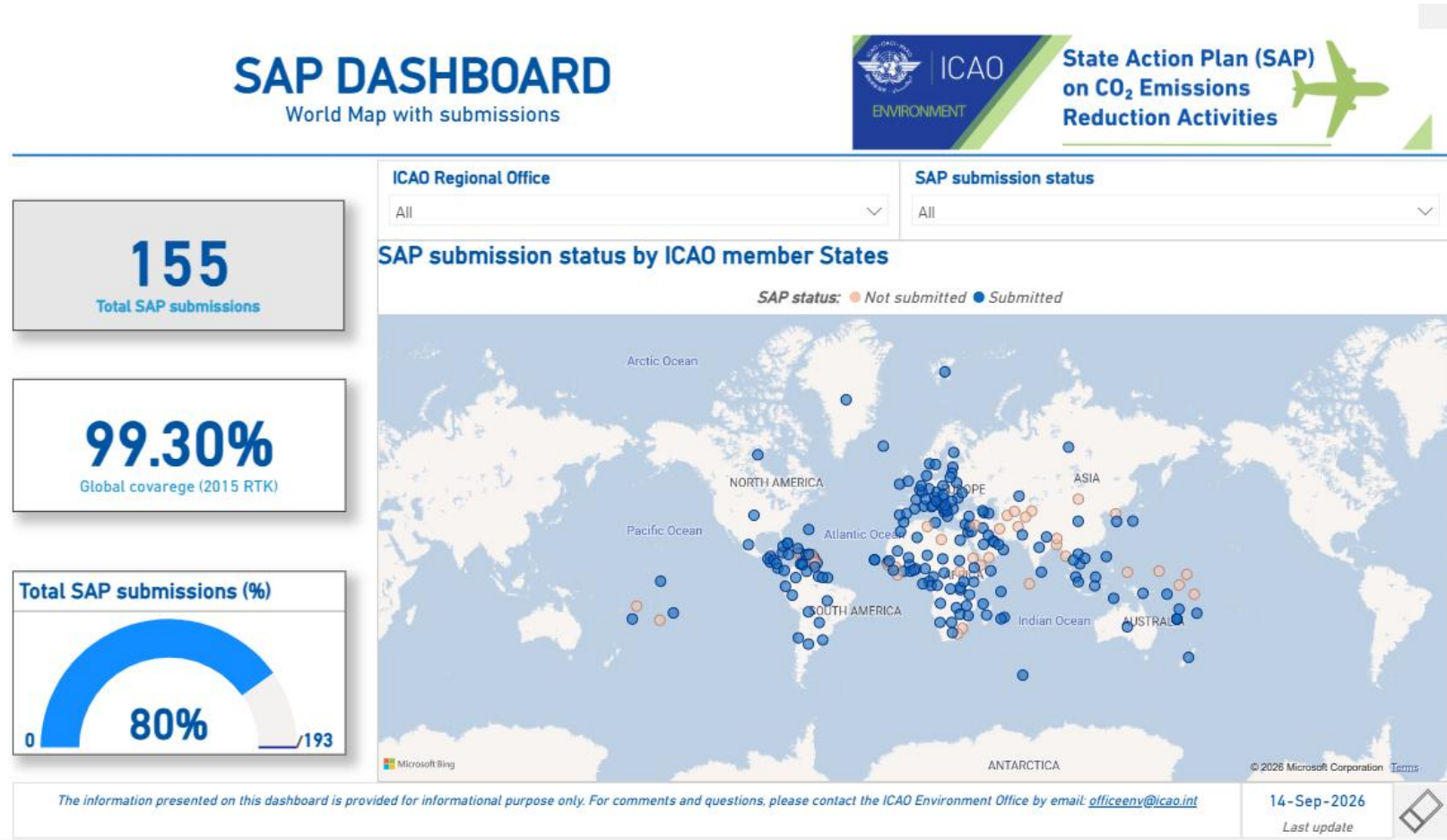
- With the adoption of ICAO's Long-Term Global Aspirational Goal (LTAG) and the ICAO Global Framework for SAF, LCAF and other Aviation Cleaner Energies, State Action Plans have become even more critical.
- They now serve as strategic tools for:
 - **Tracking Progress** toward net-zero carbon emissions by 2050.
 - **Monitoring Collective Advancement** toward the near-term goal of a 5% CO₂ emissions reduction by 2030 through aviation cleaner energies.
 - **Accessing Support** via ICAO's **ACT-SAF programme** for sustainable aviation fuels.
 - **Unlocking Financing** for decarbonization projects through ICAO's **FINVEST Platform (Finvest Hub)**.



ICAO Doc 9988: Guidance on the Development of State Action Plans on CO₂ Emissions Reduction Activities: Towards LTAG Implementation (Doc 9988)

Global: Latest achievements on SAP submissions

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155 States representing **99.30%** of global RTK have voluntarily submitted their State Action Plan

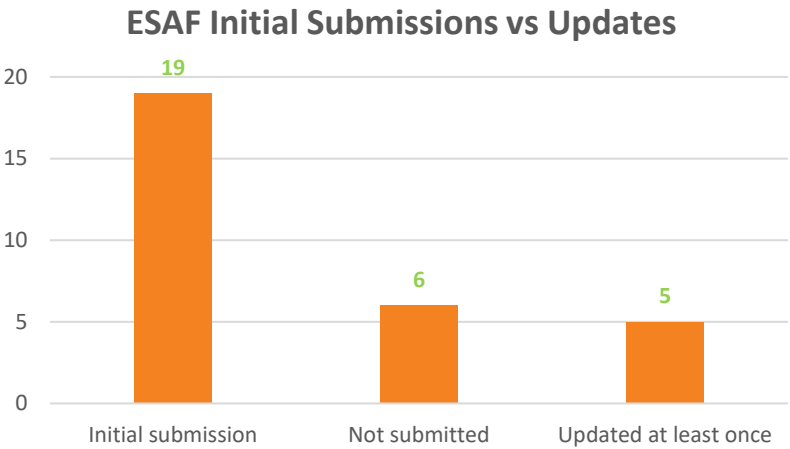


ICAO State Action Plans Website

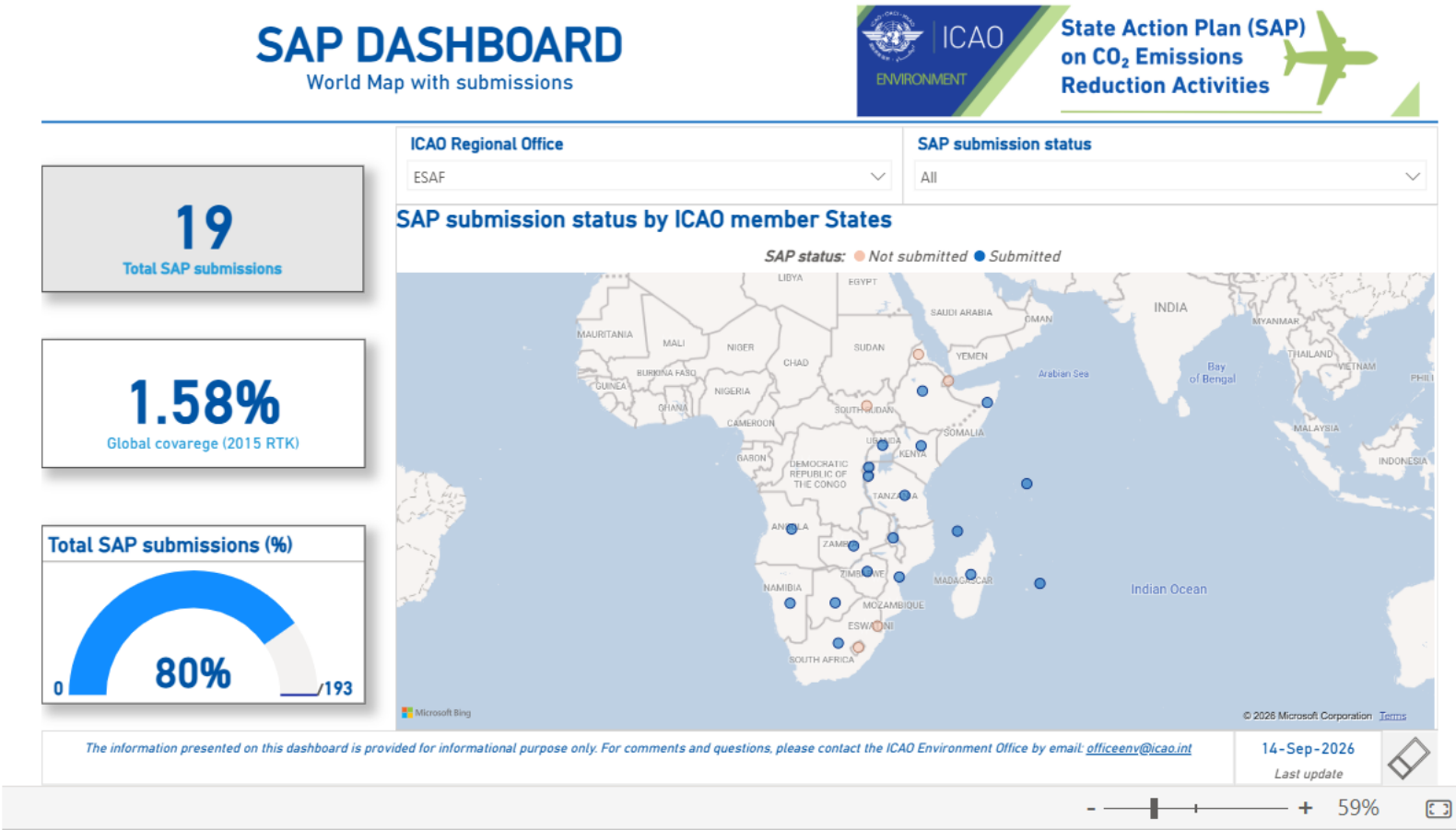
Dashboard: State Action Plans and Assistance

ESAF: Latest achievements on SAP submissions

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19 States representing
79% of ESAF States have
voluntarily submitted their
State Action Plan

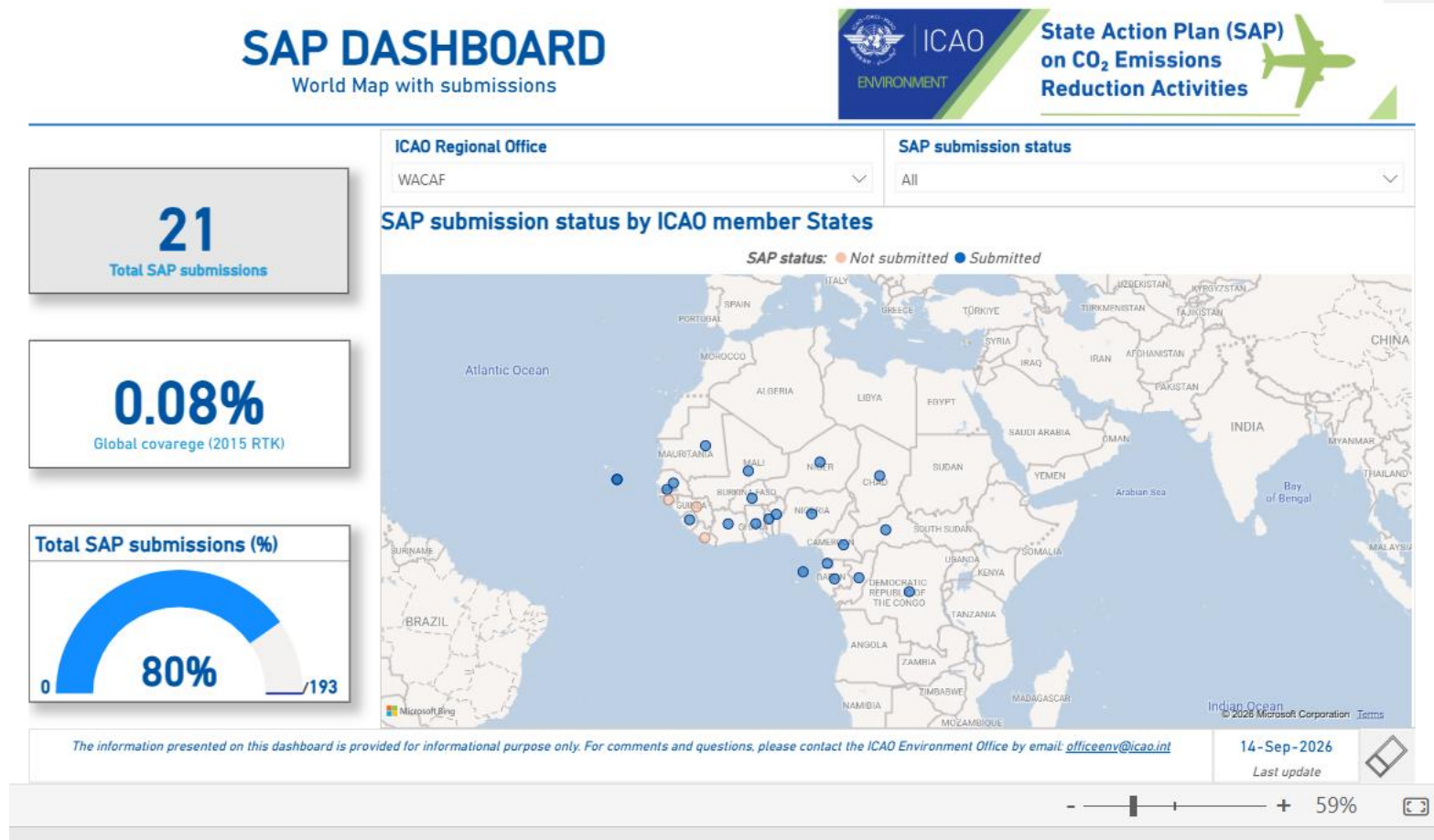


Dashboard: State Action Plans and Assistance

WACAF: Latest achievements on SAP submissions

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21 States representing
88% of WACAF States have
voluntarily submitted their
State Action Plan



Dashboard: State Action Plans and Assistance

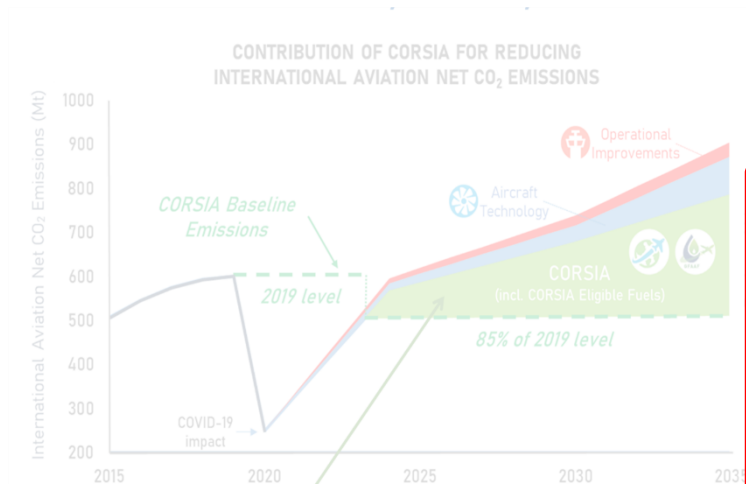
Recap: SAP as an ICAO initiative

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→ The ICAO State Action Plan initiative is one of ICAO's most successful voluntary climate action programmes, demonstrating strong global commitment to aviation decarbonization.

Tracking Global Progress Through State Action Plans

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SAP as an ICAO initiative

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CORSIA

LTAG

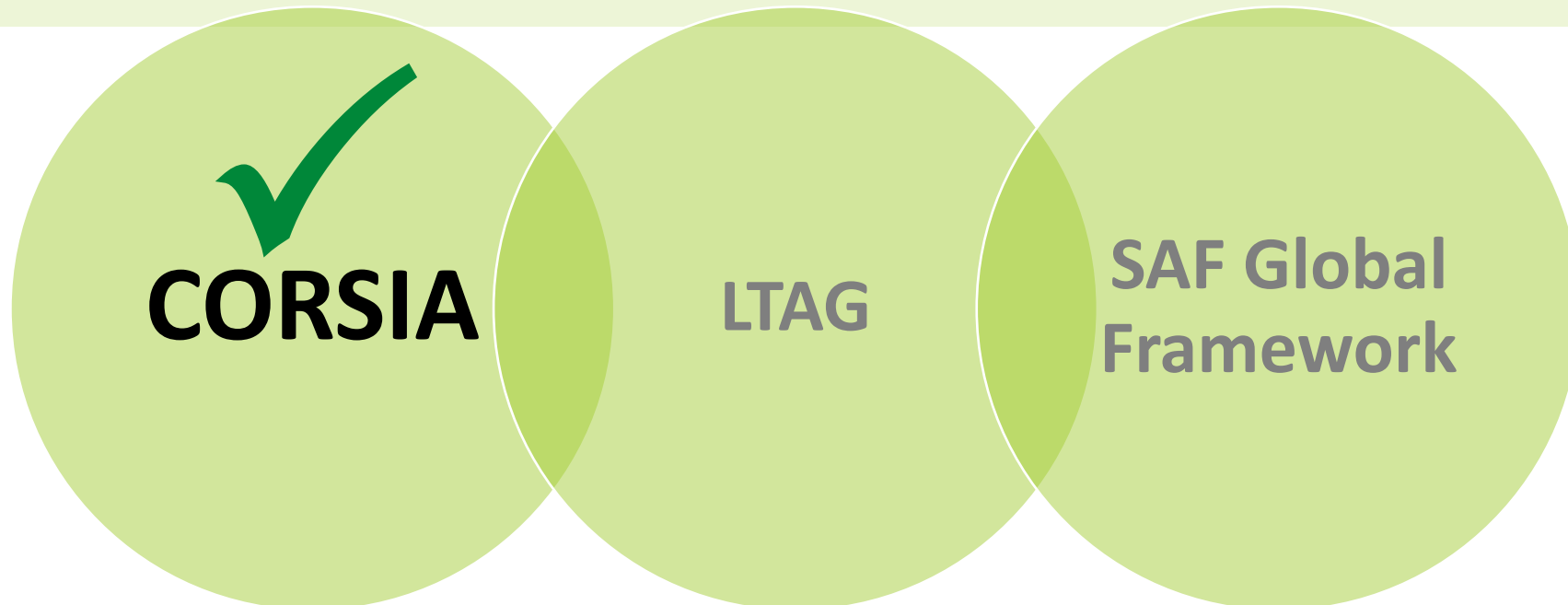
SAF Global Framework

SAP as an ICAO initiative

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What is the relationship between State Action Plans and CORSIA?

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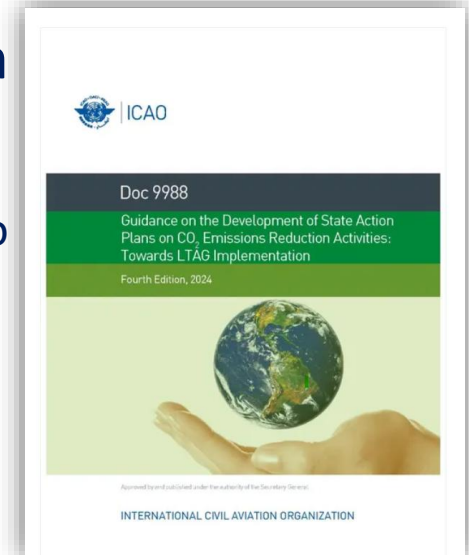
State Action Plans:

- a big-picture document that captures information related to all of a State's activities related to addressing CO₂ emissions from international civil aviation.
- **CORSIA is one element of the basket of measures**, so relevant actions by the State to implement CORSIA can be included in the State Action Plan.



NOTE!!

- the "baseline scenario" in terms of the present and future CO₂ emissions projection established by each State in their State Action Plan is **different from the State's CO₂ emissions in the CORSIA "baseline year" of 2019.**
- However, the information reported to the State through the CORSIA MRV system can serve as a basis for the fuel consumption and CO₂ emissions data in the State Action Plans.



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Connection between LTAG and State Action Plans

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Resolution A42-21 associates LTAG and SAP



State Action Plans are vital for monitoring the progress towards the LTAG of net-zero emissions by 2050.



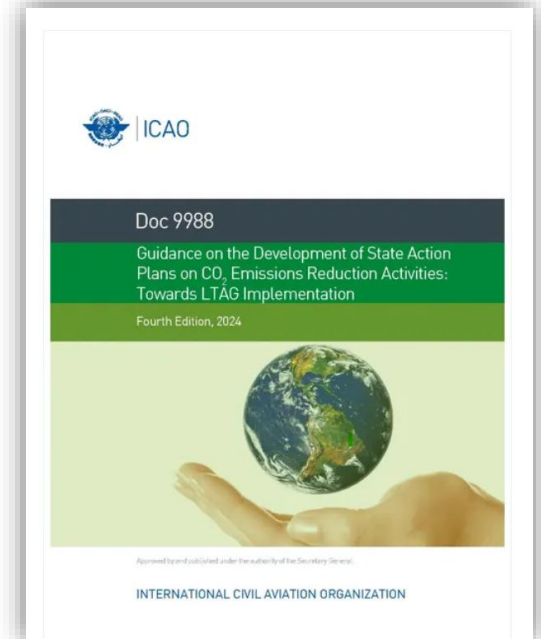
ICAO LTAG

Adopted by ICAO Assembly
Resolution A41-21 (2022)

https://www.icao.int/environmental-protection/Documents/Assembly/Resolution_A41-21_Climate_change.pdf



- **Mandate from ICAO Assembly Resolution A41-21 (Paragraph 9):**
ICAO Resolution A42-21 designates SAPs as a key **LTAG monitoring tool**.
- **Transparency & Accountability:**
SAPs provide a structured way for States to **report emissions data, share mitigation strategies, and demonstrate commitment** to achieve aspirational goals.
- **Data-Driven Assessments:**
Supports ICAO's data-driven assessments and policy guidance.

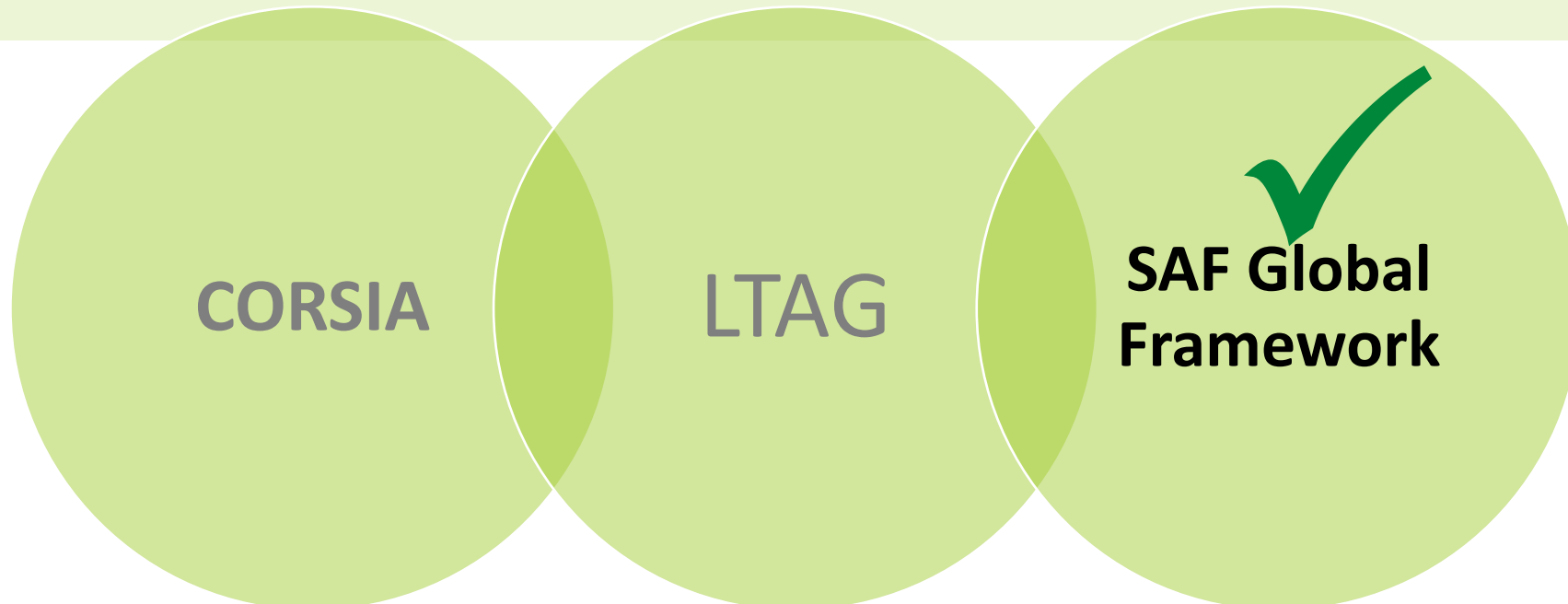


SAP as an ICAO initiative

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Tracking Global Progress Through State Action Plans

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Connection between The Global Framework for SAF, LCAF and other Aviation Cleaner Energies and State Action Plans

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Building Block 1 - Policy and Planning: Collaborative effort across different stakeholders, and encourage State policies, action plans and roadmaps

Building Block 3 – Implementation Support: Develop policy toolkit/guidance and support State Action Plans

State Action Plans play an important role in the implementation of the Global Framework

ICAO Global Framework for SAF, LCAF and other Aviation Cleaner Energies

(Adopted by CAAF/3 on 24 November 2023)

Whereas the 41st Session of the Assembly resolved under Resolution A41-21, paragraph 7 that “ICAO and its Member States are encouraged to work together to strive to achieve a collective long-term global aspirational goal for international aviation (LTAG) of net-zero carbon emissions by 2050, in support of the Paris Agreement’s temperature goal, recognizing that each State’s special circumstances and respective capabilities (e.g. the level of development, maturity of aviation markets, sustainable growth of its international aviation, just transition, and national priorities of air transport development) will inform the ability of each State to contribute to the LTAG within its own national timeframe”;

Whereas the Assembly Resolution A41-21, paragraph 8 further recognizes that “the LTAG is a collective global aspirational goal, and it does not attribute specific obligations or commitments in the form of emissions reduction goals to individual States, and urges each State to contribute to achieving the goal in a socially, economically and environmentally sustainable manner and in accordance with national circumstances”;

1. Policy and Planning

- Global aspirational **Vision** to reduce international aviation CO₂ 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**

10. States are encouraged to include their respective policies, actions and roadmaps for the development and deployment of SAF, LCAF and other aviation cleaner energies, in their State Action Plans, and where possible, to:
 - a) identify resources, capacity and other factors (e.g. capacity assistance and access to technology) required;
 - b) help ICAO to tailor capacity building and implementation support measures, including facilitating access to financing and funding, in line with the State's needs; and
 - c) to quantify their Plans, to support ICAO's work in monitoring progress towards achieving the LTAG.
11. The implementation of the global framework should be continually monitored and periodically reviewed, including through annual ICAO stocktaking, and the convening of CAAF/4. In this regard, ICAO, with the technical contribution of CAEP, should identify and develop methodologies for monitoring the:
 - a) progress on emissions reductions from SAF, LCAF and other aviation cleaner energies toward the achievement of the LTAG, including through the gathering, compiling and analyzing, by ICAO, of actions undertaken by States according to their State Action Plans and other relevant State reporting mechanisms;
 - b) progress, at a global and regional level, on means of implementation support, including financing, provided to achieve the emissions reductions from SAF, LCAF and other aviation cleaner energies toward the achievement of the LTAG, including through the gathering, compiling and analyzing, by ICAO, of actions undertaken by States, industry, and other stakeholders; and
 - c) impacts on the sustainable growth of the aviation industry, the geographical distribution of SAF production, cost impacts (including airfares and the price of SAF, LCAF and other cleaner

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energies), and the maintenance of fair and equal opportunities for the development and deployment of SAF, LCAF and other aviation cleaner energies, aspiring to have production sites in all ICAO regions before CAAF/4.



Building Block 3 – Implementation Support

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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**

Building Block 3 – Implementation Support

17. All States should have access to the means to participate across all stages of the development and deployment of SAF, LCAF and other aviation cleaner energies, and all States and regions are encouraged to work together in a spirit of solidarity to ensure there is a truly global effort to contribute to, and benefit from, the work to reduce emissions from such aviation cleaner energies.

18. The global scale-up in production of SAF, LCAF and other aviation cleaner energies requires a robust and substantial capacity-building and implementation support programme. States, ICAO, industry, academia and other relevant stakeholders are encouraged to work together to deliver such a programme that:

- a) recognizes the need for an expanded, robust, targeted and tailored support to account for the various stages of readiness across the entire SAF/LCAF value chain, taking into account different circumstances across States and regions;
- b) facilitates partnerships, alliances and cooperation between States and all relevant stakeholders, including regional collaborations that may result in regional solutions that produce fuels efficiently;
- c) includes exchange of information, sharing of best practices and technological developments among States, for which ICAO should provide a platform to facilitate this exchange and track progress;
- d) supports States in their planning, development and implementation of national and regional policies that can be applied across all stages of fuel supply-chain, including the following potential policy components that form part of a non-exhaustive 'toolkit' (referred to paragraph 6 above):

- h) assists in the development of relevant aspects of State Action Plans and roadmaps, including ICAO guidance and tools, and State-to-State support partnerships, noting that State Actions Plans may also include information on specific assistance needs for the implementation of measures to reduce aviation CO₂ emissions, which may facilitate access to investment and technology.

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Implementation and Reporting of Selected Measures:

Monitoring and Reporting Methodologies

Resolution A42-21* requested the ICAO Council... (Para 10)

with the technical contribution of CAEP, to implement the LTAG Monitoring and Reporting (LMR) methodology to assess progress on the implementation of CO₂ missions reduction measures towards the achievement of the LTAG, while the LMR will be supported by information from annual ICAO LTAG Stocktaking, ICAO Tracker Tools, **State Action Plans for international aviation CO₂ emissions reduction and other information sources, including the monitoring of progress on means of implementation support and financing.....** In this regard, the Council will present necessary updates on the LMR, for consideration by the 43rd Session of the ICAO Assembly;

ICAO Basket of Measures

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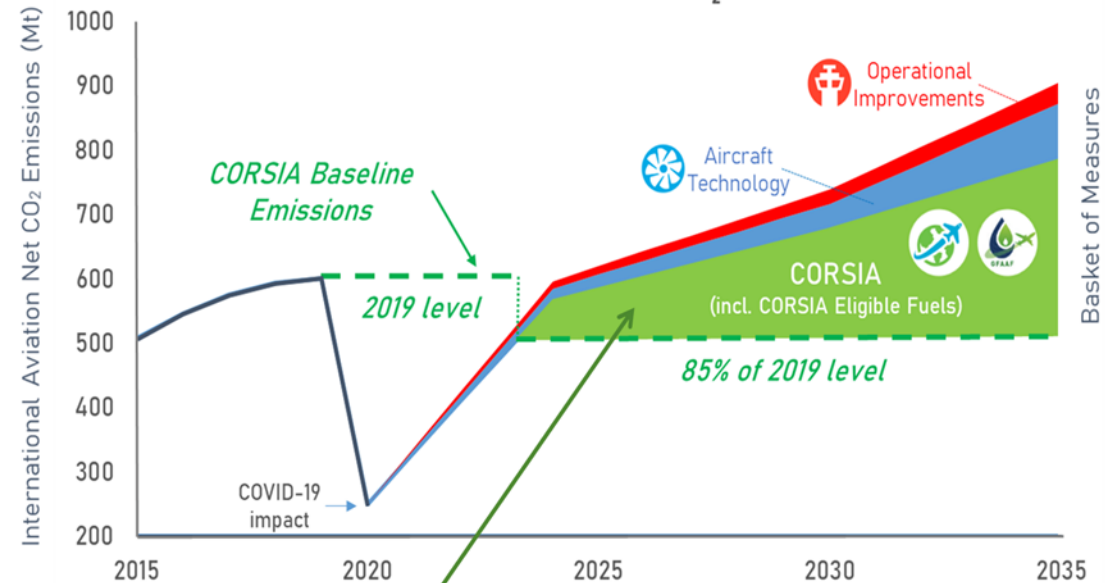
Aircraft Technology

Operational Improvements

Sustainable Aviation Fuels

Market Based Measures (CORSIA)

CONTRIBUTION OF CORSIA FOR REDUCING INTERNATIONAL AVIATION NET CO₂ EMISSIONS



CORSIA addresses the remaining "emissions gap" to achieve CNG2020

- the objective for the State is to describe how CO₂ emissions reductions from international aviation will be achieved
- Selection of measures and quantifying their expected results
 - Review of the basket of measures, their feasibility and emissions reduction potential
 - reflecting respective national capacities and circumstances
 - Prioritization and selection of mitigation measures
 - **Quantifying the effects** on fuel consumption and CO₂ emissions from the measures selected

Description of the mitigation measures in the SAP

For each measure
in each category

- an indication of its category (operational, technological, fuels, market-based, etc.)
- name of the measure as it is known in the State
- description of the measure

#	Category of the measure(s)	Name of the measure(s) selected	Description of the measure(s)	Implementation time horizon (start-end date implementation)	CO ₂ savings per year (tonnes of CO ₂ /year)	Stakeholder(s) involved in implementing the measure(s)	Assistance needed for implementation
1	☐ Technology ☐ Operational Improvements ☐ Fuels (SAF, LCAF and other aviation cleaner energies) ☐ Market-based measures Other (please specify):						☐ Yes ☐ No If yes, please detail the kind of assistance needed for the implementation of the mitigation measure. For more information, see Chapter 5 of this guidance document.

on (start date of full
ate of implementation)

er year from the measure

d in the implementation of the
nce needed for the
asure(s)

- assistance needed for the implementation of the measure(s)

Data Monitoring Mechanisms for fuel/ CO2 Reduction Measures

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Example of Applying ICAO Doc 9988 Rules of Thumb to Track Progress on Applicable Measures- Appendix C: Table C-2

- Understand the Rule-of-Thumb approach
 - Doc 9988 provides a screening-level quantification method when advanced modelling data is not yet available.
- Data outcomes are Fuel savings/CO2 emission. Need to identify the required data inputs
 - The specific activity data each rule-of-thumb formula needs, and who typically holds it in your State.
- Design a practical monitoring mechanism
 - A simple, replicable data flow, together with clear roles and quality checks.
- Position it within the ICAO reporting cycle
 - Aligning your internal tracking with the triennial Action Plan cycle.

Aircraft Technology & Operational Measures

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Measure	Rule-of-Thumb Formula	Activity Data Needed
New aircraft acquisition	$FS = 0.9\text{--}1.05\% \times \text{aircraft age} \times \text{old fuel burn}$	<i>Fleet age profile; baseline fuel burn by type</i>
Retrofit (e.g. winglets)	$FS = 2\text{--}6\% \times \text{baseline fuel burn}$	<i>Retrofit installation dates and aircraft affected</i>
Continuous Descent Ops (CDO)	$FS = 0.06 \text{ t fuel} \times \text{number of CDOs}$	<i>Count of CDO approaches flown</i>
PBN STAR arrivals	$FS = 0.02\text{--}0.05 \text{ t} \times \text{number of arrivals}$	<i>Count of arrivals on PBN STAR procedures</i>
Continuous Climb Ops (CCO)	$FS = 0.09\text{--}0.15 \text{ t} \times \text{number of CCOs}$	<i>Count of CCO departures</i>
Single-engine taxi	$FS = \Sigma (22 \times \text{idle FB/min} \times \text{minutes})$	<i>Taxi time on reduced engine count, by aircraft type</i>
SAF Uplift	$\text{CO}_2 \text{ savings} = \text{SAF}\% \times \text{fuel burn} \times 3.16$	<i>SAF blend percentage and volumes uplifted. Lifecycle assessment values</i>
CORSIA / Market-Based Measures	Reported per CORSIA Monitoring, Reporting, Verification (MRV)	<i>verified emissions data already flowing through the CORSIA MRV system- no separate rule-of-thumb required.</i>

FS = fuel savings;

Roles and Responsibilities

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Role	Responsibility	RACI
State Focal Point / CAA	Owens and submits the State Action Plan	Accountable
NAPT (ANSP, airlines, airports, fuel suppliers etc.)	Provide the underlying activity data feeds	Responsible
State Focal Point / CAA	Compiles data and runs the calculations	Responsible

Mechanism must match your State's situation

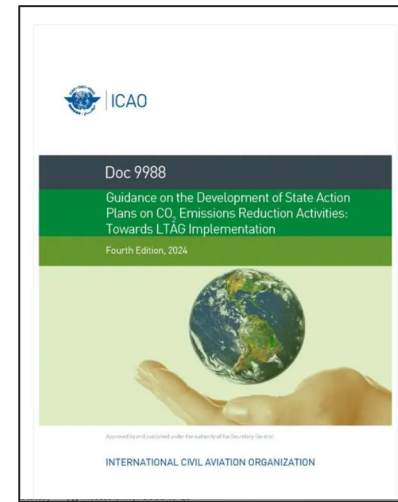
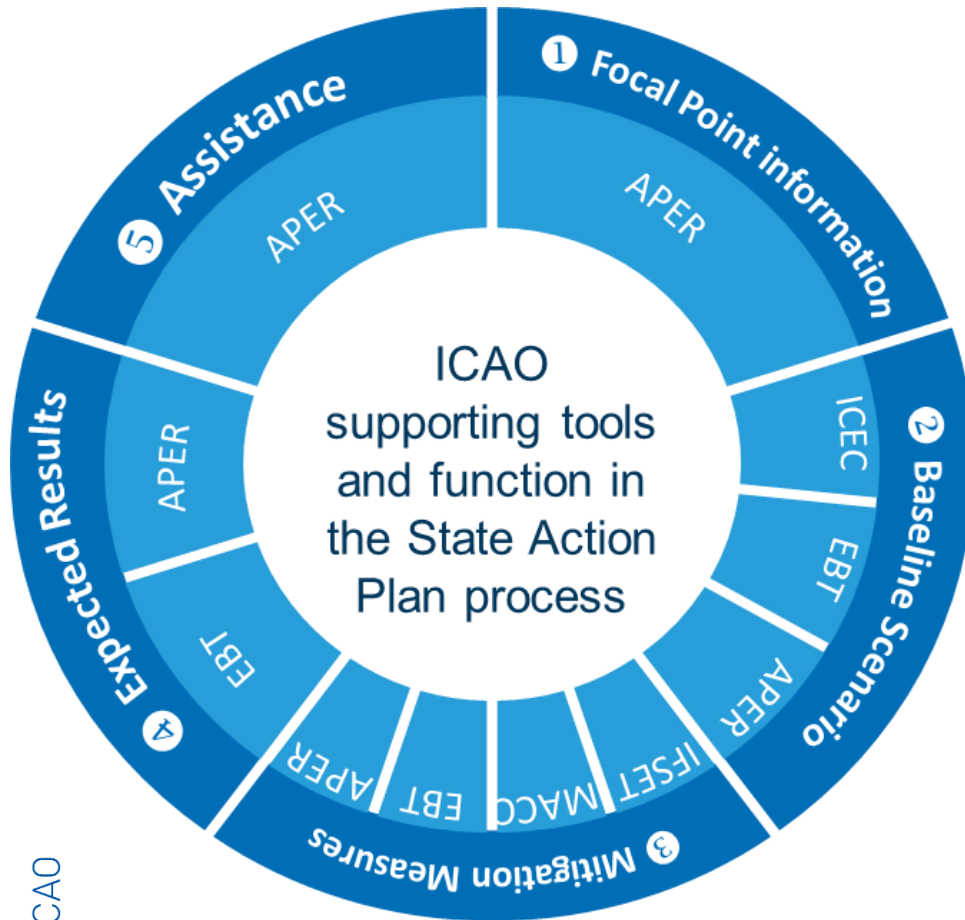
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- Rules of thumb are a practical entry point — not the ceiling — for quantifying your basket of measures
- A monitoring mechanism is a register, a data-collection routine, a validation step and clear ownership — not a single spreadsheet
- Design the mechanism to match your State's current data maturity

What data does your State already collect — through your ANSP, airlines or airports — that could feed this proposed mechanism?

ICAO SAP Tools:

Focus on the EBT (Demo)



Action Plan on Emissions Reduction (APER) Website

Developed to assist States that want to prepare and submit their State Action Plan to ICAO, providing access to tools that facilitate the SAP development.

- Environmental Benefit Tool (EBT)

This tool has been designed by ICAO to assist States in the process of defining a baseline scenario, estimating the quantifiable benefits resulting from the selected mitigation measures, and it provides estimated expected results. This tool can support a State with establishing a quantified State Action Plan, while requiring minimal data inputs. All State Action Plan Focal Points are encouraged to utilize this tool while developing or updating a State Action Plan.

Other supporting tools under APER website:

- Marginal Abatement Cost (MAC) Curve Tool
- ICAO Fuel Savings Estimation Tool (IFSET)
- ICAO Carbon Emissions Calculator for States (ICEC)

Welcome to the Action Plan on Emissions Reduction (APER) Portal



This portal has been developed to assist States that want to prepare and submit their State Action Plan to ICAO. State Action Plans enable all ICAO Member States to establish a long-term strategy on climate change for the international aviation sector, involving all interested parties at national level.

Following the agreement at the 41st Session of the ICAO Assembly in 2022 on the long-term global aspirational goal for international aviation (LTAG) of net-zero carbon emissions by 2050, State Action Plans will play a pivotal role in monitoring the progress on the implementation of all elements of the basket of measures towards the achievement of the LTAG (A41-21 operative clause 9).

As defined within ICAO Document 9988 (provided below) a complete State Action Plan should contain:

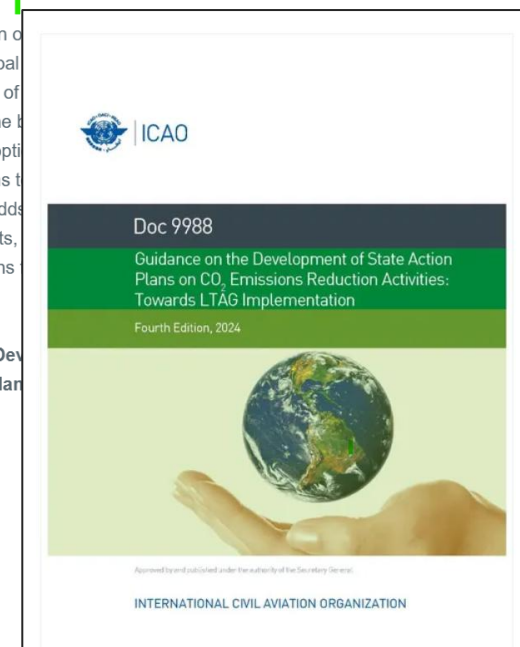
1. **Contact information** for the officially nominated State Action Plan Focal Point, alternate Focal Point (if applicable) and any other person(s) responsible for the compilation and submission of the Action Plan;
2. **Baseline Scenario (scenario without action):** Projected annual fuel consumption, CO₂ emissions and traffic data (from the latest available year until at least 2050) for international aviation;
3. List of **selected measures** proposed for mitigating CO₂ emissions from international civil aviation;
4. **Expected Results (scenario after taking action):** Estimated impact of the selected mitigation measures from the first implementation year to at least 2050 on the baseline scenario (including annual fuel consumption and CO₂ emissions); and
5. Identification of any **assistance needs** (for example financial, technological, training or capacity building) for the State.

*** NEW UPDATE – JUNE 2024: Updated ICAO Doc 9988 - Guidance on the Development of State Action Plans on CO₂ Emissions Reduction Activities (Fourth Edition)***

This document is the main resource for developing a State Action Plan. It provides step-by-step guidance, details of the required elements of a State Action Plan and contains a template that can be used to structure a State Action Plan. All State Action Plan Focal Points are encouraged to utilize this document while developing or updating a State Action Plan.

New update (June 2024): This updated version of the document reflects the ICAO Assembly's agreement on a long-term global goal for international aviation and the development of State Action Plans in contributing to the achievement of this goal. It also details the measures for reducing aviation fuels (LCAF), and other clean energy options. The updated Action Plan template aims to be a harmonized manner. This Fourth Edition also adds new measures, building programs, possible financial instruments, decarbonization projects. It also includes lessons learned and best practices for CO₂ mitigation.

Updated ICAO Doc 9988 - Guidance on the Development of State Action Plans on CO₂ Emissions Reduction Activities (Fourth Edition) (other language versions available)
[9988_cons_en.pdf](#)



EBT Live Demonstration

[EBT \(v2.9\) uploaded on APER Website](#)

Environmental Benefit Tool (EBT)

This tool has been designed by ICAO to assist States in the process of **defining a baseline scenario, estimating the quantifiable benefits resulting** from the selected mitigation measures, and it provides estimated expected results.

This tool can support **a State with establishing a quantified State Action Plan**, while requiring minimal data inputs.

All State Action Plan Focal Points are encouraged to utilize this tool while developing or updating a State Action Plan.

Submitting SAPs to ICAO:

Categorization of Action Plans

After Submission

Information provided in State Action Plans ⁴⁰

- SAP submitted **via the APER Portal ONLY**
- The quantifiable data reported by States within action **plans enables ICAO to assess the collective global contribution of State's individual plan toward the achievement of the global aspirational goals.**
- For the assessment, ICAO needs to aggregate the quantified data from the action plans.
Categorization of action plans:

With Data	Partial Data	No Data
• Quantified data provided for Baseline • Quantified annual fuel burn reduction/CO₂ emission reductions from the selected mitigation measure(s) • Quantified data provided for Expected Results	• Only historical data provided • Projected data for only one or two of the following categories: CO₂, fuel burn, and RTK data • With a graphical representation, but without data	• No baseline scenario • No mitigation measures selected • No expected results

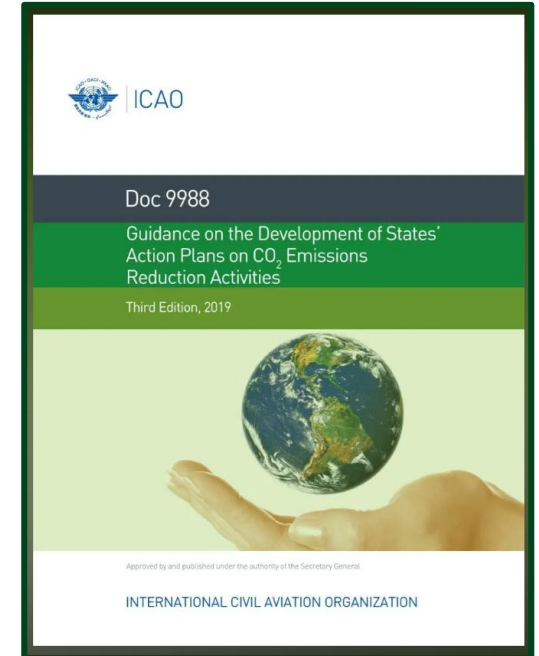
After Submission

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The development and submission of an action plan is not the end goal!

- Key points:

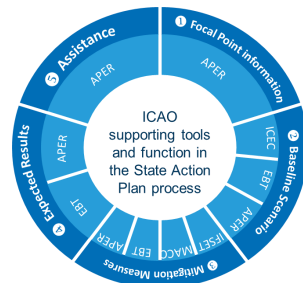
- ✓ The State should set in motion a process to implement the relevant measures in the action plan
- ✓ Continuous consultation and coordination between the various stakeholders is essential for implementation
- ✓ The State should monitor the implementation of all activities
- ✓ The State should continue to work closely with ICAO



Conclusion and Key Takeaways

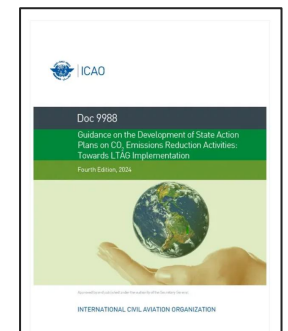
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- ICAO encourages all Member States to develop a State Action Plan and keep it up-to-date – **every 3 years**
- Assembly encourages robust and quantified State Action Plans which allow ICAO to assess future progress toward the achievement of ICAO global aspirational goals
- State Action Plans are encouraged to submit information on their use of SAF, LCAF and other aviation cleaner energies as part of their State Action Plan submissions



A screenshot of the ICAO State Action Plan tool interface. The interface is divided into several sections:

- HISTORICAL DATA & BASELINE:** Contains two input fields: "1. Historical data" and "2. Baseline".
- MEASURES:** Contains seven input fields: "1. Aircraft-related technology development", "2. Alternative fuels", "3. Improved air traffic management and infrastructure use", "4. More efficient operations", "5. Economic/Market-based measures", "6. Regulatory measures / other", and "7. Airport improvements".
- EXPECTED RESULTS:** Contains two output fields: "1. Fuel savings" and "2. CO₂ savings".
- Input and Next (Baseline) buttons:** Two large buttons at the bottom of the main section.
- HELP button:** A button on the right side of the interface.
- Historical Data Table:** A table at the bottom with columns for Year, International RTK (Tons), International fuel burn (Tons), and Efficiency (Int. Fuel burn / Int. RTK).
- Footnote:** A note at the bottom right stating: "* Please input the numbers with the appropriate decimal separator (comma ',' or '.') according to your version of Excel. *The inputted numbers should NOT include thousands".



Thank You

