



Break-out Session for Task Force Aviation

15th Compliance Conference
26 November 2024

Welcome and Introduction

Helena Waltari and Saviour Vassallo

FlyingGreen Initiative

Eurocontrol, Dr Tamara Pejović and Laurent Tabernier

#FlyingGreen

Supporting
European
Aviation



FlyingGreen platform

A one-stop-shop to support Aviation Decarbonisation
and Climate Adaptation

Dr Tamara Pejović

Programme Manager, FlyingGreen

Team Lead, Aviation Sustainability Unit, EUROCONTROL

26/11/2024

15th Compliance Conference



NETWORK
MANAGER





The Challenge

Getting to net zero

Green energy
Feedstock availability

Resilience to
Climate Change

Financing the
transformation



Flying Green

The decarbonisation of the aviation sector has been underway for several decades but still, the **pressure to speed up decarbonisation** has never been so high. Our latest traffic forecasts show that demand is still increasing, making the transition to net zero emissions even more challenging. Different decarbonisation roadmaps have been published and the recent long-term aspirational goal (LTAG) adopted during ICAO Assembly 41 shows the commitment of the whole aviation ecosystem. EUROCONTROL aims to play a **central role** by developing a brand-new platform of green services, **FlyingGreen** to support ECAC Member States and operational stakeholders to decarbonise.



FLYING GREEN

Supporting a sustainable future for aviation



FlyingGreen: A UNIQUE ONE-STOP SHOP



SECG



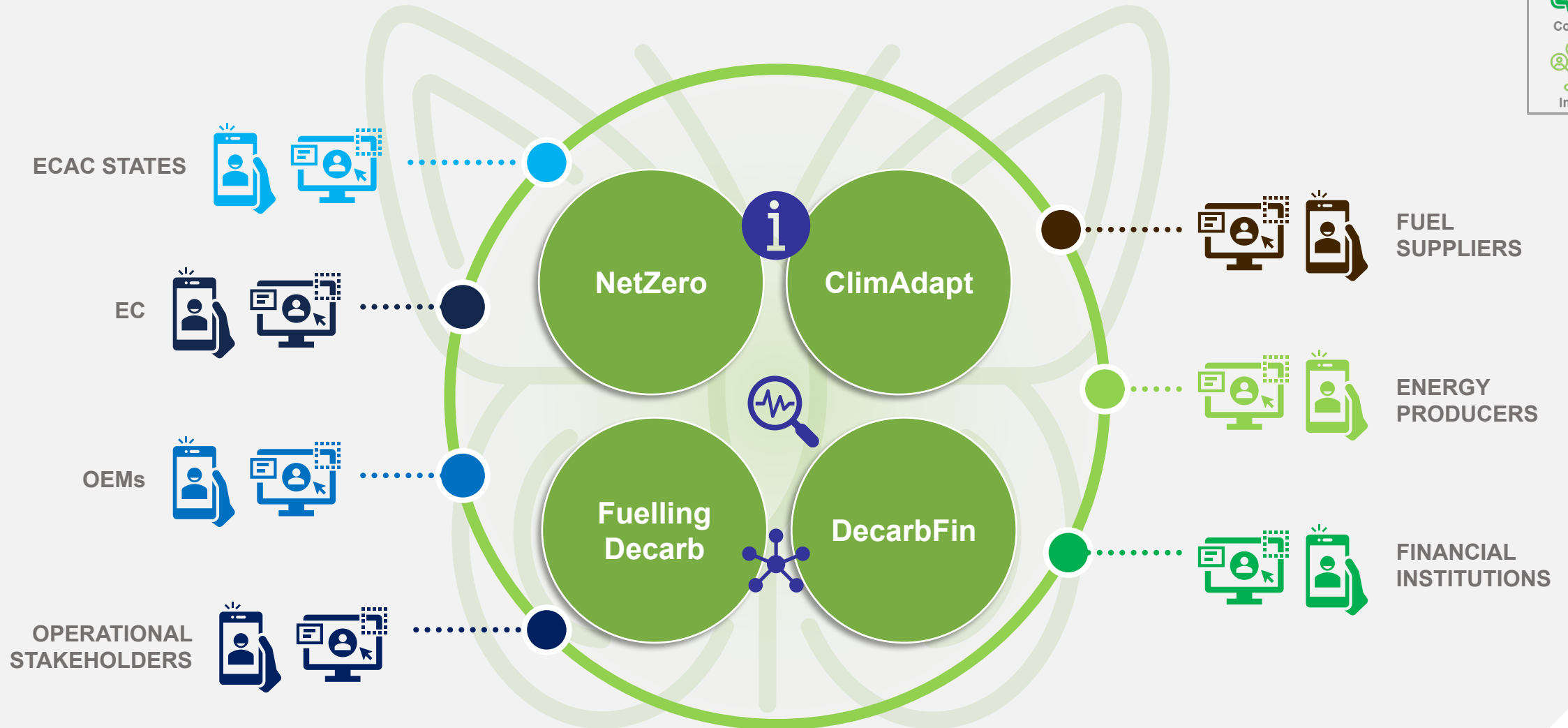
Inform



Consult



Involve



www.flying-green.eurocontrol.int





Stakeholder engagement



INFORM

- Bulletins
- Fact sheets



CONSULT

- + Prioritization of services
- + Pre-official release review



INVOLVE

- + Requirements
- + Test cases
- + Feedback on beta versions



A **centralised source** of information for emissions and decarbonization strategies

- **Comprehensive Fuel Burn and Emissions** tracking system

- **Emissions overview 2019-2050**

- Area focus; Full trajectory focus; Zoom in: Network, FAB, State, Airport (ANSP view Q12025)

- **Filters:**

- Flight type (DAIO); Flight phases; Market segments

- **Mitigation measures and strategies**

- **Traffic forecast scenario**

- **SAF mandate**

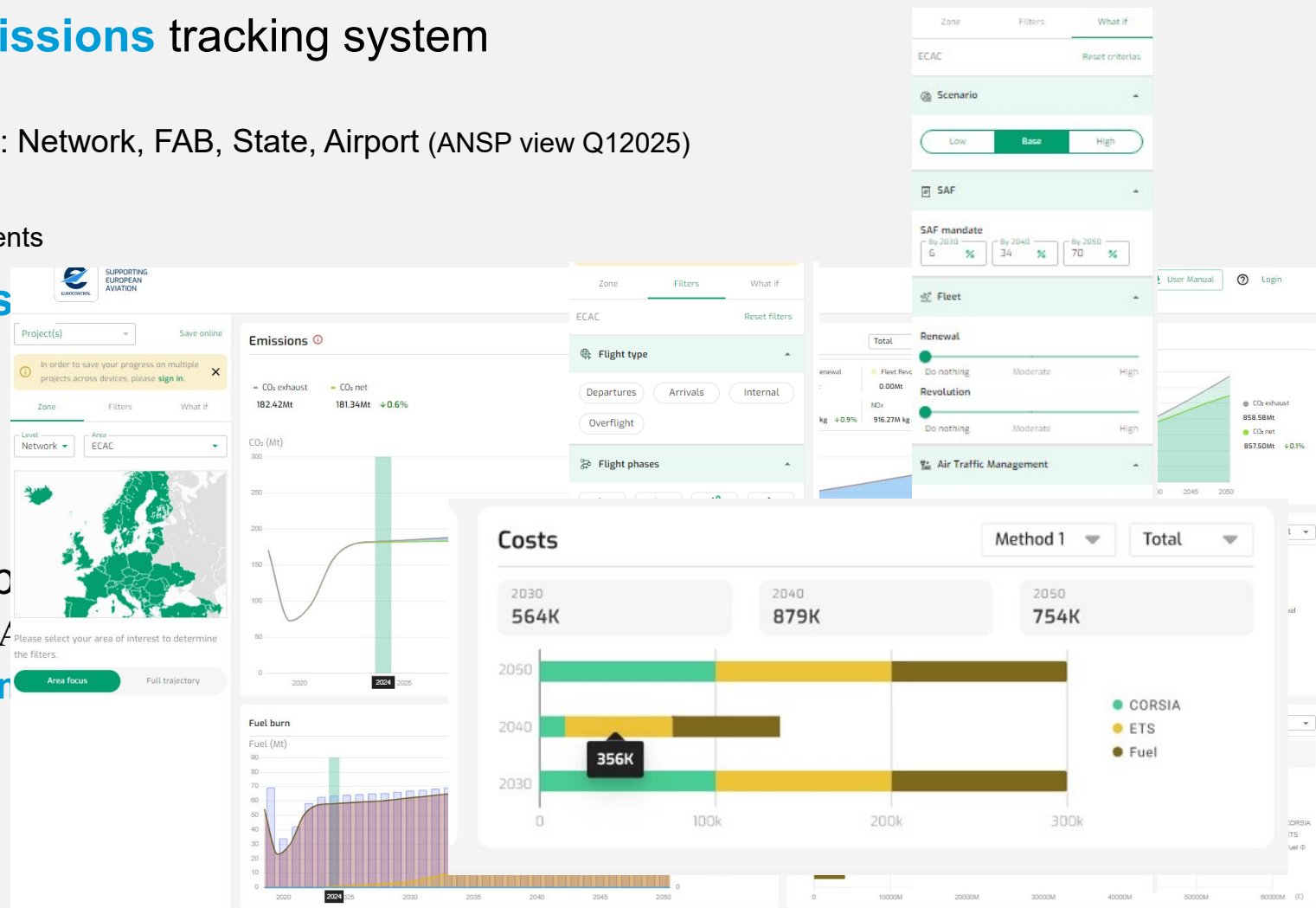
- **Fleet renewal and revolution**

- **ATM Operational improvements**

- **Aviation's economics and costs imp**

- **Additional Environmental Cost: CORSIA**

- **Emission and Cost result per improver**



A **centralised source** of information to support the **transition** from a fossil fuel to sustainable aviation

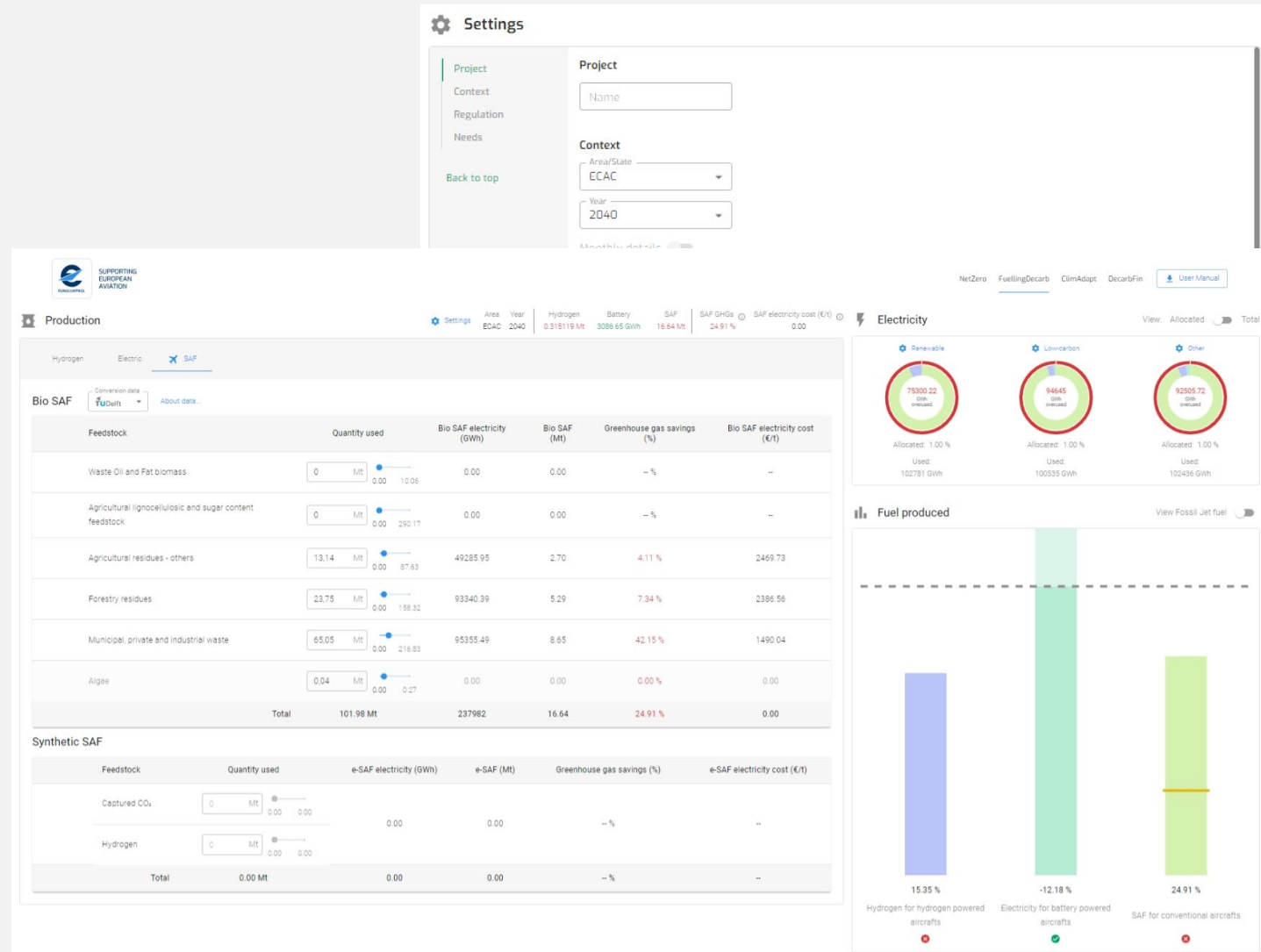
Fuel Calculator: Informed **decision making** for **fuel choice**, production methods and **electricity** requirements.

Market Check: Help to identify **gaps** between the **SAF production** and the **demand**.

Energy estimator: Provide **estimates** of **renewable** or other **electricity** requirements for fuel production and level of SAF sustainability achieved.

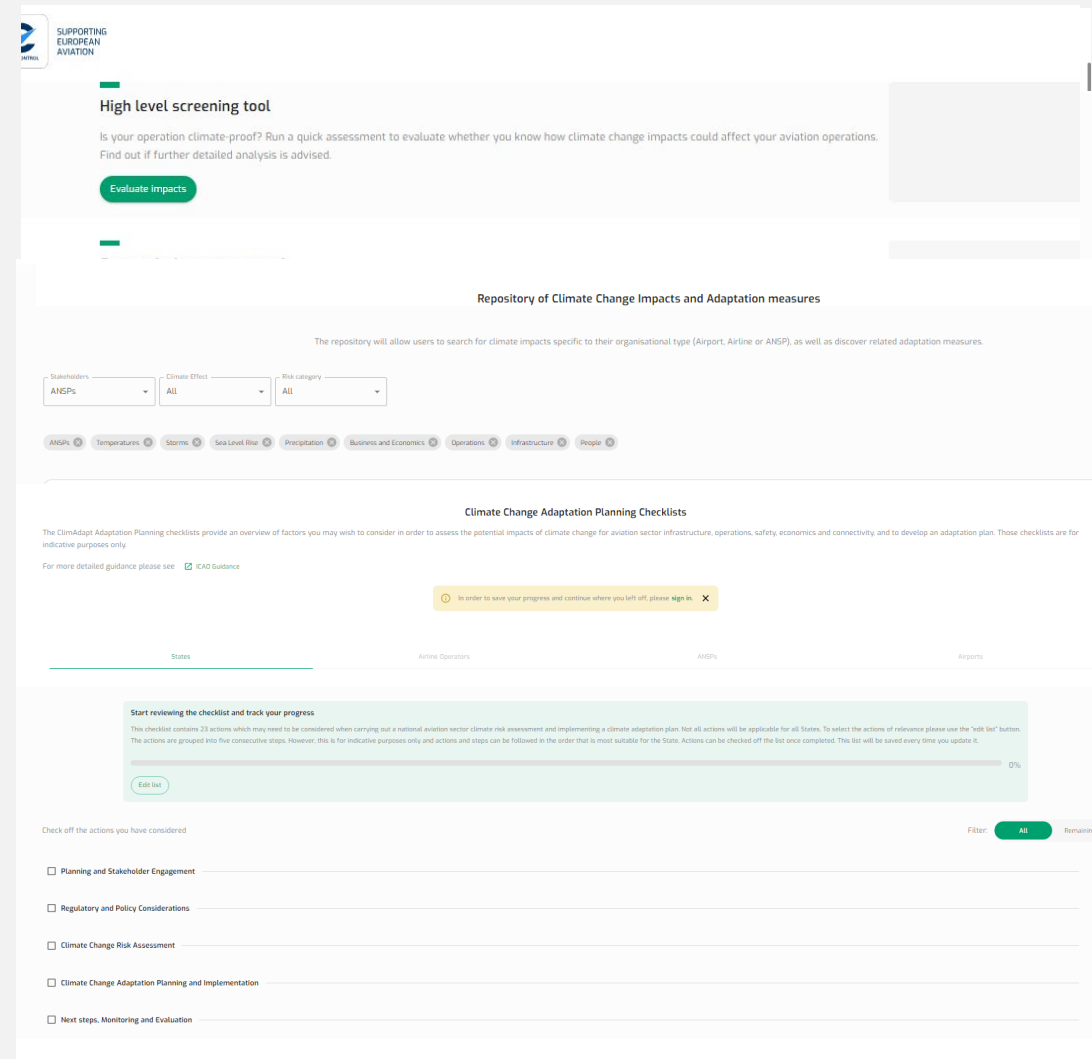
SAF Map

Resource Hub: Serve as comprehensive **resource hub** offering **guidance, indicators, policies, FAQs** and **news** related to latest developments and regulations in the industry.



A **centralised source** of information for Climate Change impacts and adaptation measures

- **High level Screening Tool**
 - Is your operation climate-proof?
- **High-level ECO assessment Tool**
 - Run a financial assessment and evaluate the potential costs of climate impacts
- **Repository** of potential impacts and adaptation measures
- Detailed climate change risk assessment and adaptation **guidance**
 - Explore key climate impacts and adaptation measures (by stakeholder, climate effect, or risk category)
- **Checklist** for state-level planning and implementation
 - Use the checklist to plan a climate change risk assessment and adaptation strategy.
 - Airport, ANSP and Airline checklists to follow
- **Good practice** examples and case studies





An open platform for aviation stakeholders to make the best out of sustainable finance and to implement their climate mitigation/ adaptation projects

SERVICES

Fund Pathfinder (F-PATH)

Dedicated to selecting the most suitable EU funding mechanisms according to financing purpose and conditions defined by the user



Funding Booster (F-BOO)

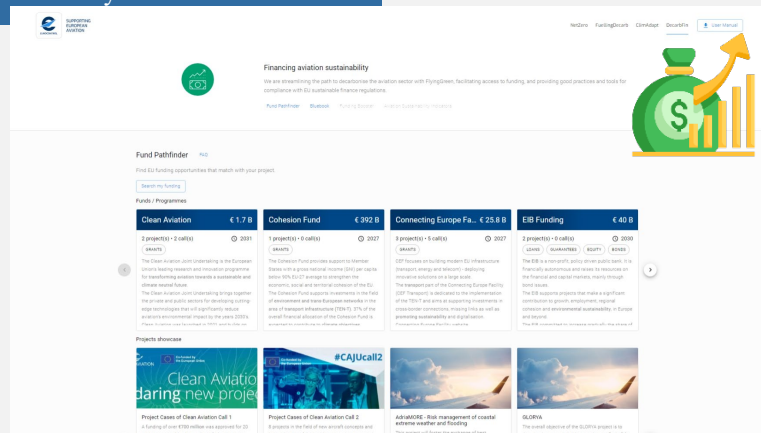
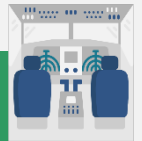
Tailored to fund-seekers looking to pursue financing into non-public sources

BlueBook (BLU)

Step-by-step guide to facilitate ESG regulatory reporting and help achieve compliance

Aviation Sustainability Indicators (ASD)

User retrieves aviation performance indicators for sustainable financing



OPPORTUNITIES

Accelerate and simplify access to sustainable financing
€ 330 M

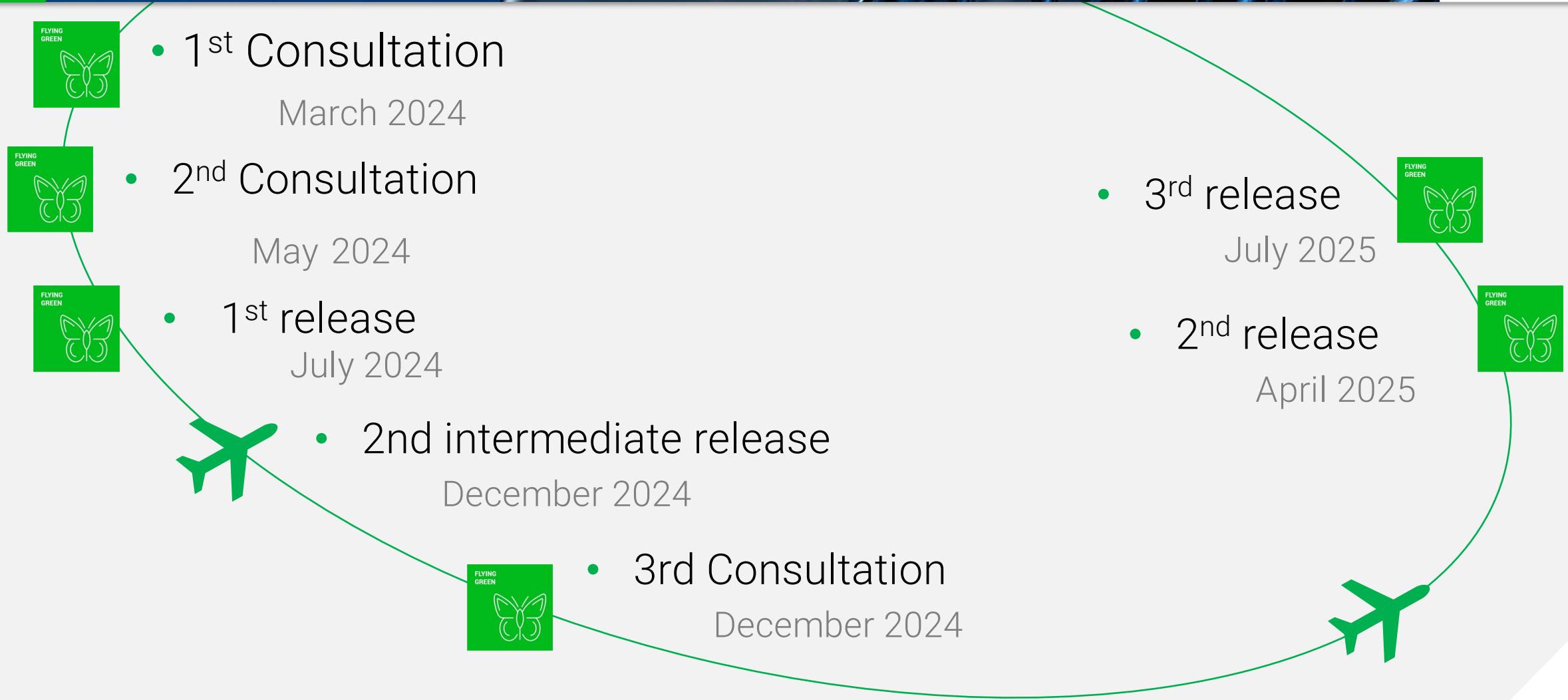
Enhance ESG reporting capabilities & harmonisation

Build strong aviation business cases via trustful sustainability indicators

for EU aviation R&D (2021-2027)



Next steps



15th Compliance Conference



SUPPORTING
EUROPEAN
AVIATION

Thank you!

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FlyingGreen Website:

<https://www.eurocontrol.int/platform/flyinggreen>

FlyingGreen Platform:

<https://flying-green.eurocontrol.int>

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NETWORK
MANAGER



#Fuellingdecarb

Supporting
European
Aviation



FlyingGreen platform

A one-stop-shop to support Aviation Decarbonisation
and Climate Adaptation

Laurent Tabernier

FuelingDecarb pillar Manager

Aviation Sustainability Unit, EUROCONTROL

26/11/2024

15th EU ETS Compliance Conference, 26 - 27 November 2024

15th Compliance Conference



NETWORK
MANAGER





Citation 1/2

”To invent an airplane is nothing. To build one is something.
To fly is everything.”

Otto Lilienthal





Citation 2/2

“Flying might be everything, but flying with no fuel is nothing.”

Laurent Tabernier




EUROCONTROL Think paper #21 & #22



Decarbonising long-haul flights by 2050

FuelingDecarb was used to estimate many figures of the #22 think paper

EUROCONTROL
Think Paper #22 – 17 October 2024



Decarbonising long-haul flights by 2050: Is there a pathway through sustainable aviation fuel use, fleet renewal and green energy upscaling?

The European Union's aviation sector faces the significant challenge of achieving net-zero emissions by 2050. Although long-haul flights of more than 3,000 km (1,620 NM) account for less than 10% of all departures, they represent more than half of aviation's carbon emissions, a proportion expected to rise to ~56% by 2050. This disparity in emissions underscores the urgent need to address the problem of emissions from long-haul flights in the EU's decarbonisation strategy.

While electric and hydrogen aircraft solutions are advancing for short-haul aircraft, they are not yet realistic for aircraft flying long-haul, as shown by EUROCONTROL Think Paper #21 on long-haul flight decarbonisation. Indeed, applying electric, hydrogen, methane, ammonia or solar technologies to long-haul flights cannot be envisaged right now due to the immense technical challenges involved. Therefore, alternative solutions are necessary to reduce long-haul flight emissions in the near future.

This Think Paper explores viable strategies for reducing emissions from long-haul flights within existing technological and time constraints, focusing on sustainable aviation fuel (SAF) and fleet modernisation as the most feasible pathways for significant emission reductions, and using the FuelingDecarb module from EUROCONTROL's FlyingGreen platform to produce new estimates that show clearly what needs to be done to advance on aviation sustainability goals.


Regarding SAF, we address the following questions:

- Will there be enough Annex IX-compliant feedstock under the EU Renewable Energy Directive (RED II) between 2025 and 2050 to produce bio-based SAF?
- How much green/clean energy is required to produce the necessary SAF to decarbonise long-haul flights?
- What logistical distribution would maximise the volume of SAF carried on long-haul flights?

We have also analysed by how much fleet renewal could accelerate the decarbonisation of long-haul flights.

Key findings

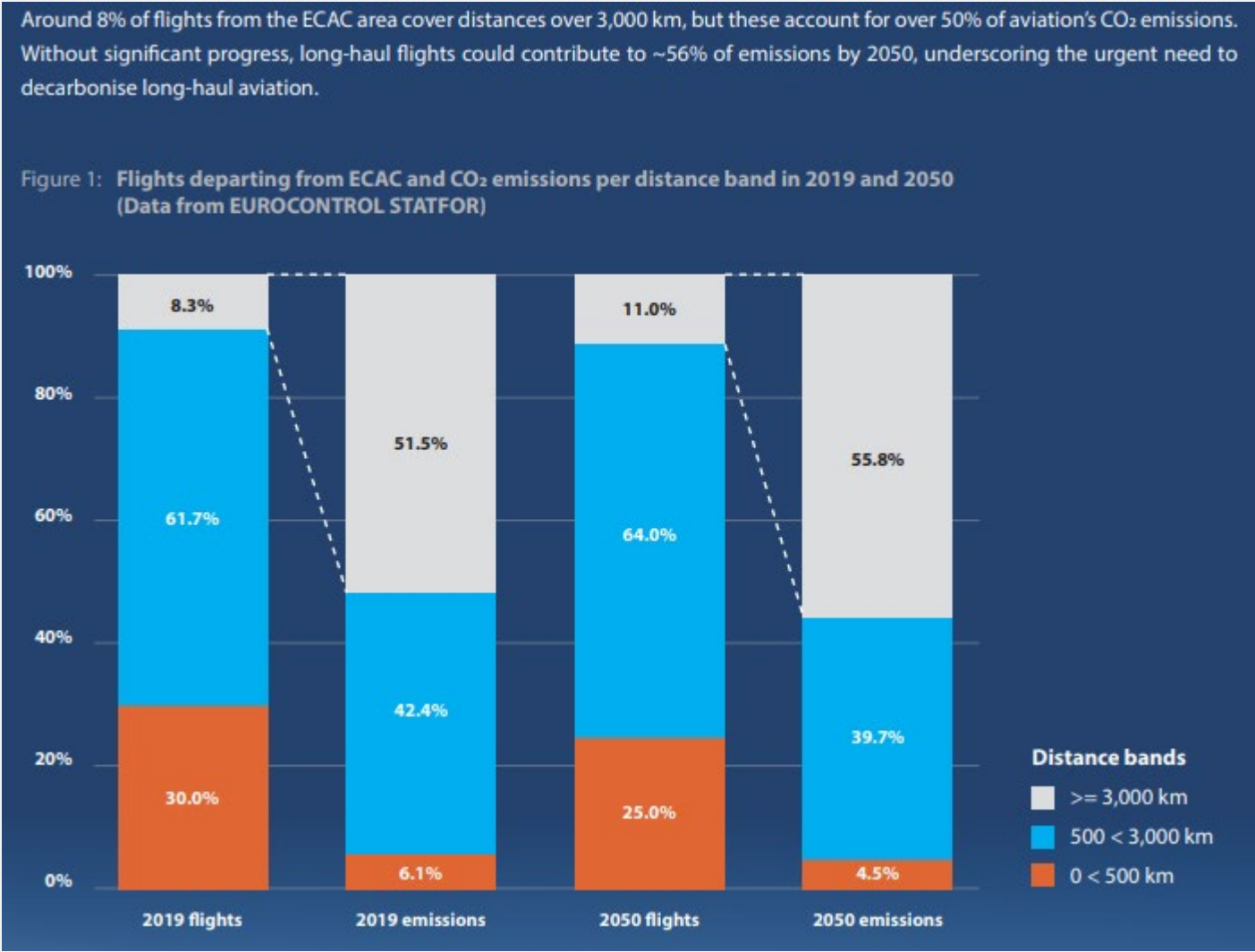
- The energy challenge is common to all transportation sectors and synergies with other transport modes could help sectors, and accelerate the production of SAF. The progressive electrification of road transport offers a huge opportunity to reallocate a large part of the EU's existing biofuel production capacity to the production of SAF (2.3 Mt). In turn, aviation decarbonisation, by producing 24 Mt of SAF, will also contribute to maritime decarbonisation by producing 7.5 Mt of biodiesel as a co-product.
- By 2050, we estimate that ECAC aviation will require an estimated 61 Mt of jet fuel a year, with ECAC long-haul flights (>3,000 km) needing 56% or 34 Mt of this. Applying ReFuelEU's 70% SAF blending mandate translates into 24 Mt of SAF, including ~12 Mt of bio-SAF (35%) and ~12 Mt of syn-SAF (35%), supplemented by 10 Mt of conventional aviation fuel. This could be met by collecting and converting 50% of used cooking oil in the ECAC area and 5.5% of the agricultural, forestry residues and municipal waste.
- The challenge of producing SAF and co-products using green/clean energy should not be underestimated. By 2050, SAF and co-products for those ECAC long-haul departing flights over 3,000 km will require various electricity mixes. The amount of electricity needed would be, for example, equivalent to 1.8 times France's total electricity production in 2023 or around 24% of all ECAC electricity production. This is equivalent to 73 nuclear reactors of 1,650 MW, or 8,157 offshore wind turbines, with a capacity ranging from 10 to 30 MW, or a net square edge of 43 km (43 km x 43 km) of photovoltaic solar panels deployed from 2025 to 2050).
- SAF supply could be initially concentrated at a much smaller set of airports to maximise the benefits and ease the transition to deploying SAF at all European airports. Introducing a 20% SAF blend for long-haul flights at five airports (or a 12.5% SAF blend at 20 airports, or 11% at 34) would have the same environmental benefits – assuming sufficient SAF production and supply – as a 10% SAF blend at all 2,165 ECAC airports.
- Accelerating fleet renewal by replacing long-haul (> 3,000 km) aircraft over 10 years old could reduce CO₂ emissions of the long-haul fleet by 10.4%, resulting in a 5.4% reduction in both total aviation emissions as well as SAF needs.



<https://www.eurocontrol.int/publication/eurocontrol-think-paper-22-decarbonising-long-haul-flights-2050>



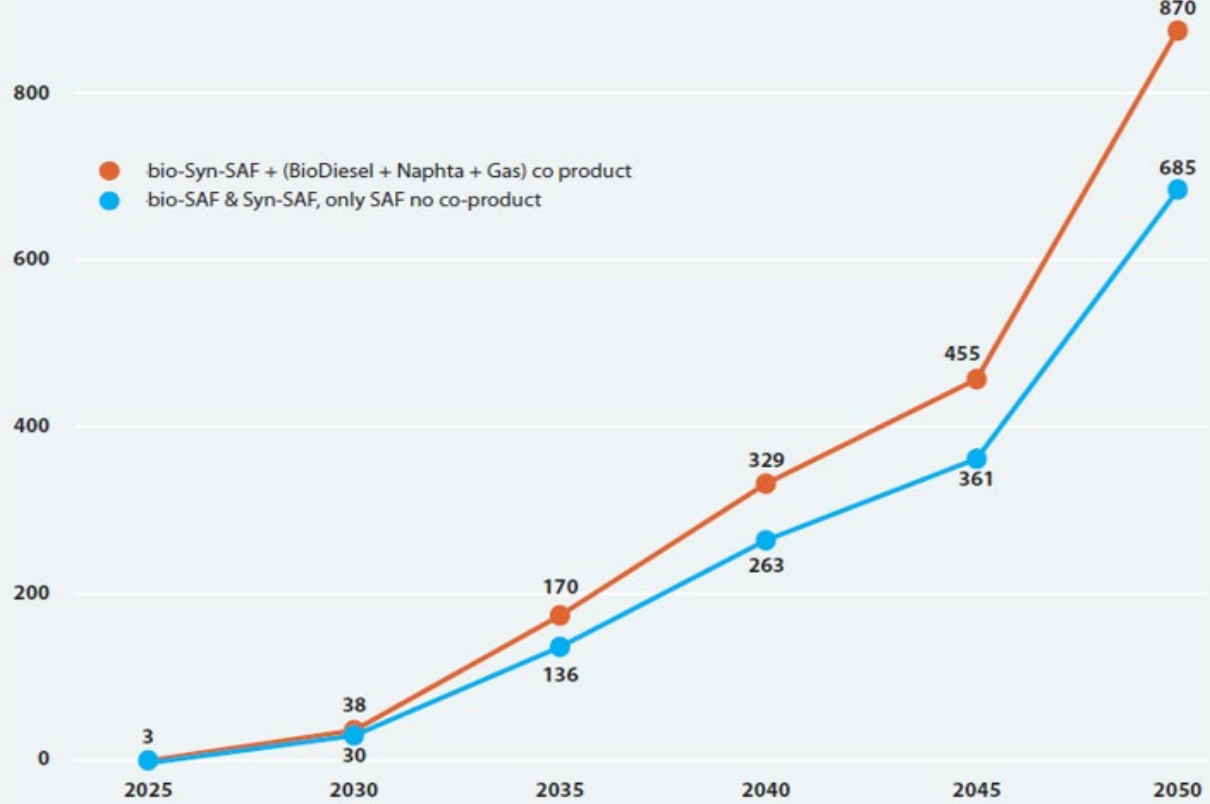
Typical distance flown, and % of jet fuel used?



How much energy would be required to produce SAF ?



By 2050, producing SAF and co-products for ECAC long-haul flights over 3,000 km will require 1.8 times France's, or 24% of ECAC's 2023 electricity production. This equals the output of 73 nuclear reactors, or 8,157 offshore wind turbines, or 43 km x 43 km of solar panels.

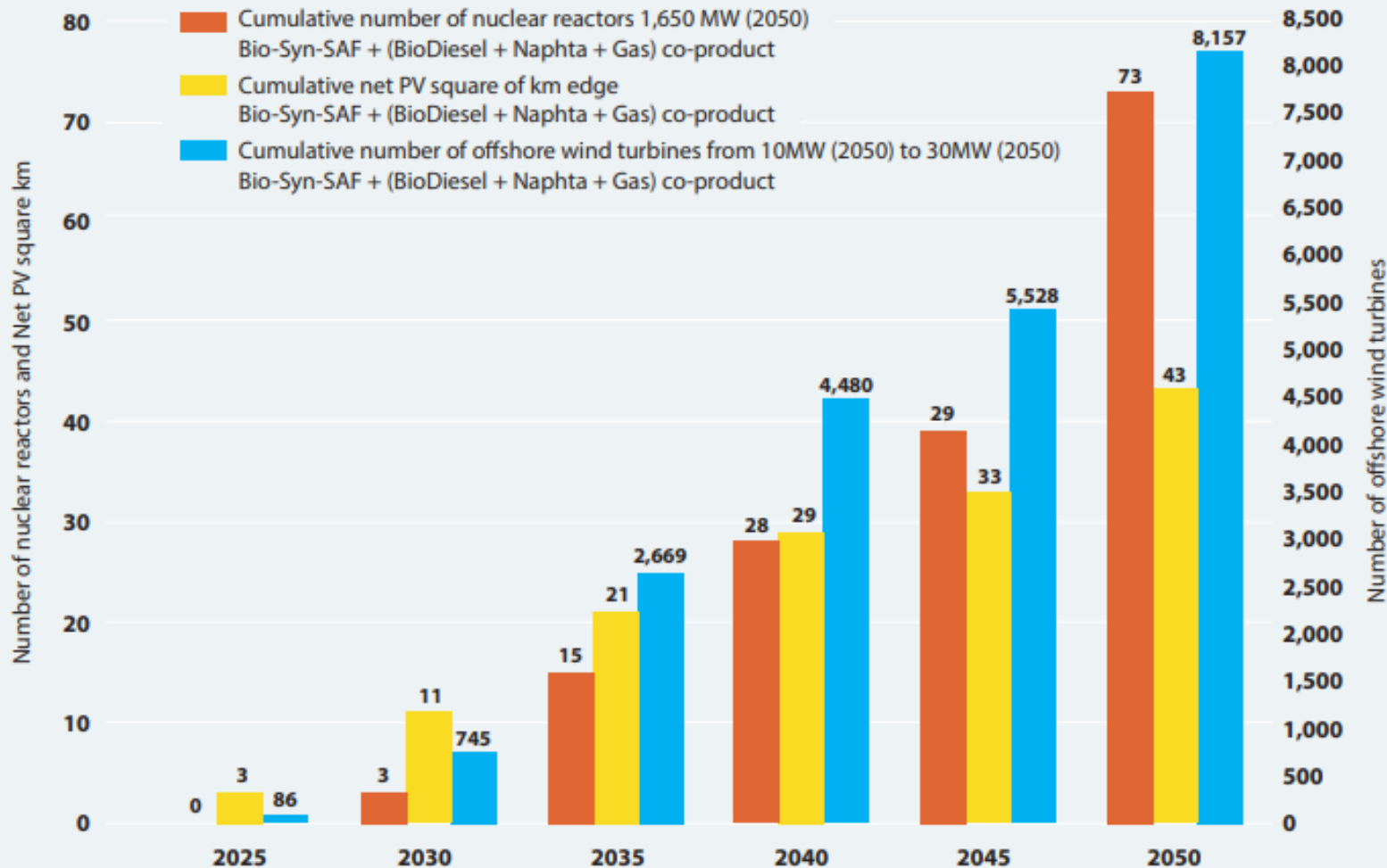


Electricity required for the production of SAF (in TWh/yr), with and without co-products, for use by ECAC long-haul (>3,000 km) flights

How much energy would be required to produce SAF ?



Figure 8: Order of magnitude illustrating the total required number of nuclear reactors OR offshore wind turbines OR solar panels to generate the electricity needed to produce bio-SAF and synthetic SAF and co-products for use by long-haul (>3,000 km) flights (EUROCONTROL)



FuellingDecarb demo



SUPPORTING EUROPEAN AVIATION

NetZero FuellingDecarb ClimAdapt DecarbFin User Manual

Production

Settings | Area: EU27 | Year: 2050 | Hydrogen: 0.424465 Mt | Battery: 3.5 GWh | SAF: 22.31 Mt | SAF GHGs: 46.12 % | SAF electricity cost (€/t): 0.00

Electricity

Hydrogen Electric SAF

Bio SAF

Conversion data: U Delft | [About data...](#)

Feedstock	Quantity used	Bio SAF electricity (GWh)	Bio SAF (Mt)	Greenhouse gas savings (%)	Bio SAF electricity cost (€/t)
Waste Oil and Fat biomass	1,36 Mt 0.00 9.09	1635.41	0.74	90.85 %	322.25
Agricultural lignocellulosic and sugar content feedstock	28.41 Mt 0.00 189.43	190907	12.79	38.39 %	2170.26
Agricultural residues - others	8.14 Mt 0.00 54.26	30517.58	1.81	30.35 %	2453.35
Forestry residues	17.39 Mt 0.00 115.90	68330.92	4.16	63.09 %	1732.24
Municipal, private and industrial waste	21.09 Mt 0.00 140.62	30919.81	2.81	54.53 %	1601.83
Algae	0.01 Mt 0.00 0.09	0.00	0.00	0.00 %	0.00
Total	76.41 Mt	322311	22.31	46.12 %	0.00

Synthetic SAF

Feedstock	Quantity used	e-SAF electricity (GWh)	e-SAF (Mt)	Greenhouse gas savings (%)	e-SAF electricity cost (€/t)
Captured CO ₂	0 Mt 0.00 0.00	0.00	0.00	-- %	--
Hydrogen	0 Mt 0.00 0.00	0.00	0.00	-- %	--
Total	0.00 Mt	0.00	0.00	-- %	--

Electricity
View: Allocated Total

Renewable

Allocated: 1.00 %
Used: 134455 GWh

Low-carbon

Allocated: 1.00 %
Used: 141836 GWh

Other

Allocated: 1.00 %
Used: 108917 GWh

Fuel produced
View Fossil Jet fuel

73.86 %	83.26 %	46.12 %
Hydrogen for hydrogen powered aircrafts	Electricity for battery powered aircrafts	SAF for conventional aircrafts

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www.flying-green.eurocontrol.int

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15th EU ETS Compliance Conference, 26 - 27 November 2024



Let's discuss this
together

15th Compliance Conference



SUPPORTING
EUROPEAN
AVIATION

Thank you!

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FlyingGreen Website:

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FlyingGreen Platform:

<https://flying-green.eurocontrol.int>



Update on legal and implementation developments relating to the ETS-Aviation, with emphasis on SAFs

DG CLIMA Aviation Team



ETS-Aviation: Update on implementation developments

TF Aviation, Compliance Conference

26 November 2024

DG CLIMA B.4, European Commission

Implementation



ETS-financed SAF support
Delegated act
+
Yearly publication of prices
for SAF, kerosene &
allowances



Non-CO2
Implementing act



Total quantity of aviation allowances
+
free allocation
to individual operators



List of countries considered
to be applying CORSIA:
Q1, Q4 2024 + regular
updates

CORSIA offsetting detailed
rules
Unit eligibility requirements:
2025

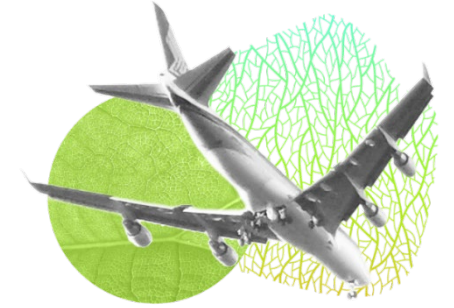
Support mechanism for the use of fuels eligible for ETS support (FEETS)

Article 3c(6) of the ETS Directive: commercial aircraft operators are entitled to receive allowances to cover the remaining price difference with kerosene.

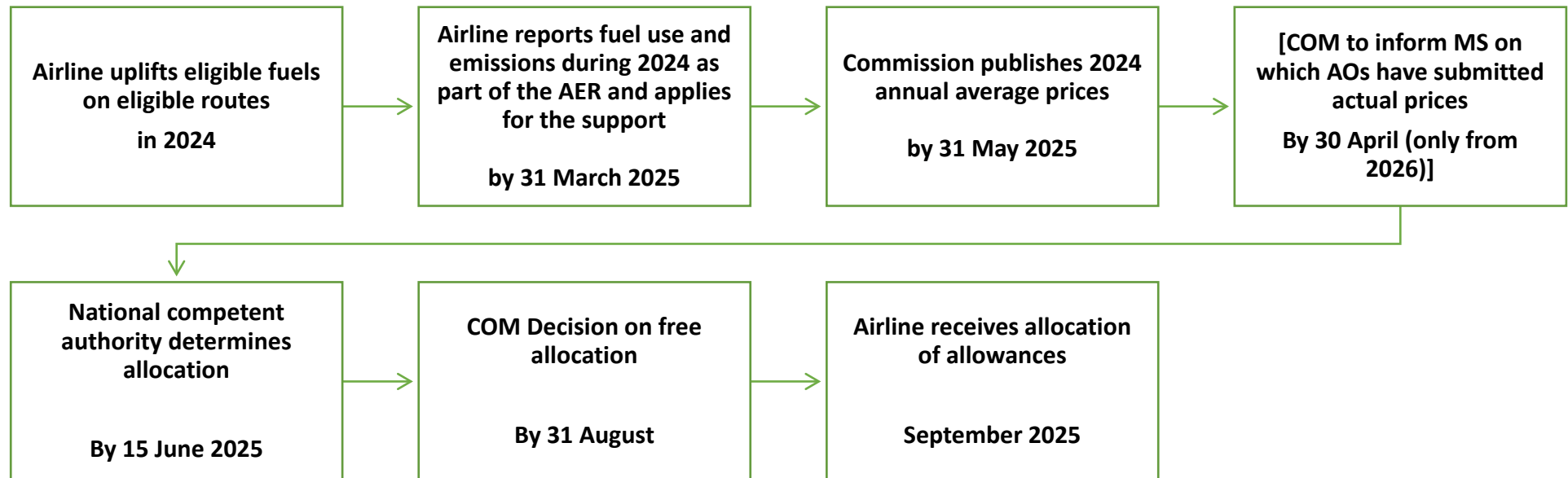
Delegated act on the detailed rules

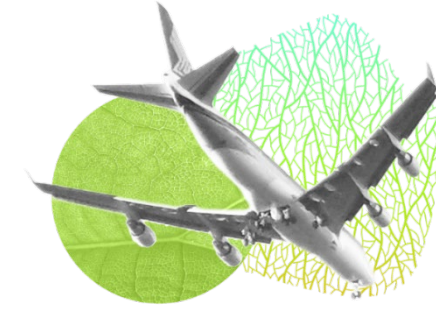
1. application for free allowances by aircraft operators;
2. yearly calculation of the average price difference and its publication, including the arrangements for taking into account incentives from the price of carbon and from harmonised minimum levels of taxation on fossil fuels;
3. determination of the amount of allowances per aircraft operator and its publication.

FEETS annual timeline

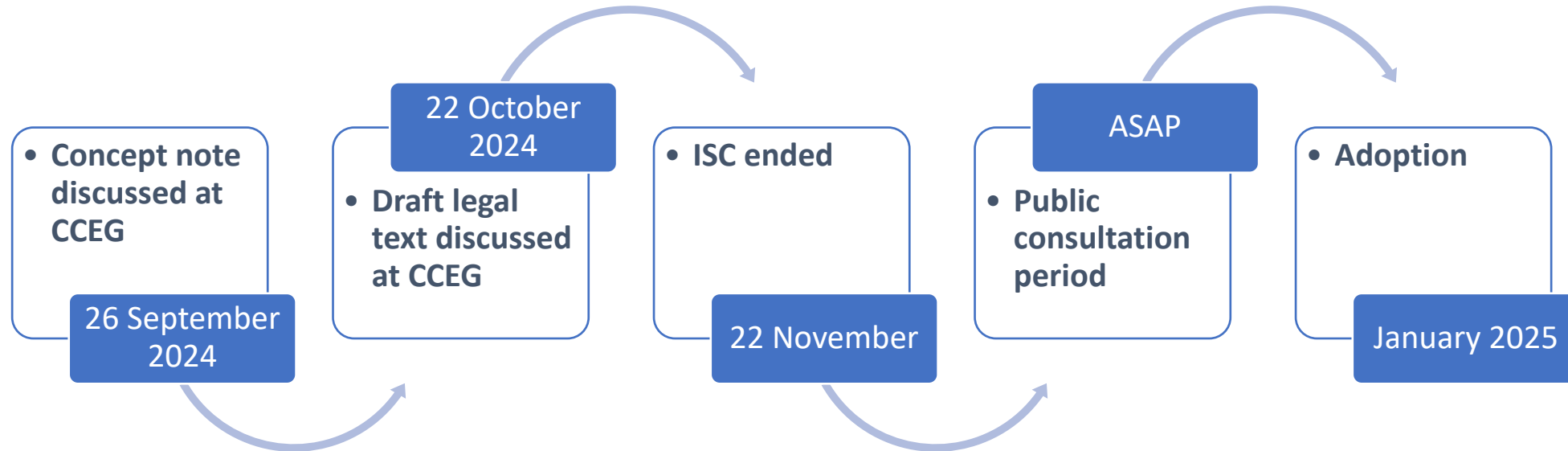


Indicative timeline (2024 fuel use)





FEETS delegated regulation timeline



- **Yearly publication** of the price of kerosene, different eligible fuel types and allowances – **first in Q2 2025**

Non-CO₂ aviation effects



- Article 14(5): Commission Implementing Regulation laying down the detailed rules of **monitoring and reporting non-CO₂ effects of aviation**
 - ⇒ **Recent amendment to Regulation (EU) 2018/2066 (MRR)**
 - ⇒ Rules on verification: draft legal text open for MS comments by 30 November
- 2025: Monitoring and reporting of non-CO₂ effects starts
- 2026: Commission publishes reporting results

Free allocation



- Article 3c(5): **total quantity of aviation allowances** fixed at current levels, and the general ETS linear reduction factor applied
Commission Decision (EU) 2024/1797 of 27 June 2024
- Total number of allowances available for free allocation:
 - 2024: 25% less (17 571 750)
 - 2025: 50% less (11 149 349)
 - 2026 onwards: full auctioning
- **Updated distribution** of free allocation: based on 2023 emissions (59 061 941 tonnes CO₂)
- Upload of **national aviation allocation tables** to the Union Registry
(Commission Decision C/2024/4781)

Transparency (1)

- Article 14(6): The Commission should publish:
 - (a) per aerodrome pair within the EEA:
 - emissions from all flights
 - total number of flights
 - (b) per aircraft operator and broken down by State pair:
 - emissions from flights within the EEA
 - emissions from flights departing from the EEA
 - emissions from flights arriving in the EEA
 - emissions from flights between two third countries
 - (c) per aircraft operator:
 - data on emissions subject to the obligation to cancel CORSIA eligible emission units
 - the amount and type of fuels used for which the emission factor is zero
 - the amount and type of fuels that entitle the aircraft operator to receive allowances pursuant to Article 3c(6)

The screenshot displays the 'CLIMATE ACTION European Union Transaction Log' interface. It features a navigation menu on the left and a main content area with several sections: 'Aircraft Operator Information', 'Aircraft Operator Information', and a large data table. The table has columns for 'Year', 'Aircraft Operator', 'Emissions (tCO2e)', 'Number of Flights', and 'State Pair'. The data is organized into sections for '2013', '2014', and '2015', with each section containing a list of aircraft operators and their corresponding emissions and flight data.

Transparency (2)

Aircraft Registration	Aircraft Type	Aircraft Category	Aircraft Subcategory	Aircraft Weight	Aircraft Length	Aircraft Height	Aircraft Wingspan	Aircraft Tail Height	Aircraft Tail Width	Aircraft Tail Area	Aircraft Tail Volume	Aircraft Tail Moment	Aircraft Tail Area	Aircraft Tail Volume	Aircraft Tail Moment
...

⇒ For 2022 emissions: Limited granularity publication

⇒ For 2023 emissions in preparation:

- Eurocontrol support – EVA tool – submission **by 30 November**
- Requests for confidentiality under consideration

Next years: Possible use of the Union Registry

CORSIA - implementation



- Article 25a(3): **list of countries considered applying CORSIA**
 - **For 2023:** [Commission Implementing Regulation \(EU\) 2024/622 of 22 February 2024](#)
 - **For 2024:** [Commission implementing Regulation \(EU\) 2024/2850 of 11 November 2024](#)
 - **For 2025:** Q2 2025
- Article 12(7): detailed **rules for calculating CORSIA-related offsetting**
[Commission Implementing Regulation \(EU\) 2024/1879 of 9 July 2024](#)

CORSIA - implementation



- **Article 28c: Monitoring, Reporting and Verification**

- Commission Delegated Regulation (EU) 2019/1603 to be updated to include requirements for reporting the use of **CORSIA eligible fuels** and **unit cancellation reports**

- ⇒ In preparation

- ⇒ Draft legal text in 2024

- ⇒ Adoption early 2025

Templates (1)



ETS/CORSIA monitoring plan template

- Feedback on non-CO₂ part by 29 November
- CO₂ part update will be circulated for feedback – main changes:
 - Deletion of TKM data
 - Deletion of references to CORSIA SARPs – the template is used solely by EEA operators who follow the ETS Directive and the implementing legislation, not the SARPS directly
 - Monitoring and reporting of fuels:
 - Neat fuels and fractions
 - Zero-rating and proportionality
 - FEETS
 - CEF

Templates (2)



ETS/CORSIA AER

- Update to the AER template needed for reporting of fuels used in 2024
 - Reporting of neat fuels in tonnes of fuel
 - Reporting of FEETS and inclusion of opt-out option
 - Reporting per aerodrome and fuel category
 - Reporting of CEF

Guidance (1)



GD2

- EU ETS vs CORSIA: clean cut implementation
- Fuels:
 - Determination of neat fuel
 - Zero and non-zero-rated fractions
 - RFNBOs, RCFs, SLCF addition
 - FEETS
 - Proportionality principle
- Removal of tkm requirements
- Use of preliminary EF for threshold assessment
- Alignment of small emitter threshold between the Directive and the MRR
- Information from latest AESA MS guidance on acceptable proofs

Guidance (2)



Other guidance

- Non-CO₂
- Exemptions from Article 14(6) – circulated
- Guidance on reporting of actual fuel prices under FEETS

UDB update



UDB operational from 21 November

- This deadline does not apply to Economic Operators ⇒ will be determined in coordination with the Members States.
- Inclusion of aviation fuel suppliers and reporting under Article 10 of the RFEUA (phase 1 of aviation implementation in the UDB) ⇒ well underway
- Inclusion of aircraft operators as points of consumption is envisaged ⇒ tentatively for end 2025
- Once operational, CAs, verifiers and AOs will be able to use the transactions in the UDB as proof of sustainability of the fuels registered ⇒ no need for (paper) PoS or PoC or other

Thank you!



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Update from the ad hoc WG AESA and follow-up on the technical guidance for zero-rating of alternative fuels

Alexandra Wasilewski, Helena Waltari, Saviour Vassallo



MINISTERIO
DE TRANSPORTES, MOVILIDAD
Y AGENDA URBANA



AGENCIA ESTATAL
DE SEGURIDAD AÉREA



CLASIFICACION DE SEGURIDAD

Treatment, under the EU ETS, of Alternative Energy Sources in Aviation

EU ETS Compliance Conference
Brussels, 26/27-11-2023



AESA-WG: *ad hoc* working group on treatment, under the EU ETS, of Alternative Energy Sources in Aviation

- **Objective:** development and update of additional guidance for the EU ETS Competent Authorities, beyond and complementing the official one, on the treatment of alternative energy sources, *inter alia* sustainable biomass.
 - *could* include FAQs intended for AOs and Verifiers as final users and/or material for support and capacity building for AOs and Verifiers and, if appropriate, for fuel suppliers.
- **Work in progress:** exchange of information and preparing further guidance (examples, templates use) upon identified needs.

Progress achieved in 2024

Updated guidance regarding PoC (endorsed in June 2024)

Work towards alternatives to the UDB in the absence of the PoS (PoC)

- In some cases the AO cannot provide the PoS (Proof of Sustainability) and an alternative is required
- In particular this got bigger relevance with the significant support of eligible fuels (FEETS) and their linkage to the type of fuel and location (airport)
- The ad hoc group has engaged with the SCSs for promoting a controlled document - the s.c. PoC (Proof of Compliance)
- Which shall offer a similar level of guarantees of sustainability and GHG savings compliance as the PoS, when the PoS or the UDB are not available.

Progress achieved in 2024

Updates regarding new alternative aviation fuels and FEETS (November 2024)

New text proposed for endorsement clarifying new MRR provisions (Regulation (EU) 2024/2493) on alternative aviation fuels and FEETS

Major points updated and newly introduced in the Guidance:

- **Glossary** – mostly focused on new types of alternative fuels (Biofuels, RFNBO, RCF, SLCF)
- New Chapter and explanatory Figure on **Sustainability criteria and emissions savings thresholds within EU ETS (zero rating and FEETS) and ReFuel EU**
- The **existing Chapters** were adjusted according to the new provisions of the MRR



- **Future work**

- Further guidance

- CEF reporting (CORSIA Eligible Fuels) and challenges regarding different sustainability schemes for CEF and RED
- Fuel quality report for the NEATS (nonCO2)
- Examples (or guidance/check list/FAQs) of **procedures** for monitoring biofuel/RFNBO use. AOs request support.
- Use of **databases** for reporting and verification - guidance
- New templates (update of guidance if needed, worked examples)



- **Calling TF Aviation**
 - Take the lead
 - Inputs for guidance
 - Participation in pilot cases or capacity building initiatives
 - Make questions
 - Join us! Outcomes would most benefit from an open and broad debate

www.seguridadaerea.gob.es



Planning the TF Aviation workplan for 2025

Helena Waltari and Saviour Vassallo

TF Aviation workplan 2025 – suggested topics and workstreams

- Implementation matters relating to the amended EU ETS Directive (mission statement of the TF);
- The interaction with other EU policy instruments relating to aviation, such as ReFuelEU Aviation;
- ICAO CORSIA and follow-up on relevant international processes (e.g. 2025 ICAO Assembly and relevant outcomes from this);
- Work of ad hoc WGs AESA (FEETS), Scope Matrix, and PSOOT to continue, as applicable
- Formalize the setting up of the new ad hoc WG on Non-CO2 MRV;
- Continue collaboration with EUROCONTROL and EASA on matters relating to implementation of ETS-Aviation/CORSIA/etc.;
- Re-activate and promote the greater use of the Sharepoint of the Compliance Forum in TF Aviation activities.

Thank you for your attention