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ENVIRONMENT

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State Action Plan Development Process

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ICAO Environment





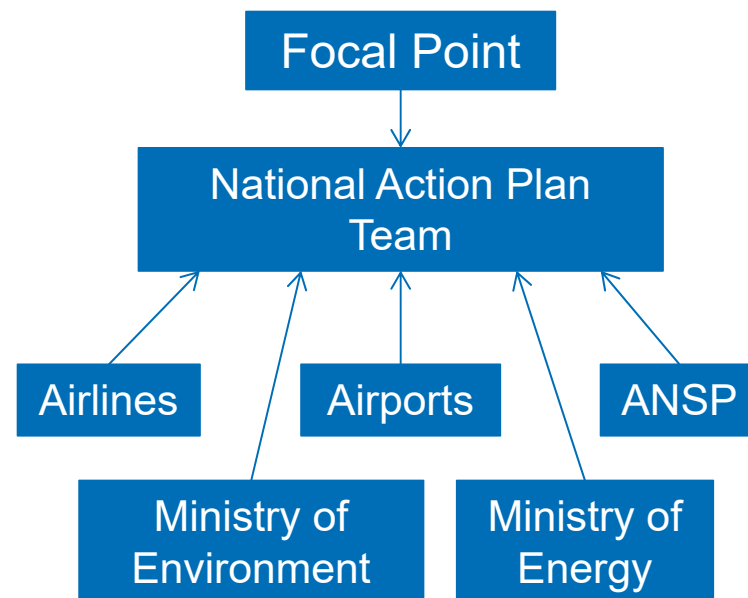
State Action Plans

- State Action Plans are a voluntary planning and reporting tool for States to communicate information on their activities to address CO₂ emissions from international civil aviation to ICAO
 - A living document that should be updated at least every three years
- To provide a big picture view of the State's activities
- For States
 - Opportunity to identify measures that will improve fuel efficiency and reduce emissions
- For ICAO
 - Assess future progress toward the achievement of ICAO global aspirational goals



The State Action Plan Process

- **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





State Action Plan Minimum Contents

1

State Action Plan Focal Point contact information

2

Baseline scenario – international fuel consumption, CO₂ emissions and traffic data projected to 2050 (without action)

3

List of selected emissions mitigation measures

4

Expected results – international fuel consumption and CO₂ emissions projected to 2050 (with the actions in #3)

5

Assistance needs (if needed)



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Baseline Scenario

- The baseline scenario describes the historic **evolution** of fuel consumption, CO₂ emissions, and traffic in the State and the expected **future evolution in the absence of action**
- Key points:
 - Differentiating between international and domestic emissions
 - Data from all air carriers can be aggregated
 - Understood to be an estimation only
 - Not the same as the CORSIA baseline



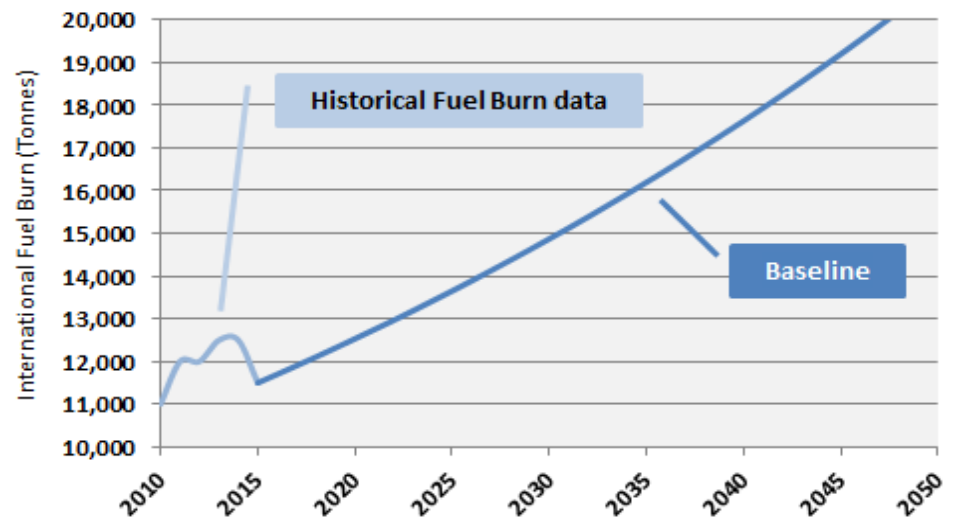
Differentiating between international and domestic emissions

- **International flight:** the operation of an aircraft from take-off at an **aerodrome of a State** or its territories, and landing at an **aerodrome of another State** or its territories.
- **Domestic flight:** the operation of an aircraft from take-off at an **aerodrome of a State** or its territories, and landing at an **aerodrome of the same State** or its territories.
- **Methodologies** to account for the CO₂ emissions attributed to international flights:
 - a) **ICAO:** each State reports the CO₂ emissions from the international flights operated by aircraft registered in the State (**State of Registry**)
 - b) **IPCC:** each State reports the CO₂ emissions from the international flights departing from all aerodromes located in the State or its territories (**State of Origin**)



Example			
Year	Historical Data		Fuel efficiency
	RTK * ('000)	Fuel Burn (tonnes)	
2010	25'000	11'000	0.440
2011	30'000	12'000	0.400
2012	32'000	12'000	0.375
2013	33'000	12'500	0.379
2014	32'000	12'500	0.391
2015	30'000	11'500	0.383

Baseline Scenario Example



* **Revenue-Tonne Kilometre (RTK)** = revenue load (persons and cargo) in tonnes (t) * distance flown in kilometres (km)
 RTK represents a measure of the size of air transport



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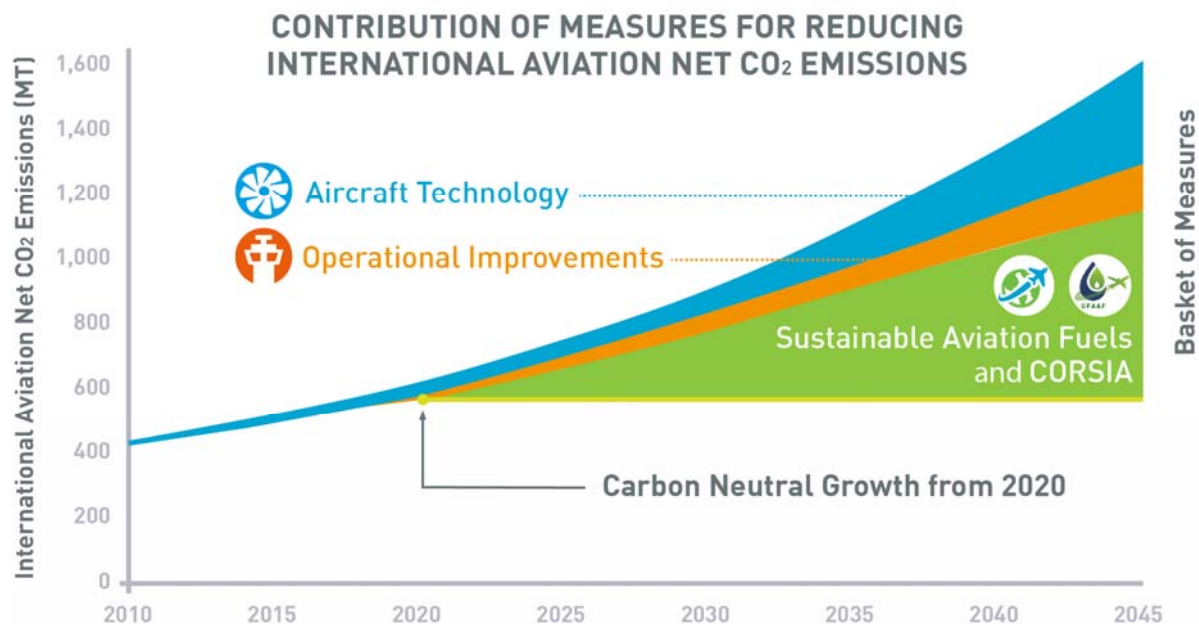
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Assistance needs (if needed)



The Basket of Measures

- Aircraft Technology
- Operational Improvements
- Sustainable Aviation Fuels (SAF)
- Market-Based Measures



→ Select measures and quantify their expected results: feasibility, emissions reduction potential, prioritization of measures, quantification of fuel & CO₂ reduction results



Aircraft Technology Development

- There are continuous efforts to improve fuel efficiency through:
 - Aircraft structures – weight reductions
 - Propulsion – fuel efficiency improvements
 - Aerodynamics
- Examples:
 - Use aircraft minimum or higher fuel efficiency standards;
 - Retrofit and upgrade existing aircraft (winglets);
 - Purchase the newest more efficient aircraft
 - Optimize improvements in aircraft produced in the near- to mid-term;
 - Avionics;
 - Invest in long term zero-emissions aircraft R&D; and (Plan to) adopt revolutionary new tech in aircraft/engines (open rotors, electric/hydrogen aircraft)

+++ Significant CO2 reduction potential
-- Time to develop
-- Fleet roll-over



Operational improvements

Opportunities

- + Moderate CO2 reduction potential
- + Relatively quick to be implemented
- + Wide applicability
- + Lower dependency to fleet roll-over
- + Often reduced A/C maintenance cost

Challenges

- Safety
- Regulatory constraints
- Constant limitations (weather, equipment, facilities, military activity, traffic)
- Site-specific requirements
- Limited airport capacity → Congestion and delays

Examples:

- Continuous climb and descend
- Harmonized airspace- Direct horizontal routes
- Big data and machine learning to optimize flight operations
- More efficient ATM planning
- Airport Collaborative Decision Making (A-CDM)
- Improved management of congestion (air/ground) and runways/taxiways
- Zero-emissions taxiing
- Limit APU use at gate; solar-at-gate
- Engine wash





Sustainable Aviation Fuels (SAF)

Opportunities

- + High emissions reduction potential
- + Ready to be used
- + Wide applicability
- + Drop-in fuels
- + Same safety standards as current aviation fuels

>250,000 flights
already
operated



Global Framework for Aviation Alternative Fuels

- SAF needs to meet **Sustainability Criteria**

ICAO Assembly Resolution A40-18 (2019)

A39-2: Acknowledging the need for such fuels to be developed and deployed in an economically feasible, socially and environmentally acceptable manner and the need for increased harmonization of the approaches to sustainability;

A39-2. Requests States to recognize existing approaches to assess the sustainability of all alternative fuels in general, including those for use in aviation which should achieve net GHG emissions reduction on a life cycle basis; contribute to local social and economic development, competition with food and water should be avoided;



How can SAF be produced today?

FEEDSTOCKS



FUEL CONVERSION

1. Fischer-Tropsch hydroprocessed synthesized paraffinic kerosene (FT)
2. Synthesized paraffinic kerosene from hydroprocessed esters and fatty acids (HEFA)
3. Synthesized iso-paraffins from hydroprocessed fermented sugars (SIP)
4. Synthesized kerosene with aromatics derived by alkylation of light aromatics from non-petroleum sources (FT-SKA)
5. Alcohol to jet synthetic paraffinic kerosene (FT-SPK)
6. Catalytic hydrothermolysis jet fuel (CHJ)
7. Synthesized paraffinic kerosene from hydrocarbon-hydroprocessed esters and fatty acids (HC-HEFA-SPK)
8. Co-processing

More feedstocks and conversion processes will become available as the SAF industry evolves.



Sustainable Aviation Fuels Challenges & ways forward

Challenges

- On both the supply and the demand sides
- **Availability** of feedstock / **Environmental sustainability** / **Cost competitiveness**



Some ways forward

Develop a serious **assessment** prior to and in order to help decision makers to **make the best (no-regret) choice**.

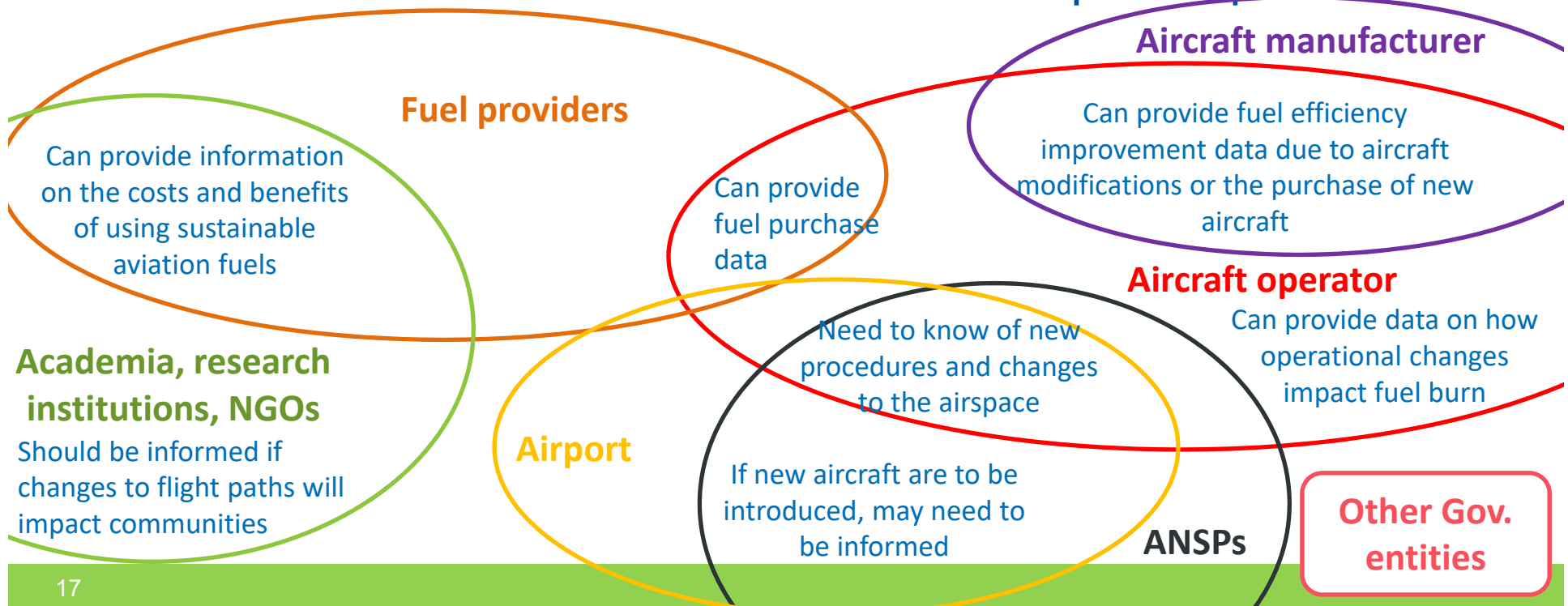
- **Feedstock options:** identify most sustainable pathways (CO2, environment), quantify volumes, identify easy to cultivate ones, supply & transport infrastructure
- **SAF production options:** competitive feedstocks, maturity of technology, local availability of equipment, costs for each pathway (production, required investments, potential ecological costs), best case production scenarios
- **Forecast demand for SAF, if low, explore options to trigger it:** improve the economic competitiveness of SAF production; develop incentives to buy/use SAF





Technology/Operations/SAF

- Who should be involved in the SAP development process?





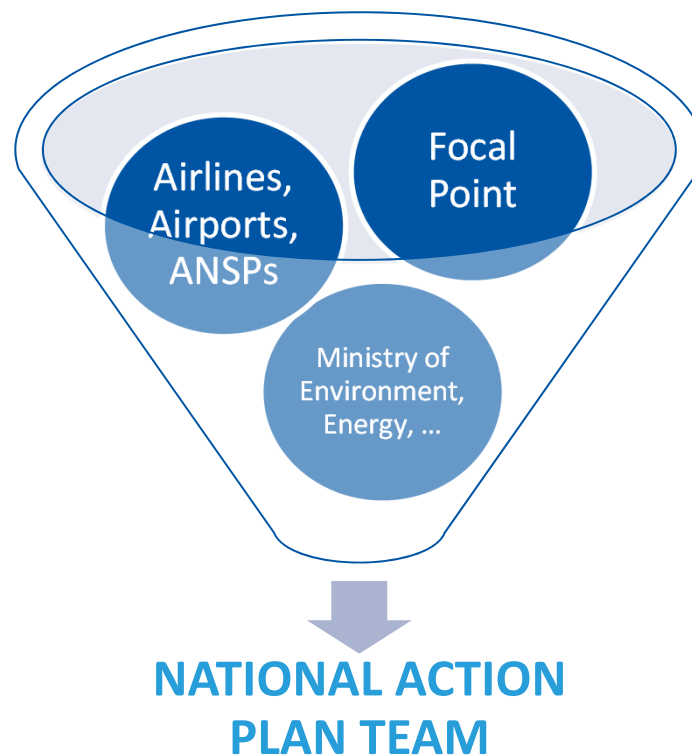
Market Based Measures

- Policy tools to achieve environmental goals, including:
 - Levies
 - **Charges:** designed and applied specifically to recover the costs of providing facilities and services for civil aviation
 - **Taxes:** designed to raise national or local government revenues, which are generally not applied to civil aviation in their entirety or on a cost-specific basis
 - Emissions trading systems
 - Establishes a cap for the total amount of emissions from participants;
 - Allowances (permits to emit CO₂) are allocated or auctioned to participants;
 - Participants buy and sell the allowances and at the end of each compliance period, participants are required to surrender allowances to account for their actual emissions.
 - Carbon offsetting
 - Such as the ICAO Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)



Selection of Mitigation Measures

- The Focal Point should always work in collaboration with the **National Action Plan Team**
- **Context** is key for the selection of appropriate mitigation measures





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Assistance needs (if needed)



Expected Results

- The expected results provide the estimated fuel consumption and CO₂ emissions **with the implementation of the selected mitigation measures** from the latest available year to 2050.
- It should:
 - Project fuel consumption, emissions, and traffic for the same future years provided in the baseline scenario; and
 - Quantify the effect of the selected mitigation measures.

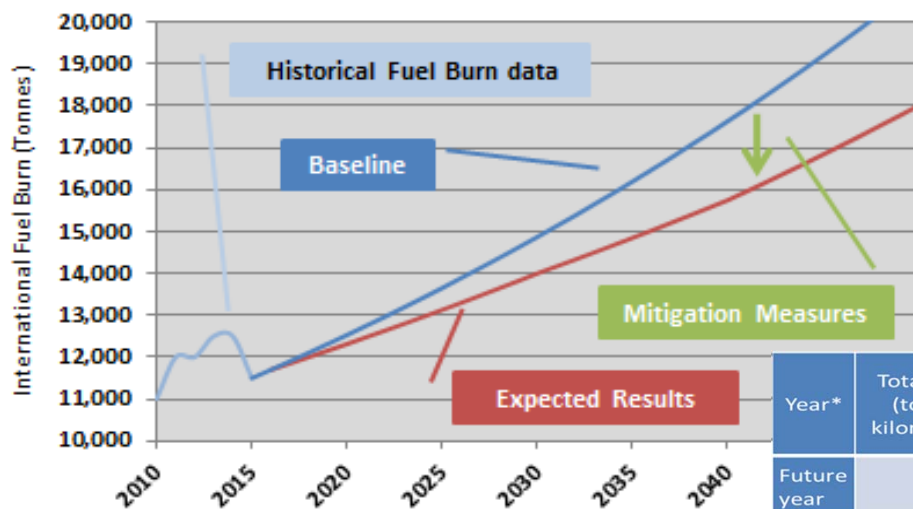


Expected Results

Baseline scenario

List of Mitigation Measures

Expected Results



Year*	Total RTKs (tonne-kilometres)	International RTKs* (tonne-kilometres)	Total fuel (litres)	International fuel (litres)*	Total CO ₂ emissions (metric tonnes)	International CO ₂ emissions* (metric tonnes)
Future year						
2020						
Future year						
2050						

*Minimum data to be entered.
 Note: the future years should match the baseline's future years.
 Note: the traffic data (RTK) may not be identical to the baseline. Some measures may enable an increase in traffic or aim to reduce demand.



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Assistance Needs

- Clearly define the assistance needed to implement mitigation measures and to achieve the expected results
 - Technical, financial, research, training/capacity building
- Could facilitate support from other government entities, financial institutions, potential future ICAO assistance projects

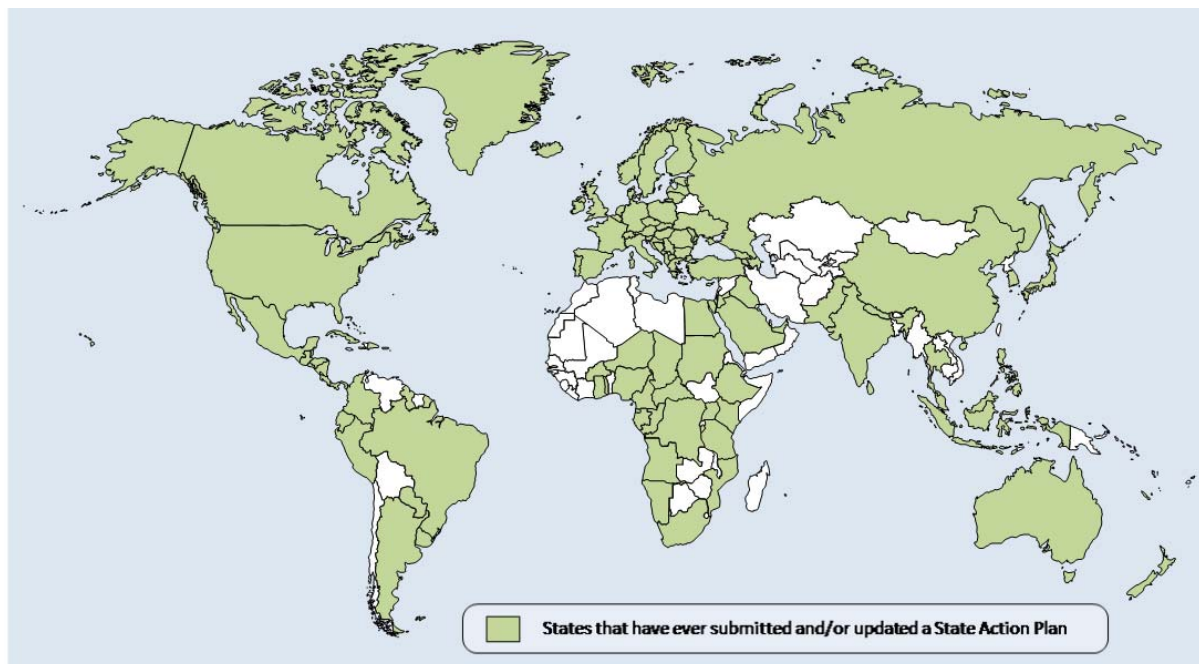


Benefits of Developing a State Action Plan

- State Action Plans give ICAO Member States the ability to:
 - Promote cooperation
 - Establish partnerships
 - Facilitate technology transfer
 - Obtain assistance
- They provide an organized means for the State to:
 - Highlight their commitment to addressing environmental challenges
 - Outline their respective policies and actions



Current Status



119 States
representing
>97% of
global RTK
have submitted a State
Action Plan to ICAO



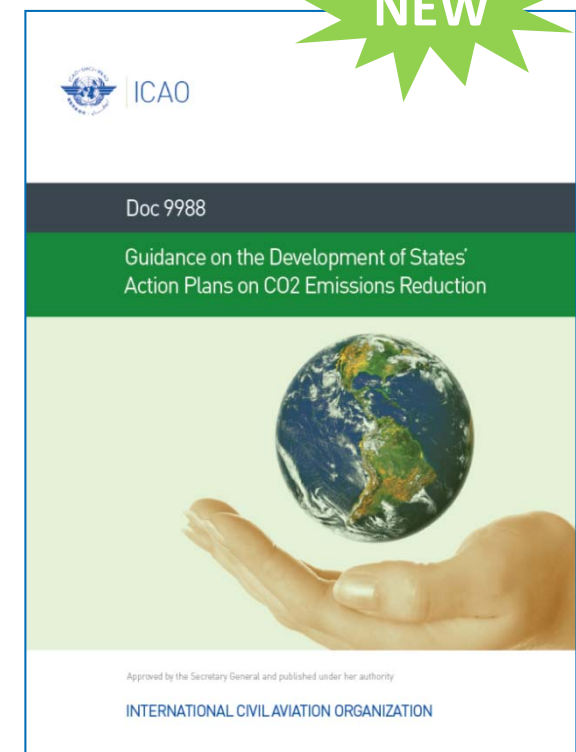
ICAO's Facilitating Role

- ICAO has facilitated the States' Action Plans initiative since 2010 by:
 - Developing guidance material and tools
 - Enabling capacity-building and assistance projects
 - ICAO / European Union Joint Assistance Project
 - ICAO / UNDP Joint Assistance Project financed by the Global Environment Facility (GEF)
 - Organizing workshops and training seminars
 - Partnering States through the State Action Plan Buddy Programme
 - Answering questions and providing support – actionplan@icao.int



ICAO Doc 9988

- *Guidance on the Development of States' Action Plans on CO₂ Emissions Reduction Activities*
 - Describes what a State Action Plan should include and provides a step-by-step guide on how to develop it
- More details about everything presented in this Seminar can be found in this document
 - Overview and introduction
 - Baseline calculation
 - Mitigation measures and expected results
 - Implementation and assistance
 - Appendix with examples and detailed information





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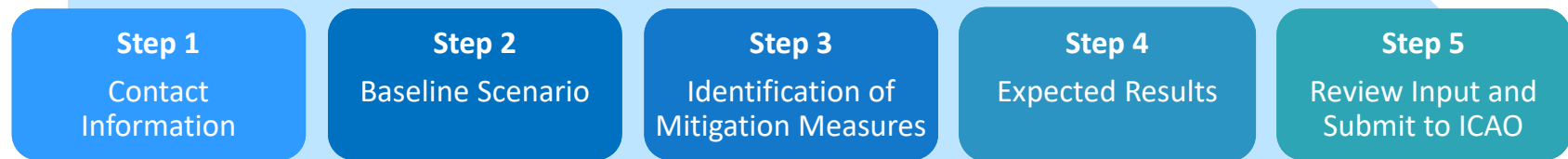
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APER website



<https://portallogin.icao.int/>



→ Follows the main parts of the Action Plan



ICAO Environmental Tools

- Publically available: www.icao.int/env

ICAO Carbon Emission Calculator (ICEC)



ICAO Fuel Savings Estimation Tool (IFSET)



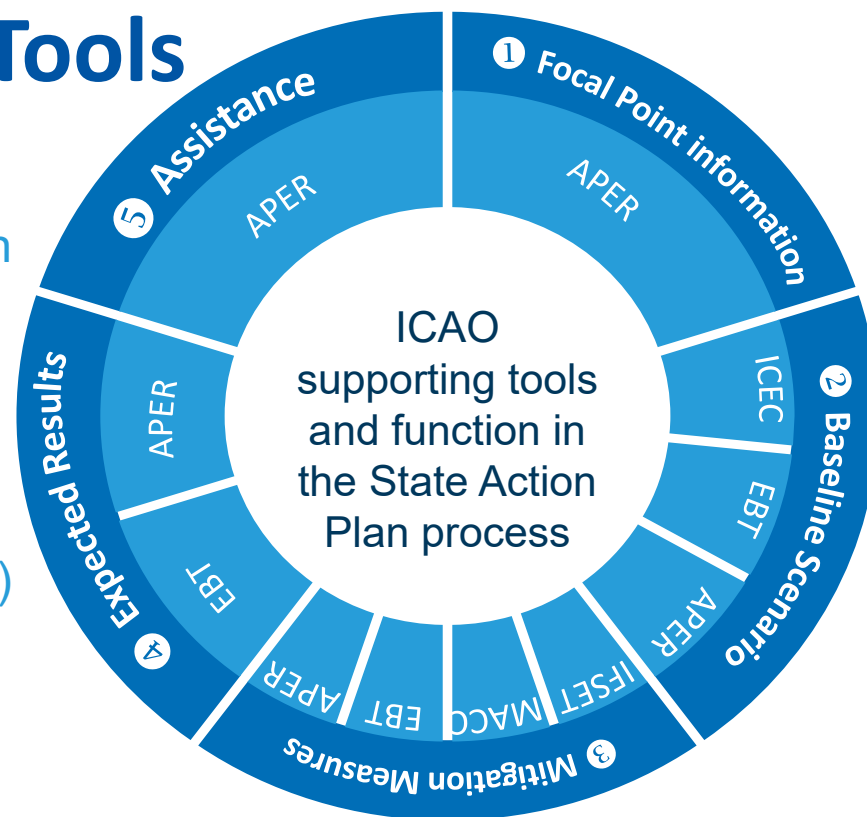
UNITAR Training Course





ICAO Environmental Tools

- State Action Plan Focal Points
 - Action Plan for Emissions Reduction (APER) Website
 - Environmental Benefit Tool (EBT)
 - Marginal Abatement Cost (MAC) Curve Tool





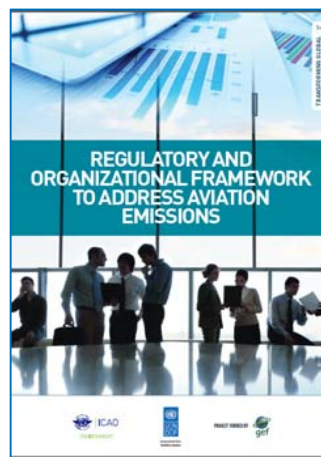
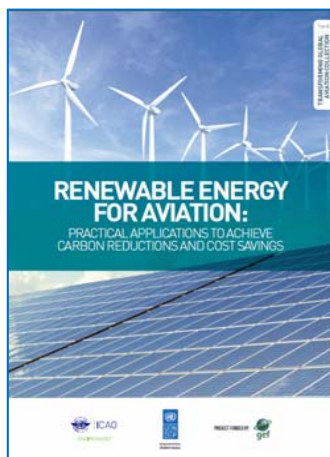
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ICAO – United Nations Development Programme (UNDP) Assistance Project (financed by the Global Environment Facility (GEF))





ICAO – European Union (EU) Assistance Project

The grid contains the following project posters:

- DOMINICAN REPUBLIC:** Feasibility Study on the Use of Sustainable Aviation.
- TRINIDAD AND TOBAGO:** Feasibility Study on the Use of Solar Energy at Piarco International Airport.
- KENYA:** Feasibility Study on the Use of Sustainable Aviation Fuels.
- BURKINA FASO:** Feasibility Study on the Use of Sustainable Aviation Fuels.



ADDITIONAL PROGRESS ONGOING UNDER PHASE 2



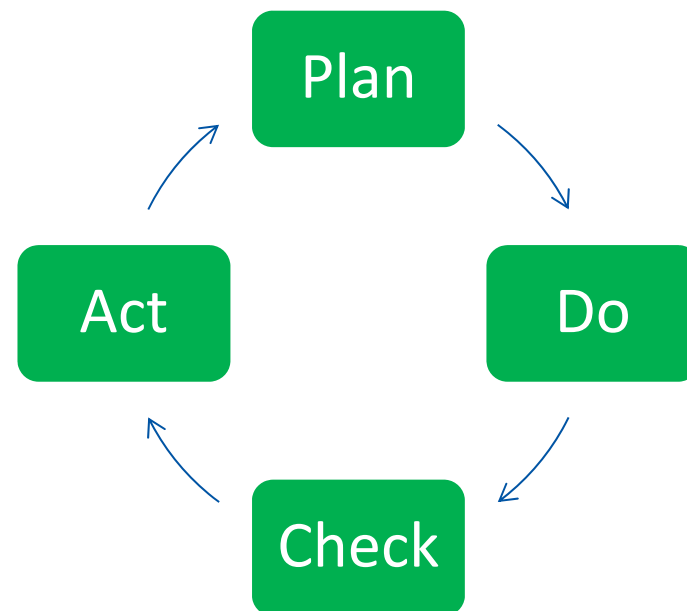
Action Plans and Project Management

PLAN: Assemble team → collect data → establish baseline scenario → select mitigation measures → quantify expected impact of measures → Identify assistance needs

DO: Implement the Action Plan and monitor progress towards established goals

CHECK: Analyze results (i.e. fuel burn and emissions) and compare against established goals in Action Plan

ACT: Make adjustments according to results and reflect this in updated Action Plan





Data confidentiality

- To protect confidentiality, the State may elect not to make certain data publicly available, or aggregate/de-identify the data before including it in the action plan
- In the event that confidential data is collected (e.g., from individual air carriers or on specific international routes), appropriate procedures should be followed by the State for the designation and treatment of such information in accordance with the applicable national legislation and regulations
- A State could improve transparency by explaining in its action plan how confidential information has been treated
- Action plans are submitted to ICAO on a confidential basis. They are **only published on the ICAO public website at the request of the State**
- Assembly Resolution A40-18 “*Encourages States (...) to make the submitted action plans available to the public, taking into account the commercial sensitivity of information contained in States’ action plans;*”, in which case States can anonymize data, e.g. by aggregating/de-identifying the data before including it in the action plan



Next Steps

- Update ICAO Doc 9988, the APER website and the other ICAO tools.
- Continue to explore means to facilitate States' access to financial resources through new possible partnerships.
- Further engage with States to support the submission of quantified State Action Plans in 2020.
 - States will be called upon to submit or update their State Action Plans in preparation for assessing global progress towards **Carbon Neutral Growth from 2020**.
 - This information can also feed into ICAO's work on assessing the feasibility of a **long-term aspirational goal** for international aviation.

No Country Left Behind



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North American
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and Caribbean
(NACC) Office
Mexico City

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(SAM) Office
Lima

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(WACAF) Office
Dakar

European and
North Atlantic
(EUR/NAT) Office
Paris

Middle East
(MID) Office
Cairo

Eastern and
Southern African
(ESAF) Office
Nairobi

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(APAC) Sub-office
Beijing

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(APAC) Office
Bangkok



THANK YOU