





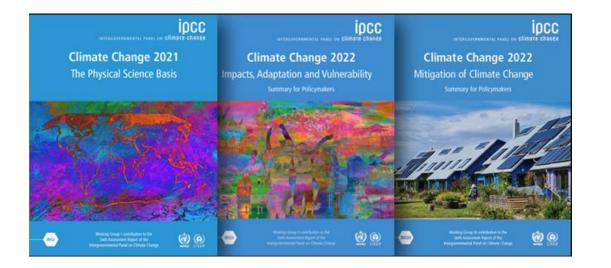
Jane Hupe

Deputy Director, Environment, ICAO









Climate & Energy | Climate Change

#### Summer 2023 was hottest on record, scientists say

#### Reuters

September 7, 2023 2:43 AM EDT - Updated 6 days ago

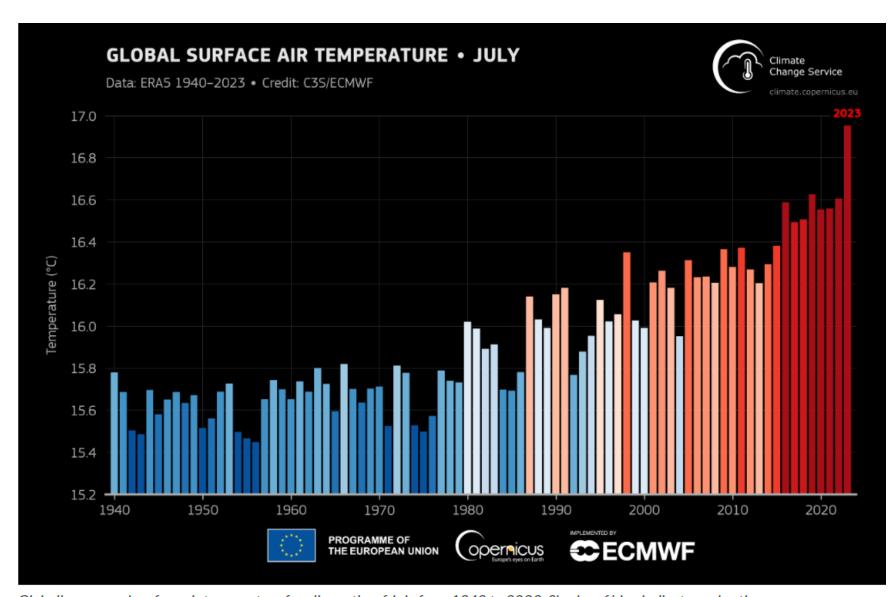




**AR6 Synthesis Report** Climate Change 2023



The skyline of Montreal is obscured by a haze of smog, Sunday, June 25, 2023, as a smog warning is in effect for Montreal and multiple regions of the province due to forest fires. THE CANADIAN PRESS/Graham Hughes



Globally averaged surface air temperature for all months of July from 1940 to 2023. Shades of blue indicate cooler-than-average years, while shades of red show years that were warmer than average. Data: ERA5. Credit: C3S/ECMWF.





2016

2017

2018

2020

2021

2022

# The 37th Session of ICAO Assembly:

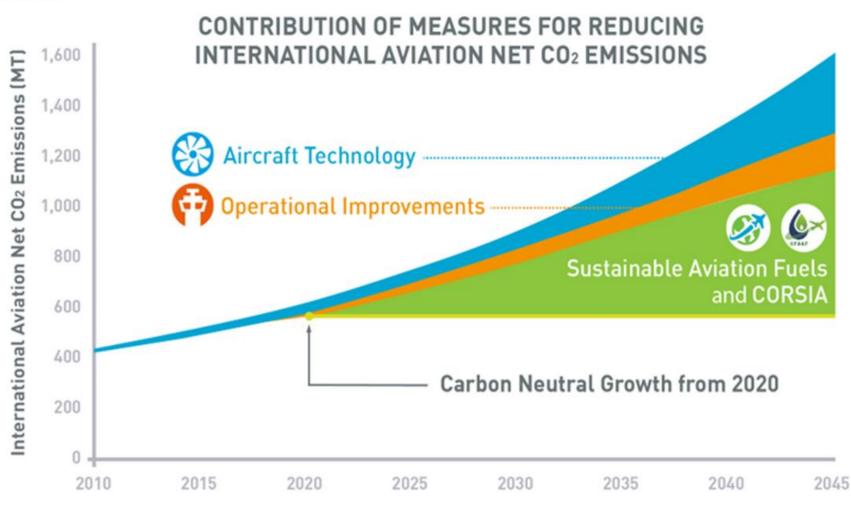
**Adoption of two Global Aspirational Goals** 

2% annual fuel efficiency improvement

Carbon neutral growth from 2020



Action Plan
on Emissions
Reduction





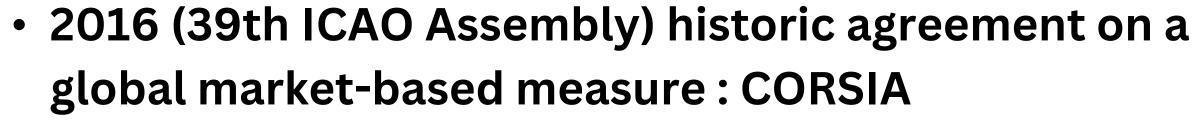
2017

2018

2019

2020

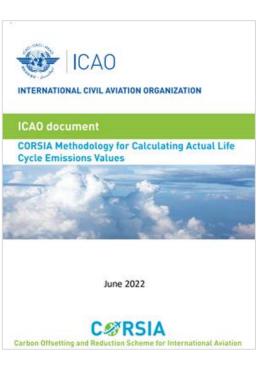
2021





- 2018: New Annex 16 Volume IV
- 2018: ACT-CORSIA with more than 130 States
- 2019: Eligibility criteria for emissions units
- 2019, 2021 and 2022: Sustainability criteria for SAF, expanded to LCAF











2018

2019

2020

2021

2022

- 2017: Mandatory CO2 certification standard for aircraft (Annex 16 Volume III)
- 2017: CAAF/2 and 2050 ICAO Vision for SAF
- 2020 onwards: ICAO work on LTAG feasibility
- 2022: ICAO ACT SAF Programme
- 2022: Adoption of the LTAG of Net Zero CO2 emissions by 2050

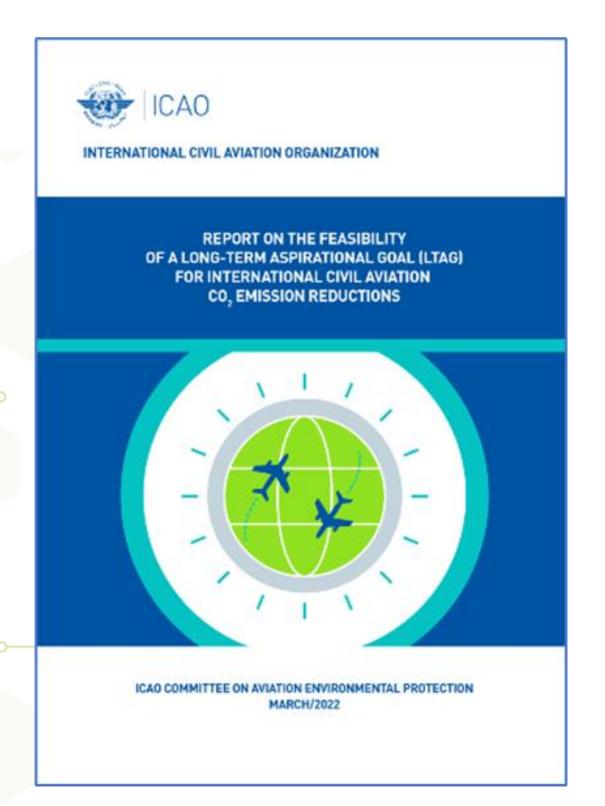












#### LTAG Report Appendixes (English only)











Appendix B1
Background
(18 pages)

Appendix R1
Summary Sheets
(61 pages)

Appendix R2
Comparison to Trends
(8 pages)

Appendix R3

Results in the Climate

Science Context

(10 pages)

Appendix S1
Climate Science Context
(24 pages)



Appendix M1

Overview of the Modelling

Approaches

(99 pages)



Appendix M2
COVID-19 Forecast
Scenario Development
(8 pages)



Appendix M3
Technology
(181 pages)



Appendix M4
Operations
(12 pages)



Appendix M5 Fuels (84 pages)



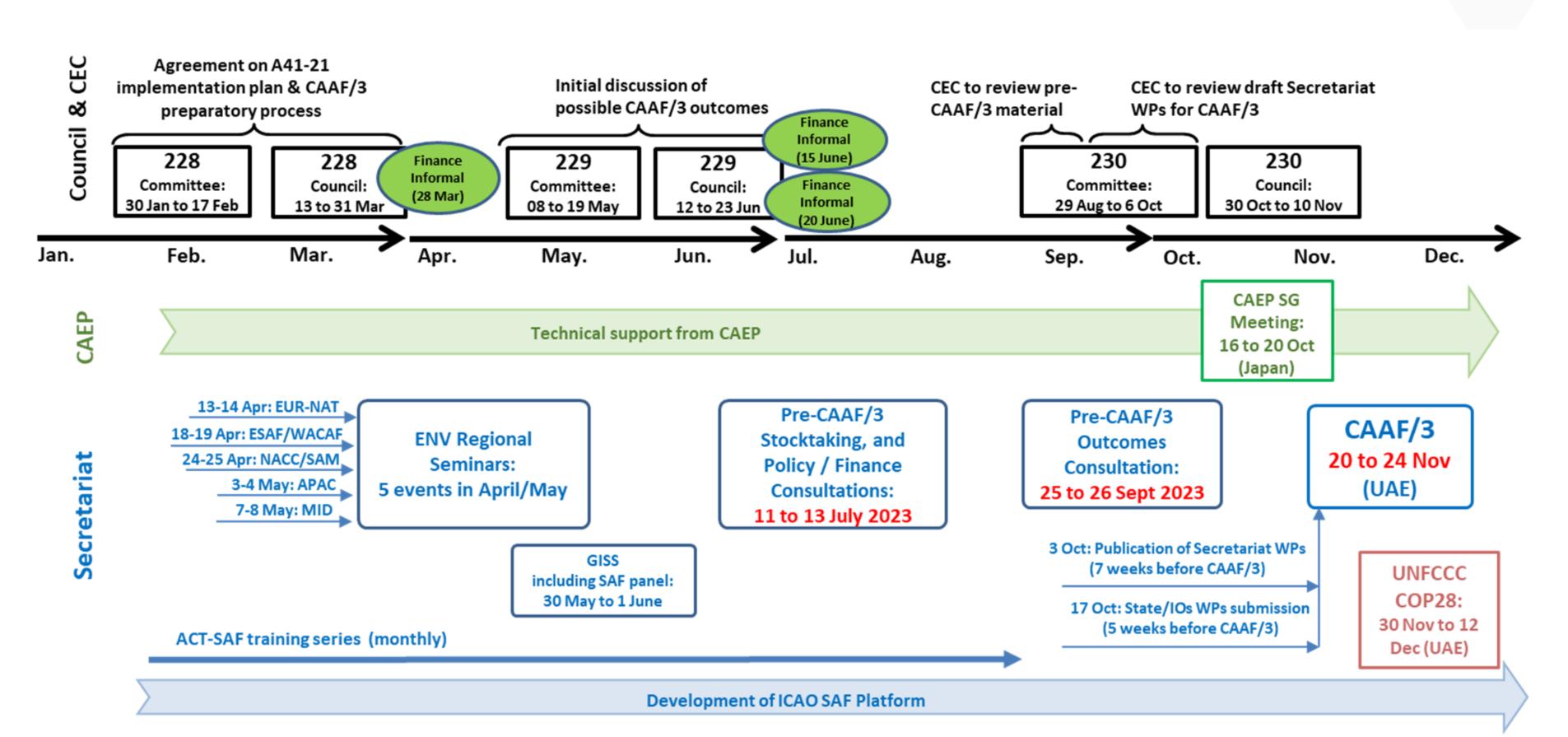
Available on the ICAO website

www.icao.int/environmental-protection/LTAG/Pages/LTAG-and-Fuels.aspx





#### 2023 timeline toward CAAF/3





# ICAO Environmental Regional Seminars (2023)













# Material provided to Regional Seminars on ICAO Guidance on Potential Policies and Coordinated Approaches for the Deployment of SAF (Building Block 1)



Developed by CAEP based on studies performed since 2016.

- A policy toolkit to be used in combination with the SAF Rules of Thumb
- A support reference for ICAO
   States to develop SAF
   production
- Insight on types of policy measures and their impacts
- Examples of policies used or under preparation
- Links to additional helpful resources

#### 2023 Updates

- Inclusion of latest policies from EU, United States and United Kingdom
- Improved outreach material (executive summary, and detailed presentation)
- Available on the ICAO website <a href="https://www.icao.int/environmental-">https://www.icao.int/environmental-</a> <a href="protection/Pages/saf\_guidance\_potential">protection/Pages/saf\_guidance\_potential</a> <a href="policies.aspx">policies.aspx</a>





https://www.icao.int/environmental-protection/Pages/saf guidance potential policies.aspx

# Material provided to Regional Seminars on SAF estimates ("Rules of thumb") (Building Block 1)

ICAO SAF "Rules of Thumb" provide order of magnitude estimations on SAF costs, investment needs and production potential to inform policymakers and project developers.

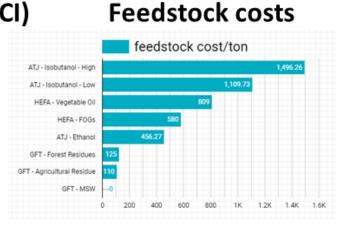
The Rules of Thumb also provide **key information for first assessment of SAF policy options.** 

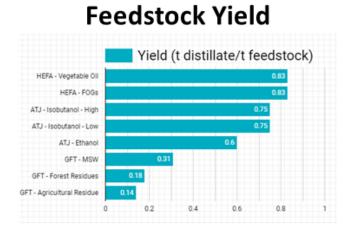
#### 2023 Updates – inclusion of new pathways

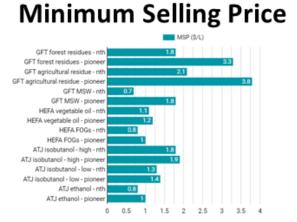
- Pyrolysis with forest residues or agricultural residues
- FT with  $CO_2$  and  $H_2$  as major inputs (Power to Liquids PtL)

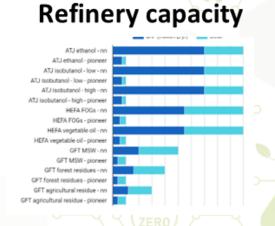








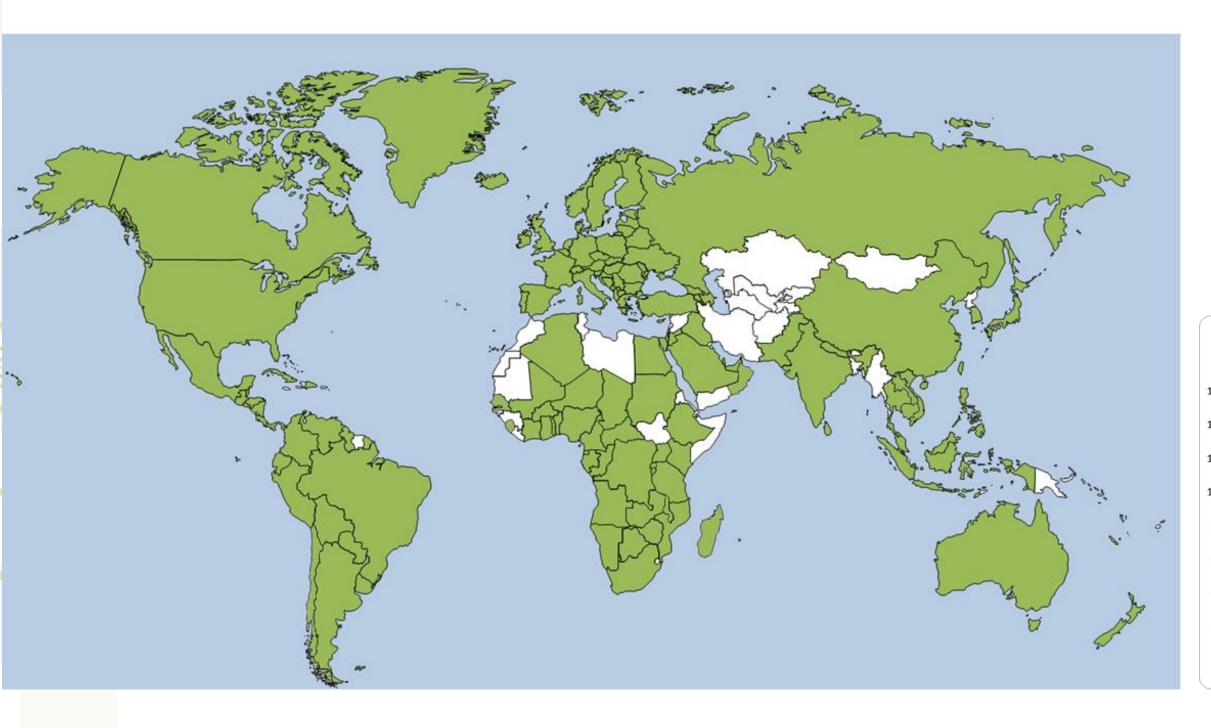


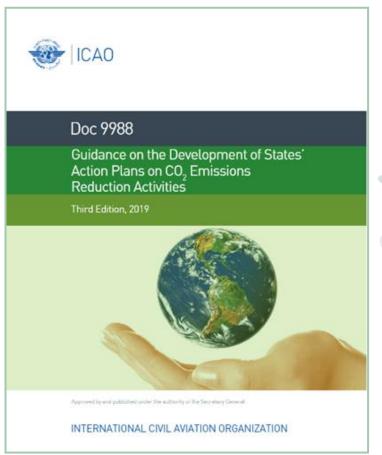


Available on the ICAO Public website - https://www.icao.int/environmental-protection/Pages/SAF\_RULESOFTHUMB.aspx

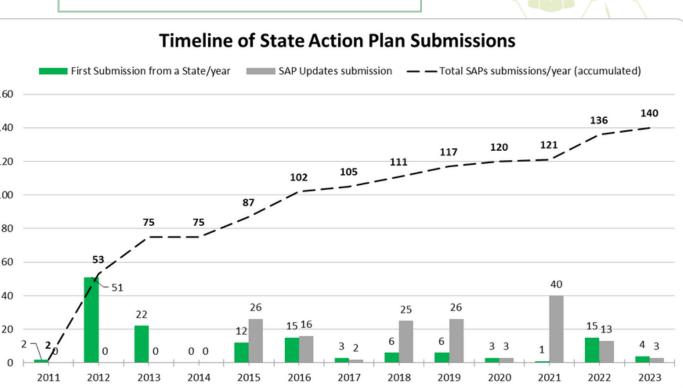


Material provided to Regional Seminars on State Action Plans (Building Block 1)



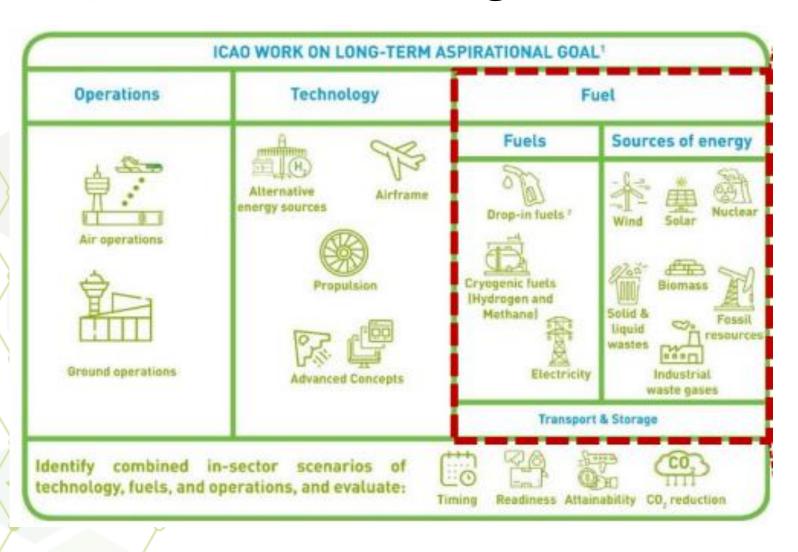


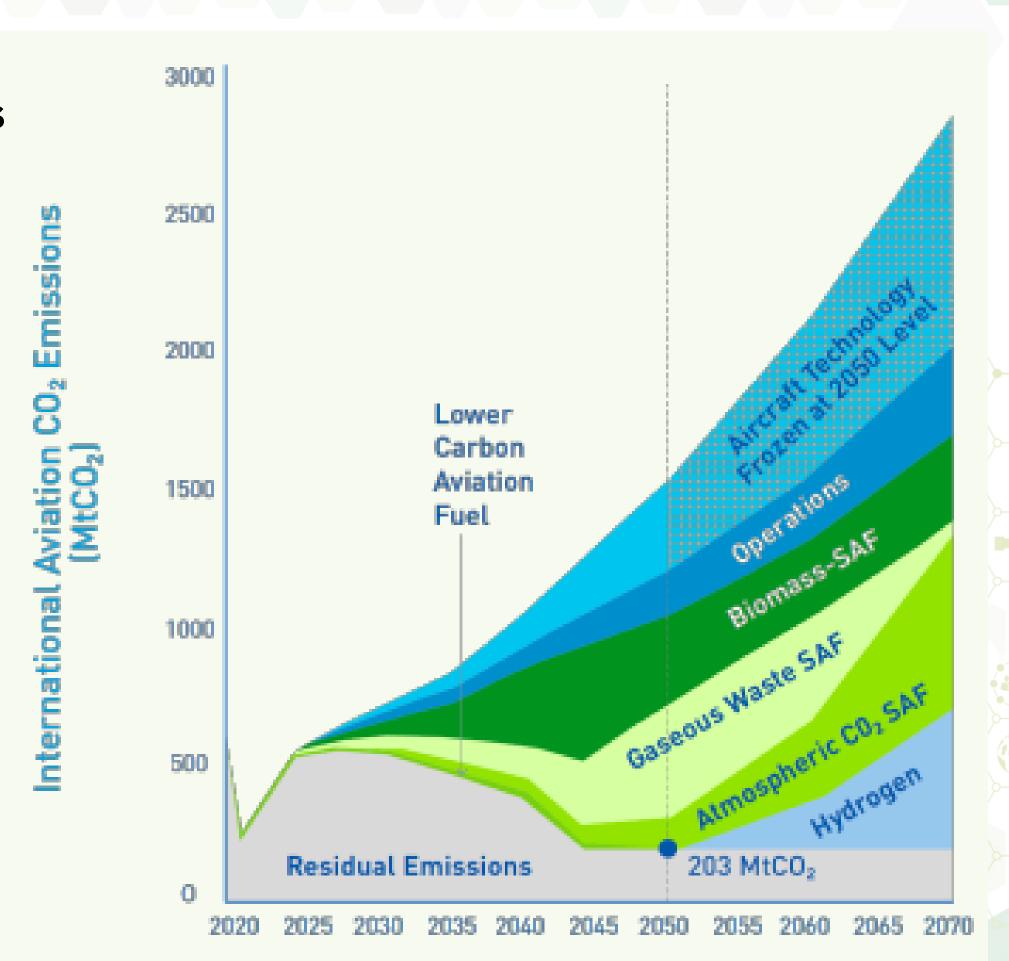
# Under review!



O · OACI · Mago

Material provided to Regional Seminars on the contribution of fuels to the LTAG (Building Block 1)





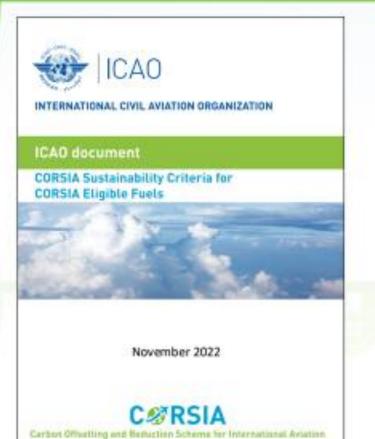
Material provided to Regional Seminars on the Regulatory framework (Building Block 2)



Carbon Offsetting and Reduction Scheme for International Aviation







For the first time, sustainable aviation fuels (SAF) have been certified under the CORSIA



OF ACCOMPLISHMENT







#### Material provided to Regional Seminars on the Regulatory framework (Building Block 2)





Version 2022



INTERNATIONAL CIVIL AVIATION ORGANIZATION

#### **ICAO** document

CORSIA Central Registry (CCR): Information and Data for Transparency



Part I: List of Verification Bodies Accredited in States

December 2022





INTERNATIONAL CIVIL AVIATION ORGANIZATION

#### **ICAO** document

CORSIA Central Registry (CCR): Information and Data for Transparency



Part II: Total CO<sub>2</sub> Emissions for 2019 Aggregated for all Aeroplane Operators on each State Pair

October 2022





INTERNATIONAL CIVIL AVIATION ORGANIZATION

#### **ICAO** document

CORSIA Central Registry (CCR): Information and Data for Transparency



Part III: Total Annual CO<sub>2</sub> Emissions and Information for Aeroplane Operators

October 2022





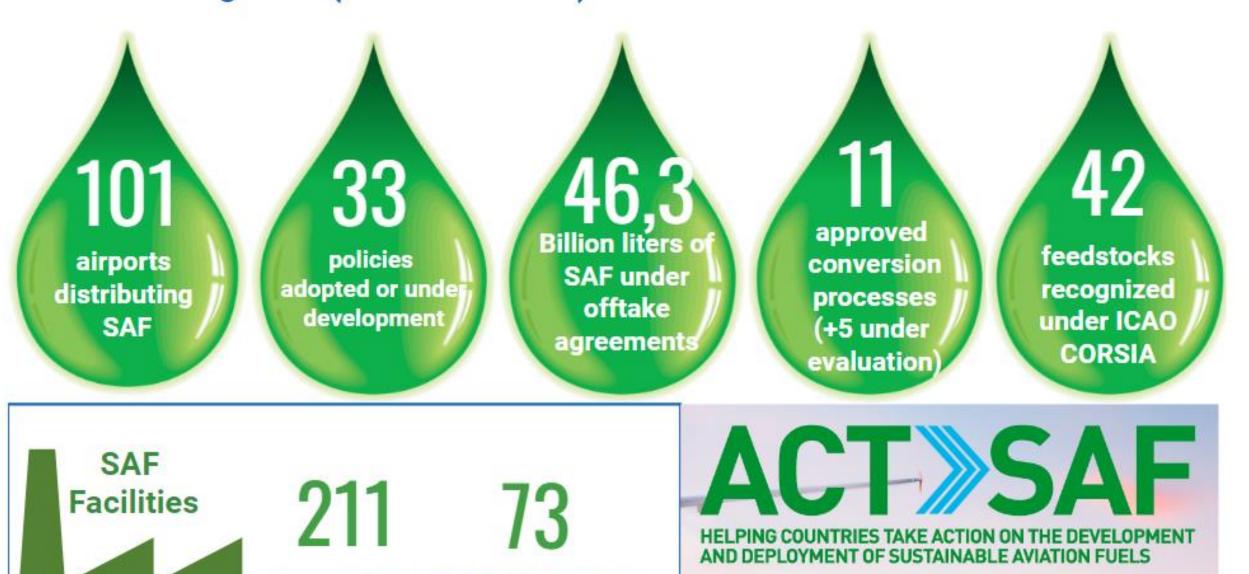
#### Material provided to Regional Seminars on the Regulatory framework (Building Block 2)



#### SAF Tracking tools (click for details)

Announced

**Facilities** 



**Feasibility studies** 

Billion liters/year

total capacity



# Material provided to Regional Seminars on implementation support (Building Block 3)



87

States

Name of State

Albania

Argentina

Australia

Austria

Bahamas

Barbados

46

Organizations

Name of Organization

WORLD TRAVEL & TOURISM COUNCIL

World Bank

WEF - World Economic Forum

Verifavia

T'way Airways

TEXAS/SEQUENCE

# ACT》SAF

#### States



#### International Organizations





#### Material provided to Regional Seminars on implementation support (Building Block 3)

#### **ACT-SAF Training Series**

Coordination with ACT-SAF partners identified that many States need conceptual training on SAF.

To address that, ICAO is developing the ACT-SAF Series of training sessions, to be held on a monthly basis. This will allow delivering comprehensive training to ACT-SAF Partners on an array of important SAF-related topics, ranging from sustainability, to policy, economics/financing certification and logistics.

The ACT-SAF Series will empower the ACT-SAF Partners with training material designed with the support of Supporting States and Organisations from the air transport, fuels and finance sectors, as well as academics and actors with niche expertise such as SAF reporting under CORSIA.

Want to participate on the ACT-SAF Series? Join ACT-SAF now (click here to access the ACT-SAF Terms and



the policy

development

#### **ICAO ACT-SAF Platform**

#### ICAO ACT-SAF platform of implementation support initiatives

Many ACT-SAF partners and aviation stakeholders are supporting implementation energies for aviation, including Sustainable Aviation Fuels. The dashboards below provides a summary of these initiatives (click on the drops for details)







Dates	Event	Venue	Reference
11-13 July 2023	1CAO Stocktaking 2023	Montréal, Canada	https://www.cao.int/Meet max.shootia max.ca/.pe es/default.at ta
3-5 July 2023	First AFCAC Workshop on Acceleration of Development and Deployment of Sustainable Aviation Fuels (SAFs)	Addis Ababa, Ethiopia	NA.
2-4 October 2023	Sustainable Aviation Futures North America	Houston, USA	https://www. safccogress na.com/
21-24 November 2023	Third ICAD Conference on Aviation and Alternative Fuels (CAAF/3)		tatios //www. cao int/Meed pos/CAAF3/ Pages/ocfa/ t.ascx

#### **ACT-SAF Feasibility Studies Template and Guide**

#### DRAFT - DO NOT QUOTE OR DISTRIBUTE WITHOUT ICAO PERMISSION



#### TEMPLATE FOR FEASIBILITY STUDIES ON SUSTAINABLE AVIATION FUELS

The ICAO Assistance, Capacity-building and Training for Sustainable Aviation Fuels (ACT-SAF) Programme was launched in June 2022. Its objective is to enable States to develop their full potential in SAF development and deployment, in line with the ICAO's No Country Left Behind initiative, the 2050 ICAO Vision for SAF, and the three main pillars of sustainable development recognized by the United Nations.

This template has been developed in the context of the ICAO ACT-SAF Programme to facilitate the preparation of standardized feasibility studies on SAF. The template can be used to assess the feasibility of SAF development and deployment both at the State and Regional level. ICAO has developed an interactive guide to assist in the preparation of feasibility studies following the structure defined in this

The information to be included in a feasibility study will be determined by the preparer to demonstrate the potential for the SAF development and deployment in the State under consideration. To ensure the consistency of information across different feasibility studies, it is recommended that all sections of the template be elaborated in a clear and concise manner. In parts where this may not be applicable, an appropriate explanation should be provided. It should also be noted that this template is by no means exhaustive, and a feasibility study may incorporate additional elements as appropriate.'

The structure of the template is summarized as follows

- Executive Summary
- Section 1: State-specific Information
- Section 2: Evaluation of Feedstocks and Pathways for SAF Production
- Section 3: Implementation Support and Financing
- Section 4: Action Plan

For any questions or assistance, please contact the ICAO Secretariat by email (officeenv@icao.int) indicating "ACT-SAF FS template" in the subject of the email message.

#### Feasibility Studies and other projects and activities under development





Financial contributions to support **ACT-SAF** activities



## Material provided to Regional Seminars on financing cleaner energy (Building Block 4)

### LTAG Report - Financing costs and investments across stakeholders

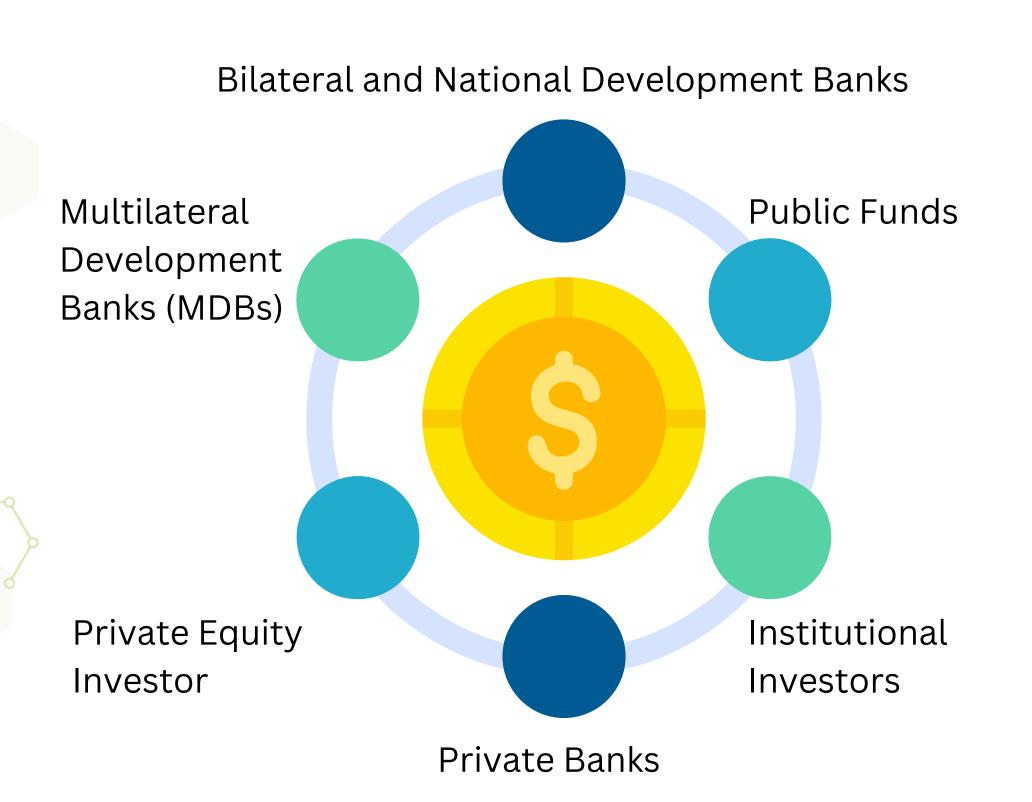
Projected cumulative (2020-2050) costs and investments associated with highest-ambition LTAG scenario, across each stakeholder group:

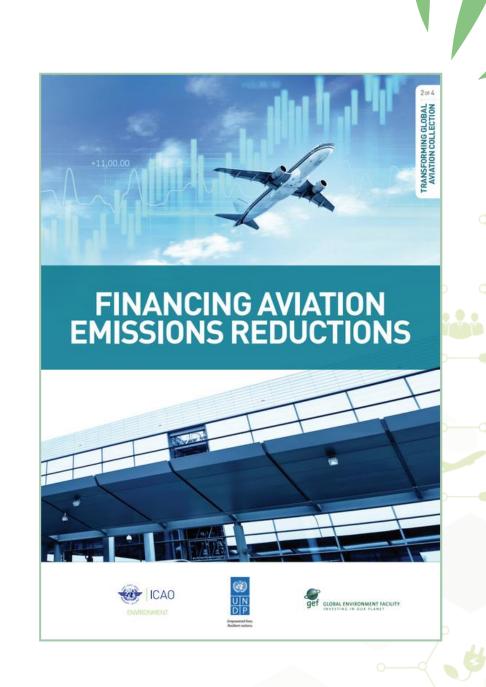
Stakeholders	Integrated Scenario 3
States	\$160b
Air Navigation Service Providers	\$20b
Aircraft manufacturers	\$350b
Fuel suppliers	\$3,200b
Airports	\$125b

Note: Some investments from upstream stakeholders are passed on downstream (e.g. airline operators) in the form of incremental price of products



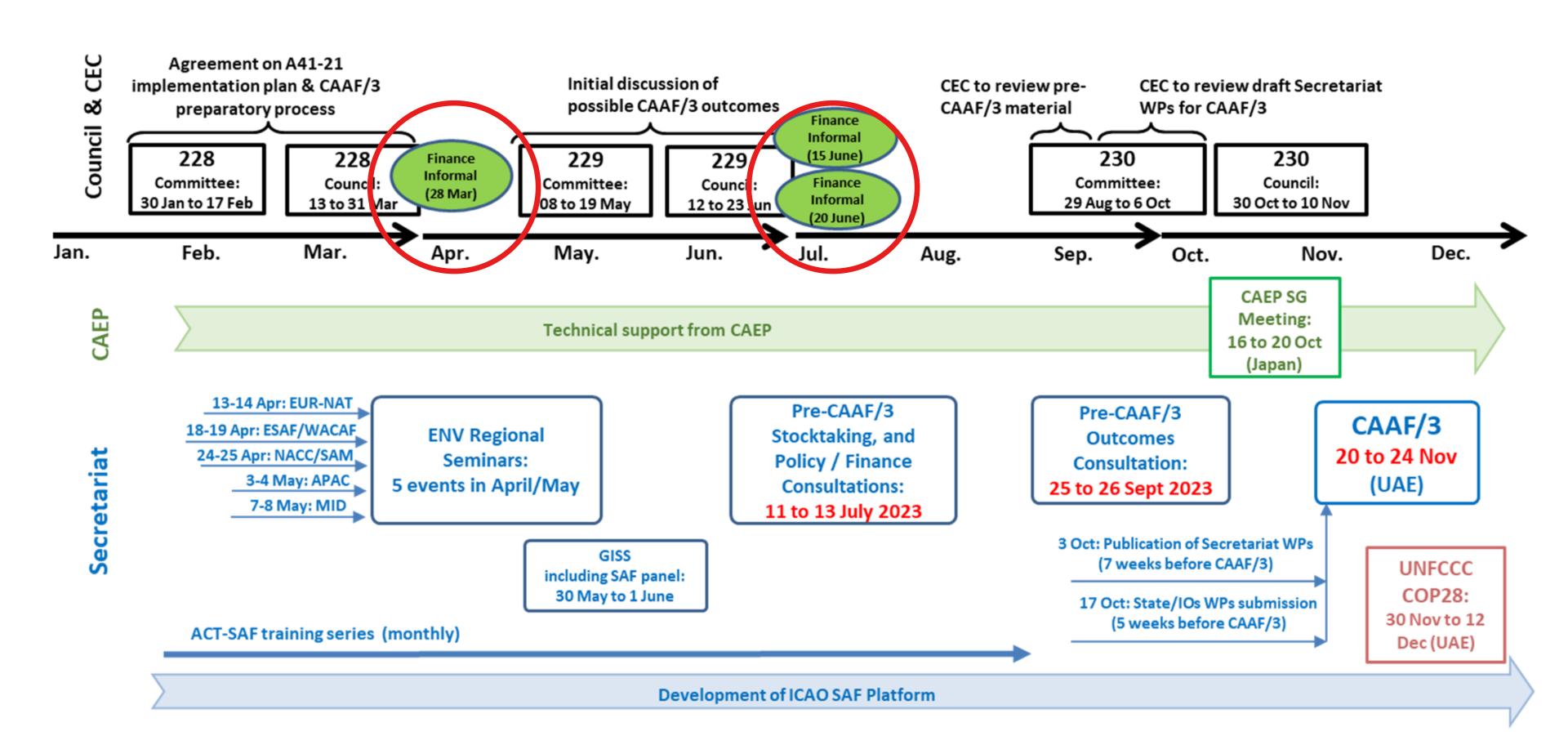
#### Diverse sources of financing







#### 2023 timeline toward CAAF/3





#### Council dialogues with the financing sector and energy providers (March – June 2023)







**Meridiam** 































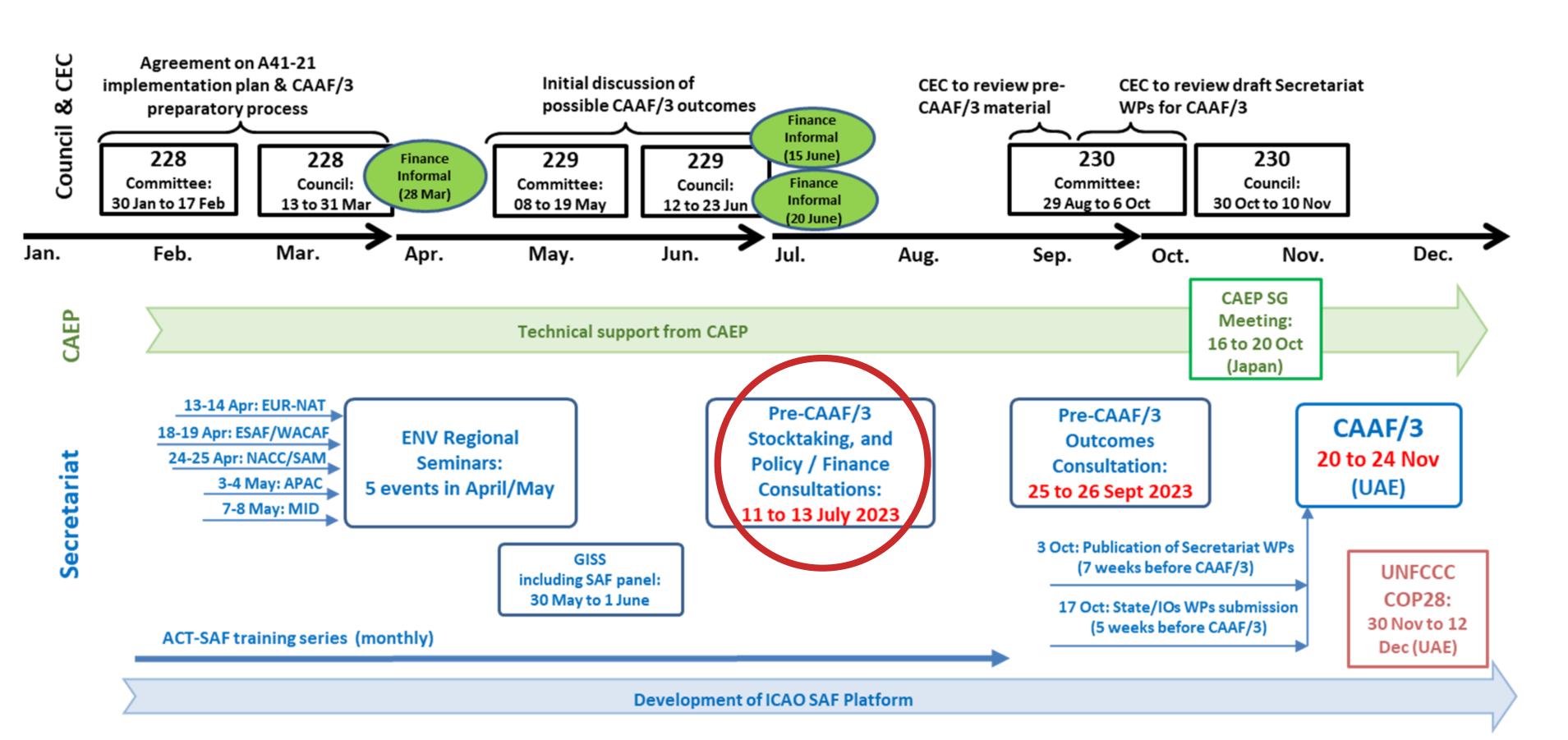








#### 2023 timeline toward CAAF/3









#### 2022 Stocktaking

- > Airports delivering SAF
- Announced SAF facilities
- Conversion processes certified for aviation
- > ACT-SAF partners
- SAF policies adopted or under development

















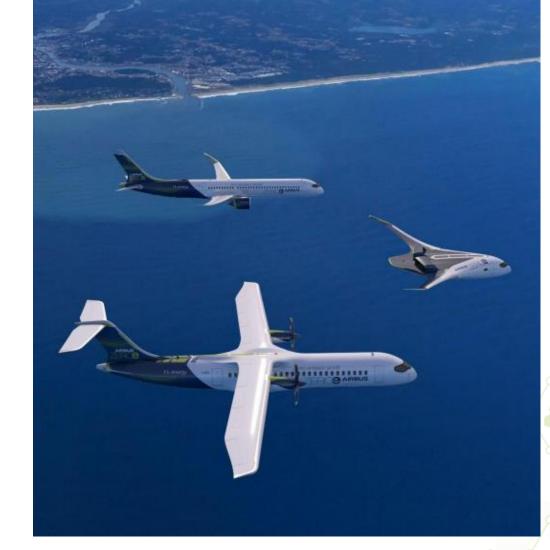


















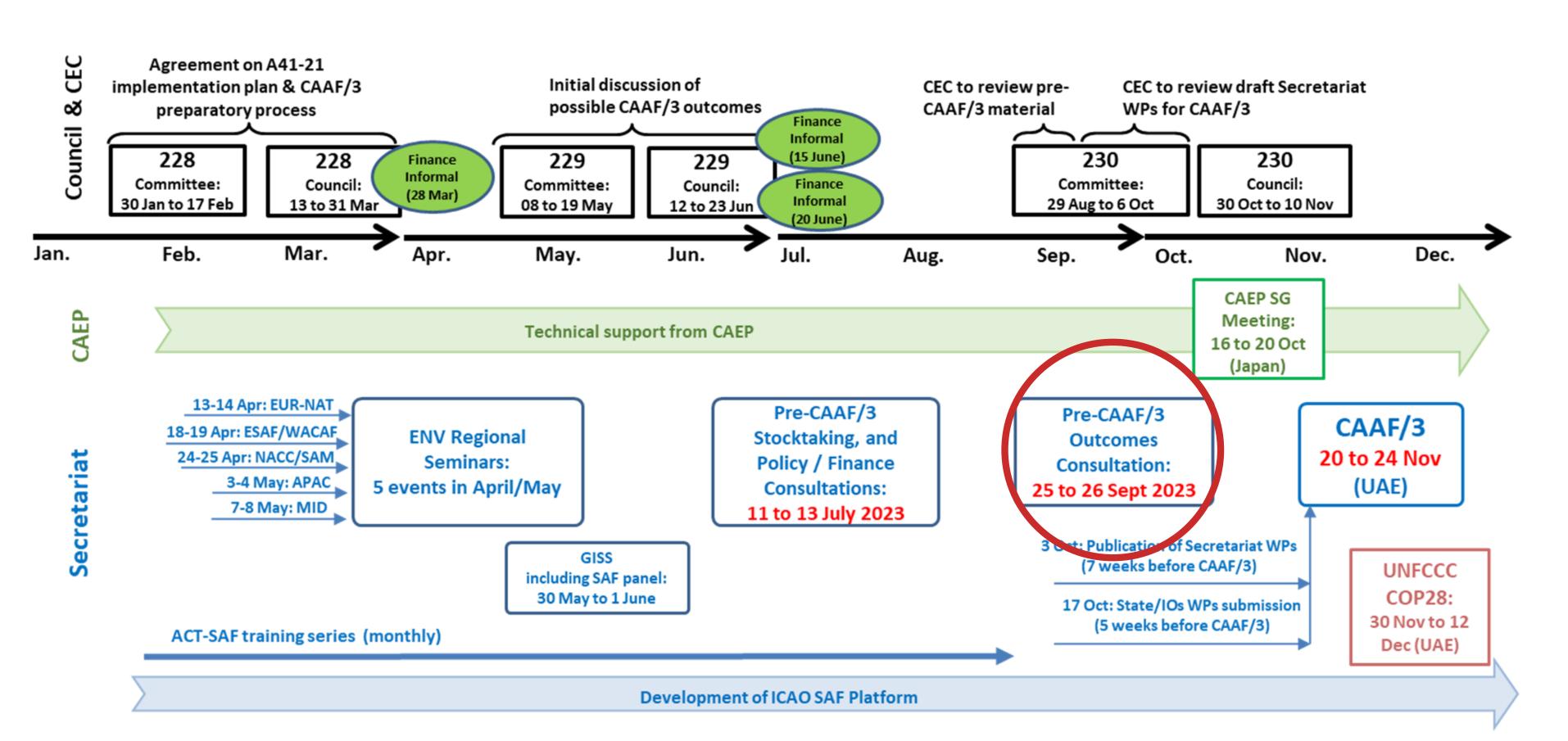








#### 2023 timeline toward CAAF/3



# Special Environment

Report



ICAO



