EUROPEAN COMMISSION
DIRECTORATE-GENERAL
CLIMATE ACTION
Directorate B – Carbon Markets & Clean Mobility
Unit B.2 – ETS (II): Implementation, Policy Support & ETS Registry

Guidance Document

The Monitoring and Reporting Regulation – General guidance for Aircraft Operators

MRR Guidance document No. 2

Updated Version, 9 February 2026

This document is part of a series of documents provided by the Commission services for supporting the implementation of the "MRR" (the "Monitoring and Reporting Regulation") for the EU ETS (the European greenhouse gas Emission Trading System). The version of the MRR developed for the use in the 4th phase of the EU ETS, i.e. Commission Implementing Regulation (EU) 2018/2066 has been revised in 2023 and 2024[1]. This guidance document takes into account those amendments.

The guidance represents the views of the Commission services at the time of publication. It is not legally binding.

This guidance document takes into account the discussions within meetings of the informal Technical Working Group on MRVA (Monitoring, Reporting, Verification and Accreditation) under the WG III of the Climate Change Committee (CCC), as well as written comments received from stakeholders and experts from Member States. This guidance document is the result of consultation with representatives of Member State competent authorities in the Task Force Aviation under the EU ETS Compliance Forum.

All guidance documents and templates can be downloaded from the documentation section of the Commission's website at the following address: **https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/monitoring-reporting-and-verification_en#documentation** .

[1] Latest consolidated MRR: **http://data.europa.eu/eli/reg_impl/2018/2066/2025-05-27**

Version History

Date	Version status	Remarks
16 July 2012	Published	Endorsed by CCC on 11 July 2012
11 January 2018	Published	Main changes: • taking into account Regulation (EU) 2017/2392; • Inclusion of biomass topics from GD3, making this document a standalone document for aviation activities in the EU ETS; • Improvement of the biomass guidance; • Alignment with other existing guidance, various minor improvements.
31 January 2022	Published	Adjustment to revised MRR; Guidance on CORSIA, Brexit and Swiss linking
29 May 2023	Published	Update building on GD3 on biomass (treatment of biofuels in accordance with RED II requirements)
9 February 2026	Published	Takes into account the MRR amendments based on the 2023 review of the EU ETS Directive, i.e. by Commission Implementing Regulations (EU) 2023/2122 and 2024/2493.

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1 SUMMARY

Monitoring and reporting of emissions is a cornerstone of the EU ETS[2] (the Union Emissions Trading System). The rules for monitoring and reporting have been laid down in the form of an EU Regulation (the Monitoring and Reporting Regulation, hereinafter the "MRR"). At the same time, a Regulation for verification of emissions and accreditation of verifiers (the "AVR")[3] was established. In 2018, both Regulations were revised and re-published. Further revisions took place in 2020, 2023 and 2024([4]). This guidance document builds on these revised Regulations.

This guidance document is part of a series of guidance documents and electronic templates provided by the Commission services to support the EU-wide harmonised implementation of the MRR. It gives an introduction to the EU ETS compliance system, the concepts used for monitoring and reporting of aircraft operators' emissions, and then describes in more detail the requirements laid down in the MRR for the possible monitoring approaches. This guidance does not add to the mandatory requirements of the MRR, but it is aimed at assisting correct interpretation and facilitated implementation.

Note that this document does not cover requirements for stationary installations. Operators of installations in search of guidance on monitoring and reporting in the EU ETS are invited to consult guidance document No. 1.

1.1 Where should I start reading?

This document has been developed to guide readers who are new to the EU ETS as well as those who are already familiar with the EU ETS. The latter group should in particular pay attention to sections which are marked with a *New!* sign throughout the document (for a list of guiding symbols see section 2.2). Section 1.2 of this summary will serve as useful starting point.

Readers with little experience of the EU ETS and its MRV (Monitoring, Reporting and Verification) system should read in particular chapter 4 (about the EU ETS compliance cycle) and chapter 5 (concepts and approaches). All readers who need to monitor aviation activities and therefore who have to develop (or update) a monitoring plan, are advised to check chapter 6 on monitoring plans. Chapter 7 provides an introduction to CORSIA, the system covering the international aviation. Furthermore, a short introduction on the monitoring of non-CO_2 effects of aviation is given in chapter 8.

Aircraft operators who qualify as "small emitters" (for definition see section **5.6.1**) should look for the "small" icon.

[2] For an explanation of acronyms and for references of legislative texts please see the annex of this document.

[3] Commission Implementing Regulation (EU) 2018/2067 of 19 December 2018 on the verification of data and on the accreditation of verifiers pursuant to Directive 2003/87/EC of the European Parliament and of the Council. Latest consolidated version: http://data.europa.eu/eli/reg_impl/2018/2067/2025-06-22

[4] A corrigendum in 2025 concerns only the Swedish and French versions.

1.2 What is new for Aircraft Operators?

New!

The M&R Regulation was developed for harmonisation of the MRV requirements across all Member States[5] applying the EU Emission Trading System. The MRR was revised to implement the amendment of the EU ETS Directive as part of the "Fit-For-55" package contributing to the "European Green Deal". The revision also included elements relevant for CORSIA-related monitoring and reporting.

Besides changes in the MRR, amendments to the EU ETS Directive also had to be taken into account for updating this guidance document. Readers who want to focus on new elements of this guidance should especially note the following changes:

- The updated implementation of an MRV system for the purpose of CORSIA (ICAO's global market-based measure) from 2021 through a new Delegated Regulation (EU) 2025/927[6] (the "CORSIA delegated act") replacing Delegated Regulation (EU) 2019/1603. Aircraft operators have to monitor and report all international flights as explained in section 3.1.5.
- The introduction of rules regarding the calculation of offsetting requirements for the purpose of CORSIA via Implementing Regulation (EU) 2024/1879[7] (see section 7.6).
- An explicit distinction between zero-rated and non-zero-rated carbon was added with the 2024 amendment of the MRR (see section 5.5.6). This was needed to extend the concept of zero-rating from biomass to other types of alternative fuels (see section 5.5).
- New monitoring and reporting requirements apply for such non-standard fuels (collectively called alternative aviation fuels). In particular, aircraft operators are obliged to attribute the amounts of fuels used to each flight or aerodrome pair[8] (see section 5.5.7 and 5.5.8).
- The role of the Union Database (UDB) was strengthened under the updated RED II for simplifying the process of providing evidence for zero-rating.
- Commercial aircraft operators may apply for allocation of allowances pursuant to Article 3c(6) of the EU ETS Directive[9], provided they use a fuel eligible for support (see section 5.5.10.3);
- From 2025 onwards aircraft operators are obliged to monitor the non-CO_2 effects of their aviation activities (see section 8), but not to surrender allowances for these emissions.

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[5] In this guidance document, "Member States" means the current 27 EU Member States as well as the EFTA countries Norway, Iceland and Liechtenstein.

[6] Commission Delegated Regulation (EU) 2025/927 of 20 May 2025 supplementing Directive 2003/87/EC of the European Parliament and of the Council as regards measures adopted by the International Civil Aviation Organization for the monitoring, reporting and verification of aviation emissions for the purpose of implementing a global market-based measure and repealing Commission Delegated Regulation (EU) 2019/1603, ***http://data.europa.eu/eli/reg_del/2025/927/oj***

[7] Commission Implementing Regulation (EU) 2024/1879 of 9 July 2024 laying down rules for the application of Directive 2003/87/EC of the European Parliament and of the Council as regards the calculation of offsetting requirements for the purpose of CORSIA, **http://data.europa.eu/eli/reg_impl/2024/1879/oj**

[8] Article 3(51) of the MRR defines: *'aerodrome pair' means a pair constituted by the aerodrome of departure and the aerodrome of arrival*

[9] Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a system for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC including all amendments. Latest consolidated version: **http://data.europa.eu/eli/dir/2003/87/2024-03-01**

2 INTRODUCTION

2.1 About this document

This document has been written to support the M&R Regulation, by explaining its requirements in a non-legislative language. For some more specific technical issues, further guidance documents are available. The set of guidance documents is further complemented by electronic templates[10] for information to be submitted by aircraft operators to the competent authority. However, it should always be remembered that the Regulation is the primary requirement.

This document interprets the Regulation regarding requirements for aircraft operators. It builds on earlier guidance as well as best practice identified during earlier phases of the EU ETS. It also takes into account the valuable input from the task force on aviation established under the EU ETS Compliance Forum, and from the informal Technical Working Group (TWG on MRVA) of Member State experts established under Working Group 3 (WG III) of the Climate Change Committee.

2.2 How to use this document

Where article numbers are given in this document without further specification, they always refer to the most recent M&R Regulation[11]. For acronyms, references to legislative texts and links to further important documents, please see the Annex.

This document only refers to emissions starting from 2025.
The “New” symbol marks new elements that were introduced since the last version of this guidance or which specifically apply only from 2025 onwards.

This symbol points to important hints for aircraft operators and competent authorities.

This indicator is used where significant simplifications to the general requirements of the MRR are promoted.

The light bulb symbol is used where best practices are presented.

The small emitter symbol is used to guide the reader to topics which are applicable for aircraft operators classified as “small emitters”.

The tools symbol tells the reader that other documents, templates or electronic tools are available from other sources.

The book symbol points to examples given for the topics discussed in the surrounding text.

[10] Note that Member States may define their own templates, which must contain at least the same information as the Commission’s templates.

[11] Commission Implementing Regulation (EU) 2018/2066 taking into account amendments by Commission Implementing Regulation (EU) 2020/2085, Commission Implementing Regulation (EU) 2023/2122 and Commission Implementing Regulation (EU) 2024/2493.

2.3 Where to find further information

All guidance documents and templates provided by the Commission based on the M&R Regulation and the A&V Regulation can be downloaded from the Commission's website at the following address:

https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/monitoring-reporting-and-verification_en#documentation

Aviation-specific information:

https://climate.ec.europa.eu/eu-action/transport-decarbonisation/reducing-emissions-aviation_en

The following documents are provided[12] (documents not relevant for aircraft operators are given in grey):

- "Quick guides" as introduction to the guidance documents below. Separate documents are available for each audience:
  - Operators of stationary installations;
  - Aircraft operators;
  - Competent Authorities;
  - Verifiers;
  - National Accreditation Bodies.
- Guidance document No. 1: "The Monitoring and Reporting Regulation – General guidance for installations".
  - An exemplar simplified monitoring plan in accordance with Article 13 MRR.
- Guidance document No. 2 (this document): "The Monitoring and Reporting Regulation – General guidance for aircraft operators". This document outlines the principles and monitoring approaches of the MRR relevant for the aviation sector. It also includes guidance on the treatment of biomass and other alternative fuels in the aviation sector, making it a stand-alone guidance document for aircraft operators.
  - A set of documents[13] explaining the monitoring of non-CO_2 effects of aviation, in particular "Guidance Document non-CO_2 MRV pre-NEATS". This document clarifies the monitoring and reporting principles regarding the non-CO_2 effects of aviation activities.
- Guidance document No. 3: "Biomass issues in the EU ETS": This document discusses the application of sustainability criteria for biomass, as well as the requirements of Articles 38 and 39 of the MRR. This document is relevant for operators of installations and useful as background information for aircraft operators.

[12] This list reflects the status at the time of writing this updated guidance. Further documents may be added later.

[13] https://climate.ec.europa.eu/eu-action/transport-decarbonisation/reducing-emissions-aviation_en#documentation

- Guidance document No. 4: “Guidance on Uncertainty Assessment”. This document for installations gives information on assessing the uncertainty associated with the measurement equipment used, and thus helps the operator to determine whether he can comply with specific tier requirements.
  - Guidance document No. 4a: “Exemplar Uncertainty Assessment”. This document contains further guidance and provides examples for carrying out uncertainty assessments and how to demonstrate compliance with tier requirements.
- Guidance document No. 5: “Guidance on sampling and analysis” (only for installations). This document deals with the criteria for the use of non-accredited laboratories, development of a sampling plan, and various other related issues concerning the monitoring of emissions in the EU ETS.
  - Guidance document No. 5a: “Exemplar Sampling Plan”. This document provides an example sampling plan for a stationary installation.
- Guidance document No. 6: “Data flow activities and control system”. This document discusses possibilities to describe data flow activities for monitoring in the EU ETS, the risk assessment as part of the control system, and examples of control activities.
  - Guidance document No. 6a: “Risk Assessment and control activities – examples”. This document gives further guidance and an example for a risk assessment.
- Guidance document No. 7: “Continuous Emissions Monitoring Systems (CEMS)”. This document gives information on the application of measurement-based approaches where GHG emissions are measured directly in the stack, and thus helps the operator to determine which type of equipment has to be used and whether he can comply with specific tier requirements.
- Guidance document No. 8: “EU ETS Inspection”: Targeted at competent authorities, this document outlines the role of the CA’s inspections for strengthening the MRVA system of the EU ETS.

The Commission furthermore provides the following electronic templates:

- Template No. 1: Monitoring plan for the emissions of stationary installations
- Template No. 2: Monitoring plan for the emissions of aircraft operators
- Template No. 4: Annual emissions report of stationary installations
- Template No. 5: Annual emissions report of aircraft operators
- Template No. 7: Improvement report of stationary installations
- Template No. 8: Improvement report of aircraft operators

There are furthermore the following tools available for operators:

- Unreasonable costs determination tool;
- Tool for the assessment of uncertainties;
- Frequency of Analysis Tool;
- Tool for operator risk assessment.

The following MRR Training material is available for operators:

- Roadmap through M&R Guidance
- MRVA for Biomass
- Uncertainty assessment
- Unreasonable costs
- Sampling plans
- Data gaps
- Round Robin Test

Besides these documents dedicated to the MRR, a separate set of guidance documents on the A&V Regulation is available under the same address. Furthermore, the Commission has provided guidance on the scope of the EU ETS for aircraft operators:

http://data.europa.eu/eli/dec/2009/450/oj

A huge amount of information for aircraft operators is also found on DG CLIMA's website dedicated to the EU ETS for aviation (Especially under the tabs "Documentation" and "FAQ"[14]):
https://climate.ec.europa.eu/eu-action/transport-decarbonisation/reducing-emissions-aviation_en

All EU legislation is found on EUR-Lex: **http://eur-lex.europa.eu/**

The most important legislation is furthermore listed in the Annex of this document.

Competent authorities in the Member States may also provide useful guidance on their own websites. Aircraft operators should in particular check if the competent authority provides workshops, FAQs, helpdesks etc.

[14] With regard to FAQ, it is always advisable to check the date of publication in case it has been superseded by more recent guidance/developments.

3 AVIATION IN THE EU ETS – PRINCIPLES

3.1 Scope of included aviation activities

Due to the international character of aviation activities, an aircraft operator has to be aware not only of the EU ETS, but of several systems for GHG emission reduction which exist in parallel, and which may have a different scope regarding monitoring and reporting obligations. Therefore, the following sections explain the "(extended) full scope" and "reduced scope" of the EU ETS, the scope of flights under the Swiss Linking Agreement, and the scope of flights falling under CORSIA. The UK ETS is mentioned as well.

The basic monitoring and reporting approaches in these systems are quite similar. When an aircraft operator is included in any of these systems, it must ensure that it is able in a reliable manner to identify for all flights carried out whether they are falling under one or more of these systems. This is achieved in principle by including appropriate procedures in the monitoring plan for tracking the aircraft in the fleet (including various leasing options), for monitoring the fuel consumption, and for assigning correctly for each flight whether it is included in one or more GHG emission reduction systems, taking into account the relevant exemptions of flight types. Relevant "GHG emission reduction systems" at this time include the EU ETS, CORSIA, the Swiss ETS and UK ETS.

Figure 1 in section 3.4 gives an overview of how an aircraft operator can determine if it is included in the EU ETS, and whether it is entitled to use simplified methods for Monitoring, Reporting and Verification (MRV).

Note on terminology:

For determining the scope of the EU ETS and for whether simplified monitoring approaches are applicable, there are several thresholds applicable. This guidance document uses the following terminology:

- **De-minimis threshold:** If below this threshold, the aircraft operator is excluded from the EU ETS. The following apply in accordance with Annex I of the EU ETS Directive (see also section 3.2.2; here the "extended full scope" applies):
  - For commercial aircraft operators: *either 10 000 t CO_2/yr (extended full scope) or 243 flights per period for three consecutive four-month periods*.
  - For non-commercial aircraft operators: *1 000 t CO_2/yr.* This threshold applies only until 31 December 2030.
- **Simplified procedures threshold**: Determines, whether simplified monitoring and reporting approaches are allowed. There are two different thresholds:
  - Small emitters: Article 55(1) of the MRR uses a threshold of *either 25 000 t CO_2/yr (full scope) or 243 flights per period for three consecutive four-month periods*. Details are given in section 5.6.
  - Other emitters: Article 55(2) of the MRR also includes a threshold *of 3 000 t CO_2/yr reduced scope*. See details in section 5.9.

3.1.1 "Full scope" EU ETS aviation activities

Annex I of the EU ETS Directive defines the scope of aviation activities included in the EU ETS. The Directive requires that *all flights are covered which depart from or arrive in an aerodrome situated in the territory of a Member State* to which the Treaty applies (including outermost regions, dependencies, and territories of that Member State)[15]. Due to the extension of the EEA agreement[16], "Member State" must be read as "EEA State" (i.e. the current 27 EU Member States plus the EFTA states Norway, Iceland and Liechtenstein). Furthermore, from 1 January 2020, flights from Switzerland to EEA aerodromes are covered by the Swiss ETS based on the Swiss linking agreement[17]. These flights are therefore excluded from the "full scope" of the EU ETS (however, they are *not* excluded from the "extended full scope" for determining the de-minimis thresholds, see section 3.2.2). The same applies from 1 January 2021 to flights from the UK to EEA aerodromes, based on the Trade and Cooperation Agreement between the European Union, as the UK ETS covers these flights[18].

Flights from Switzerland and UK to the EEA are also excluded from the *reduced scope*. However, this is the case based on the fact that they are no EEA countries and needs no further explanation.

Aircraft operators who perform such aviation activities are to participate in the emissions trading system, regardless of whether they are based in the EU, EFTA countries or in third countries, or where their operating license has been issued.

Note that under the current legislation this "(extended) full scope" is required for determining if an aircraft operator is included in the EU ETS, whether it is considered a "small emitter"[19] and for the monitoring under CORSIA. For monitoring and reporting of emissions and subsequent surrendering of allowances in the EU ETS, the "reduced scope" (section 3.1.2) applies.

For criteria if an aircraft operator is exempted in its entirety from the EU ETS, please see section 3.2.2.

Annex I of the EU ETS Directive also lists several **exemptions** from the scope of the EU ETS. Exempted are:

- Flights performed by aircraft with a certified maximum take-off mass of less than 5 700 kg. That means especially that aircraft operators who do not use heavier aircraft are not included in the EU ETS.

[15] The following overseas territories belong to the "territory to which the Treaty applies": the five French overseas departments (Guadeloupe, French Guyana, Martinique, Réunion, Mayotte); the French overseas communities of Saint-Martin; the Spanish Autonomous Community of the Canary Islands; and the Portuguese autonomous regions of the Azores and Madeira; Furthermore the territories Ceuta and Melilla (Spain), Aland Islands (Finland) and Jan Mayen (Norway) belong to the EEA and are therefore covered by the EU ETS.

[16] See Annex for legislative reference.

[17] EU ETS Directive Annex I as amended by Commission Delegated Decision (EU) 2020/1071

[18] EU ETS Directive Annex I as amended by Commission Delegated Decision (EU) 2021/1416

[19] Note, however, that for the determination of the de-minimis thresholds, flights from UK and Switzerland are to be added to the full scope.

- The following types of flights are excluded from the EU ETS:
  - Flights on official mission, of a reigning Monarch and his immediate family, of Heads of State, Heads of Government and Government Ministers, of a country other than a Member State;
  - Military flights performed by military aircraft, customs and police flights;
  - Flights related to search and rescue, firefighting flights, humanitarian flights and emergency medical service flights;
  - Flights performed exclusively under visual flight rules;
  - Circular flights (departing and arriving at the same airport without an intermediate stop);
  - Training flights;
  - Flights performed exclusively for the purpose of scientific research;
  - Flights performed in the framework of public service obligations.

For more details on these exemptions see the Commission's guidance[20] on the interpretation of aviation activities listed in Annex I of the EU ETS Directive. That guidance gives information on the use of CRCO exemption codes[21] for identifying these exemptions using flight plans.

In short, the phrase "all flights covered by Annex I of the EU ETS Directive, i.e. all flights landing in or departing from an EEA aerodrome, taking into account the above exceptions, minus flights from Switzerland or the UK" defines the "full scope" of the EU ETS.

3.1.2 "Reduced scope" of the EU ETS

From 2013, the "full scope" was temporarily replaced by the "reporting scope/reduced scope" due to the development and implementation of the ICAO's global market-based measure in the form of the "Carbon Offsetting and Reduction Scheme for International Aviation" (CORSIA). The EU ETS Directive was amended by Regulation (EU) 421/2014 and Regulation (EU) 2392/2017 which introduced the following exceptions from the full scope:

- Flights from and to non-EEA aerodromes are exempted from the reporting and surrendering obligations of the EU ETS[22].
- Exempted are all emissions from flights between an aerodrome located in an outermost region of a Member State, within the meaning of Article 349 of the Treaty on the Functioning of the European Union, and an aerodrome located in the same Member State, including another aerodrome located in the same outermost region or in another outermost region of the same Member State. The EU currently includes nine outermost regions: Canary Islands, French Gui-

[20] Commission Decision 2009/450/EC of 8 June 2009 on the detailed interpretation of the aviation activities listed in Annex I to Directive 2003/87/EC of the European Parliament and of the Council, 2009/450/EC.

[21] Codes used by Eurocontrol's Central Route Charges Office (CRCO) for identification of route charges exemption.

[22] Flights to and from overseas territories of Member States which are not part of the EEA are consequently also excluded. Such overseas territories are: DK: Greenland, Faeroe Islands; FR: French Polynesia, New Caledonia, Saint Barthélemy, Saint Pierre and Miquelon, Wallis and Futuna; NL: Aruba, Bonaire, Saba, Sint Eustatius, Curaçao, Sint Maarten; NO: Svalbard.

ana, Guadeloupe, Martinique, Mayotte, Réunion, Saint-Martin, Azores and Madeira. Emissions from flights between aerodromes in the same outermost region remain fully covered by the EU ETS.

The reduced scope is applicable until 31 December 2026. Thereafter, the full scope will be re-established, unless new provisions enter into force following a new amendment of the EU ETS Directive. However, flights beyond the reduced scope are relevant to the reporting of emissions under CORSIA (see chapter 7).

Note: There are exemptions from the above-mentioned exemption. From 1 January 2020, **flights departing from EEA aerodromes to Switzerland** are covered by the EU ETS based on the Swiss linking agreement. From 1 January 2021, the Trade and Cooperation Agreement between the European Union and the UK clarifies that **flights from EEA countries to the UK**[23] remain covered by the EU ETS**. These flights are included in the "reduced scope".**

For symmetry reasons, flights from Switzerland to EEA aerodromes are covered by the Swiss ETS[24] and so are Swiss domestic flights. Similarly, the UK ETS covers flights departing from the UK to EEA countries as well as UK domestic flights[25,26].

3.1.3 Change of EU ETS scope due to the linking with the CH ETS

An agreement between the European Union and the Swiss Confederation on the linking of their greenhouse gas emissions trading systems was reached at the end of 2017 and has entered into force on 1 January 2020. As a consequence, the EU ETS Directive was amended[27]: Flights from the EEA to Switzerland (e.g. Lisbon – Zurich) are included in the EU ETS. Flights from Switzerland to the EEA (e.g. Zurich – Lisbon) and domestic flights in Switzerland (e.g. Zurich – Bern) are included in the Swiss ETS (CH ETS). Note that this change applies to both, the full and the reduced scope of the EU ETS, as mentioned in sections 3.1.1 and 3.1.2. However, flights from Swiss to EEA aerodromes are still to be taken into account when determining the de-minimis thresholds.

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[23] The Trade and Cooperation Agreement applies to the metropolitan territory of the United Kingdom. This means that the overseas countries and territories are in principle not covered. In particular, the Crown dependencies, i.e. Bailiwick of Guernsey, Bailiwick of Jersey and Isle of Man as regards to the EU ETS are not covered. Similarly the Agreement does not apply to Gibraltar nor has any effects on its territory. This does not exclude the possibility to have in the future a separate agreement between the EU and the UK in relation to Gibraltar. Therefore, flights from EEA aerodromes to those destinations should currently not be included in the EU ETS.

[24] For basic information on the Swiss ETS for aircraft operators please see https://www.bafu.admin.ch/bafu/en/home/topics/climate/info-specialists/reduction-measures/ets/aviation.html

[25] Guidance on the UK ETS is available from the UK's authorities: https://www.gov.uk/government/publications/participating-in-the-uk-ets/participating-in-the-uk-ets

[26] Accordingly, flights from the UK to Switzerland are covered by the UK ETS and flights from Switzerland to the UK are covered by the CH ETS.

[27] Commission Delegated Decision (EU) 2020/1071 of 18 May 2020 amending Directive 2003/87/EC of the European Parliament and of the Council, as regards the exclusion of incoming flights from Switzerland from the EU emissions trading system

3.1.4 Change of EU ETS scope due to Brexit

A Trade and Cooperation Agreement[28] was concluded between the European Union and the United Kingdom in December 2020. The Agreement entered into force on 1 May 2021 but is applicable from 1 January 2021. As a consequence, the EU ETS Directive has been amended appropriately by a delegated act[29]. Flights from the EEA to the UK (e.g. Lisbon – London) are included in the EU ETS. Flights from the UK to the EEA (e.g. London – Lisbon) and domestic flights in the UK (e.g. London – Manchester) are included in the UK ETS. Note that this change applies to both, the full and the reduced scope of the EU ETS, as mentioned in sections 3.1.1 and 3.1.2. However, flights from UK to EEA aerodromes are still to be taken into account when determining the de-minimis thresholds.

New!

3.1.5 Scope of CORSIA

Since 1 January 2019, aircraft operators which exceed the respective thresholds of 10 000 t CO_2 for international flights need to report all international flights for purposes of CORSIA. The EU agreed to implement CORSIA (and in particular the relevant MRV system) through the EU ETS. “International flights” are flights between aerodromes in two different ICAO states. Only “domestic flights” (flights within one ICAO member state, e.g. Los Angeles – New York) are excluded from CORSIA MRV.

Aircraft operators who have obligations for CORSIA in an EEA State (see section 3.3.3) have to monitor **all international flights** to fulfil the CORSIA requirements at the same time as their EU ETS requirements. CORSIA coverage can be broken down as follows:

- Flights under the reduced scope of the EU ETS with the exception of domestic flights;
- Flights included in the “full scope” of the EU ETS:
  - Flights between aerodromes located in Member States and aerodromes located in third countries;
  - Flights between aerodromes located in Member States and aerodromes located in dependencies or territories of other Member States;
  - Flights between aerodromes located in outermost regions, dependencies or territories of Member States and aerodromes located in third countries or dependencies or territories of other Member States;
- Flights between aerodromes located in two different third countries.

Several categories of flights are excluded from CORSIA, such as State flights, humanitarian flights, medical flights, military flights and firefighting flights.[30]

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[28] Council Decision (EU) 2021/689 of 29 April 2021 on the conclusion, on behalf of the Union, of the Trade and Cooperation Agreement between the European Union and the European Atomic Energy Community, of the one part, and the United Kingdom of Great Britain and Northern Ireland, of the other part, and of the Agreement between the European Union and the United Kingdom of Great Britain and Northern Ireland concerning security procedures for exchanging and protecting classified information (OJ L 149, 30.04.2021, p.2).

[29] Commission Delegated Regulation (EU) 2021/1416 of 17 June 2021 amending Directive 2003/87/EC of the European Parliament and of the Council as regards the exclusion of incoming flights from the United Kingdom from the Union emissions trading system, http://data.europa.eu/eli/reg_del/2021/1416/oj

[30] The definitions for the exempted types of flight according to Commission Decision 2009/450/EC apply.

It is important to note however, that while the scope covered by CORSIA MRV is quite broad ("international flights" include e.g. flights between Member States), Article 12(6) of the EU ETS Directive introduces a clean cut between the EU ETS and CORSIA obligations, by defining the CORSIA-related offsetting requirements only on flights between a Member State and States that are listed in the implementing act adopted pursuant to Article 25a(3) as well as flights between these States, and flights between Switzerland or the United Kingdom and these States. It is crucial to understand that these flights, which define the CORSIA offsetting requirements, are only a subset of flights covered by CORSIA MRV and Implementing Regulation (EU) 2025/927.

3.2 Aircraft operators

3.2.1 Identification and attribution of flights

According to the EU ETS Directive (Article 3(o)), an aircraft operator is "*the person who operates an aircraft at the time it performs an aviation activity listed in Annex I [of the EU ETS Directive] or, where that person is not known or is not identified by the owner of the aircraft, the owner of the aircraft*". For the purpose of monitoring and reporting, a unique identification for the aircraft operator is necessary. Article 51(3) of the M&R Regulation defines that those unique aircraft operators are defined by the call sign used for Air Traffic Control (ATC). In general, this is the unique ICAO designator in box 7 of the flight plan (three letter code, which excludes the flight identifier).

If the unique ICAO designator is not available, the aircraft registration markings are used in item 7. If this registration is specifically included in an AOC, the AOC holder is deemed to be the aircraft operator. Should the registration not be part of an AOC, the aircraft operator responsible for that flight is the legal or natural person employing the captain of the flight or that is in another contractual relationship with the captain. Should the aircraft operator still not be identifiable, the owner of the aircraft is deemed to be the aircraft operator.

Note: Wherever this guidance uses the term "ICAO designator" it should be read as above, including the aircraft registration markings entered in box 7 of the flight plan if the ICAO designator is not available.

The use of the ICAO designator does not necessarily imply that an aircraft operator is commercially or operationally responsible for a particular flight. This depends in most cases on the type of commercial arrangements between carriers in the aviation sector. Whether code sharing, dry leasing or wet leasing, long or short-term leasing is applied by an aircraft operator has no bearing on identifying the aircraft operator. However, for the purpose of the EU ETS, aircraft operators are identified following the rules presented irrespective of these commercial arrangements.

A daughter company does not have to carry out its own monitoring and reporting (i.e. submit a monitoring plan and annual emission reports) if all flights of the daughter company are performed under the unique ICAO designator of the parent company or another daughter company. The parent or sister company will in that case be the aircraft operator for flights performed by the daughter company and all flights will have to be covered in the monitoring plan and reports of the parent or sister company. An aircraft operator having two Air Operator Certificates

but only using one unique ICAO designator should submit one monitoring plan. In case of doubt, Eurocontrol data on payment of route charges will be a useful tool to check assignment of the unique ICAO designator in box 7 of the flight plan to individual aircraft operators within the meaning in the EU ETS.

3.2.2 Excluded Aircraft operators

The following aircraft operators have no obligations under the EU ETS (they are "excluded" from the EU ETS):

- *Commercial air transport operators*[31] operating either:
  - fewer than 243 flights per period for three consecutive four-month periods, or
  - flights with total annual emissions lower than 10 000 tonnes CO_2 per year[32].

  For applying those "de-minimis thresholds", a **special (extended) version of the "full scope of the EU ETS"** has to be used: The flights from Switzerland or the UK to an EEA aerodrome have to be added to the full scope[33].

  Where the thresholds of this "*de-minimis* rule" are exceeded, all flights of that aircraft operator (if not excluded due to the other exemptions) during the whole calendar year are included in the EU ETS.

  Clarifications: Aircraft operators who do not have an air operator's certificate[34] (AOC) are non-commercial operators. The four-month periods are: January to April; May to August; September to December. The local time of departure of the flight determines in which four-month period that flight shall be taken into account for deciding whether the aircraft operator falls above or below the exemption thresholds of the de-minimis rule.

  Further clarifications are given in the Commission's guidance on the interpretation of aviation activities listed in Annex I of the EU ETS Directive[20].
- Until 31 December 2030, *non-commercial aircraft operators* with total annual emissions lower than 1 000 tonnes per year[35] are exempted from the EU ETS. The threshold has to be evaluated on an annual basis. The "extended" full scope is relevant for determination whether the de-minimis threshold is exceeded, as explained in the previous bullet point.
- *Other exemptions*: As flights performed by aircraft with a certified maximum take-off mass of less than 5 700 kg are excluded, it is clear that aircraft operators who do not use heavier aircraft are not included in the EU ETS.

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[31] Article 3(p) of the EU ETS Directive defines: *'commercial air transport operator' means an operator that, for remuneration, provides scheduled or non-scheduled air transport services to the public for the carriage of passengers, freight or mail.*

[32] The calculation is to be carried out using the preliminary emission factor, i.e. without any zero-rating of fuels.

[33] This is due to the special wording of Annex I of the EU ETS Directive, which on the one hand excludes flights from Switzerland or UK from Annex I, but states that for the purpose of calculating the de-minimis threshold, these flights are *not* excluded.

[34] Outside the EU other terms for such certificates may be in use.

[35] This provision was introduced by Commission Delegated Decision (EU) 2020/1071 of 18 May 2020 amending Directive 2003/87/EC of the European Parliament and of the Council, as regards the exclusion of incoming flights from Switzerland from the EU emissions trading system

3.2.3 Aircraft operators eligible for simplified MRV

Certain (usually small) aircraft operators are eligible for simplified monitoring, reporting and verification procedures. These are further discussed in section 5.6. Relevant "small emitter thresholds" are:

- Emissions of less than 25 000 t CO_2 per year[32,36] applying the full scope (see 3.1.1); or
- Emissions of less than 3 000 t CO_2 per year[32] under reduced scope (these may still be large emitters if considering the full scope).
- Aircraft operators operating fewer than 243 flights per period for three consecutive four-month periods.

3.3 Administering Member States

3.3.1 Administering MS for the EU ETS

In the EU ETS, both EU (and EEA) and non-EU aircraft operators are included. In order to ensure an efficient implementation of the EU ETS Directive, each aircraft operator is assigned to one and only one administering Member State (Article 18a of the Directive):

- In the case of an aircraft operator with a valid operating licence granted by a Member State in accordance with the provisions of Council Regulation (EEC) No 2407/92, the Member State which granted the operating licence.
- In all other cases, the Member State with the greatest estimated attributed aviation emissions from flights performed by that aircraft operator in the base year[37]. Those estimated attributed emissions are calculated by Eurocontrol.

The European Commission has to publish a list (or updates thereof) of aircraft operators and their assigned administering Member States at least every two years before 1 February.

From 1 January 2021, the UK has ceased to participate in the EU ETS. **Aircraft operators which were previously administered by the UK authorities and perform aviation activities under the EU ETS are assigned to other EEA States from 2021**.

The latest version of that list (in the form of a Commission Regulation) can be found on the Commission's website[38]. That list contains for each aircraft operator identified by Eurocontrol:

- Its "unique identifier" (identical to the CRCO Identification Number used for invoicing route charges);
- The name of the aircraft operator;
- The aircraft operator's state of origin; and
- The administering EEA state.

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[36] Note that Article 28a(4) of the EU ETS Directive does not include the threshold of less than 243 flights in each of 3 consecutive 4-months periods.

[37] The first calendar year of operation for aircraft operators which started operating in the EEA after 1 January 2006 and in all other cases the calendar year starting on 1 January 2006.

[38] https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/monitoring-reporting-and-verification/aircraft-operators-and-their-administering-countries_en

The unique identifier is also very important for identifying the aircraft operator's monitoring plans and emission reports.

For aircraft operators who start operation of aviation activities which fall under the EU ETS, but are not yet contained in the above-mentioned list, the Commission regularly updates a "prior compliance list", which gives an indication of the most likely administering Member State well before the next regular operator list is published. The prior compliance list can be found under

https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/monitoring-reporting-and-verification/aircraft-operators-and-their-administering-countries_en#prior-compliance-list

Furthermore, Eurocontrol and the Commission are interested in improving the data quality of those lists. In particular, aircraft which may belong (sometimes) to a specific aircraft operator but are also operated outside that aircraft operator's business, or which are (sometimes, but not always) managed by service companies (e.g. for CRCO billing purposes), should be notified to Eurocontrol using the "fleet list form"[39]. For such declarations which relate to more than one aircraft operator, EUROCONTROL (contract.office.ets.sf@eurocontrol.int) should be notified to provide guidance on the submission process. For further instructions please see the link given above.

Knowing the administering Member State is important for aircraft operators, because the national law of the administering Member State applies. Note that the general legal framework of the EU ETS is the same in all Member States, based on the EU ETS Directive. However, there may be some differences in some details such as deadlines or administrative fines applied. The M&R Regulation and A&V Regulation are directly applicable in all Member States.

The administering Member State also assigns the competent authority in line with its national legislation. Any reference to "competent authority" made in this document should be read as the appropriately designated authority or authorities in the aircraft operator's assigned administering Member State.

3.3.2 One-stop-shop for Swiss Linking

As can be seen in section 3.1.3 on "Swiss Linking", an operator flying to and from Switzerland will have both flights covered by the EU ETS and the Swiss ETS. In order to reduce administrative burden, the linking agreement introduces the concept of a single point of contact (a "one-stop-shop") for the administration of both the EU ETS and the CH ETS. It is either Switzerland or a Member State, never both.

Aircraft operators that are not exempted in the EU ETS must also report their CH ETS scope emissions.

[39] https://climate.ec.europa.eu/document/download/a7d5ac76-cd4d-4244-8aeb-a86db8b4791e_en?filename=fleet_list_form_en.doc

3.3.3 Competent authority for CORSIA

If an aircraft operator is mentioned in the list referenced in section 3.3.1, the competent authority of the Member State to which the aircraft operator is attributed to is also responsible concerning their CORSIA obligations. Should an aircraft operator not be specified in said list, the responsible competent authority is that of the Member State that issued the air operator certificate. For an aircraft operator that does not possess an air operator certificate, the competent authority of the Member State where the aircraft operator is judicially registered is responsible.

ICAO published and regularly updates a list of Aeroplane Operators and the State to which they have been attributed as reported to ICAO Secretariat by Member States as per Article 3(3) of the CORISA Delegated Act. This document can be downloaded on the ICAO CORSIA webpage[40].

For those aircraft operators that have an AOC or operating license from an EU Member State or EEA State, the administration of EU ETS and CORSIA is performed by the same competent authority (and also the MP and AER are combined in joint templates for both purposes). Foreign operators are reporting for CORSIA purposes to their home country's authorities.

3.4 Decision tree for inclusion of aircraft operators

Under current legislation an aircraft operator who needs to decide on his status in the EU ETS/CORSIA should follow the following step-by-step instructions as shown in Figure 1 (red numbers in the Figure correspond with the steps outlined below).

Note that this is not a one-time exercise, but needs to be repeated every year if the aircraft operator operates near to the thresholds given.

Obligation under the EU ETS:

1. The Aircraft Operator (AO) has to determine its fleet used **in the year under examination**. This includes also temporarily or permanently leased aircraft (see also section 3.2.1). Aircraft with a certified maximum take-off mass of less than 5 700 kg are removed from that list.
2. The AO determines a list of all flights. Depending on whether the inclusion in the EU ETS or CORSIA is assessed, the list of flights has to be "filtered" accordingly, applying either the scope of the EU ETS or the CORSIA scope. Keep in mind that different exemption rules apply for these scopes. For the purpose of the EU ETS, both extended full and reduced scope are required for the decision tree.
3. The AO has to conclude whether it is a "commercial air transport operator" (see footnote 31).
4. Using this list of flights, the AO has to determine the emissions related to the flights covered by the EU ETS, based on the *extended full scope* of the EU ETS. The emissions for this purpose must be calculated by multiplying the

[40] https://www.icao.int/environmental-protection/CORSIA/Pages/default.aspx in section "CORSIA Central Registry (CCR)"

annual consumption of each fuel by its preliminary emissions factor (ignoring zero-rating). If the AO is a commercial air transport operator and the list of flights includes fewer flights than the threshold under point 5a, the determination of emissions may be omitted. Non-commercial AOs continue with point 6.

5. Commercial air transport operators should answer the following questions:
   a. Is the number of (extended full scope) flights below 243 flights in each of the three periods January to April, May to August and September to December?
   b. Is the amount of (extended full scope) emissions below 10 000 t CO_2 per year?

   If at least one of the answers is "yes", the AO is not covered by the EU ETS (i.e. he has no further obligation under the EU ETS Directive). All other commercial AOs continue with point 7.
6. Non-commercial aircraft operators should check if their emissions ("extended" full scope) are below 1 000 t CO_2 per year (using preliminary emissions factor as mentioned above). If this is the case, they are excluded from the EU ETS. Checking step 6 is applicable until 31 December 2030.
7. All AOs which have come to this point are included in the EU ETS (and both CH ETS and UK ETS) and consequently have to follow the applicable rules on MRV as outlined in the following chapters of this guidance document. However, they may wish to use simplified requirements. If this is the case, the AOs should perform the following steps.
8. If the AO performs (under the full scope of the EU ETS) less than 243 flights in each of the three periods January to April, May to August and September to December, or his emissions are lower than 25 000 t CO_2 per year, the AO is considered a "small emitter" and may consequently be approved to apply the simplified approaches discussed in section 5.6.
9. If the AO is considered an aircraft operator with low emissions because it emits less than 25 000 t CO_2 per year and chooses to create his annual emission report fully by using Eurocontrol's "Small Emitter Tool" (SET) populated by Eurocontrol with data from its Environmental Management Information Service (EMIS)[41], the AO is allowed to submit that emission report without verification. Further details on this approach are given in section 5.9.
10. Finally, if the AO emits less than 3 000 t CO_2 per year applying the "reduced scope", and the AO chooses to create his annual emission report fully by using Eurocontrol's "Small Emitter Tool" (SET) populated by Eurocontrol with data from EMIS, the AO is allowed to submit that emission report without verification, as under the previous point.

[41] Formerly known as "ETS Support Facility" (ESF)

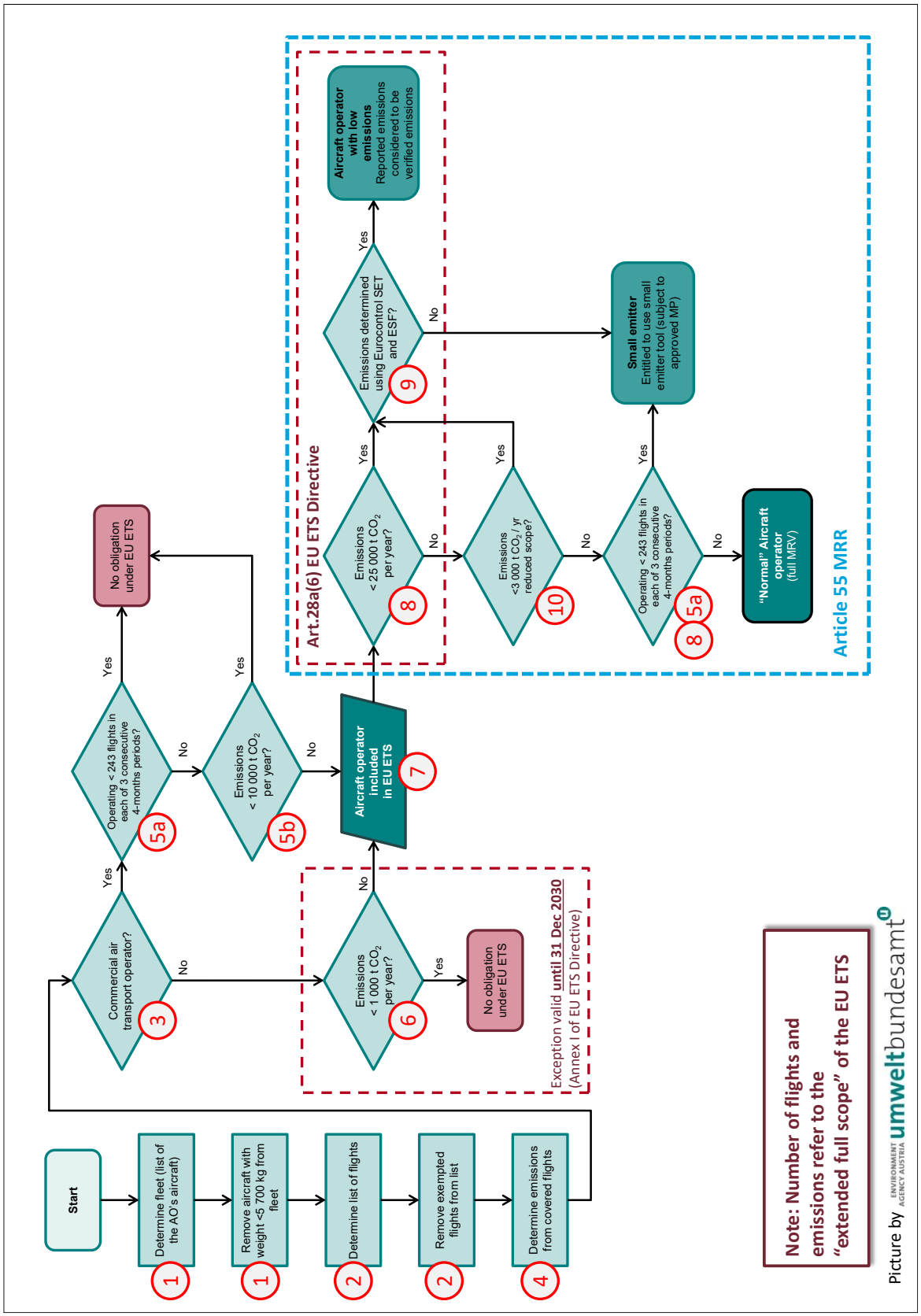

Figure 1: Decision tree for determining if an aircraft operator is included in the EU ETS, and if so, if simplified MRV approaches are allowed. For further explanation please refer to the main text.

Obligations under CORSIA

For determination of an obligation under CORSIA, only steps 1 and 2 above need to be performed. Thereafter: An aircraft operator with emissions below 10 000 t CO_2 per year from international flights is not covered by CORSIA (i.e. he has no further obligation under the EU ETS Directive for CORSIA purposes). All other AOs consequently have to follow the applicable rules on MRV.

4 THE EU ETS COMPLIANCE CYCLE

4.1 Importance of MRV in the EU ETS

Monitoring, reporting and verification (MRV) of emissions play a key role in the credibility of any emission trading system. Without MRV, compliance would lack transparency and be much more difficult to track, and enforcement compromised. This holds true also for the Union Emission Trading System (EU ETS). It is the complete, consistent, accurate and transparent monitoring, reporting and verification system that creates trust in emissions trading. Only in this way can it be ensured that operators and aircraft operators meet their obligation to surrender sufficient allowances.

This observation is based on the twofold nature of the EU ETS: On the one hand it is a market-based instrument. It has allowed a significant market to evolve, in which market participants want to know the monetary value of the allowances they get allocated, they trade and they have to surrender. On the other hand, it is an instrument for achieving an environmental benefit. But in contrast to other environmental legislation, the goal is not to be achieved by individuals, but the whole group of EU ETS participants having to achieve the goal jointly. This requires a considerable level of fairness between participants, ensured by a solid MRV system. The competent authorities' oversight activities contribute significantly to ensuring that the goal set by the cap is reached, meaning that the anticipated emission reductions are delivered in practice. It is therefore the responsibility of the competent authorities together with the accreditation bodies to protect the integrity of the EU ETS by supervising the well-functioning of the MRV system.

Both, carbon market participants and competent authorities want to have assurance that one tonne CO_2 equivalent emitted finds its equivalent of one tonne reported (for the purpose of one allowance to be surrendered). This principle has become known already from the early days of the EU ETS as the proverbial postulation: **"A tonne must be a tonne!"**

In order to ensure that this is achieved in a robust, transparent, verifiable and yet cost effective way, the EU ETS Directive provides a solid basis for a good monitoring, reporting and verification system. This is achieved by Articles 14 and 15 in connection with Annexes IV and V of the EU ETS Directive. Based on Article 14, the Commission has provided the "M&R Regulation[42]" (MRR), which has been amended several times since the introduction from 1 January 2013.

However, it has always been recognised by the Commission as well as by Member States that a complex and technical legislation such as the MRR needs to be supported by further guidance, in order to ensure harmonised implementation throughout all Member States, and for paving the way to smooth compliance through pragmatic approaches wherever possible.

Furthermore, a Regulation for verification and accreditation of verifiers has been provided (the "A&V Regulation"[43], also revised for the 4th phase of the EU ETS),

[42] Commission Implementing Regulation (EU) 2018/2066 of 19 December 2018 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council and amending Commission Regulation (EU) No 601/2012.

[43] Commission Implementing Regulation (EU) 2018/2067 on the verification of data and on the accreditation of verifiers pursuant to Directive 2003/87/EC of the European Parliament and of the Council

for which a separate series of guidance documents has been developed by the Commission.

4.2 Overview of the compliance cycle

The annual process of monitoring, reporting, verification of emissions, surrender of allowances, and the competent authority's procedure for accepting emission reports are often referred to as the "compliance cycle". Figure 2 shows the main elements of this cycle.

On the right side of the picture there is the "main cycle": The aircraft operator monitors the emissions throughout the year. After the end of the calendar year (within three months[44]) he must prepare the annual emissions report (AER), seek verification and submit the verified report to the competent authority (CA). The verified emissions must correlate with the surrender of allowances in the Registry system[45]. Here the principle "a tonne must be a tonne" translates into "a tonne must be an allowance", i.e. at this point the market value of the allowance is correlated with the costs of meeting the environmental goal of the EU ETS. Thereafter the monitoring goes on, as shown in the picture. More precisely, the monitoring continues without any stop at the end of the year.

The monitoring process needs a firm basis. Resulting data must be sufficiently robust for creating trust in the reliability of the ETS, including the fairness of the surrender obligation, and it must be consistent throughout the years. Therefore, the aircraft operator must ensure that the monitoring methodology is documented in writing and cannot be changed arbitrarily. In the case of the EU ETS, this written methodology is called the Monitoring Plan (MP) of the aircraft operator (see Figure 2). It is a requirement for aircraft operators under Article 3g of the EU ETS Directive.

The figure also shows that the monitoring plan, although very specific for an individual aircraft operator, must follow the requirements of the EU-wide applicable legislation, in particular the Monitoring and Reporting Regulation. As a result, the MRV system of the EU ETS is able to square the circle between strict EU-wide rules providing reliability and preventing arbitrary and undue simplifications, and allowing for sufficient flexibility for the circumstances of individual aircraft operators.

[44] According to national legislation, this period may be shorter, see footnote 50.

[45] For the purpose of simplification, the surrender of allowances has not been included in the picture. Similarly, the picture also ignores the processes of allocation and trading of allowances.

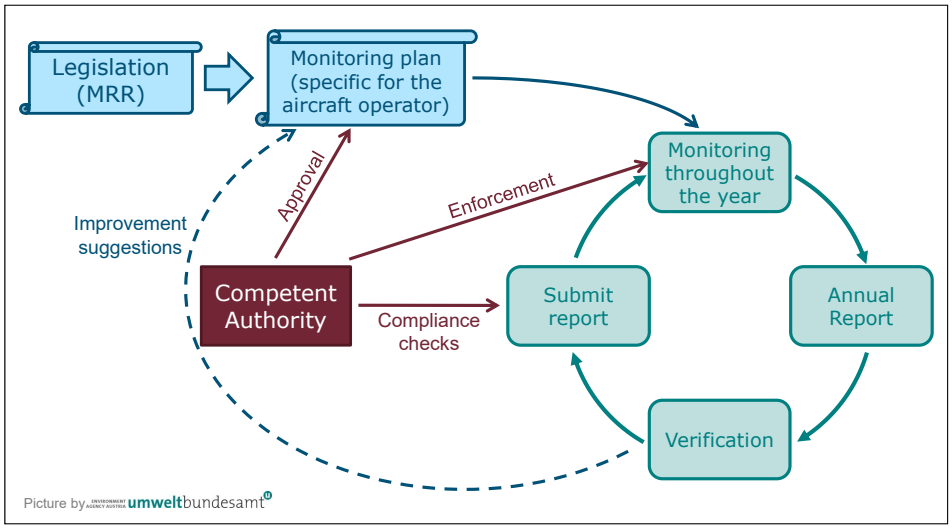

Figure 2: Principle of the EU ETS compliance cycle (only main elements of the MRR shown).

Figure 2 also shows some key responsibilities of the competent authority. It has to supervise the compliance of aircraft operators. As the first step, the CA has to approve every monitoring plan before it is applied. This means that the monitoring plans developed by the aircraft operator are checked for compliance with the MRR's requirements. Where the aircraft operator makes use of simplified approaches allowed by the MRR, this must be justified by the aircraft operator, for example, based on the threshold limits set by the EU ETS Directive.

It is furthermore the responsibility of the competent authority to carry out checks on the annual emission reports, as appropriate. This includes spot checks on the already verified reports, but also cross-checks with figures entered in the verified emissions table of the registry system, and checking that sufficient allowances have been surrendered.

However, the compliance cycle has a wider perspective. As Figure 2 shows, there is a second cycle. This is the regular review of the monitoring plan, for which the verification report may provide valuable input. Besides, the aircraft operator is required to continuously strive for further improving the monitoring methodology.

4.3 The importance of the monitoring plan

From the previous section it becomes apparent, that the approved monitoring plan is the most important document for every aircraft operator participating in the EU ETS. Like a recipe for a cook and like the management handbook for a certified quality management system, it serves as manual for the aircraft operator's tasks. Therefore, it should be written in a way that allows all, particularly new staff to immediately follow the instructions. It must also allow the CA to quickly understand the aircraft operator's monitoring activities. Finally, the MP is *the* guide for the verifier against which the aircraft operator's emission report is to be judged.

Typical elements of a monitoring plan include the following activities of the aircraft operator (applicability depends on the specific circumstances):

- Data collection (metering data, invoices, flight logs,...);
- Description of calculations and formulae to be used;
- Control activities (e.g. four eyes principle for data collection);
- Data archiving (including protection against manipulation);
- Regular identification of improvement possibilities.

However, monitoring plans must be drafted carefully (see chapter 6), so that administrative burden is minimised. Since the MP is to be approved by the competent authority, it goes without saying that changes of the MP are only allowed with the consent of the CA. The M&R Regulation reduces the administrative efforts here by allowing two approaches which should already be taken into account when drafting monitoring plans:

- Only changes which are "significant" need the approval by the CA (Article 15 of the MRR, see section 6.5 below);
- Monitoring activities which are not crucial in every detail, and which by their nature tend to be frequently amended as found necessary, may be put into "written procedures", which are mentioned and described briefly in the MP, but the detail of which are not considered part of the approved MP. The relationship between monitoring plan and written procedures is described in more detail in section 6.2.

Because of the importance of the monitoring plan, the Commission is also providing templates for monitoring plans. Some Member States might have provided customized templates based on the Commission's templates, other Member States use a dedicated (usually web-based) electronic reporting system (that must also meet at least stated Commission requirements). Before developing a monitoring plan, aircraft operators are therefore advised to check their competent authority's website or make direct contact with the CA for finding out the concrete requirements for submitting a monitoring plan. National legislation of the administering Member State may also state specific requirements.

NOTE: The Commission has provided a monitoring template which can be used simultaneously for the EU ETS and CORSIA (if applicable) to minimise administrative burden[46]. Since the main difference between EU ETS, Swiss ETS, UK ETS and CORSIA regarding the monitoring aspects lies in the different scopes (which flights are to be covered), there is in principle no obstacle against using the same

[46] Download from https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/monitoring-reporting-and-verification_en#documentation

monitoring plan for all these systems, provided that appropriate procedures are added for identifying under which of these systems each flight has to be reported.

4.4 Milestones and deadlines

4.4.1 The annual compliance cycle

The EU ETS compliance cycle is built around the requirement that monitoring is always related to the calendar year[47], as shown in Table 1 and Figure 3.

The monitoring plan should be approved by the competent authority before the start of the first year for which emissions are to be reported (i.e. the first year of the trading period, such as 2013). However, for new aircraft operators, Article 52 of the MRR requires the monitoring plans to be submitted to the competent authority at the latest four months before he commences aviation activities covered by the EU ETS.

In practice this is often difficult to achieve (sometimes aircraft operators do not know very far in advance that they will operate flights to destinations in the EEA). Furthermore, some aircraft operators will not know early enough which Member State will be their administering MS (see section 3.3.1). Therefore, Article 52 allows the following derogations:

- An aircraft operator that performs an aviation activity covered by the EU ETS for the first time that could not be foreseen four months in advance, shall submit a monitoring plan to the competent authority *without undue delay, but no later than six weeks after performance of that activity*. A justification must be attached.
- Where the administering Member State is not known in advance, the aircraft operator shall without undue delay submit the monitoring plan when information on the competent authority of the administering Member State becomes available (i.e. when the aircraft operator appears on the "prior compliance list", he should contact that Member States' competent authority, and at the latest when the regular aircraft operator list is published by the Commission, see section 3.3.1)

Aircraft operators have three months[48] after the end of the year to finalise the emission reports and to get them verified by an accredited verifier in accordance with the A&V Regulation. Aircraft operators must then surrender the corresponding amount of allowances. Subject to national legislation, the competent authority of the administering MS may or shall perform (spot) checks on the reports received, and must determine a conservative estimate of the emissions, if the aircraft operator fails to submit an emissions report, or where a report has been submitted, but it is either not compliant with the MRR or not (positively) verified in accordance with the A&V Regulation (Article 70(1) of the MRR). When the CA detects any kind of errors in the submitted reports, corrections to the verified emissions figure may be a result. Note that for such corrections no deadline is

[47] Article 3(12) of the MRR defines: '*reporting period' means one calendar year during which emissions have to be monitored and reported* […].

[48] According to national legislation, this period may be shorter, see footnote 50.

given by EU legislation. However, there may be some requirement given in national legislation.

Table 1: Common timeline of the annual EU ETS compliance cycle for emissions in year N.

When?	Who?	What?
1 January N		Start of monitoring period
31 December N		End of monitoring period
Before 1 February N+1	European Commission	Update and publish a list of aircraft operators at least every 2 years specifying the administering Member State for each aircraft operator
by 31 March[49] N+1	Verifier	Finish verification and issue verification report to operator
By 31 March[50] N+1	Aircraft operator	Submit *verified* annual emissions report
By 31 March N+1	Aircraft operator / Verifier[51]	Enter verified emissions figure in the verified emissions table of the Registry
March – September[52] N+1	CA	Subject to national legislation, possible spot checks of submitted annual emissions reports. Require corrections by aircraft operator, if applicable. N.B. Subject to national legislation, there is no obligation for CAs to provide assistance or acceptance of aircraft operator reports either before or after 30 April).
By 30 September N+1	Aircraft operator	Surrender allowances (amount corresponding to verified annual emissions) in Registry system
By 30 June N+1	Aircraft operator	Submit report on possible improvements of the MP to the CA, if applicable[53]
(No specified deadline)	CA	Carry out further checks on submitted annual emissions reports, where considered necessary or as may be required by national legislation; require changes of the emissions data and surrender of additional allowances, if applicable (in accordance with administering Member State legislation.

Figure 3 also suggests indicative timings for the verification process. Experience has shown that the availability of verifiers may be a bottleneck in some Member States, especially if the whole verification process is performed in the first three months of the year. However, several parts of the verification process can be

[49] Footnote 50 applies here as well.

[50] According to Article 68(1) of the MRR competent authorities may require operators or aircraft operators to submit the verified annual emission report earlier than by 31 March, but by 28 February at the earliest.

[51] This may be regulated differently in the Member States.

[52] Depending on Member States' legislation or administrative practice, CAs may continue checking the data after September N+1.

[53] For aircraft operators only the improvement reports in accordance with Article 69(4) of the MRR are relevant, i.e. the ones to be submitted in the year where a verifier reports improvement recommendations. The CA may set a different deadline, but no later than 30 September of that year.

performed well before the end of the reporting year. Therefore, the advice to the aircraft operator is to contract a verifier early in the reporting year, ideally soon after the previous report has been submitted in March. The verifier is then able to plan and perform much of the required work throughout the rest of the year, leaving only the final checks and the issuing of the verification report for the first quarter of the following year.

Finally, it has to be mentioned that further requirements apply which are not listed here. In particular, as discussed in section 6.5, the aircraft operator has to update the monitoring plan throughout the year where relevant, and the competent authority has to assess and approve it where relevant.

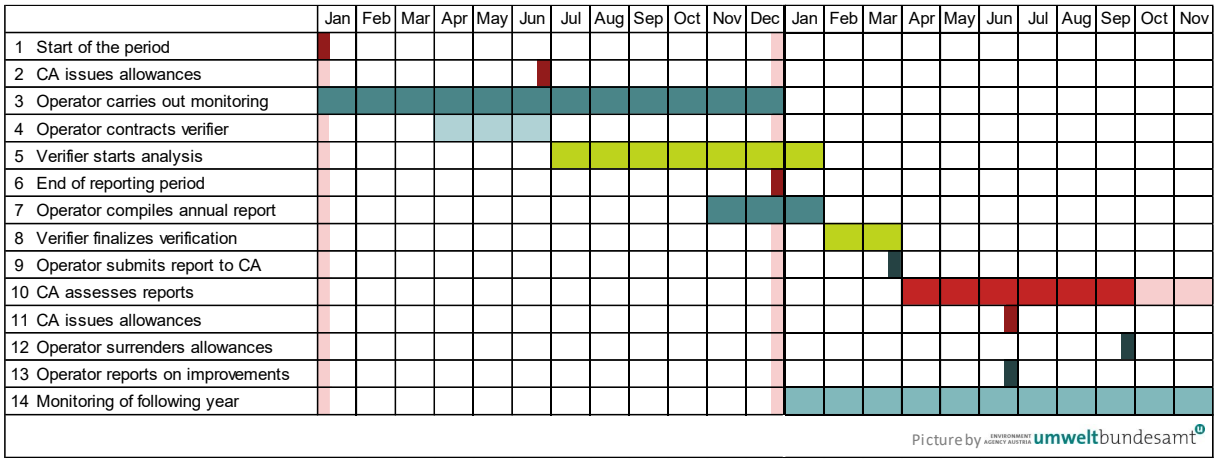

Figure 3: Example timeline for the EU ETS compliance cycle. "Operator" should be read as "aircraft operator". Note that point 2 (CA issues allowances) does not apply to aircraft operators. For FEETs, a dedicated timeline is presented in section 5.5.9.

4.4.2 Approval of the monitoring plan

In order to make the compliance cycle work, the monitoring plans of all aircraft operators needed to be approved by the competent authority before the start of the monitoring period. For new participants in the EU ETS (or CORSIA, if relevant), the MP must be approved before the start of operations, or without undue delay after receiving certainty about the administering Member State (see section 4.4.1).

For the start of a new trading phase, some Member States may require that the monitoring plans of all aircraft operators be revised and adapted to the new requirements. Based on experience from previous ETS phases, such a general revision process may require several months and should be well prepared. For the purpose of providing additional guidance, a (legally non-binding) timeline is presented here. Relatively long timescales are assumed, as required for the most complex aircraft operators, as follows: Firstly, preparation of the monitoring plan by the aircraft operators can take up to several months, depending on the complexity of their operations. However, for simple aircraft operators, the monitoring plan may be compiled within a few working days.

Because the CA also need a few weeks or months for assessing all submitted MPs (depending on current workload) and because aircraft operators then need some weeks for finally implementing the new approved MP, aircraft operators should prepare the new monitoring plans early enough for submission of MPs by the middle of the year, but at the latest by end of September[54]. An example timeline for the start of a new trading period is shown in Table 2.

Table 2: Model timeline for preparing the EU ETS compliance cycle for the start of a new trading period. Note that deadlines may significantly differ according to the Member States. Y is the year in which the new trading period starts (e.g. Y=2013 for the third trading period).

When?	Who?	What?
May – Sept. Y-1	Aircraft Operator	Check existing MP for required updates, or develop new MP, as applicable
July – Sept. Y-1	CA	Suggested deadline for receiving new or updated MP from operators
July – Dec. Y-1	CA	Check and approve MPs
Oct. – Dec. Y-1	Aircraft operator	Prepare for implementation of approved MP
1 January Y		Start of monitoring period using the new MRR requirements

4.5 Roles and responsibilities

The different responsibilities of the aircraft operators, verifiers and competent authorities are shown in Figure 4, taking into account the activities mentioned in the previous sections. For the purpose of completeness, also the accreditation body is included. The picture clearly shows the high level of control which is efficiently built into the MRV system. The monitoring and reporting is the main responsibility of the aircraft operators (who are also responsible for hiring the verifier and for providing all relevant information to the verifier). The CA approves the monitoring plans, receives and checks the emission reports and may make corrections to the verified emissions figure where errors are detected. Thus, the CA is in control over the final result. Finally, the verifier is ultimately answerable to the accreditation body[55]. Note that based on Article 66 of the A&V Regulation, Member States must also monitor the performance of their national accreditation bodies, thereby fully ensuring the integrity of the EU ETS system of MRV and accreditation.

[54] Note that the concrete deadlines set by competent authorities in the Member States may differ from this assumption.

[55] The A&V Regulation also allows in exceptional cases verifiers (if natural persons) to be certified and supervised by a national authority appointed by that Member State (in accordance with AVR Article 55).

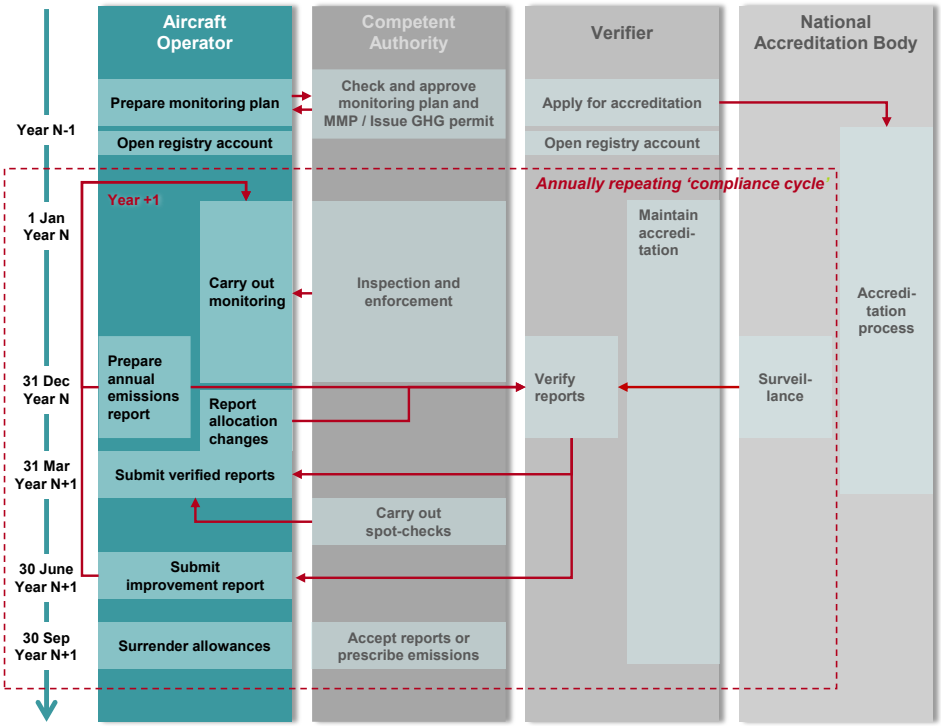

Figure 4: Overview of responsibilities of the main actors in the EU ETS. Regarding "Accreditation body" see also footnote55.

5 CONCEPTS AND APPROACHES

This chapter is dedicated to explaining the most important terms and concepts needed for developing a monitoring plan.

5.1 Underlying principles

Articles 5 to 9 of the MRR outline the guiding principles which the aircraft operators have to follow when fulfilling their obligations. These are:

- **Completeness** (Article 5): The completeness of emission sources and source streams is at the very core of the EU ETS monitoring principles. This is why the aircraft operator has to implement a procedure for keeping track of his fleet, i.e. all aircraft carrying out activities covered by the EU ETS, including leased-in aircraft, in order to ensure completeness of the emissions monitored.
- **Consistency and comparability** (Article 6(1)): Time series[56] of data need to be consistent throughout the years. Arbitrary changes of monitoring methodologies are prohibited. This is why the monitoring plan has to be approved by the competent authority, such as also significant changes to the MP.
- **Transparency** (Article 6(2)): All data collection, compilation and calculation must be made in a transparent way. This means that the data itself, the methods for obtaining and using them (in other words: the whole data flow) have to be documented transparently, and all relevant information has to be securely stored and retained allowing for sufficient access by authorised third parties. In particular, the verifier and the competent authority must be allowed access to this information.
  It is worth mentioning that transparency is in the own interest of the aircraft operator: It facilitates transfer of responsibilities between existing and new staff and reduces the likelihood of errors and omissions. In turn this reduces the risk of over-surrendering, or under-surrendering and penalties. Without transparency, the verification activities are more onerous and time-consuming.
  Furthermore Article 67 of the MRR specifies that relevant data is to be stored for 10 years. The minimum data to be retained is listed in Annex IX of the MRR.
- **Accuracy** (Article (7)): Aircraft operators have to take care that data is accurate, i.e. neither systematically nor knowingly inaccurate. Due diligence is required by aircraft operators, striving for the highest achievable accuracy. As the next point shows, “highest achievable” may be read as where it is technically feasible and “without incurring unreasonable costs”.
- **Integrity of the methodology and of the emissions report** (Article 8): This principle is at the very heart of any MRV system. The MRR mentions it explicitly and adds some elements that are needed for good monitoring:

[56] This does not imply a requirement to produce time series of data, but assumes that the aircraft operator, verifier or competent authority may use time series as a means of consistency checks.

- The monitoring methodology and the data management must allow the verifier to achieve "reasonable assurance[57]" on the emissions report, i.e. the monitoring must be able to endure a quite intensive test;
- Data shall be free from material[58] misstatements and avoid bias;
- The data shall provide a credible and balanced account of an aircraft operator's emissions.
- When looking for greater accuracy, aircraft operators may balance the benefit against additional costs. They shall aim for "highest achievable accuracy, unless this is technically not feasible or would lead to unreasonable costs".

- **Continuous improvement** (Article 9): In addition to the requirement of Article 69, which requires the aircraft operator to submit reports on improvement possibilities if appropriate, this principle also is the foundation for the operator's duty of responding to the verifier's recommendations (see also Figure 2 on page 27).

5.2 Source streams and emission sources

The MRR uses some terms for appropriately covering some concepts which apply to installations as well as aircraft operators. For aircraft operators the following two terms might need some interpretation:

- **Emission source:** The M&R Regulation defines (Article 3(5)): "'emission source' means a separately identifiable part of an installation or a process within an installation, from which relevant greenhouse gases are emitted or, for aviation activities, an individual aircraft". For ensuring the completeness of monitoring, the aircraft operator must ensure that he always tracks the completeness of his emission sources, i.e. the fleet of aircraft currently operating, including leased-in aircraft.
- **Source streams**[59]: From aircraft operator's view this term simply concerns "fuel". Where an aircraft operator only uses one type of fuel, as is typically the case at the present time, he has only one source stream. However, different types of fuel constitute different source streams.

5.3 The tier system

The EU ETS system for monitoring and reporting provides for a building block system of monitoring methodologies. Each parameter needed for the determination of emissions can be determined by different "data quality levels". These "data

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[57] Article 3(19) of the A&V Regulation defines: "*'reasonable assurance' means a high but not absolute level of assurance, expressed positively in the verification opinion, as to whether the operator's or aircraft operator's report subject to verification is free from material misstatement.*" For more details on the definition this term, see guidance documents on the A&V guidance, in particular the AVR Explanatory Guidance (EGD I). Section 2.3 provides a link to those documents.

[58] See footnote57.

[59] MRR Article 3(4): 'source stream' means any of the following:
(a) a specific fuel type, raw material or product giving rise to emissions of relevant greenhouse gases at one or more emission sources as a result of its consumption or production;
(b) a specific fuel type, raw material or product containing carbon and included in the calculation of greenhouse gas emissions using a mass-balance methodology"

quality levels" are called "tiers"[60]. In general, it can be said that a tier with a lower number represents a method with lower requirements and less accurate than a higher tier.

For aircraft operators, the revision of the MRR in 2018 simplified the monitoring in a way that no tiers are defined anymore (i.e. there is only one uniform quality level for all data).

5.4 Monitoring approaches for emissions

5.4.1 General approach

Aircraft operators determine CO_2 emissions using a simplified version of the standard methodology for combustion emissions[61], using the following formula:

$$Em = AD \cdot EF \quad (1)$$

Where:

Em ..... Emissions [t CO_2]

AD..... Activity data (=amount of fuel consumed) [t]

EF ..... Emission factor [t CO_2/t fuel]

Note that unlike installations, aircraft operators always report the activity data as tonnes of fuel, not based on the calorific value. However, for consistency reasons, the Net Calorific Value (NCV) of the fuel has to be reported as a memo-item.

This calculation is to be carried out in principle for each individual flight. For reporting purposes, all fuel consumptions of the same type of fuel can be summed up. However, for the annual emissions report an aggregation of emissions per aerodrome pair and per country of departure and arrival is also to be prepared. Aircraft operators should ensure that their electronic data processing systems are capable of ensuring those aggregations.

5.4.2 Definition of a 'flight'

The guidelines in Commission Decision 2009/450/EC define: "*The term 'flight' means one flight sector that is a flight or one of a series of flights which commences at a parking place of the aircraft and terminates at a parking place of the aircraft.*" In simpler wording, this means "from one block-off to the next block-off" (Method A), or "from one block-on to the next block-on" (Method B).

Note that the fuel consumption of the auxiliary power unit (if any) is included consistently in both monitoring methods (see section 5.4.3). For avoiding data gaps or double counting[62], it is important to use consistently for each aircraft only either Method A or Method B.

[60] Article 3(8) of the MRR defines: *'tier' means a set requirement used for determining activity data, calculation factors, annual emission and annual average hourly emission, and payload.*

[61] For more information see guidance document No. 1 (general guidance for installations).

[62] 'Double counting' is the process of attributing the same amount of emissions, fuel, material, etc. twice, either within one single or to multiple accounting systems.

For attributing a flight to a specific reporting year, the local time of departure should be used. For example, if a flight departs in Toronto at 22.00pm local time on 31 December 2016 and lands in Amsterdam at 11.30am local time on 1 January 2017, the flight should be listed in the 2016 emissions report.

5.4.3 Amount of fuel consumed

The M&R Regulation allows two different approaches (Method A and Method B, see section 1 of Annex III of the MRR) for determining fuel consumption of a flight which is covered by the EU ETS (flight N):

Method A[63]: The operator shall use the following formula:

$$F_{N,A} = T_N - T_{N+1} + U_{N+1} \quad (2)$$

Where:

$F_{N,A}$..... Fuel consumed for the flight under consideration (=flight N) determined using method A [t]

T_N..... Amount of fuel contained in aircraft tanks once fuel uplift for the flight under consideration (=flight N) is complete [t]

T_{N+1} ..... Amount of fuel contained in aircraft tanks once fuel uplift for the subsequent flight (=flight N+1) is complete [t]

U_{N+1}..... Fuel uplift for the subsequent flight (=flight N+1) [t]

Method B[64]: The operator shall use the following formula:

$$F_{N,B} = R_{N-1} - R_N + U_N \quad (3)$$

Where:

$F_{N,B}$..... Fuel consumed for the flight under consideration (=flight N) determined using method B [t]

R_{N-1}..... Amount of fuel remaining in aircraft tanks at the end of the previous flight (=flight N–1), i.e. at block-on before the flight under consideration, expressed in [t]

R_N..... Amount of fuel remaining in aircraft tanks at the end of the flight under consideration (=flight N), i.e. at block-on after the flight, expressed in [t]

U_N..... Fuel uplift for the flight considered, expressed in [t]

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[63] Section 1 of Annex III of the MRR: "*Actual fuel consumption for each flight [t] = Amount of fuel contained in aircraft tanks once fuel uplift for the flight is complete [t] – Amount of fuel contained in aircraft tanks once fuel uplift for subsequent flight is complete [t] + Fuel uplift for that subsequent flight [t]*"

[64] Section 1 of Annex III of the MRR: "*Actual fuel consumption for each flight [t] = Amount of fuel remaining in aircraft tanks at block-on at the end of the previous flight [t] + Fuel uplift for the flight [t] - Amount of fuel contained in tanks at block-on at the end of the flight [t]*"

For ensuring completeness of the data, it is important to note that not only data generated during the duty of the one flight's crew is needed, but also data generated from the subsequent flight (Method A) or the previous flight (Method B). This is in particular important when a non-ETS flight is followed by an ETS flight, or vice versa. For avoiding data gaps it is therefore recommended that (depending on the Method applied), the amount of fuel remaining in the tank after the flight or the amount of fuel in the tank after fuel uplift is *always* recorded on flights of aircraft which are used for EU ETS flights. For the same reasons, fuel uplift data for *all* flights of those aircraft should be collected, before deciding which flights are covered by the EU ETS (see section 3.13.1)

Treatment of special situations:

Method A: Where no fuel uplift for the flight or subsequent flight takes place, the amount of fuel contained in aircraft tanks (T_N or T_{N+1}) shall be determined at block-off for the flight or subsequent flight.

In exceptional cases the variable T_{N+1} cannot be determined. This is the case when an aircraft performs activities other than a flight, including undergoing major maintenance involving the emptying of the tanks, after the flight to be monitored. In such case the aircraft operator may substitute the quantity "$T_{N+1} + U_{n+1}$" with the 'Amount of fuel remaining in tanks at the start of the subsequent activity[65] of the aircraft', as recorded by technical logs.

Method B: For simplification, the moment of block-on may be considered equivalent to the moment of engine shut down.

Where an aircraft does not perform a flight previous to the flight for which fuel consumption is being monitored (e.g. if the flight follows a major revision or maintenance), the aircraft operator may substitute the quantity R_{N-1} with the 'Amount of fuel remaining in aircraft tanks at the end of the previous activity of the aircraft', as recorded by technical logs.

5.4.4 Comparing Method A and B

The difference between Method A and B can best be explained by the following example highlighted in the figure below which shows that Method A has different end and starting points for the monitoring of the fuel consumption compared to Method B.

Figure 5 shows the changes of the fuel level in the aircraft tank and highlights which measurements have to be taken for calculating fuel consumption with Method A or B. Measurements "A" are taken after the fuel uplift. Measurements "B" are taken on block-on at the end of the previous flight or engine shut down.

[65] This is the activity which is not a flight.

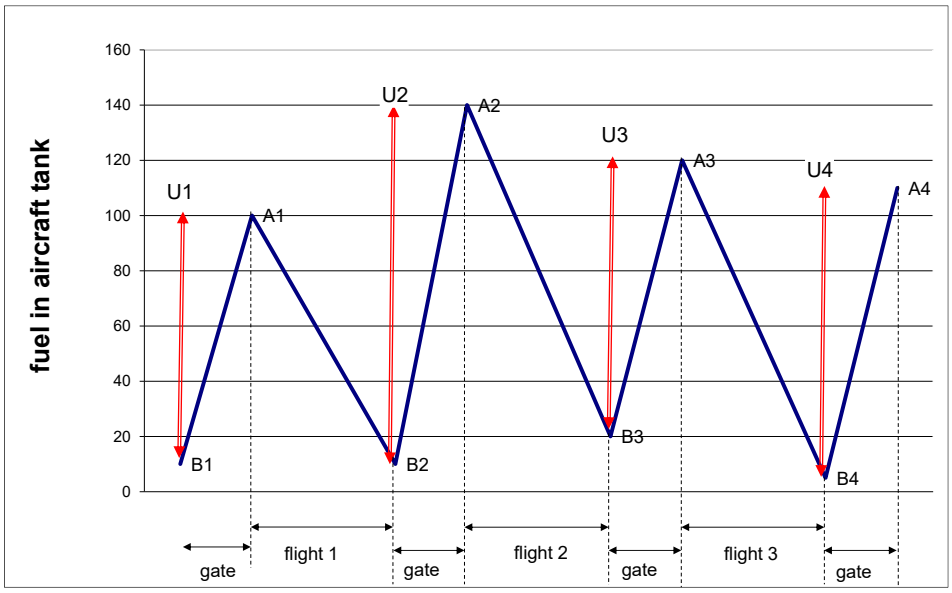

Figure 5: Illustration of the two monitoring methods for fuel consumption of aircraft operators. For explanation please see the main text. (Picture by PriceWaterhouseCoopers[66])

In this example the fuel consumption according to Method A and according to Method B respectively would be calculated in the following manner:

	Method A	Method B
Fuel consumption flight 1	A1 – A2 + U2	B1 + U1 – B2
Fuel consumption flight 2	A2 – A3 + U3	B2 + U2 – B3
Fuel consumption flight 3	A3 – A4 + U4	B3 + U3 – B4

In both methods subsequent EU ETS flights are monitored without time gap between the flights. When monitoring the fuel consumption of a flight, the data from the previous flight and the subsequent flight have to be available and taken into account, even if non-EU ETS activities are concerned.

5.4.5 Density

If the amount of fuel uplift or the amount of fuel remaining in the tanks is determined in units of volume (litres, US gallons or m^3), these values have to be converted to mass values by using appropriate density values. The following formula shall be used:

$$M = V \cdot \rho \cdot f \qquad (4)$$

[66] Guidance for the Aviation Industry, commissioned by the Dutch government, 2009.

Where:

M..... Mass of fuel [t]

V ..... Volume of fuel, expressed as litres [L]

ρ..... (Actual) Density, expressed as [kg/L]. "Actual density" means density determined for the applicable temperature.

f..... Correction factor for making units consistent. If *ρ* is expressed as [kg/L], the value of *f* is 1t/1000kg. If *V* or *ρ* are expressed using non-SI units, such as gallons, lb/gal etc., appropriate values for the conversion factor *f* must be used[67].

The aircraft operator shall use the same fuel density as used for operational and safety reasons, which may be either a standard value of 0.8 kg per litre or the actual density value (Article 53(5) of the MRR). The monitoring plan shall contain a written procedure describing how the actual or standard density factor is to be determined.

5.4.6 Emission factors

In general, the aviation sector uses only a few types of – highly standardised – fuels. For the most commonly used fuels (Jet kerosene (Jet A1 or Jet A), Jet gasoline (Jet B) and Aviation gasoline (AvGas)), the MRR contains default values for the emission factor (EF, see section 2 of Annex III of the MRR). For other fuels the emission factor has to be determined in accordance with Article 32, i.e. by laboratory analyses (see guidance documents No. 1 and 5). However, the required information (carbon content / emission factor and net calorific value) can also be obtained from purchasing records provided by the fuel supplier, provided that they have been derived based on internationally accepted standards (Article 53(7)).

New!

5.5 Alternative aviation fuels

One important aspect of reporting emissions under the EU ETS is to account for the usage of alternative aviation fuels, where relevant.

"Alternative aviation fuels" are neat aviation fuels that contain carbon not stemming from the neat fossil fuels listed in Table 1 of Annex III to the MRR, in particular:

- Aviation gasoline (AvGas)
- Jet gasoline (Jet B)
- Jet kerosene (Jet A1 or Jet A)

Not only is this the case because Article 53(2) of the MRR states that "*Each aircraft operator shall determine the fuel consumption for each flight and for each*

[67] For the definition of the SI system of units (the "metric system"), see http://www.bipm.org/en/si/. Conversion factors to US units can be found on the website of the U.S. National Institute of Standards and Technology (NIST), in particular under http://www.nist.gov/pml/wmd/pubs/upload/AppC-12-hb44-final.pdf

fuel…"[68], but also because alternative aviation fuels can be "zero-rated". Zero-rating in the context of the EU ETS refers to the process by which the emission factor of a fuel or material is reduced to zero if applicable criteria are complied with, as defined in point 23c of Article 3 of the MRR. For aviation, the conditions for zero-rating are defined in Article 54c of the MRR. With the purpose of avoiding the double counting of emissions, zero rating can be applied to the following fuels which are further explained in the sections below:

- Biofuels (section 5.5.1);
- Renewable Fuels of Non-Biological Origin (RFNBOs, 5.5.2);
- Recycled Carbon Fuels (RCFs, 5.5.2);
- Synthetic Low-Carbon Fuels (SLCFs, 5.5.3).

For alternative aviation fuels to be zero-rated they have to meet sustainability criteria (biofuels) and greenhouse gas (GHG) emission savings criteria laid out in Articles 29 and 29a of the RED II, the latter calculated pursuant to Article 31 of the RED II and Commission Delegated Regulation (EU) 2023/1185[69]. Compliance with those criteria needs to be verified pursuant to Article 30 of that regulation. These criteria are referred to jointly as "RED II criteria" in this guidance document.

When an aircraft operator reports the usage of alternative aviation fuels, they have to provide evidence that the fuel complies with these criteria. Alternatively, the compliance is also deemed proven if evidence of a purchase, as well as the later cancellation, of the quantity of alternative aviation fuels in the Union Database (UDB)[70] is provided by the operator.

5.5.1 Biofuels

Biofuels are defined in Article 3 of the MRR:

> *(23) 'biofuels' means liquid fuels for transport produced from biomass.*

The definition derives from the RED II and draws an explicit contrast between **biofuels**, which are only relevant for transport purposes (and thereby, in the context of the EU ETS, mainly for aviation, maritime transport and the ETS2) and **bioliquids** which are specifically not used for transport purposes. Biofuels are produced from biomass, which are defined in Article 3 of the MRR as well.

> *(21) 'biomass' means the biodegradable fraction of products, waste and residues from biological origin from agriculture, including vegetal and animal substances, from forestry and related industries, including fisheries and aquaculture, as well as the biodegradable fraction of waste, including industrial and municipal waste of biological origin.*

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[68] This applies to the use of alternative aviation fuels as well as fossil fuels or mixed fuels (blends of fossil fuels and alternative aviation fuels).

[69] Commission Delegated Regulation (EU) 2023/1185 of 10 February 2023 supplementing Directive (EU) 2018/2001 of the European Parliament and of the Council by establishing a minimum threshold for greenhouse gas emissions savings of recycled carbon fuels and by specifying a methodology for assessing greenhouse gas emissions savings from renewable liquid and gaseous transport fuels of non-biological origin and from recycled carbon fuels; Official journal version: http://data.europa.eu/eli/reg_del/2023/1185/oj

[70] The UDB is set up in accordance with Article 31a of the RED II. When the UDB is mentioned in this guidance, this includes any Member State's database linked to the UDB according to Article 31a(5) of the RED II.

It is important to note that fuels and materials can be processed in other industries than those mentioned in the definition of biomass. Applying a “trace the atom” approach, a biogenic[71] material remains biogenic. Yet, whether it can be zero-rated or not may change as consequence of processing.

As mentioned above, biofuels further have to comply with a set of sustainability criteria. These are defined in Article 29(2) to (7) of the RED II, as referenced in Article 38(5) of the MRR.

Annex I of this guidance provides a more detailed explanation of the sustainability and GHG savings criteria and the methods for demonstrating compliance (section 9.1) for alternative aviation fuels.

5.5.2 Renewable Fuels of Non-Biological Origin (RFNBO) and Recycled Carbon Fuels (RCFs)

RFNBOs are produced using energy of renewable origin, but **NOT** from biomass. Examples of RFNBOs include fuels derived from green hydrogen (hydrogen produced from electrolysis utilising renewable energy) such as many e-fuels, or produced from renewable electricity entirely.

RCFs on the other hand are produced from non-renewable waste streams. While they have to comply with a GHG savings requirement, they do not need to be produced from renewable energy sources entirely. Typical cases of RCFs could be synthetic fuels from municipal waste or unrecyclable plastics.

Because the distinction between RFNBOs and RCFs is not always straight forward (e-fuels may simultaneously fall into both categories), the MRR treats them as one single category, the “RFNBO or RCF fraction”.

Within the MRR (Article 3) RFNBOs and RCFs are defined as follows:

> *(36) Renewable fuels of non-biological origin’ [RFNBO] means liquid and gaseous fuels the energy content of which is derived from renewable sources other than biomass;*
>
> *(35) Recycled carbon fuels’ [RCF] means liquid and gaseous fuels that are produced from liquid or solid waste streams of non-renewable origin which are not suitable for material recovery in accordance with Article 4 of Directive 2008/98/EC, or from waste processing gas and exhaust gas of non-renewable origin which are produced as an unavoidable and unintentional consequence of the production process in industrial installations.*

As is the case for biofuels, RFNBOs and RCFs have to meet GHG emission savings criteria to be zero-rated. In their case the criteria can be found in Article 29a of the RED II, which is referenced in Article 39a(3) of the MRR.

[71] The word implies *stemming from* biological sources.

5.5.3 Synthetic Low-Carbon Fuels (SLCFs)

Synthetic low-carbon fuels (SLCFs) are gaseous and liquid fuels that are similar to RFNBOs and RCFs, but their energy content stems from "low-carbon hydrogen"[72] and therefore from a different energy source. This energy source does not need to be entirely renewable but has to meet a GHG savings criterion of 70%.

The MRR defines SLCFs in Article 3:

> *(23h) 'synthetic low-carbon fuels' means gaseous and liquid fuels, the energy content of which is derived from low-carbon hydrogen as defined in Article 2, point (13) of Directive (EU) 2024/1788, which meet the greenhouse gas emission reduction threshold of 70 % compared to the fossil fuel comparator for renewable fuels of non-biological origin set out in the methodology adopted according to Article 29a(3) of Directive (EU) 2018/2001, as certified in accordance with Article 9 of Directive (EU) 2024/1788;*

5.5.4 Determination of neat fuel quantity

New!

As Article 53(1) of the MRR requires only **neat** alternative aviation fuels to be reported, the quantities of any neat fuel need to be determined first. This is relatively simple as long as different neat fuels are purchased as individual batches with individual purchase records. These fuels would be directly reported as separate fuels.

However, any blended fuel needs to be split into the different quantities of neat fuels of which the blended fuel consists of. This can be achieved by applying the neat fuel fractions and calculating the amount of neat fuels, based on the total amount of (blended) fuels purchased and these fractions.

Example:

An AO purchases 500 tonnes of a blended Jet-A1 (mixed aviation fuel) at Salzburg airport, containing 20% certified biofuel, the AO monitors:

- Fuel type: 20% blended Jet A1; fuel quantity: 500 t
- Fossil fraction: 80%, zero-rated biomass fraction 20%

That AO therefore has to report the following neat fuels:

- 400 t fossil Jet-A1 (500 * 0.8)
- 100 t zero-rated biomass Jet-A1 (500 * 0.2)

5.5.5 Determination of alternative aviation fuel fractions

The AO has several options to determine the fractions of alternative aviation fuel in a blended fuel:

Neat fuel is either zero-rated where the emission factor used is zero or not zero-rated (assuming 100% fossil) where the preliminary emission factor is used. For

[72] According to Article 2(11) of Directive (EU) 2024/1788: "*'low-carbon hydrogen' means hydrogen the energy content of which is derived from non-renewable sources, which meets the greenhouse gas emission reduction threshold of 70 % compared to the fossil fuel comparator for renewable fuels of non-biological origin set out in the methodology for assessing greenhouse gas emissions savings from renewable fuels of non-biological origin and from recycled carbon fuels, adopted pursuant to Article 29a(3) of Directive (EU) 2018/2001 [i.e. the RED II];*"

aviation fuels, it is defined in Article 3(36) and required by Article 53(6) of the MRR. For the determination of the alternative aviation fuel fractions, there are several options.

Option 1 – Determination of alternative aviation fuel fraction by analyses

This option only applies to biofuels. If the blended fuel containing the biofuel is delivered to the aircraft in physically identifiable batches and if the competent authority approves the method, the aircraft operator can determine its fraction of the blended fuel by using the standards and analytical methods laid out in Articles 32 to 35 of the MRR. However, it is not common practice to analyse every fuel uplifted, as the blended fuels are analysed and certified when leaving the blending facility. However, due to the use of co-mingled fuel systems, the certification may no longer be applicable to the fuel being uplifted.

Option 2 – Determination of alternative aviation fuel fraction by mass balance

Unlike option 1, this option applies to all types of alternative aviation fuels. The fraction of alternative aviation fuel can be determined via a mass balance system. A specific form of mass balance is set out in Article 30(1) of the RED II.

If the proof for the applicable RED II criteria is provided through the Union Database, this automatically covers the requirement of the mass balance.

Option 3 – Determination of alternative aviation fuel fraction by purchase records

This option can be used to determine the fractions of all types of alternative aviation fuels by providing purchase records of the fuel purchased. It is applicable whether the purchased batches of alternative aviation fuels are physically delivered to a specific aircraft or not. The purchase record needs to identify the particular blend (such as in the example in section 5.5.4).

Purchase Records

Because alternative fuels may be traded between different parties, some form of evidence is required for aircraft operators using that fuel, to prove that a purchase of that quantity of fuel actually took place. This is why purchase records need to be provided to the verifier, and upon request, to the competent authority. Usually, these purchase records will be requested in the form of invoices. However, if the aircraft operator uses a registry for alternative fuels, such as the UDB, certificates used within that registry may be considered as purchase records as well.

5.5.6 Zero-rating of alternative aviation fuels

New!

The concept of zero-rating was expanded significantly by the 2024 amendment of the MRR compared to earlier versions of the EU ETS' MRV framework within which the only case of zero-rating was sustainable biomass. Nevertheless, one remnant of the former framework is the obligation to differentiate between both zero-rated and non–zero-rated neat fuels for all cases in which alternative aviation fuels are used. While it is expected that aircraft operators will not willingly purchase or use fuels that are not zero-rated, the possibility exists that the operator cannot or does not provide the evidence necessary for zero-rating, or not in time for the verification and submission of the annual emission report. This already existing approach for biomass is therefore expanded in a way that the general case assumes that the mixed fuel monitored can contain a mixture of all seven possible neat fuels:

- fossil fuel;
- zero-rated and non-zero-rated biofuel;
- zero-rated and non-zero-rated RFNBO/RCF;
- zero-rated and non-zero-rated SLCF.

As a result, calculating the emissions for which allowances have to be surrendered in the EU ETS for certain blended fuels might require a more complex process as seen in Figure 6.

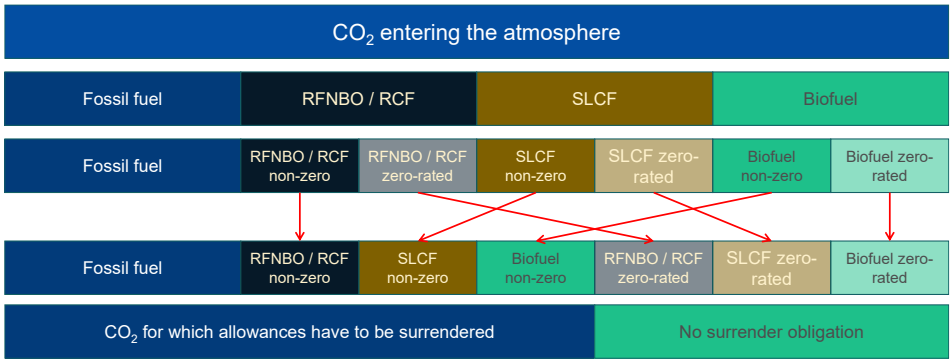

Figure 6: Example for determining the surrender obligation of a blended fuel

It is important to note, that, while possible, it is unrealistic that a blended fuel consists of all seven neat fuels. The above example portrays the most extreme case of a blended fuel to better clarify the process to determine the surrender obligation for that fuel. A more realistic example would be a blended fuel containing a fossil fuel and a zero-rated and a non-zero-rated biofuel. Yet, the basic procedure stays the same in both cases.

For alternative aviation fuels it is more likely these are purchased as neat fuels or as blended fuels with specified fractions. Where this is the case, it is expected that the relevant evidence for zero-rating will be available (e.g. from the "Union Database"), and the determination of the non-zero-rated fraction will not be necessary. This is reflected in the MRR requirements.

Despite the fact that in practice the alternative aviation fuels may be physically delivered in the form of blended fuels and therefore there are "fractions" of these fuels that need to be monitored, **all reporting of fuels by aircraft operators shall refer to the neat fuels**, i.e. theoretical fuels that contain only one single fraction of fuel[73].

New!

5.5.7 Attribution of alternative aviation fuels

Aircraft operators have to attribute the fuels used to the flights carried out (Article 53(2) of the MRR). Furthermore, alternative aviation fuels and their emissions have to be split proportionally between EU ETS flights and other flights. This is regulated in Article 53a of the MRR for alternative aviation fuels in general (in particular for zero-rated fuels) and in Article 54a for aviation fuels eligible for support pursuant to Article 3c(6) of the EU ETS Directive (otherwise known as "Fuels Eligible for ETS Support" or FEETS; see section 5.5.9).

As is the case for fossil fuels, only the alternative aviation fuel quantities attributed to flights included pursuant to Annex I of the EU ETS Directive are to be reported. Therefore, when an aircraft operator claims the use of alternative aviation fuels, it needs to provide sufficient evidence that the fuels can be attributed to EU ETS flights. Any approach used for this purpose must be robust against double counting, i.e. the system used must ensure that each unit of alternative aviation fuel can be consumed exactly once, no matter if used within the EU ETS, the CH or UK ETS, another system such as CORSIA or outside of a GHG regulation system. However, regarding the EU ETS, CH and UK, and CORSIA, there is a clear-cut legal situation. The only case of a possible double counting would therefore be where one single flight was covered by more than one GHG emission reduction system other than the ones mentioned.

At aerodromes where a mandatory quota of alternative aviation fuel blending is put in place (by ReFuelEU Aviation, the Member State or the aerodrome itself), such blending mandates should not lead to automatic assumption of this quota for each flight starting from the aerodrome, i.e. it does not waive the need of evidence for purchase of an alternative aviation fuel which complies with the RED II criteria, as further discussed below under Option 2.

Problem definition

The EU ETS deals with direct emissions from defined emission sources. In principle, the monitoring of emissions is therefore aiming at correlating the reported emissions with the CO_2 molecules built from carbon atoms contained in the fuel

[73] Definition in Article 3(23g) of the MRR: *'neat fuel' means a fuel in its pure form containing only one of the following fractions:*
(i) fossil fraction;
(ii) non-zero-rated biomass fraction;
(iii) zero-rated biomass fraction;
(iv) non-zero-rated RFNBO or RCF fraction;
(v) zero-rated RFNBO or RCF fraction;
(vi) non-zero-rated synthetic low-carbon fraction;
(vii) zero-rated synthetic low-carbon fraction;
(viii) fraction of fuels containing carbon other than stemming from the fossil fuels listed in Table 1 of Annex III to this Regulation or from biomass, RFNBO, RCF or synthetic low-carbon fuels;

actually burnt. Regarding aircraft operators, the correlation can only be traced physically if the aircraft operator can be sure about the type of the fuel used (or in particular alternative aviation fuel). It would require e.g. that a truck loaded with this particular fuel would directly deliver the fuel to the aircraft in question. However, for aviation activities it is much more likely that several fuel suppliers share a common infrastructure of tanks, pipelines, and hydrants within an aerodrome, where alternative aviation fuels are blended in the tanks and are distributed to all aircraft supplied via the pipelines. Furthermore, the fuel remaining in the tank of an aircraft (if not of the same composition as the uplifted fuel) is repeatedly diluted by subsequent fuel uplifts.

For the situation where (blended) alternative aviation fuel batches are physically delivered to an aircraft please see below “Option 1” for detailed guidance.

Where purchased alternative aviation fuel batches are not physically delivered and in order to avoid unreasonable monitoring costs, Articles 54 and 54b of the MRR allow for a monitoring approach based on purchase records and the proportionality principle mentioned in chapter 5.5.8. Any such method must be highly transparent (i.e. providing a complete audit trail to the verifier). Option 2 below gives guidance on how to use the purchase records-based monitoring approach.

Having a database (“alternative aviation fuel registry”) which tracks each unit (tonne) of alternative aviation fuel throughout the full supply chain, from feedstock and production over trade and transport, blending, purchase to final consumption can be beneficial. By tagging the fuel quantity with a Proof of Sustainability (PoS), such a system can also serve for providing evidence on the GHG savings and sustainability criteria required by the RED II. With full functionality of the Union Database (see section 9.1.4) it will make the need for other such registries irrelevant, since it can handle alternative fuels complying with the RED II worldwide.

Applicable criteria for the attribution of alternative fuels:

No matter which option is applied, the aircraft operator has to ensure that the quantity of alternative fuel reported complies with certain limits without further attributing the alternative fuel to specific flights. The aircraft operator must be able to demonstrate to the CA and the verifier that[74]:

- The total amount of alternative fuel claimed does not exceed the total fuel usage of that aircraft operator for ETS flights originating from the airports at which the fuel is supplied.
- The amount of alternative fuel accounted for under the EU ETS does not exceed the total quantity of alternative fuel purchased minus the alternative fuel sold to third parties[75].
- The calculated ratio (blend) of the fuel is not higher than the maximum allowable (certified) blend in the fuel in accordance with the relevant international standards, in particular ASTM D7566[76].

[74] The best way of providing evidence for meeting these criteria, the aircraft operator should define a written procedure (see section 6.2) attached to its Monitoring Plan on how the alternative aviation fuel amount will be assigned to EU ETS flights.

[75] Third parties are in particular other aircraft operators, but also fuel suppliers. Therefore, such trades must be fully traceable, so that the third party can itself claim the purchased alternative fuel, as appropriate.

[76] For example, according to the latest revision of ASTM D7566 (2024), this limit is 50% maximum blend for pathways HEFA-SPK, FT-SPK, FT-SKA, ATJ-SPK and ATJ-SKA. It is 10% maximum blend for SIP-SPK and HC-HEFA. Co-processing with petroleum feedstock is allowed at a 5% limit.

- The aggregated zero-rated fuel claimed does not exceed the amount of zero-rated fuel for which proof of it meeting the sustainability and GHG savings criteria is provided. The best way to ensure compliance with this criterion is to always request the PoS directly from the fuel supplier.
- The same amounts of alternative fuel have not been accounted for in other carbon pricing systems, in an earlier report or by another aircraft operator.

Option 1 – The fuel is delivered directly to the aircraft in physically identifiable batches

In this case, the alternative aviation fuel is attributed to the flight directly following the uplift. It should be noted that, to be able to use this option, it is important that the exact composition of the fuel is known. I.e. the fuel comes directly from a blending facility, or the fuel has undergone analysis as per section 5.5.5. The sole fact that the fuel is delivered by a truck directly to the aircraft and not via common pipeline system does not qualify to use this option.

Where several subsequent flights are carried out without fuel uplift between these flights ("tankering"), the aircraft operator shall split the amount of the alternative fuel and assign it to these flights proportionally to the emissions from those flights calculated using the preliminary emission factor.

Nevertheless, the aircraft operator must determine whether the alternative aviation fuel quantity is fully attributable to EU ETS flights, taking into account the following recommendations:

- The alternative aviation fuel uplift should always be assigned to the flight immediately following that uplift. Note: Where Method A is used for determining fuel quantity, the fuel uplift *before* the flight must be recorded in addition to the usual data. However, this only requires additional effort in the case of an EU ETS flight following a non-ETS flight.
- It is assumed that in most cases significantly more fuel is consumed during the flight than remains in the tank. For blended fuels, it is generally accepted as a simplification that the remaining fuel in the tank is considered entirely fossil-based.
- For the purpose of attributing fuel to subsequent flights without fuel uplift in-between, the aircraft operator must use a suitable written procedure (see section 6.2) described in the monitoring plan and approved by the competent authority. A realistic, yet pragmatic approach should be applied, e.g. making the split proportional to the great-circle distances of those two flights, to the flight time (between block-off and block-on) or fuel consumed during the flights.

Option 2 – The fuel delivered cannot be physically attributed to a specific flight, e.g. because it is physically delivered only to a tank/pipeline system at the aerodrome

Under this option, the aircraft operator may deviate from assigning and reporting alternative aviation fuels for each individual flight. However, the fuel must be assigned and reported in the AER in all relevant sections, including the Annex (section 11). Therefore, at least a correct assignment to an aerodrome pair is neces-

sary. To approach this option a method of attributing the alternative fuel to different aerodromes, via the so-called proportionality principle, can be used. A description of this principle can be found in chapter 5.5.8 below.

Further, as a proof that the quantities of alternative fuels reported by the aircraft operator were actually purchased by that AO and fulfil the sustainability and GHG savings criteria, purchase records and the corresponding proof of compliance/sustainability needs to be provided. Information on these can be found in chapter 5.5.5 and 9.1.3.6.

5.5.8 The proportionality principle

5.5.8.1 EU ETS requirements

The proportionality principle as reflected in the Commission's template for the annual emissions report provides a method to attribute alternative aviation fuel used to an aircraft operator's different flights departing from an aerodrome at which the fuel cannot otherwise be physically attributed to a specific flight. In its essence this principle applies a so-called proportionality factor, representing the proportion of emissions from flights relevant for the EU ETS, compared to the emissions of all flights.

The proportionality factor is calculated at each aerodrome separately.

However, if an aerodrome is part of a mass-balance system (MBS) encompassing several aerodromes, the proportionality factor should be calculated for the whole system and the same factor be used for all aerodromes connected to that MBS. Note, that in certain cases, depending on RED implementation, multiple MBS must be considered where the SAF has been accounted as output in one and an input in another MBS, e.g. where fuel withdrawn from a pipeline is further transported by other means such as train, truck or vessel and transported to a non-connected airport/facility. To be able to fully implement the proportionality factor across MBS and combinations of MBS, a mapping of such MBS must be developed. Accordingly, this paragraph applies once that mapping is in place.

As an example, in case of NATO's Central Europe Pipeline System (CEPS), the proportionality factor should take into account all flights by the aircraft operator departing from all aerodromes connected to CEPS, where the aircraft operator performs flights. Similarly, where injection/input into the final MBS does not ensure physical attribution possibility to that site/MBS (i.e. the injection/input is an output from another MBS), flights from aerodromes connected to both MBS must be considered in the calculation.

More precisely the proportionality principle can be applied using the following formulae:

$AttrF_N = TotalF_N \times F_{Ae}$	$F_{Ae} = Em_{relevant}/Em_{total}$

Wherein the variables have the following definitions:

$AttrF_N$	Attributed fuel quantity of Fuel N at the specified aerodrome/MBS in tonnes (the amount of fuel to be reported for calculating its emissions).

$TotalF_N$	Total quantity (in tonnes) of the Fuel N used by the aircraft operator at the specified aerodrome/MBS. If it is not possible to directly take this number from purchase records, see section 5.5.4 for determining the amount of neat fuel.
F_{Ae}	Proportionality factor to be applied for all fuels uplifted at the same aerodrome/at the aerodromes part of the specified MBS (with exception of batches physically delivered to the aircraft).
$Em_{relevant}$	Total emissions of all flights by the aircraft operator starting from this aerodrome/the aerodromes connected to this MBS using all fuels (including standard fuels) which are "relevant" (see explanation below), calculated using the preliminary emission factor (i.e. without zero-rating).
Em_{total}	Total emissions of all flights[77] by the aircraft operator starting from this aerodrome/the aerodromes connected to this MBS using all fuels (including standard fuels), calculated using the preliminary emission factor (i.e. without zero-rating), including all non-ETS flights such as fire-fighting flights and flights falling under other carbon pricing systems.

An example of using the proportionality principle could look like this:

Example for individual aerodromes:

1. First, an aircraft operator purchases 100 tonnes of RED II-certified biofuel at Munich airport (100% SAF purchase or determined as neat from mixed aviation fuel).
2. As a next step, the aircraft operator determines the total CO_2 emissions from its flights subject to surrender departing from Munich (intra-EEA flights) to be 10 000 tonnes of CO_2 (using the preliminary EF).
3. The aircraft operator determines the total CO_2 emissions from all its flights departing from Munich (intra-EEA and extra-EEA flights) to be 50 000 tonnes of CO_2 (using the preliminary EF).
4. This way, the aircraft operator determines the proportionality factor: *F = 10 000 / 50 000 =* ***0,2 (20%)***
5. Therefore, the aircraft operator can report **20 tonnes** of RED II-certified biofuel at Munich airport (100 × 0,2).

This is the number used in the AER in the section on aerodrome pairs departing from Munich freely, following certain limitations.

Example for Mass Balance Systems:

1. An aircraft operator has flights departing from Brussels and Amsterdam Schiphol airports, with both of them being connected to CEPS (Central Europe Pipeline System).
2. This aircraft operator purchases 1 500 tonnes of SAF which is injected into the CEPS (irrespective whether the SAF is destined for BRU or AMS).

[77] This includes flights not covered by the EU ETS.

3. The aircraft operator determines the total CO_2 emissions from its flights subject to surrender departing from both airports (intra-EEA flights) to be 33 000 tonnes of CO_2 (using the preliminary EF).
4. The aircraft operator determines the total CO_2 emissions from all its flights departing from these two airports (intra-EEA and extra-EEA flights) to be 100 000 tonnes of CO_2 (using the preliminary EF).
5. This way, the aircraft operator determines the proportionality factor applicable to both airports:
   F = 33 000 / 100 000 = ***0,333 (33,3%)***
6. Therefore, the aircraft operator can report **500 tonnes** of RED II-certified biofuel at Brussels and Amsterdam airports (1 500 × 0,333).

This is the number used in the AER in the section on aerodromes pairs departing from Brussels and Amsterdam (CEPS) airports freely, following certain limitations.

The same principle is to be applied to calculate the amount of fuel that is eligible for support under Article 3c(6) of the EU ETS Directive (FEETS, see section 5.5.9) pursuant to Article 54a of the MRR. However, there is a slight difference between flights relevant for the support of FEETS and alternative aviation fuels in general. Table 3 presents which flights are relevant for the reporting of which fuels.

Table 3: Flights relevant for the reporting of (eligible) alternative aviation fuels

What is to be reported	Scope of flights
Alternative fuels in general (Article 53a of the MRR)	All flights starting from this aerodrome/MBS for which allowances have to be surrendered pursuant to Article 12(3) of the EU ETS Directive, i.e. the flights under the "reduced scope" of the EU ETS.
Eligible aviation fuels for applying for support under Art. 3c(6) of the EU ETS Directive (Article 54a of the MRR)	All flights starting from this aerodrome/MBS for which allowances have to be surrendered pursuant to Article 12(3) of the EU ETS Directive, i.e. all flights under the "reduced scope" of the EU ETS **AND** flights starting from this aerodrome/MBS covered by Article 3c(8) of the EU ETS Directive, i.e. flights between an aerodrome located in an outermost region of a Member State and an aerodrome located in the same Member State, including another aerodrome located in the same outermost region or in another outermost region of the same Member State.

5.5.8.2 Proportionality regarding CH ETS flights

Annex 17, point 2.3.2 of the Swiss CO_2 Ordinance[78] requires alternative aviation fuels to be distributed proportionally between CH ETS flights and other flights, like the proportionality within the EU ETS legal framework.

Unlike in the EU ETS, however, this attribution is calculated on an aggregate level for the entirety of Switzerland, not for individual aerodromes or MBS. Therefore, for each alternative aviation fuel used, the proportionality factor has to be calculated only once, using the entire amount of fuel uplifted at Swiss aerodromes.

Regarding the annual emissions report template, a table is provided under point 10a(b) in the sheet "CH ETS Annex Aerodromes" for the purpose of proportionally attributing the alternative aviation fuels between CH ETS flights and other flights, similar to the one used for the proportional attribution of alternative aviation fuels within the EU ETS (see section 5.5.10.2).

New!

5.5.9 Fuels Eligible for ETS Support (FEETS)

With the adoption of Directive (EU) 2023/958[79] amending the EU ETS Directive a new mechanism was introduced to incentivize the usage of alternative aviation fuels and to support the decarbonisation of commercial air transport. A reserve of a maximum of 20 million allowances was created to be allocated to cover the remaining price difference between fossil kerosene and fuels, which are considered to be eligible for this ETS support (FEETS fuels). This support is reserved for commercial aircraft operators carrying out subsonic flights.

This support mechanism, codified in Delegated Regulation (EU) 2025/723 ("FEETS Regulation"), operates by determining the price of the eligible aviation fuel in accordance with Article 4(2), and the price of fossil kerosene, including differences in taxation and the notional EU ETS cost if such kerosene were used, as set out in Articles 4(4) to 4(6) of the FEETS Regulation. The difference between those prices is subsequently used, among other factors, to calculate the final allowances that can be attributed for the usage of an eligible fuel (herein *y*), using this equation:

$$Allocation\ (y) = \frac{Fuel\ used\ (y)\ \times\ price\ difference\ (y)\ \times\ level\ of\ EU\ ETS\ support(y)}{allowance\ price}$$

Of particular interest is the "level of EU ETS support", which represents a factor, that applies to all kinds of eligible fuels, changing the final amount of allocations depending on the type of fuel used. The level of support ranges from 50% to 95%. One exception, however, are eligible fuels that are uplifted at certain airports according to third subparagraph point (c) of Article 3c(6) of the EU ETS Directive, for which the price differential can be supported entirely (i.e. 100%)[80].

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[78] https://www.bafu.admin.ch/en/ets-aircraft-operators

[79] Directive (EU) 2023/958 of the European Parliament and of the Council of 10 May 2023 amending Directive 2003/87/EC as regards aviation's contribution to the Union's economy-wide emission reduction target and the appropriate implementation of a global market-based measure (Text with EEA relevance); Official journal version: http://data.europa.eu/eli/dir/2023/958/oj

[80] An indicative list of these airports is regularly generated and published by the Commission. The latest version can be found under: https://climate.ec.europa.eu/document/download/7eace0de-fbc8-46c5-b52c-80d50f406c58_en?filename=policy_transport_aviation_airport_100_support_en.pdf

Table 4: Eligible aviation fuels and their level of support

Eligible aviation fuel sub-category	Level of direct EU ETS support	Details
Renewable fuels of non-biological origin	95%	Drop-in renewable fuels of non-biological origin as defined in Article 2, point (36), of Directive (EU) 2018/2001 and that are certified in compliance with Article 30 of that Directive
Co-processed renewable fuels of non-biological origin	95%	Co-products in a conventional refinery that are drop-in renewable fuels of non-biological origin as defined in Article 2, point (36), of Directive (EU) 2018/2001 and that are certified in compliance with Article 30 of that Directive
Advanced aviation biofuels	70%	Biofuels produced from the feedstock listed in Part A of Annex IX to Directive (EU) 2018/2001 and that are certified in compliance with Article 30 of that Directive
Advanced co-processed biofuels	70%	Co-products in a conventional refinery produced from the feedstock listed in Part A of Annex IX to Directive (EU) 2018/2001 and that are certified in compliance with Article 30 of that Directive
Renewable hydrogen for aviation	70%	Renewable hydrogen for aviation as defined in Article 3, point (16), of Regulation (EU) 2023/2405
Aviation biofuels	50%	Biofuels produced from feedstock listed in Part B of Annex IX to Directive (EU) 2018/2001 and that are certified in compliance with Article 30 of that Directive
Other aviation biofuels	50%	Biofuels produced from the feedstock not listed in Annex IX to Directive (EU) 2018/2001 and not produced from food and feed crops, and that are certified in compliance with Article 30 of that Directive
Non-fossil low-carbon hydrogen for aviation	50%	Low-carbon hydrogen for aviation as defined in Article 3, point (15), of Regulation (EU) 2023/2405 that is not derived from fossil fuels
Non-fossil synthetic low-carbon aviation fuels	50%	Synthetic low-carbon aviation fuels as defined in Article 3, point (13), of Regulation (EU) 2023/2405 that is not derived from fossil fuels
Co-processed biofuels	50%	Co-products in a conventional refinery other than advanced co-processed biofuels and that are certified in compliance with Article 30 of Directive (EU) 2018/2001

Note: Commercial aircraft operators apply for allocation of allowances by reporting the verified amounts of eligible aviation fuels in their emissions report pursuant to Article 54a of the MRR. However, they do have the possibility to opt-out of the FEETS support by indicating that decision in the annual emissions report.

The following table presents the timeline relevant to parties involved in the support mechanism:

Table 5: Timeline relevant to the FEETS support mechanism.

When?	Who?	What?
1 January N – 31 December N	Aircraft Operator	Monitor the eligible fuel uplifted.
By 28 February N+1	Aircraft Operator	If applicable, report the actual prices paid for the eligible fuel used in year N.
By 31 March N+1	Aircraft Operator	Submission of the annual emissions report including the verified amount of eligible fuels uplifted in year N.
By 30 April N+1	European Commission	Inform Member States which commercial aircraft operators have submitted the reported prices.
By 31 May N+1	European Commission	Publish the price differences calculated for year N.
By 15 June N+1	Competent Authority	Notify to the Commission information for each aircraft operator regarding • its name and ETS ID; • the amount of eligible fuel per category; • the demand for allocation of allowances.
By 31 August N+1	European Commission	Adopt a Decision indicating the allocation of allowances per commercial aircraft operator based on the notifications by the CAs of the demand for allowances for FEETS support.

New!

5.5.10 Attribution of alternative aviation fuels in the annual emissions report template

This section provides a guide on how alternative aviation fuels are to be reported and attributed in the annual emissions report template, provided by the European Commission.

5.5.10.1 List of alternative aviation fuels used

First, all alternative fuels used in the relevant reporting year have to be listed (as neat fuels) in the table under point 5(b) in the sheet “Emissions overview” of the annual emission report template. Several inputs regarding the fuels’ properties have to be made:

- Fuel type: describes which standard aviation fuels’ (Jet A, Jet A1, Jet B or aviation gasoline) parameters apply to the alternative aviation fuel.

- MRR Category: describes whether the fuel belongs to a category of fuels that can be zero-rated according to Article 54c of the MRR and to which category it belongs (Biofuels, RFNBOs and RCFs or SLCFs).
- Alternative fuel sub-category: further breaks down the aforementioned category and describes whether the fuel can be zero-rated and for which level of FEETS support it qualifies (see section 5.5.9).

Each of these inputs is required for the functionality of the table and the later attribution of fuels by airport.

Fuel No.	Name of fuel	Fuel type	MRR Category	Alternative fuel sub-category	preliminary EF [t CO2 / t fuel]	NCV [GJ/t]	Zero rated fuel	Eligibility for ETS support
1	Jet kerosene (Jet A1 or Jet A)		Standard aviation fuel		3,16	*44,10*		
2	Jet gasoline (Jet B)		Standard aviation fuel		**3,10**	*44,30*		
3	Aviation gasoline (AvGas)		Standard aviation fuel		**3,10**	*44,30*		
4	Alternative Fuel 1	Jet-A	Biofuel	Adv. Biofuel	3,16	44,10	*WAHR*	*70%*
5	Alternative Fuel 2	Jet-A1	RFNBO/RCF	RFNBO	3,16	44,10	*WAHR*	*95%*
6	Alternative Fuel 3	Jet-B	SLCF	non-foss SLCF	3,10	44,30	*WAHR*	*50%*
7	Alternative Fuel 4	Jet-B	SLCF	Non-zero SLCF	3,10	44,30	*FALSCH*	*n.a.*
8	Alternative Fuel 5	AvGas	Biofuel	Other Biofuel	3,10	44,30	*WAHR*	*50%*
9	Alternative Fuel 6	Jet-A	RFNBO/RCF	RCF	3,16	44,10	*WAHR*	*n.a.*
10	Alternative Fuel 7	Jet-B	Fossil Alternative Fuel	Other	3,10	44,30	*FALSCH*	*n.a.*
11								

Once all necessary data are provided, the preliminary EF, the net calorific value (NCV), information on whether the fuel can be zero-rated and the eligibility for FEETS support are automatically calculated for that fuel.

In the same sheet, further information on the alternative fuels, including their feedstock, conversion process, their life cycle emissions, GHG savings, as well as the overall annual consumption has to be entered for any fuel used.

Note: Fuels do not have to be reported for each batch but rather for types of fuel that exhibit, in its entirety, common properties. Therefore, the amount of fuel in section 5(c) of the annual emission report template might include an aggregation of multiple different batches of fuel uplifted by the aircraft operator. These fuels can later be distributed to different airports in section 10a, as described in chapter 5.5.10.2 below.

However, section 5(c) still has to include the correct amount of that (aggregated) fuel used and needs to be covered by the relevant invoices and proof of sustainability or compliance.

5.5.10.2 Attribution of alternative aviation fuels to aerodromes

For the purpose of proportionally attributing the alternative aviation fuels between EU ETS flights and other flights pursuant to Article 53a of the MRR, a table is provided under point 10a(a) in sheet “EU ETS Annex Aerodromes” of the annual emissions report template. In that table, for each aerodrome at which alternative aviation fuels were uplifted, the amount of these fuels has to be entered as neat fuels. These steps should be followed when filling the table:

Step 1: Generate a list of all aerodromes at which your aircraft have uplifted alternative aviation fuels. Where more than one alternative fuel is relevant at an aerodrome, provide separate rows in the table for each (neat) fuel. The fossil and standard fuels should not be listed.

Step 2 (only if you want to apply for FEETS support): Identify for each aerodrome whether it is eligible for 100% support in accordance with third subparagraph point (c) of Article 3c(6) of the EU ETS Directive (see section 5.5.9).

Step 3: For each identified fuel and aerodrome, determine the total quantity of this (neat) fuel used at this aerodrome (see section 5.5.4).

Step 4: For each identified aerodrome determine the proportionality factor which applies to alternative aviation fuels in general, in particular for zero-rating (see section 5.5.8).

Step 5 (only if you want to apply for FEETS support): For each identified aerodrome, determine the proportionality factor which applies to eligible aviation fuels pursuant to Article 54a of the MRR (see section 5.5.8).

Based on these inputs the table calculates the amount of fuel that is attributed to this airport, as well as the amount thereof that is zero-rated and eligible for FEETS support (which are not necessarily the same values).

Table for Attribution of alternative aviation fuels

Note: Due to the complexity of the formulae connected to the fuel types, it is not possible to add further rows!

When ready with entries in this sheet, please click here for returning to entering data in section 5c (fuel quantities used in sheet "Emissions overview").

Aerodrome	Eligibility for 100% support (Art. 3c(6) EU ETS Directive)	Alternative aviation fuel name	Total alternative aviation fuel used [tonnes]	Proportionality factor (Art. 53a) [%]	Proportionality factor for eligible fuels (Art. 54a) [%]	Attributed fuel (tonnes)	Attributed zero-rated fuel (tonnes)	Fuel eligible for support (tonnes)
GRW	WAHR	4. Alternative Fuel 1	50,00	50,00%	50,00%	25,00	25,00	25,00
GRW	WAHR	6. Alternative Fuel 3	100,00	100,00%	50,00%	100,00	100,00	50,00
GRZ	FALSCH	5. Alternative Fuel 2	200,00	30,00%	20,00%	60,00	60,00	40,00
NAP	FALSCH	8. Alternative Fuel 5	400,00	20,00%	10,00%	80,00	80,00	40,00
NAP	FALSCH	10. Alternative Fuel 7						
HAM	FALSCH	9. Alternative Fuel 6	150,00	40,00%		60,00	60,00	0,00
VIE	FALSCH	4. Alternative Fuel 1	600,00	30,00%	30,00%	180,00	180,00	180,00
VIE	FALSCH	7. Alternative Fuel 4	300,00	20,00%		60,00		0,00
VIE	FALSCH	8. Alternative Fuel 5	50,00	100,00%	100,00%	50,00	50,00	50,00

Attribution of fuels under the CH ETS

A similar table for the purpose of attributing CH ETS flights can be found under point 10a (b) in the sheet "CH ETS Annex Aerodromes". As the alternative aviation fuels only need to be reported on a national level, they do not have to be attributed to individual aerodromes. Rather, the amount of each alternative aviation fuel uplifted at Swiss aerodromes should be assigned to the aerodrome "Switzerland (CH)" in the table under point 10a(b).

5.5.10.3 Overview of fuels eligible for FEETS support

Subsequently, point 10b in sheet "FEETS Application" of the annual emissions report template contains a table that calculates the total amount of fuel for each fuel type eligible for FEETS support and for each support level (see section 5.5.10.3). This is the amount of fuels for which FEETS support can be claimed.

It is important to note, however, that point 10b also includes an option for aircraft operators to indicate that they do **NOT** want to apply for FEETS support.

(b) Aggregated amount of neat fuels eligible for Article 3c(6) support

The table below lists the amounts of neat fuels in tonnes, attributed proportionally to eligible flights, as entered in section 10a of this

The level of support is automatically taken from the fuel definitions in section 5b.

Where an airport listed in section 10b is eligible for 100% support in accordance with Article 3c(6) of the EU ETS Directive, this support level is set to 100%.

	Level of direct ETS support under Article 3c(6)				
Fuels entered in Section 10a [tonnes]	50%	70%	95%	100%	**Total Volume**
Advanced Aviation Biofuel		180		25	**205**
Aviation Biofuel					
Other aviation biofuel	90				**90**
Co-processed advanced biofuel					
Co-processed biofuel					
RFNBO			40		**40**
non-fossil SLCF				50	**50**
Other Aviation fuel (Manual input)					
TOTAL	90	180	40	75	**385**

5.5.10.4 Attribution of alternative aviation fuels to aerodrome pairs

The annual emissions report template contains a section (the sheet “Annex”) for the aircraft operators to report their emissions data per aerodrome pair as required by the MRR, Annex X, section 2. Especially in the context of reporting alternative aviation fuels, there are some caveats that need to be considered.

The AER Annex (section 11) includes all flights covered by the EU ETS and CH ETS and ALL types of neat fuel consumed need to be reported. Especially in the context of reporting alternative aviation fuels, there are some caveats and limitations that need to be considered as per section 5.5.7.

The amount of alternative fuels reported on the combined EU ETS and CH ETS flights in AER section 11 needs to match the total amount of zero-rated alternative fuels attributed under AER sections 10a(a) and 10a(b) (column J and column I respectively) and must have been uplifted at aerodromes reported under these sections. Another important aspect is that with both fossil and alternative aviation fuels being reported under point 11, those data are used as proof that the ratio between them does not exceed the maximum blending limit for the given fuel type, as certified according to a recognised international standard[81].

The total emissions for every aerodrome pair are calculated automatically based on input of fuels consumed.

[81] This is mandated by Article 53a(4)(iii) and 54a(6)(c) of the MRR. For applicable standards, see footnote 76.

Example on checking maximum blending limits per aerodrome pair:

1. The table below is an example of fuels reported in AER Annex:

Aerodrome Pair (use 4-letter ICAO designator)		Fuel name as defined in section 5	Fuel consumed [tonnes]
Aerodrome of departure	Aerodrome of arrival		
LFPG	LKPR	Jet kerosene (Jet A1 or Jet A)	1,000
LFPG	LKPR	4. HEFA	500
LKPR	LFPG	Jet kerosene (Jet A1 or Jet A)	1,000
LKPR	LFPG	5. HEFA co-processed	500
EHAM	LGAV	Jet kerosene (Jet A1 or Jet A)	5,000
EHAM	LGAV	6. ATJ	6,000
LGAV	EHAM	Jet kerosene (Jet A1 or Jet A)	5,000
LGAV	EHAM	4. HEFA	5,000

2. The ratio needs to be checked for each aerodrome pair, using the ratio: SAF volume / total fuel volume and compared to the maximum limit allowed for that SAF type.
   a. LFPG-LKPR: 500/1,500 = 33%
      HEFA blend limit is 50% -> OK
   b. LKPR-LFPG: 500/1,500 = 33%
      HEFA co-processing limit is 5% -> NOT OK
   c. EHAM-LGAV: 6,000/11,000 = 55%
      ETJ blend limit is 50% -> NOT OK
   d. LGAV-EHAM: 5,000/10,000 = 50%
      HEFA blend limit is 50% -> OK

5.6 Small emitters

5.6.1 Eligibility as small emitter

Aircraft operators operating fewer than 243 flights per period for three consecutive four-month periods and aircraft operators operating flights with total annual emissions lower than 25 000 tonnes CO_2 per year shall be considered small emitters (Article 55(1) of the MRR). For these, special simplifications of the MRV system are applicable in order to reduce administrative costs.

Note that an **additional simplification** regarding verification has been introduced by Regulation (EU) 421/2014 for aircraft operators emitting less than 25 000 t CO_2 per year (full scope) or less than 3 000 t CO_2 per year (reduced scope). The latter “small emitter threshold” was introduced by Regulation (EU) 2017/2392. Further details are explained in section 5.9.

For determination of the threshold, the annual emissions under the appropriate scope (see section 3.1) of the previous reporting year should be used, by applying the preliminary emission factor, i.e. without any zero-rating of fuels. Where this emission figure is not available (e.g. because the aircraft operator is new to the EU ETS), a conservative estimate should be used concerning the projected emissions, or an estimate using the tool described in section 5.6.2.

For assessing whether less than 243 flights per period are operated, the four-month periods are January to April, May to August and September to December.

The local time of departure of the flights determines in which four month-period a flight has to be taken into account. The flights exempted by Annex I of the EU ETS Directive (see section 3.1.1) are not to be included in assessing the number of flights or the total amount of annual emissions.

A special situation then arises if the aircraft operator's emissions exceed the small emitter threshold. In that case it is necessary to revise the monitoring plan and submit a new one to the CA, for which the simplifications for small emitters are not applied any more. However, the wording of Article 55(4) of the MRR suggests that the aircraft operator should be allowed to continue using the small emitter tool provided that the aircraft operator can demonstrate to the competent authority that the threshold has not been exceeded in the previous five years and will not be exceeded again. Thus, high emissions or a larger number of flights in one single year out of five years may be tolerable. However, if the small emitter threshold is exceeded again in one of the following five years, that exception will not be applicable anymore.

5.6.2 Use of the small emitter tool

Article 55 of the MRR allows small emitters to "*estimate the fuel consumption using tools implemented by Eurocontrol or another relevant organisation, which can process all relevant air traffic information and avoid any underestimations of emissions*" if such tool has been approved by the Commission. At the time of updating this guidance (December 2025) the small emitter tool by Eurocontrol is the only tool approved[82] by the Commission. It is found at

https://www.eurocontrol.int/tool/small-emitters-tool

Using this tool the aircraft operator can estimate the fuel consumption based on the distance of the flight and the aircraft type used. This fuel consumption can then be used instead of a value determined in accordance with section 5.4.3, for calculating the emissions in accordance with equation (1) in section 5.4.1. For the emission factor, a small emitter will usually use a default value from Annex III of the MRR. However, if biofuels or other alternative fuels are used, sections 5.4.6 and 5.5 apply.

Notes:

- A more sophisticated tool, although not free of charge, is EMIS (see section 5.8).
- There is no obligation to use the small emitter tool. Any small emitter is allowed to use the standard monitoring methodology instead, if the aircraft operator wishes to have more accurate emissions data. However, a consequence of using the small emitter tool is the strong simplification of the monitoring plan (which is taken into account in the Commission's monitoring plan templates).

[82] For the approval see Commission Regulation (EU) No. 606/2010, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:175:0025:0026:EN:PDF

5.7 Allowed methodology for data gaps

The aircraft operator's monitoring plan, including the associated written procedures should be sufficiently robust to avoid data gaps in general. However, if data gaps nevertheless occur in emissions data, the aircraft operator shall use surrogate data for the respective time period. For this purpose he will use a calculation method defined already in the monitoring plan (Article 66(2) of the MRR). That Article allows in particular that the same tool as for small emitters (see section 5.6.2) may be used for this purpose, including for non-small emitters.

Where the number of flights with data gaps exceeds 5% of the annual flights that are reported, the operator shall inform the competent authority thereof without undue delay and shall take remedial action for improving the monitoring methodology. Furthermore, the percentage of flights with data gaps has to be reported in the annual emissions report.

5.8 EMIS (formerly EU ETS support facility)

A further development, which exceeds the possibilities of the small emitter tool (see section 5.6.2), is the "Environmental Management Information Service (EMIS)", another tool provided by Eurocontrol, which can be used by aircraft operators on a voluntary basis. It can be found at:

https://www.eurocontrol.int/service/emissions-trading-system-support

This tool was originally designed for competent authorities and has now been made available also for aircraft operators[83], and if they wish so, also for their verifiers. According to Eurocontrol's website, the tool delivers:

- **a draft annual emissions report**, presenting what the aircraft operator's report would be if based on the flight data information available to Eurocontrol and on the fuel burn and CO_2 emissions estimated by Eurocontrol by applying the same methodology as used in the Eurocontrol small emitters tool. This draft report is provided in the form of an Excel file compliant with the reporting format definition of either the Swiss, UK's or the Commission's templates.
- a text file in a comma separated file (csv) format containing **the list of the flights attributed to the Aircraft Operator and operating in the ETS area** (both included and exempted fights) with details allowing the identification of the flight and the reasons for its inclusion, exemption and the attribution to the operator (departure airport, destination airport, departure date and time, call sign, aircraft registration mark – if available –, flown distance, applicable route charge exemption – if any –, estimated fuel consumption, estimated CO_2 emissions, possible ETS exemption as determined by Eurocontrol) upon which the Aircraft Operator's draft annual emissions report is built.

[83] Note that charges set by Eurocontrol apply for the use of this support facility. Its use is purely voluntary.

- There are furthermore functions supporting the user in tasks related to CORSIA (e.g. performing syntax and order of magnitude checks on emissions reports), the Swiss and UK's ETS.

New!

The support facility can be used as follows:

- Small emitters can use it for generating their draft annual emissions report as further simplification beyond the small emitter tool.
- Other aircraft operators and service companies can use it for corroborating the result of their monitoring, including for checking the list of included aircraft and flights.
- Aircraft operators can make the data available to their verifiers, for a similar purpose.

Note that there is no requirement in the MRR for using the support facility, but it may be a potential means to reduce compliance costs and verification costs.

5.9 Further simplification regarding verification

Aircraft operators who emit less than 25 000 t CO_2 per year (full scope, see section 3.2.2) or less than 3 000 t CO_2 per year (reduced scope), and who have chosen to use the Eurocontrol small emitters tool populated independently by Eurocontrol with data from the ETS Support Facility (see section 5.8) for generating their Annual Emission Report (AER), **do not need to seek external verification of the AER** (Article 28a(4) of the EU ETS Directive, as amended by Regulation (EU) 421/2014 and Regulation (EU) 2017/2392).

Notes:

- This exemption does not exclude that such aircraft operators still let their AER be verified by an accredited verifier as an additional means of quality control.
- The exemption does not apply to aircraft operators which operate less than 243 flights per 4-month period, but have higher emissions than 25 000 t CO_2 per year (extended full scope). Neither does it apply to aircraft operators who base their AER on other data than those generated by the ETS support facility and filled in independently by Eurocontrol.
- Because of differences in administrative procedures and IT systems in the Member States, aircraft operators are advised to check the relevant websites or to get in contact with the competent authority of their administering Member State in order to explore the administrative procedures for how to submit an annual emission report without verification.

Should alternative aviation fuels be reported, whether only for zero-rating in general or in order to apply for support through FEETS, verification of the AER is required, even for aircraft operators that would otherwise qualify for the derogation. This is because the Eurocontrol tools do not dispose of information of alternative fuels used by aircraft operators.

6 THE MONITORING PLAN

6.1 Developing a monitoring plan

When developing a monitoring plan, aircraft operators should follow some guiding principles:

- Knowing in detail the situation of their operations, aircraft operators should make the monitoring methodology as simple as possible. This is achieved by attempting to use the most reliable data sources, robust metering instruments, short data flows, and effective control procedures.
- Aircraft operators should imagine their annual emission report from verifier's perspective. What would a verifier ask about how the data has been compiled? How can the data flow be made transparent? Which controls prevent errors, misrepresentations, omissions?
- Because aircraft operators usually undergo technical changes (not only regarding their fleet) over the years, monitoring plans must be considered living documents to a certain extent. In order to minimise administrative burden, aircraft operators should be careful which elements must be laid down in the monitoring plan itself, and what can be covered under written procedures supplementing the MP.

Important note: The monitoring plan always has to reflect the methodology actually applied, not the minimum requirements. The general principle is that aircraft operators should attempt to improve their monitoring systems wherever possible.

Small operators (for definition see section 5.6.1) may apply significantly simplified monitoring methodologies for emissions (see section 5.6.2 and section 5.9). If an aircraft operator is approved to use this simplification, then the monitoring plan also follows reduced requirements.

6.2 Procedures and the monitoring plan

The monitoring plan should ensure that the aircraft operator carries out all the monitoring activities consistently over the years, like according to a recipe book. In order to prevent incompleteness, or arbitrary changes by the aircraft operator, the competent authority's approval is required. However, there are always elements in the monitoring activities, which are less crucial, or which may change frequently.

The M&R Regulation provides a useful tool for such situations: Such monitoring activities may (or even shall) be put into "written procedures"[84], which are mentioned and described briefly in the MP, but are not considered part of the MP. These procedures are tightly linked to, but not part of the monitoring plan. They must be just described in the MP with such level of detail that the CA can understand the content of the procedure, and can reasonably assume that a full documentation of the procedure is maintained and implemented by the aircraft operator. The full text of the procedure would be delivered to the competent authority only upon request. The aircraft operator shall also make procedures available for

[84] Article 11(1) 2nd sub-paragraph: "*The monitoring plan shall be supplemented by written procedures which the operator or aircraft operator establishes, documents, implements and maintains for activities under the monitoring plan, as appropriate*."

the purposes of verification (Article 12(2) of the MRR). As a result, the aircraft operator has the full responsibility for the procedure. This gives him the flexibility to make amendments to the procedure whenever needed, without requiring update of the monitoring plan, as long as the procedure's content stays within the limitations of its description laid down in the monitoring plan.

The MRR contains several elements which are by default expected to be put into written procedures, such as:

- Tracking the completeness of the list of emission sources (aircraft operated) over the reporting year;
- Defining the monitoring methodology for additional aircraft types;
- Monitoring the completeness of the list of flights operated under the unique ICAO designator by aerodrome pair;
- Determining whether flights are covered by Annex I of the EU ETS Directive, ensuring completeness and avoiding double counting;
- Monitoring fuel consumption per flight, in both owned and leased-in aircraft;
- Determining the density used for fuel uplifts and fuel in tanks, in both owned and leased-in aircraft (operated under your ICAO designator);
- Cross checks between uplift quantities from invoices and uplifts from onboard devices;
- Determination of quantities of alternative aviation fuels and assessment whether they can be zero-rated;
- Determination of quantities of eligible aviation fuels and assessment whether they are eligible;
- Managing responsibilities and competency of personnel;
- Data flow and control procedures (see section 6.3);
- Quality assurance measures;
- Estimation method for substitution data where data gaps have been found;
- Regular review of the monitoring plan for its appropriateness.

The MRR furthermore outlines how the procedure must be described in the monitoring plan. Note that for aircraft operators with simple operations also the procedures will usually be very simple and straightforward. Where the procedure is very simple, it may be useful to use the procedure text immediately as "description" of the procedure as required for the monitoring plan.

Table 6 outlines the necessary elements of information required to be put into the monitoring plan for each procedure (Article 12(2) of the MRR), and gives an example for procedures.

Table 6: Example related to the management of staff: Descriptions of a written procedure as required in the monitoring plan.

Item according to Article 12(2)	Possible content (examples)
Title of the procedure	ETS personnel management
Traceable and verifiable reference for identification of the procedure	ETS 01-P
Post or department responsible for implementing the procedure and the post or department responsible for the management of the related data (if different)	HSEQ deputy head of unit
Brief description of the procedure[85]	• Responsible person maintains a list of personnel involved in ETS data management • Responsible person holds at least one meeting per year with each involved person, at least 4 meetings with key staff as defined in the annex of the procedure; Aim: Identification of training needs • Responsible person manages internal and external training according to identified needs.
Location of relevant records and information	Hardcopy: HSEQ Office, shelf 27/9, Folder identified “ETS 01-P”. Electronically: “P:\ETS_MRV\manag\ETS_01-P.xls”
Name of the computerised system used, where applicable	N.A. (Normal network drives)
List of EN standards or other standards applied, where relevant	N.A.

6.3 Data flow and control system

Monitoring of emissions data is more than just reading instruments or fuel invoices. It is of utmost importance to ensure that data are produced, collected, processed and stored in a controlled way. Therefore, the aircraft operator must define instructions for “who takes data from where and does what with the data”. These “data flow activities” (Article 58 of the MRR) form part of the monitoring plan (or are laid down in written procedures, where appropriate (see section 6.2). A data flow diagram is often a useful tool for analysing and/or setting up data flow procedures. Examples for data flow activities include reading from instruments, aggregating data, calculating the emissions from various parameters, and storing all relevant information for later use.

[85] This description is required to be sufficient clear to allow the operator, the competent authority and the verifier to understand the essential parameters and operations performed.

As human beings (and often different information technology systems) are involved, mistakes in these activities can be expected. The M&R Regulation therefore requires the aircraft operator to establish an effective control system (Article 59 of the MRR). This consists of two elements:

- a risk assessment, and
- control activities for mitigating the risks identified.

"Risk" is a parameter which takes into account both, the probability of an incident and its impact. In terms if emission monitoring, the risk refers to the probability of a misstatement (omission, misrepresentation or error) being made, and its impact in terms of annual emissions figure.

When the aircraft operator carries out a risk assessment, he analyses for each point in the data flow needed for the monitoring of the emissions of all his aviation activities as far as covered by the EU ETS, whether there would be a risk of misstatements. Usually this risk is expressed by qualitative parameters (low, medium, high) rather than by trying to assign exact figures. He furthermore assesses potential reasons for misstatements (such as paper copies being transported from one department to another, where delays may occur, or copy & paste errors may be introduced), and identifies which measures might reduce the found risks, e.g. sending data electronically and storing a paper copy in the first department; search for duplicates or data gaps in spreadsheets, control check by an independent person ("four eyes principle"), etc.

Measures identified to reduce risks are implemented. The risk assessment is then re-evaluated with the new (reduced) risks, until the aircraft operator considers that the remaining risks are sufficiently low for being able to produce an annual emissions report which is free from material misstatement(s)[86].

The control activities are laid down in written procedures and referenced in the monitoring plan. The results of the risk assessment (taking into account the control activities) are submitted as supporting documentation to the competent authority when approval of the monitoring plan is requested by the aircraft operator.

Aircraft operators are required to establish and maintain written procedures related to control activities for at least (Article 59(3) of the MRR):

a. quality assurance of the measurement equipment;
b. quality assurance of the information technology system used for data flow activities, including process control computer technology;
c. segregation of duties in the data flow activities and control activities and management of necessary competencies;
d. internal reviews and validation of data;
e. corrections and corrective action;
f. control of out-sourced processes;
g. keeping records and documentation including the management of document versions.

[86] The aircraft operator should strive to produce "error-free" emission reports (Article 7 of the MRR: Aircraft operators "*shall exercise due diligence to ensure that the calculation and measurement of emissions exhibit the highest achievable accuracy*"). However, verification cannot produce 100% assurance. Instead, verification aims at providing a reasonable level of assurance that the report is free from material misstatements. For further information see the Explanatory Guidance (EGD I) on the A&V Regulation. Section 2.3 provides a link to those documents.

Small emitters: Article 55(3) of the MRR exempts small emitters (see section 5.6.1) from submitting a risk assessment when submitting the monitoring plan for approval by the competent authority. However, aircraft operators will still find it useful to carry out a risk assessment for their own purposes. It has the advantage of reducing the risk of under-reporting, under-surrender of allowances and consequential penalties, as well as over-reporting and over-surrender.

More information can be found in Guidance document No. 6 ("Data flow activities and control system"), and some examples are available as GD 6a.

6.4 Uncertainty assessment as supporting document

In contrast to the requirements regarding uncertainty assessment for stationary installations, the requirements for aircraft operators are relatively simple, as laid down in Article 56 of the MRR:

- The aircraft operator shall consider sources of uncertainty and their associated levels of uncertainty when selecting the monitoring methodology.
- The aircraft operator shall regularly perform suitable control activities, including cross-checks between the fuel uplift quantity as provided by invoices and the fuel uplift quantity indicated by on-board measurement, and take corrective action if notable deviations are observed.

When submitting a new or updated monitoring plan, the aircraft operator must choose a suitable monitoring methodology (Section 1 of Annex III of the MRR) considering associated levels of uncertainty. Pursuant to Article 12(1) of the MRR, operators of installations have to submit an uncertainty assessment as supporting document together with the monitoring plan. For aircraft operators this requirement has been waived by the 2018 review of the MRR.

Section 9.3 in the Annex of this document gives a short introduction to the concept of uncertainty[87]. It also includes a calculation example.

6.5 Keeping the monitoring plan up to date

The monitoring plan must always correspond to the current nature and functioning of the aircraft operator's activities. Where the practical situation of the aircraft operator is modified, e.g. because fuels, measuring equipment, IT systems, or organisation structures (i.e. staff assignments) are changed (where relevant for the monitoring of emissions), the monitoring methodology must be updated (Article 14 of the MRR)[88]. Depending on the nature of the changes, one of the following situations can occur:

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[87] Furthermore, guidance document No. 4 provides additional details. However, that document is addressed to operators of installations in the EU ETS. Under normal circumstances reading that document should not be necessary for aircraft operators.

[88] Article 14(2) of the MRR lists a minimum of situations in which a monitoring plan update is mandatory:
"(a) new emissions occur due to new activities being carried out or due to the use of new fuels or

- If an element of the monitoring plan itself needs updating, one of the following situations can apply:
  - The change to the monitoring plan is a significant one. This situation is discussed in section 6.5.1. In case of doubt, the aircraft operator has to assume that the change is significant.
  - The change to the monitoring plan is not significant. The procedure described under 6.5.2 applies.
- An element of a written procedure is to be updated. If this doesn't affect the description of the procedure in the monitoring plan, the aircraft operator will carry out the update under his own responsibility without notification to the competent authority.

The same situations may occur as a consequence of the requirement to improve the monitoring methodology continuously (see section 6.6).

The M&R Regulation in Article 16(3) also defines the requirements for record keeping about any monitoring plan updates, such that a complete history of monitoring plan updates is maintained, which allows a fully transparent audit trail, including for the purposes of the verifier.

For this purpose it is considered best practice for the aircraft operator to make use of a "logbook", in which all non-significant changes to the monitoring plan and to procedures are recorded, as well as all versions of submitted and approved monitoring plans. This must be supplemented with a written procedure for regular assessment of whether the monitoring plan is up to date (Article 14(1) and point 1(f) of section 2 of Annex I of the MRR).

6.5.1 Significant changes

Whenever a significant change to the monitoring plan is necessary, the aircraft operator shall notify the update to the competent authority without undue delay. The competent authority then has to assess whether the change is indeed a significant one. Article 15(4) of the MRR contains a (non-exhaustive) list of monitoring plan updates which are considered significant[89]. If the change is not significant, the procedure described under 6.5.2 applies. For significant changes, the

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materials not yet contained in the monitoring plan;
(b) change in the availability of data, due to the use of new types of measuring instrument, sampling methods or analysis methods, or for other reasons, leads to higher accuracy in the determination of emissions;
(c) data resulting from the monitoring methodology applied previously has been found to be incorrect;
(d) changing the monitoring plan improves the accuracy of the reported data, unless this is technically not feasible or incurs unreasonable costs;
(e) the monitoring plan is not in conformity with the requirements of this Regulation and the competent authority requests the operator or aircraft operator to modify it;
(f) it is necessary to respond to the suggestions for improvement of the monitoring plan contained in a verification report."

[89] Article 15(4):
"*4. Significant changes to the monitoring plans of an aircraft operator include:*
(a) with regard to the emission monitoring plan:
(i) a change of emission factor values laid down in the monitoring plan;
(ii) a change between calculation methods as laid down in Annex II, or a change from the use of a calculation method to the use of estimation methodology in accordance with Article 55(2) or vice versa;

competent authority thereafter carries out its normal process of approving monitoring plans[90].

The approval process may sometimes need longer than implementing the proposed change of the monitoring plan. Furthermore, the competent authority may find the aircraft operator's monitoring plan update incomplete or inappropriate and may require additional amendments of the monitoring plan. Thus, monitoring according to the old monitoring plan may be incomplete or lead to inaccurate results, while the aircraft operator is not sure whether the new monitoring plan will be approved as requested. The MRR provides for a pragmatic approach here:

According to Article 16(1) of the MRR, the aircraft operator shall immediately apply the new monitoring plan where he can reasonably assume that the updated monitoring plan will be approved as proposed. This may apply e.g. when an additional fuel is introduced. Where the new monitoring plan is not yet applicable, because the situation of the aircraft operator will change only after the approval of the monitoring plan by the competent authority, monitoring is to be carried out in accordance with the old monitoring plan until the new one is approved.

Where the aircraft operator is unsure whether the CA will approve the changes, he shall carry out monitoring in parallel using both the new and the updated monitoring plan (Article 16(1)). Upon receiving the approval of the competent authority, the aircraft operator shall use only the data obtained in accordance with the new monitoring plan from the date from which that version of the monitoring plan is applicable (Article 16(2)).

6.5.2 Non-significant updates of the monitoring plan

While significant updates of the monitoring plan are to be notified without undue delay, the competent authority may allow the aircraft operator to delay the notification of non-significant updates in order to simplify the administrative process (Article 15(1) of the MRR). Where this is the case and the aircraft operator can reasonably assume that changes to the monitoring plan are non-significant, they may be collected and submitted to the CA once a year (by 31 December of the same year), if the competent authority allows this approach.

The final decision on whether a change to the monitoring plan is significant is the responsibility of the competent authority. However, an aircraft operator can reasonably anticipate that decision in many cases:

- Where a change is comparable to one of the cases listed in Article 15(4) of the MRR, the change is significant;

(iii) the introduction of new source streams;
(iv) changes in the status of the aircraft operator as a small emitter within the meaning of Article55(1) or with regard to one of the thresholds provided by Article 28a(4) of Directive 2003/87/EC;

(b) with regard to the tonne-kilometre data monitoring plan:
(i) a change between a non-commercial and commercial status of the air transport service provided;
(ii) a change in the object of the air-transport service, the object being passengers, freight or mail."

[90] This process may differ between Member States. The usual procedure will include a completeness check for the information provided, a check for the appropriateness of the new monitoring plan in regard of the changed situation of the aircraft operator, and a check for compliance with the M&R Regulation. The competent authority may also reject the new monitoring plan or require further improvements. The competent authority may also come to the conclusion that the proposed changes are not significant ones.

- Where the impact of the proposed monitoring plan change on the overall monitoring methodology or on the risks for error is small, it may be non-significant;
- In case of doubt assume it is a significant change and follow section 6.5.1.

Non-significant changes do not need the approval of the competent authority. However, in order to provide for legal certainty, the competent authority must inform the aircraft operator without undue delay of its decision to consider changes non-significant where the aircraft operator has notified them as significant. Aircraft operators can be expected to appreciate if the competent authority acknowledges receipt of notifications in general.

6.6 The improvement principle

While the previous section has dealt with monitoring plan updates which are mandated as consequence of factual changes of the aircraft operators' operations, the MRR also requires the aircraft operator to explore possibilities to improve the monitoring methodology when the operations themselves are unchanged. For implementing this "improvement principle", there are two requirements:

- Aircraft operators must take account of the recommendations included in the verification reports issued pursuant to Article 15 of Directive 2003/87/EC (Article 9), and
- Aircraft operators must check regularly on their own initiative, whether the monitoring methodology can be improved (Article 14(1) and Article 69(1) of the MRR).

Aircraft operators must react to those findings on possible improvements by

- Sending a report on the proposed improvements to the competent authority for approval,
- Updating the monitoring plan as appropriate (using the procedures outlined in sections 6.5.1 and 6.5.2), and
- Implementing the improvements according to the time table proposed in the approved improvement report.

For the improvement report responding to a verifier's recommendations, the deadline is 30 June of the year in which the verification report is issued. The deadline of 30 June may be extended by the competent authority up to 30 September of the same year.

New!

If the aircraft operator has already submitted an updated monitoring plan resolving all open issues to the competent authority before the deadline for the improvement report, there is no need to submit an improvement report (Article 69(5)).

7 CORSIA

New!

In 2016 the assembly of the International Civil Aviation Organisation (ICAO) adopted the “Carbon Offsetting and Reduction Scheme for International Aviation” (CORSIA). It is a global market-based measure that aims at offsetting the CO_2 emissions of the air transport industry above 2020 levels. In the EU, CORSIA is implemented via the ETS Directive, while the general requirements are specified in the ICAO CORSIA SARPs (“Standards and Recommended Practices”)[91]. As **this guidance document is directed towards aircraft operators subject to EU ETS, this CORSIA section is relevant only for aircraft operators from the EEA**.

Aircraft operators have to apply and comply with the legislation of the country of their AOC (air operator certificate) or registration. As noted above, the EU has implemented rules for CORSIA in the EU ETS and respective implementing and delegated acts, mainly via the EU ETS Directive, the MRR and Delegated Regulation (EU) 2025/927, otherwise known as the CORSIA delegated act[92].

Aircraft operators that hold an air operator certificate issued by an EEA State or are registered in an EEA State, including in the outermost regions, dependencies and territories of that State, have an obligation to report CORSIA data under the rules of the EU ETS.

With its implementation within the framework of the EU ETS, aircraft operators that fall within the scope of CORSIA (see section 3.1.5) need to report their emissions for CORSIA flights and are subject to offsetting obligations. The calculation of these offsetting obligations is covered by another piece of legislation, the Implementing Regulation 2024/1879.

Although CORSIA requirements are included in the EU ETS Directive, there are significant differences between the two systems that aircraft operators with CORSIA reporting obligations should be aware of. This chapter addresses some of those differences.

7.1 Scope delineation

New!

In section 3.1.5 the coverage of CORSIA has been explained. It has to be highlighted that there is a clear-cut distinction between EU ETS and CORSIA flights, with each flight being either under the EU ETS or CORSIA or neither, but never both. Since formally also CORSIA flights are regulated by the EU ETS Directive, a distinction can be made based on the compliance mechanism for both types of flights. The Commission’s templates and this guidance document use the following terminology:

- Emissions or flights "**falling under the EU ETS**" means emissions or flights for which allowances have to be surrendered pursuant to Article 12(3) of the EU ETS Directive;
- Emissions or flights "**falling under CORSIA**" means one of the following:

[91] Volume IV of Annex 16 to the Convention on International Civil Aviation (Chicago Convention); https://elibrary.icao.int/product/229739

[92] See footnote 6.

- Emissions or flights with offsetting requirement, i.e. for which the aircraft operator must cancel units pursuant to Article 12(9) of the EU ETS Directive;
- Flights with CORSIA MRV obligation: Emissions or flights for which the aircraft operator shall monitor and report emissions in accordance with the CORSIA Delegated Act.

7.2 Functioning and Compliance Cycle of CORSIA

The biggest difference between the EU ETS and CORSIA is that CORSIA is not a cap-and-trade system and therefore there is no fixed amount of emission allowances like there is in the EU ETS. In order to achieve the ICAO's aspirational goal of CO_2-neutral growth from 2020 onwards, the system requires that emissions above the baseline (which is currently set at 85% of 2019 emissions from international flights) are offset by cancellation of emission units generated by emission reduction projects elsewhere, e.g. credits from voluntary carbon markets.

Further, CORSIA is a voluntary scheme until 2027 when it will become obligatory for states above certain level on RTKs in 2018, with the exception of Least Developed Countries (LDCs), Small Island Developing States (SIDS) and Landlocked Developing Countries (LLDCs). While the reporting obligations of aircraft operators above the relevant threshold apply for all international flights, offsetting requirements are only calculated for flights between a Member State and States participating in CORSIA as well as flights between these States, and flights between Switzerland or the United Kingdom and these States. A list of these countries is regularly published by the ICAO, and for EU ETS purposes the European Commission[93] publishes the list pursuant to Article 25a(3) of the ETS Directive. It is important to note, that these two lists contain differences as the EU list does not include EEA states, UK and Switzerland and may also excluded the States that the EU does not consider applying CORSIA.

Both the timeline and compliance obligations within the compliance cycle of CORSIA deviate from the EU ETS. The compliance cycle for CORSIA is set for a three-year period. Furthermore, the offsetting requirement is calculated by the Member State administering the aircraft operator. After the aircraft operator is informed by their competent authority of the offsetting requirement and subsequent cancellation of the appropriate number of credits, the aircraft operator has to submit a verified "emissions unit cancellation report" (see section 7.7).

The following table provides a timeline of actions to be taken by different parties within the compliance cycle. It is split into two parts representing the annual obligations for these parties, as well as those that have to be implemented only once every three years.

Please note that the rules for calculating and reporting an aircraft operators offsetting requirements laid out in Articles 3(3) and Article 4 of Implementing Regulation 2024/1879, as well as Article 7(1) of the CORSIA delegated act, currently

[93] Commission Implementing Regulation (EU) 2024/622: http://data.europa.eu/eli/reg_impl/2024/622/oj

only apply for the CORSIA period ending in 2026 and the obligations and timeline given below might be subject to change.

Annual obligations		
When?	**Who?**	**What?**
1 January N	Aircraft operator	Start of monitoring period
31 December N	Aircraft operator	End of monitoring period
By 28 February - 31 March N+1 ([94])	Aircraft operator	Compile year N's emissions data and have it verified by a verification body. Submit the verified annual emissions report to their administering state.
By 31 March N+1 ([94])	Aircraft operator / Verification body	The aircraft operator shall submit the verified emissions report for year N to their administering state.
1 May N+1 to 31 July N+1	Administering State	Conduct an "order of magnitude check" of the verified emissions report of year N.
31 July N+1	Administering State	Submit required information regarding CO_2 emissions for year N to ICAO.
31 October N+1	Administering State	Obtain and use the Sector's Growth Factor (SGF) for year N from the ICAO document entitled "CORSIA Annual Sector's Growth Factor (SGF)".
30 November N+1	Administering State	Calculate and inform aircraft operators of their offsetting requirements for year N. Submit updates to the list of aircraft operators that are attributed to the administering state, as well as updates to the list of verification bodies accredited in the administering state[95].
Obligations once every three years		
30 November N	Administering State	Calculate and inform aircraft operators of their final offsetting requirements for the previous period (year N-3 to N-1).
30 April N+1	Aircraft operator / Verification body	The aircraft operator submits the verified unit cancellation report and associated verification report for the previous period.
1 May N+1 to 31 July N+1	Administering State	Conduct an order of magnitude check of the verified unit cancellation report for the previous period.
31 July N+1	Administering State	Report to ICAO the required information regarding emissions unit cancellation for the previous period.

[94] This is the deadline to be applied in the EU ETS and corresponds to the reporting obligations laid out in Article 68 of the MRR. The general deadline is therefore set at 31 March, with CAs may requiring aircraft operators to submit the verified annual emissions report by 28 February at the earliest.

[95] This list, submitted to ICAO, should only include verification bodies accredited for verification activities under CORSIA requirements.

7.3 Monitoring

Article 4 of Delegated Regulation (EU) 2025/927 (the CORSIA delegated act[6]) states that aircraft operators shall monitor and report emissions from flights subject to CORSIA reporting obligations in accordance with the MRR. Therefore, for EEA aircraft operators the monitoring of emissions under CORSIA does not differ from the monitoring for EU ETS purposes. Differences occur, however, between the monitoring and reporting of CORSIA eligible fuels (CEFs) under CORSIA and zero-rated fuels in the EU ETS. These will be explained in section 7.5.

7.4 (Annual) Reporting

Article 4 of the CORSIA delegated act[6] clarifies that aircraft operators reporting their emissions for CORSIA are subject to the same requirements laid out in the MRR. However, there are some differences that need to be considered separately from the reporting under the EU ETS.

One of the obligations for aircraft operators reporting pursuant to the MRR is to submit to their Member State a verified emissions report (Article 68(1) of the MRR). The European Commission published a template for the purpose of reporting emissions, which serves jointly for the reporting under the EU ETS, the Swiss ETS and CORSIA. Aircraft operators who have compliance obligations under CORSIA in a third country only have to fill the parts of the template necessary for the EU ETS and the Swiss ETS, if applicable. For CORSIA, they will have to use a template provided by their administering country.

As the rules for alternative fuels ("CEFs", CORSIA eligible fuels, see section 7.5) are different from the rules for zero-rating of alternative aviation fuels in the EU ETS, there is a need to report information on CEFs together with the annual emissions report. The information on CEFs is to be included in the verification of the annual emissions report.

7.5 CORSIA eligible fuels (CEFs)

In the EU ETS, some types of alternative aviation fuels can be zero-rated. Under CORSIA, certain fuels can be used to reduce an aircraft operator's offsetting requirement. These fuels are called **CORSIA Eligible Fuels** (**CEFs**)**,** provided they meet the necessary criteria. However, these fuels are not zero-rated, but a reduction to the offsetting requirement may be calculated in line with the fuels' lifecycle GHG savings.

For CEFs it is essential that they are certified as such via a **CORSIA approved Sustainability Certification Scheme (SCS)**, in line with Article 5(3) of the CORSIA delegated act. A list of available schemes can be found in Annex I to the CORSIA delegated act.

Concerning the monitoring for CORSIA purposes, in general the MRR is applicable. However, Articles 53a, 54a and 54c of the MRR are explicitly excluded from application to CEFs (Article 5(2) of the CORSIA delegated act). These Articles concern, on one hand, the sustainability criteria to zero-rate alternative aviation

fuels in the EU ETS and on the other hand the attribution of alternative fuels to each flight or aerodrome pair.

In practice aircraft operators therefore have to monitor and report the CEFs used as neat fuels pursuant to Article 53 of the MRR, but not for each flight or aerodrome pair. Relevant for the reporting of CEFs are the total reductions claimed for the use of all CEFs at the end of the reporting period, as well as the following information according to Article 5(6) of the CORSIA delegated act:

- Fuel type: this includes the type of fuel (e.g. Jet A, Jet B…), the feedstock and conversion process for that fuel;
- Total mass of neat CEF claimed per fuel type;
- Life cycle emissions values
- Reductions claimed from the use of each CEF as calculated pursuant to Article 4(3) of Implementing Regulation (EU) 2024/1879 (see section 7.6).

Nevertheless, when reporting CEFs at the end of the reporting period, in addition to the aforementioned information the aircraft operator has to provide supplementary information, listed in Annex II to the CORSIA delegated act, for each CEF used.

An additional declaration listing all greenhouse gas schemes in which the aircraft operator participates and where reductions from the use of CEFs or other alternative aviation fuels may be claimed has to be submitted as an attachment to the annual emissions report. Within this declaration, the aircraft operator needs to confirm that no claims have been made for the same batches of CEFs used to reduce their offsetting requirements, under those other schemes.

7.6 Calculation of offsetting requirements

During the three-year compliance period, the administering Member State has to calculate the offsetting requirement and inform the aircraft operator of the result every year and once again every three years for its final offsetting requirements. The calculation rules are laid down in Implementing Regulation (EU) 2024/1879, and summarised here.

Step 1 (annually): The Sector's Growth Factor (SGF), a multiplier that is calculated and published and calculated by the Secretariat of ICAO according to the following methodology:

$$SGF_y = (SE_y - SE_{B,y})/SE_y$$

where:

SGF_y	Sector's growth factor for the given year y.
SE_y	Total sectoral CO_2 emissions from international flights performed by aircraft operators between two States participating in CORSIA in the given year y.
$SE_{B,y}$	85% of total annual sectoral CO_2 emissions in 2019 from international flights performed by aircraft operators between two States participating in CORSIA in the given year y.

Step 2 (annually): By using this factor Member States calculate the offsetting requirements of each year for each aircraft operator that reported emissions pursuant to Implementing Regulation (EU) 2024/1879:

$$OR_y = OE_y * SGF_y$$

where:

OR_y	The aircraft operator's offsetting requirements in the given year y.
OE_y	The aircraft operator's CO_2 emissions from international flights covered in the given year y[96].
SGF_y	Sector's growth factor for the given year y.

Step 3 (only for calculation of the final offsetting requirement every 3 years): Calculate reductions to the final offsetting requirements from the use of CEFs, using this formula:

$$ER_y = EF * \left[\sum_f MS_{f,y} * \left(1 - \frac{L_{CEF}}{LC}\right)\right]$$

where:

ER_y	The reductions from the use of CORSIA eligible fuels in the given year y (in tonnes).
EF	The emission factor as specified in Table 1, Annex III to the MRR.
$MS_{f,y}$	The total mass of a neat CORSIA eligible fuel claimed in the given year y (in tonnes), as reported in accordance with the provisions of the CORSIA delegated act.
L_{CEF}	The life cycle emissions value for a CORSIA eligible fuel (in g CO_2e/MJ) as reported in accordance with the provisions of the CORSIA delegated act.
LC	The baseline life cycle emissions values for aviation fuel, equal to 89 g CO_2e/MJ for Jet-A fuel, Jet-A1 fuel or Jet-B fuel and equal to 95 g CO_2e/MJ for AvGas.

Step 4 (only for calculation of the final offsetting requirement every 3 years): Now that both the offsetting requirements and reductions thereof due to the use of CEFs are known to the Member State, it can calculate the final offsetting requirement for that period as follows:

$$FOR_c = \left(OR_{1,c} + OR_{2,c} + OR_{3,c}\right) - \left(ER_{1,c} + ER_{2,c} + ER_{3,c}\right)$$

where:

[96] The covered emissions are those from flights between Member States and states in the list published pursuant to Article 25a(3) of the EU ETS Directive, flights between Switzerland or the UK and states from that list, as well as flights between two states from that list. Flights between EU Overseas Countries and Territories and EEA States may be included at the discretion of each EEA State according to transposition of the EU ETS Directive into national legislation.

FOR_c	The aircraft operator's total final CO_2 offsetting requirements in the given period c.
$OR_{y,c}$	The aircraft operator's offsetting requirements in the given year y (where y = 1, 2 or 3) of the period c.
$ER_{y,c}$	The reductions due to the use of CORSIA eligible fuels in the given year y (where y = 1, 2 or 3) of the period c.

Once the Member State has calculated the final offsetting requirements, they have to inform the aircraft operator of that number by 30 November 2027 for the offsetting period 2024-26.

Note:

1. The final offsetting requirements are rounded up to the nearest tonne.
2. If the sum of an aircraft operator's offsetting requirements in the 3 years of a given period is less than 3 000 tonnes of CO_2 they can request their Member State to calculate no offsetting requirements for that period instead.
3. If the final calculated offsetting requirement is negative, the aircraft operator does not have any offsetting requirement. Any negative offsetting requirements cannot be used in the subsequent period.

7.7 Emissions unit cancellation report

After the final offsetting requirement has been calculated by the Member State at the end of the three-year compliance period, the aircraft operator needs to cancel that amount of eligible units. This must be done within the registry designated by the selected emissions unit programme. The aircraft operator has to request that programme registry to make information for each emissions unit cancelled during the relevant CORSIA period visible on its public website. That information needs to include the consolidated identifying information for each batch of cancelled emissions units described in the report outlined below (see Annex III to the CORSIA delegated act).

To complete the compliance process, the aircraft operator has to submit a verified unit cancellation report and a copy of the associated verification report by 30 April of the year after the end of that CORSIA period[97]. That report has to contain at least the information listed in Annex III to the CORSIA delegated act.

It is important to note that the emissions unit cancellation report, just like the annual emissions data and the use of CEFs, needs to be verified. The CORSIA Delegated Act specifies rules for the verification in Article 6 regarding emissions and CEF data, as well as in Article 8 regarding the emissions unit cancellation report. While some specific requirements are laid out in these Articles (as well as a reference to Annex IV of that regulation, listing the information to be contained in the verification reports), verification procedures generally have to follow the AVR (Implementing Regulation (EU) 2018/2067).

[97] This report will be due by 30 April 2028 for the first time, covering the compliance period 2023-26. For the period before, the offsetting requirement was zero, and the reporting requirement was waived.

8 NON-CO_2 EFFECTS OF AVIATION

Note: This chapter only provides an overview of the basic principles concerning non-CO_2 effects of aviation. For details, please refer to the documentation provided here:

https://climate.ec.europa.eu/eu-action/transport-decarbonisation/reducing-emissions-aviation_en#documentation

Starting from 1 January 2025, aircraft operators under the EU ETS are obliged to monitor the non-CO_2 effects from aviation activities performed by aircraft equipped with jet engines[98]. This provision is established in Article 14 of the EU ETS Directive, with Article 3(v) of that Directive providing a definition for these effects:

'non-CO_2 aviation effects' means the effects on the climate of the release, during fuel combustion, of oxides of nitrogen (NO_x), soot particles, oxidised sulphur species, and effects from water vapour, including contrails, from an aircraft performing an aviation activity listed in Annex I.

The aircraft operator therefore has to include the monitoring results in the annual emissions report, with the non-CO_2 aviation effects depicted as CO_2 equivalent (CO_2(e)) per flight, calculated using a suitable greenhouse warming potential (GWP) metric.

Currently there is only a MRV (monitoring, reporting and verification) obligation for aircraft operators. This means that no allowances have to be surrendered for the non-CO_2 effects.

To facilitate both the monitoring and reporting of these effects, specific rules and monitoring methodologies were introduced in the broader MRV framework as well, notably in Articles 56a, 56b and Annex IIIa of the MRR. The electronic templates provided by the European Commission have been updated as well.

Additionally, the Commission and EUROCONTROL are developing a tool for aircraft operators, accredited verifiers and competent authorities to help them automate the monitoring, reporting and verification of non-CO_2 aviation effects as much as possible. This tool is called the "non-CO_2 aviation effects tracking system" or "NEATS" and is made available free of charge.

Furthermore, the Commission published a standalone guidance document describing the processes, applicable monitoring methodologies and reporting obligations concerning non-CO_2 aviation effects. These, as well as the revised/new templates can be downloaded from the European Commission's website:

https://climate.ec.europa.eu/eu-action/transport-decarbonisation/reducing-emissions-aviation_en#documentation

[98] For the reporting periods in 2025 and 2026 reporting is only required for flights under the reduced scope (see section 3.1.2). However, the reporting of other flights is possible.

8.1 Data required for the monitoring of non-CO_2 aviation effects

The monitoring of non-CO_2 aviation effects requires a set of inputs from the aircraft operator. Which data are required depends on the method the aircraft operator applies for the calculation. There are two possible options, **Method C** and **Method D**[99], with Method D only being available to small emitters pursuant to Article 55(1) of the MRR (see section 5.6), but access to Method C for small emitters is fully available. For all aircraft operators not falling within the small emitter threshold, Method C is the default option.

8.1.1 Method C

Using NEATS, the non-CO_2 impact can be fully computed by the tool[100] without input from aircraft operators. Only the flight information provided by NEATS should be checked by the aircraft operator to ensure consistency between actual flights that took place and secondary data[101] provided by NEATS. Where it is not possible to use NEATS due to its unavailability, the aircraft operator shall monitor at a minimum the flight information and aircraft properties per flight. Furthermore, even with NEATS being available it is recommended to monitor all datasets as primary data.

A more extensive description of the datasets and which secondary data sources are available for their monitoring can be found in the guidance document mentioned at the beginning of section 8.

8.1.2 Method D

Method D relies primarily on in-flight location-related data such as flight information and trajectory data. Basic aircraft properties and weather data also need to be provided (either as secondary or primary data). However, weather data are not explicitly included for climate effect calculation. In addition, the data on fuel properties is optional.

In practice, the application of Method C is made as simple as application of Method D, through the high degree of automatization provided by NEATS and the introduction by the Commission of provisions that facilitate monitoring (e.g., fuel properties flexibility approach where the Commission is to provide values gathered for ReFuelEU throughout years 2025 and 2026, more information in NEATS guidance).

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[99] Methods A and B apply to the monitoring of CO_2 emissions (see section 5.4.3)

[100] Therefore, aircraft operators can comply with the MRR without needing to provide any primary data (see footnote 101)

[101] Primary data refers to data collected by the aircraft operator. Secondary data refers to data sourced from external sources (e.g. EUROCONTROL) and provided by NEATS or any other tool approved by the Commission.

8.2 Reporting of non-CO_2 aviation effects

Article 68(5) of the MRR requires the aircraft operator to provide a report for non-CO_2 aviation effects as an attachment to the annual emissions report. The information that needs to be contained in the report is listed in section 2a of Annex X to the MRR. The respective template will be made available by the Commission on its website, and the data to feed the reports automatically delivered by NEATS.

9 ANNEX

9.1 Annex I: Demonstrating compliance with sustainability and GHG savings criteria for alternative aviation fuels

Note: In order to make this guidance document a self-standing information source for aircraft operators, section 9.1 contains a (slightly adjusted) copy of relevant parts of MRR Guidance Document No.3 ("Biomass and other zero-rating under the EU ETS"). Consequently, reading GD3 should not be necessary for the average aircraft operator. However, detailed information on the functioning of RED II certification schemes are not repeated here. Therefore, the interested reader is invited to look up those details in GD3.

9.1.1 Alignment of EU ETS and RED II

An important element of the MRR for phase 4 of the EU ETS is the alignment of requirements for alternative aviation fuels with those of the Renewable Energy Directive (RED II).

The relevant provisions for applying **sustainability and GHG savings criteria** (together, this document refers to them as the "**RED II criteria**"), concerning aircraft operators, are found in Article 54c of the MRR. However, this Article itself refers to Articles 38(5), 39a(3) and 39a(4) of the MRR, which require the RED II criteria to be met in order to apply an emission factor of zero to alternative fuels. This is referred to as "zero-rating" the fuels in this document. Articles 38(5), 39a(3) and 39a(4) clarify that **if those criteria are not met, the fuel must be treated like a fossil fuel**, i.e. the preliminary emission factor has to be considered the final emission factor.

9.1.2 Implications of the RED II criteria for mixed fuels

9.1.2.1 Biomass

With regard to biomass a source stream[102] *(for aircraft operators, only fuels are relevant)* can be either fossil, biomass or a mixture of both. The application of RED II criteria for biomass leads to the need to distinguish furthermore the following types of source streams (some may appear as theoretical cases):

1. Fossil source streams;
2. Biomass where sustainability and/or GHG savings criteria apply:
   a. Criteria are satisfied: Biomass is zero-rated;
   b. Criteria are not satisfied: Biomass is treated like a fossil source stream, i.e. allowances must be surrendered for these emissions. In the Commission's annual emissions report template, emissions from fossil fractions and from "non-zero-rated biomass" are reported separately.
3. Biomass where RED II criteria do not apply: Always zero-rated.

[102] Source stream means either fuel or process material leading to emissions. For details see Guidance document No. 1 (general guidance for installations).

4. Mixed source streams:
   a. Fossil / biomass mix, where either RED II criteria do not apply, or where they apply and are satisfied: The emission factor is the preliminary emission factor multiplied by the fossil fraction.
   b. Fossil / biomass mix, where RED II criteria apply and are not satisfied: The whole source stream is treated as fossil (with separate reporting of the non-zero-rated biomass fraction).
   c. Biomass mix or fossil / biomass mix, where RED II criteria apply and only a part of the biomass satisfies the applicable RED II criteria: These source streams are to be treated like those under point 4a, with separate reporting of the zero-rated biomass fraction, the non-zero-rated biomass fraction and the fossil fraction.

- Examples:
- Point (a): This could be fibre wood panels, where biomass (wood, for which the RED II criteria are satisfied by certification under a voluntary scheme) is mixed with resins which are usually made from fossil raw materials.
- Point (b): This could be a liquid fuel where the supplier claims that x% biofuel has been added, but does not provide evidence for meeting the RED II criteria for that amount.
- Point (c): An example would be rape seed methyl ester ("biodiesel"), where the rape seed oil satisfies the sustainability criteria and respective evidence is provided, while the methanol is either stemming from fossil sources, or where it is claimed to be biomass, but no evidence for meeting the RED II criteria is available.

Note that the above classification assumes that the whole source stream has the same composition, or is analysed using the same methodology where calculation factors are not based on default values[103]. However, the situation may occur that a certain biofuel, bioliquid or biomass fuel is used, where some batches delivered do satisfy the relevant RED II criteria, while other batches do not. In such a case the operator or aircraft operator may in its monitoring plan and emissions report either consider this material as one source stream with different biomass fraction values, or as two distinct source streams, one being biomass without meeting RED II criteria, and one biomass with RED II criteria met. The same approaches apply to mixed source streams where the biomass fraction only sometimes complies with the relevant sustainability criteria.

The above considerations lead to practical consequences when setting up the monitoring plan in relation to biomass: The simplest way forward would be to establish a written procedure[104] which requires the operator to attribute each batch of biomass used in the installation to either a "zero-rated biomass" source stream[105] or to a "non-zero-rated biomass" source stream, depending on whether

[103] Similar to e.g. different batches of coal which are analysed separately, but all reported under the same source stream "coal".

[104] See guidance document no. 1 on the topic of "written procedures" as supplement to the monitoring plan.

[105] Note that the MP and AER templates use also the simpler terminology "sustainable biomass" and "non-sustainable biomass", where "RED II compliant / non compliant" is more precise.

a proof is available for meeting the applicable sustainability and/or GHG savings criteria or not. The ways of obtaining such proof are discussed in section 9.1.3 below.

9.1.2.2 Other zero-rated fuels

New!

As has been just discussed for biomass, fuels can also be composed of several other fractions. Although it may be unlikely in practice, a fuel might e.g. be a blend of a fossil fuel with a biofuel and an RFNBO. In such case, the fractions of biofuel and RFNBO need to be determined separately (e.g. using proofs of sustainability from RED II certifiers). Where such proofs are only partly available, the blended fuel could theoretically consist of five fractions: fossil, zero-rated and non-zero-rated biomass, zero-rated and non-zero-rated RFNBO (see section 5.5.6).

In practice, operators will have to use a similar approach for RFNBO, RCF and SLCF as described in section 9.1.2.1 for biomass only: i.e. the operator has to apply a written procedure for documenting for each batch of fuel received if the respective proof of sustainability or equivalent evidence is available.

9.1.3 Practical approach for RED II criteria

Note: This section applies to all zero-rating, not only to biomass.

The Commission's website dedicated to renewable energy is:
https://energy.ec.europa.eu/topics/renewable-energy_en

Information on voluntary schemes for certification of biofuels and other zero-rated fuels can be found at https://energy.ec.europa.eu/topics/renewable-energy/bioenergy/voluntary-schemes_en

These websites should be useful for looking for guidance on all issues regarding the assessment of RED II criteria which is not covered by guidance on the EU ETS websites.

According to the RED II, there are three ways in which economic operators can demonstrate compliance with applicable RED II criteria for zero-rating:

- by means of a 'national scheme'[106,107];
- by using a 'voluntary national or international scheme'[108] that the Member State accepts. If the Commission has formally recognised the scheme, the certificates and proofs of sustainability of the scheme must be accepted by all Member States. Therefore, using a recognised scheme gives legal certainty to operators, ensures harmonised implementation of the RED II requirements and reduces the need for additional documentation;

[106] The Union Data Base (UDB; see section 9.1.4) can be used in both cases by economic operators.

[107] Provided that this approach is accepted by national authorities in the Member State to demonstrate RED II compliance, i.e. not all support schemes for biomass are necessarily compliant with RED II requirements.

[108] See footnote 104

- by providing all relevant evidence and GHG calculations themselves, having the information appropriately audited[109] (if this approach is accepted by national authorities in the Member State).

For zero-rating under the EU ETS MRV rules, the burden of proof concerning a source stream meeting the requisite sustainability and/or GHG savings criteria remains with the EU ETS operator or aircraft operator shipping company or regulated entity under ETS2)[110]. Possible proof can be provided from applicable documentation ensuring compliance with a national system or the availability of certificates containing evidence of sustainability issued under a voluntary scheme recognised by the Commission or the installation's (or aircraft operator's administering) Member State under the RED II (see sections 9.1.3.3 to 9.1.3.4). The evidence provided should furthermore indicate the amount of delivered biomass or other fuel and identify the batch to which they relate. If the biomass or other fuel has not already been certified (or where the certification does not cover all steps in the supply chain), the operators or aircraft operators would have to perform the necessary assessment themselves and have it audited accordingly by an auditor accepted by the Member State's legislation. Note, however, that the national legislation of the Member State may contain other provisions. Some Member States may e.g. accept only biomass that has been certified by a scheme recognised by the Commission.

Where compliance with the applicable RED II criteria cannot be confirmed to the satisfaction of the competent authority[111], the respective biofuel or other fuel will have to be treated like a fossil source stream and not zero-rated.

9.1.3.1 General responsibilities

The Member State where the installation is situated, or the administering Member State in case of aircraft operators, is responsible for defining the rules under which compliance with the RED II criteria must be demonstrated for the source stream to be zero-rated and used within the Member State. Certification schemes under the RED II can cover different parts of the supply chain, and "economic operators" are often certified for only part of the supply chain. For the purpose of the EU ETS the burden of proof for compliance with the RED II criteria is on the user of the biomass or other fuel, i.e. the operator of the installation or the aircraft operator, as these are the persons who have the obligation of reporting emissions. However, for practical reasons, the operator or aircraft operator will often have to rely on data and information[112] provided by third parties, i.e. either the supplier or producer of the biomass or other fuels.

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[109] Such audit is mandatory according to Article 30(3) of the RED II: "*[…] Member States shall require economic operators to arrange for an adequate standard of independent auditing of the information submitted, and to provide evidence that this has been done. […]*". This audit can be performed by an EU ETS verifier only if the latter has the proven competence (i.e. accreditation) for that task (see section 3.4.6.5 of GD3).

[110] As for shipping companies and ETS2 regulated entities there are specific guidance documents made available by the Commission, those entities are mentioned here only once, while the rest of the document focusses on installations and aircraft operators.

[111] Not only the competent authority, but also the verifier during verification will assess if the evidence for meeting the sustainability criteria is sufficient.

[112] See section 9.1.3.5 on the functioning of RED II certification schemes.

9.1.3.2 Which criteria apply?

New!

Biofuels

As described in chapter 5.5.6 the 2024 amendment of the MRR introduces an explicit distinction between zero-rated and non-zero-rated carbon. This improvement is reflected in Article 38(5)[113]. It is the key linking Article between the MRR requirements and the RED II, and in particular how the sustainability and GHG saving criteria of the RED II are to be applied in order to allow the emissions from biomass to be zero-rated. The following points are worth noting:

- Not all the criteria given in Article 29 of the RED II apply. In particular:
  - The "land related" sustainability criteria of Article 29(2) to (7) of the RED II apply;
  - The GHG saving criteria of Article 29(10) of the RED II apply;

Some provisions contained in Article 29(1) of the RED II are copied into the MRR in order to clarify their applicability. In particular, this includes the simplification that for municipal solid waste the GHG saving criteria do not apply. Furthermore, the RED II criteria apply irrespective of the geographical origin of the biomass.

Guidance document No.3 contains a "decision tree" in section 3.5.2, which describes in detail for which types of materials the sustainability criteria, the GHG savings criteria, both or none of the RED II criteria apply. However, as for aircraft operators it is assumed that they will rely on RED II certification schemes, the details are not repeated here.

[113] Article 38(5) of the MRR:

"*Biofuels, bioliquids and biomass fuels shall fulfil the sustainability and the greenhouse gas emissions saving criteria laid down in paragraphs 2 to 7 and 10 of Article 29 of Directive (EU) 2018/2001 in order to be counted towards the zero-rated biomass fraction of a source stream.*

However, biofuels, bioliquids and biomass fuels produced from waste and residues, other than agricultural, aquaculture, fisheries and forestry residues are required to fulfil only the criteria laid down in Article 29(10) of Directive (EU) 2018/2001. This subparagraph shall also apply to waste and residues that are first processed into a product before being further processed into biofuels, bioliquids and biomass fuels.

Electricity, heating and cooling produced from municipal solid waste shall not be subject to the criteria laid down in Article 29(10) of Directive (EU) 2018/2001.

The criteria laid down in paragraphs 2 to 7 and 10 of Article 29 of Directive (EU) 2018/2001 shall apply irrespective of the geographical origin of the biomass.

Article 29(10) of Directive (EU) 2018/2001 shall apply to an installation as defined in Article 3(e) of Directive 2003/87/EC.

The compliance with the criteria laid down in paragraphs 2 to 7 and 10 of Article 29 of Directive (EU) 2018/2001 shall be assessed in accordance with Articles 30 and 31(1) of that Directive. The criteria may also be considered complied with if the operator provides evidence for a purchase of a quantity of biofuel, bioliquid or biogas connected to the cancellation of the respective quantity in the Union Database set up pursuant to Article 31a or a national database set up by the Member State in accordance with Article 31a(5) of that Directive. In case of subsequent non-compliance regarding the proof of sustainability of the quantities cancelled in the aforementioned databases, the competent authority shall correct the verified emissions accordingly.

Where the biomass used does not comply with this paragraph, its carbon content shall be considered as fossil carbon.

Where according to the first to sixth subparagraphs of this paragraph, the criteria laid down in paragraphs 2 to 7 and 10 of Article 29 of Directive (EU) 2018/2001 do not apply to biomass, the zero-rated biomass fraction equals its biomass fraction."

RFNBOs, RCFs and SLCFs

For these non-biomass alternative fuels, no sustainability criteria apply. The greenhouse gas emission savings of fuels have to be at least 70% for compliance with the GHG savings criteria, i.e. in order to be zero-rated. In case of SLCFs an additional criterion is the avoidance of double counting[114]. The calculation methodology for the GHG savings is laid out in Regulation (EU) 2023/1185. The calculation is usually performed by an economic operator certified under a "RED II certification scheme" (a national or (international) voluntary scheme in accordance with Article 30 of the RED II).

9.1.3.3 National systems

Member States' implementations of the RED II use diverse approaches. There is no complete overview available of Member States' national systems on providing evidence of compliance with the RED II criteria for biomass and other zero-rateable fuels. Operators and aircraft operators should obtain information on national systems from the relevant competent authority.

The RED II does not explicitly require a Member State to publish dedicated information. However, it is considered best practice to provide transparent information to operators. For the purpose of the EU ETS, Member States are therefore encouraged to consider practical ways of making information available to the public regarding the sustainability of biomass and other fuels (by producer, brand, generic type or other suitable grouping), suppliers or producers thereof, or similar information, which allow the user of these biofuels, bioliquids, biomass fuels or other fuels (and any EU ETS verifier) to gather assurance that a material complies with the applicable sustainability criteria.

Under the RED II, Member States may use the possibility of Article 30(6) to notify a national scheme to the Commission for recognition. If such recognition is granted, the relevant information will be published on the Commission website[115], and all other Member States are required to accept the resulting certificates, like it is the case of voluntary international schemes recognised by the Commission. National schemes have a national scope only, since it is difficult for a national scheme to have the legal basis and technical capacity to perform certification in other Member States or in third countries. Therefore, the use of international voluntary systems may be desirable in many cases where the biofuel, bioliquid, biomass fuel or any other zero-rateable fuel is not used in the Member State where it is produced (e.g. in the aviation sector).

9.1.3.4 Voluntary schemes

Details on all voluntary schemes recognised by the Commission can be found on the Commission's website[116]. Regarding schemes not [yet] recognised by the

[114] The CO_2 used for producing the SLCF has to come from a source for which already allowances have been surrendered under the EU ETS, unless the CO_2 itself was zero-rated. This ensures that the SLCF comes from a source with a reliable MRV system in place and avoiding double counting.

[115] See footnote 116.

[116] https://energy.ec.europa.eu/topics/renewable-energy/biofuels/voluntary-schemes_en . Approvals are valid for 5 years. It is therefore necessary to check the validity period of the approval in the relevant Commission Decision.

Commission, Member States may accept those schemes, if they come to their own conclusion that the scheme ensures compliance of the biomass or other zero-rateable fuel with RED II criteria. Under the same conditions, the Member States may continue the acceptance of certificates issued by schemes approved under the previous version of the RED II. However, Member States may have also other specific provisions in their legislation, e.g. allowing only schemes that have been recognised by the Commission. Hence, except when using schemes recognised by the Commission, operators will always have to check with their competent authority or national legislation how to provide evidence that the fuel used complies with the RED II criteria applicable at the time the biomass or other zero-rateable fuel was purchased by the installation using or intending to use it.

The most important aspect of the schemes recognised by the Commission is their applicability across the EU in a harmonised manner. This means that a biofuel, bioliquid or biomass fuel, RFNBO, RCF or SLCF certified under such a recognised scheme will have to be recognised as sustainable in all Member States.

An operator who purchases a zero-rateable fuel which has received a proof of sustainability from a recognised voluntary scheme (i.e. a certificate of compliance with that scheme's rules), may in any case assume that it can be considered to comply with RED II criteria, and can be used with an emission factor of zero in the EU ETS[117]. However, there are important limitations:

- The operator has to be aware that some voluntary schemes are approved only for some fuels types, some of the required criteria (e.g. only the sustainability criteria or only the GHG savings criteria), or only regarding some steps of the value chain (e.g. only collecting and trading of biomass, or only the actual biofuel production or processing stage, etc.). If applicable, another proof must be obtained for the remaining criteria or missing parts of the value chain.
- In particular the GHG savings criteria are highly dependent on the distance of transport to the EU ETS installation (see default values in Annex VI of RED II). Hence, if the economic operator under the certification scheme does not carry out the verification of the GHG savings criterion specifically for each site where the biomass or other zero-rateable fuel is used, the operator will have to provide his own evidence for this purpose and ensure appropriate verification, or request an economic operator under the certification scheme to provide the missing certification. The latter may often be preferred by operators due to its simplicity, and may be required by the installation's Member State.
- Some sustainability schemes cover a wider scope than just RED II criteria. Many have an international background. Some have set up a specific version of the same overarching scheme for the purpose of demonstrating RED II compliance. Only the latter is recognised by the Commission. Operators, verifiers and competent authorities should be aware of these differences (where applicable), and use only certificates which explicitly refer to those "RED II compliant versions" of the voluntary schemes as eligible for zero-rating in the EU ETS.
- Some schemes are recognised with limited geographical scope (e.g. if auditing services are available only in specific countries).

[117] In case of mixed materials or fuels, obviously the zero-rating applies only to the fraction of the zero-rateable fuel.

- The Commission's recognition of voluntary schemes are usually valid for five years. Furthermore, economic operators' certification can be suspended by the certification scheme. Only fuels certified by an economic operator covered by a valid recognition are eligible for zero-rating in the EU ETS.

Since all voluntary schemes are required to publish their rules, their certification bodies and the certificates issued on their website, operators of EU ETS installations can obtain all the required information. In case of doubt, direct contact to the certification scheme operator should be sought.

9.1.3.5 How do RED II certification schemes work?

Note: This section may apply to both, national or international schemes, which may be voluntary or required by Member States. Furthermore, this section only describes certification schemes for biomass, but the principles are the same for certification of RFNBO, RCF and SLCFs (with the exception that for the latter only GHG savings criteria apply).

Guidance document No.3 contains details on this topic in section 3.5.5. It is assumed that aircraft operators will rely on such RED II schemes, but the level of detail in GD3 exceeds their needs.

RED II "Certificate" vs. "Proof of Sustainability"

A *certificate*[118] is what certifies that an economic operator complies with the rules of the certification scheme. The *Proof of Sustainability*[119] *(PoS)* is issued by the economic operator for confirming that a certain consignment of biomass material, biofuel, biogas, or biomass fuel fulfils the sustainability or GHG savings criteria.

The role of a certification body is different from the EU ETS verifier in that not specific environmental data are verified, but the certification means that the **economic operator is certified as being capable** of managing the sustainability information, GHG savings data or the relevant mass balance system, depending on the certification scope. Depending on the certification scheme's rules, such certificate is valid for one year from the certification[120] (i.e. forward-looking, while EU ETS verification confirms data from the past). This does not mean that the auditor will not check data from specific consignments (batches) of biomass, but still the certificate proves that the economic operator is capable of issuing "proofs of sustainability" for the biomass material, biofuel, biogas or biomass fuel.

[118] Article 2(4) of **Implementing Regulation (EU) 2022/996** defines "*'certificate' means a conformity statement by a certification body within the framework of a voluntary scheme, certifying that an economic operator complies with the requirements of Directive (EU) 2018/2001 [the RED II]*";

[119] Article 2(23) of **Implementing Regulation (EU) 2022/996**defines "*'proof of sustainability' means a declaration by an economic operator, made on the basis of a certificate issued by a certification body within the framework of a voluntary scheme certifying the compliance of a specific quantity of feedstock or fuels with the sustainability and greenhouse gas emissions savings criteria set out in Articles 25(2) and 29 of Directive (EU) 2018/2001* [the RED II]".

[120] The certificate has to give the validity period.

For the EU ETS aircraft operators this means that **the evidence required is the "proof of sustainability"** for each of the consignments (batches) of biofuel used so that emissions from biomass can be zero-rated in the annual emissions report. The evidence can be obtained by one of the following methods:

- The supplier of the biofuel provides a proof of sustainability for the biofuel purchased by the aircraft operator or delivered to the airport. The aircraft operator (and EU ETS verifier) would only have to check if the full value chain[121] and all required RED II criteria are covered. For the GHG savings criteria, emissions from transport to the airport need to be included.
- For installations, other options exist, which are less likely to be applicable to aircraft operators, but theoretically possible:
  - If the operator of the EU ETS installation or aircraft operator has obtained a certificate from a certification scheme, the operator can apply the processes it has established for obtaining the certification, and issue proofs of sustainability for the biomass in question, and manage its own mass balance system for this purpose.
  - Alternatively, and if applicable, the operator or aircraft operator can apply other processes or certification rules, e.g. rules provided by a national scheme or directly by the Member State's legislation, taking into account any specific rules for auditing provided by the Member State.

9.1.3.6 Evidence to be provided for the use of alternative aviation fuels and the proof of compliance with RED II criteria

In principle, in order to allow an alternative fuel to be zero-rated, the aircraft operator has to provide for each batch of alternative fuel a "PoS" (Proof of Sustainability) issued by an economic operator certified by one of the RED II certification schemes. In particular, a PoS coming directly from the Union Database linked to the fuel invoice will be the preferred evidence.

However, cases exist where the PoS has to be used for other purposes than the EU ETS. As solution to this problem, some certification schemes offer to provide a "PoC" (Proof of Compliance), i.e. a kind of copy of the PoS. One PoS can be split into several PoCs (e.g. if one batch of fuel is split into several deliveries to different aircraft operators). However, a PoC must be based on a specific PoS and must be designed and tracked by the certification scheme in a way that it cannot lead to double use of the same quantity of alternative fuel by different actors.

It is to be noted that the PoC is a voluntary service offered by the certification scheme, but is not part of the RED II, rather building and expanding on these processes[122]. Therefore, it is up to the administering Member State to decide if such evidence is accepted. The Member States may also decide to accept any other documentation they deem to fulfil and demonstrate all the necessary requirements. The Task Force Aviation under the EU ETS Compliance Forum has

[121] "Full value chain" means from cultivation/first gathering point to the gate of the installation, including applicable processing steps (e.g. production of a biofuel). The steps covered should be indicated on the proofs of sustainability provided by the fuel supplier in this case.

[122] More Information on the certification of PoCs in the context of existing certification frameworks can be found for example in: https://www.iscc-system.org/wp-content/uploads/2024/12/ISCC-Guidance-Document-Proof-of-Compliance-V1.0.pdf

developed guidance for this purpose, which can be found at the Commission's website:

https://climate.ec.europa.eu/document/download/88f6d12c-3a59-4701-8c3c-2dfba63ebb0a_en?filename=policy_ets_monitoring_alternative_fuels_guide_for_aesawg_en.pdf

9.1.3.7 Evidence to be provided for the use of alternative aviation fuels under the CH ETS

In order to claim an alternative fuel as zero-rated under the CH ETS, the following conditions must be met:

- The alternative fuel must be placed on the market in Switzerland. It should be noted that only alternative fuels meeting the sustainability and greenhouse gas saving requirements referred to in Article 35d of the Environment Protection Act may be placed on the market in Switzerland.
- Guarantee of Origin (GO) certificates must have been assigned to the CH ETS in the electronic Swiss GO-System in favour of the aircraft operator. GO certificates will only be generated if a PoS issued by a RED II certified economic operator is available for each batch of alternative fuels.
- The amounts of alternative fuels purchased must be indicated on the aircraft operator's fuel invoices.
- The alternative fuels have been attributed to the aircraft operator's CH ETS flights in proportion of the emissions subject to the CH ETS compared to the total emissions from fuels uplifted in Switzerland.

9.1.4 The Union Database (UDB)

New!

The union database (UDB)[123,124] is a global database that covers data of traded fuels (liquid and gaseous) and the raw materials used for their production from the 1st collection point of the raw material until the produced fuels are put for consummation on the EU market. For each fuel stream this covers transaction data between economic operators as well as the fuel's sustainability characteristics. The goal of the database is to promote transparency and to hinder irregularities by ensuring that fuels and raw materials are traceable. It thereby provides a fully electronic implementation of the mass balance requirement under Article 30(1) of the RED II, for all liquid and gaseous biofuels. At a later stage, RFNBOs will also be included.

The application of the UDB has the following advantages:

- Each fuel can be traced back to the point of origin (PoO) of the relevant raw material;
- The proof of sustainability (PoS) is digitalized with a unique reference PoS identifier (PoS ID);

[123] Article 31a REDII

[124] User Guides and Demo Videos for the Usage of the UDB can be found here: https://wikis.ec.europa.eu/pages/viewpage.action?pageId=102630809. Access to the database is found on that site under "Links".

- The total GHG emissions can be determined for each fuel stream at any point of the supply chain;
- Certificates as well as PoS ID can be validated through the Database;
- The UDB can be used as the basis for the reporting of renewable energy consumption;
- Auditing and certification is simplified.

The UDB was created according to Article 31a of RED II (second revision entering into force in November 2023). Due to the strengthening of the UDB under the RED's revision, a tracing mechanism for liquid and gaseous renewable and recycled fuels was planned to start from 21 November 2024. For the aviation and maritime sectors an extended UDB design is planned.

For the establishment of the UDB the following characteristics were defined:

- The Union's interconnected gas system is defined as a single mass balance system;
- The UDB contains data on the injection and withdrawal of renewable gaseous fuels into the Union´s interconnected gas system;
- Local grids are subjected to different mass-balances;
- Trade between grids will be reported as trade transactions;
- PoS can be transferred and monitored within the grid without the need for traceability
- Data on support, including the type of scheme, for the production of a fuel consignment must be recorded in the database;
- National databases can be used to enter data into the UDB;
- The UDB's data can be made publicly available in aggregated form omitting all personal or commercially sensitive data.

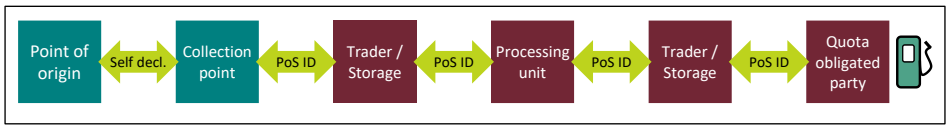

Figure 7: Functioning of the UDB

Functioning of the UDB

Figure 7 depicts the entire value chain of a batch of fuel from its point of origin to its consumer. The transactions between the different sellers, as well as processing steps (e.g. biofuel production from harvested plants) are recorded in the UDB. This is characterized by the following steps:

- The first declaration of the batch of biomass occurs at the first collection point after initial transfer from the Point of Origin;
- During each further trade of the batch of fuel a PoS ID is associated. This identifier includes:
  - The GHG emissions of the batch of fuel until this point;
  - The quantity of material or fuel;
  - The point of origin of the traded batch of material or fuel;

    - A link to the previous PoS ID[125].
- The trade is reported to the UDB by each seller;
- Buyers can reject the trade only with reason;
- The transactions can be corrected in a specific time frame;
- Economic operators are registered in the UDB based on the certificate information from a certification scheme or information provided by the Competent authority of a Member State in the case of final fuel suppliers;
- Competent authorities can check the validity of a PoS claimed to be evidence for zero-rating by an operator.

[125] This is just the case for the transaction happening after a first PoS ID has been issued

9.2 Annex II: Unreasonable costs

Note: This section of the annex is included in this guidance only for completeness reasons. It explains the concept of unreasonable cost, which is not as important for aircraft operators as for operators of stationary installations in the EU ETS. Consequently, this section is taken from guidance document No. 1, and gives also examples for installations.

Cost effectiveness is an important concept for the MRR. It is generally possible for the (aircraft) operator to get permission from the competent authority to derogate from a specific requirement of the MRR, if fully applying the requirement would lead to **unreasonable costs**. Therefore, a clear-cut definition for "unreasonable costs" is required. It is found in Article 18 of the M&R Regulation. As outlined below, it is based on a cost/benefit analysis for the requirement under consideration.

Similar derogations may be applicable if a measure is **technically not feasible**. Technical feasibility is not a question of cost/benefit, but whether the (aircraft) operator is able to achieve a certain requirement at all. Article 17 of the MRR requires that an (aircraft) operator provides a justification where he claims something to be technically not feasible. This justification must demonstrate that the (aircraft) operator does not have the resources available to meet the specific requirement within the required time.

When assessing whether costs for a specific measure are reasonable, the costs are to be compared with the benefit it would give. Costs are considered unreasonable where the costs exceed the benefit (Article 18 of the MRR). The detailed description of the cost-benefit analysis is a new element in the MRR.

Costs: It is up to the (aircraft) operator to provide a reasonable estimation of the costs involved. Only costs which are additional to those applicable for the alternative scenario should be taken into account. The MRR also requires that the equipment costs are to be assessed using a depreciation period appropriate for the economic lifetime of the equipment. Thus, the annual costs during the lifetime rather than the total equipment costs are to be used in the assessment.

Example (applicable for stationary installations): An old measuring instrument is found to not function properly any more, and is to be exchanged for a new one. The old instrument has allowed reaching an uncertainty of 3% corresponding to tier 2 (±5%) for activity data. Because the operator would have to apply a higher tier anyway, he considers whether a better instrument would incur unreasonable costs. Instrument A costs 40 000 € and leads to an uncertainty of 2.8% (still tier 2), instrument B costs 70 000 €, but allows an uncertainty of 2.1% (tier 3, ±2.5%). Due to the rough environment in the installation, a depreciation period of 5 years is considered appropriate.

The costs to be taken into account for the assessment of unreasonable costs are 30 000 € (i.e. the difference between the two meters) divided by 5 years, i.e. 6 000 €. No cost for the working time should be considered, as the same workload is assumed to be necessary independent from the type of the meter to be installed. Also same maintenance costs can be assumed as approximation.

Benefit: As the benefit of e.g. more precise metering is difficult to express in financial values, an assumption is to be made following the MRR. The benefit is considered to be proportionate to an amount of allowances in the order of magnitude of the reduced uncertainty. In order to make this estimation independent from daily price fluctuations, the MRR requires a constant allowance price of 80 € to be applied. For determining the assumed benefit, this allowance price is to be multiplied by an "improvement factor", which is the improvement of uncertainty multiplied by the average annual emissions caused by the respective source stream[126] over the three most recent years[127]. The improvement of uncertainty is the difference between the uncertainty currently achieved[128] and the uncertainty threshold of the tier which would be achieved after the improvement.

Where no direct improvement of the accuracy of emissions data is achieved by an improvement, the improvement factor is always 1%. Article 18(3) of the MRR lists some of such improvements, e.g. switching from default values to analyses, increasing the number of samples analysed, improving the data flow and control system, etc.

Please note the **minimum threshold** introduced by the MRR: Accumulated improvement costs below 4 000 € per year are always considered reasonable, without assessing the benefit.

Summarizing the above by means of a formula, the costs are considered reasonable, if:

$$C < P \cdot AEm \cdot \left(U_{curr} - U_{new\ tier}\right) \quad (9)$$

Where:

C .....Costs [€/year]

P .....specified allowance price = 80 € / t $CO_{2(e)}$

AEm .....Average emissions from related source stream(s) [t $CO_{2(e)}$/year]

U_{curr} .....Current uncertainty (not the tier) [%]

$U_{new\ tier}$ ....Uncertainty threshold of the new tier that can be reached [%]

Example: For the replacement of meters described above, the benefit of "improvement" for instrument A is zero, as it is a mere replacement maintaining the current tier. It cannot be unreasonable, as the installation cannot be operated without at least this instrument.

In case of instrument B, tier 3 (threshold uncertainty = 2.5 %) can be reached. Thus, the uncertainty improvement is $U_{curr} - U_{new\ tier}$ = 2.8% – 2.5% = 0.3%.

[126] Where one measuring instrument is used for several source streams, such as a weighbridge, the sum of emissions of all related source streams should be used.

[127] Only the fossil emissions are considered. Where the most average emissions of the most recent three years are not available or not applicable due to technical changes, a conservative estimate is to be used.

[128] Please note that the "real" uncertainty is meant here and not uncertainty threshold of the tier.

The average annual emissions are AEm = 120 000 t CO_2/year. Therefore, the assumed benefit is 0.003 ·120 000 ·80 € =28 800 €. This is higher than the assumed costs (see above). It is therefore not unreasonable to require instrument B installed.

9.3 Annex III: Uncertainty

Note: This section of the annex is included in this guidance only for completeness reasons. It explains the concept of uncertainty, which is not as important for aircraft operators as for operators of stationary installations in the EU ETS. It is taken from guidance document No. 1.

When somebody would like to ask the basic question about the quality of the MRV system of any emission trading system, he would probably ask: "How good is the data?" or rather "Can we trust the measurements which produce the emission data?" When determining the quality of measurements, international standards refer to the quantity of "uncertainty". This concept needs some explanation.

There are different terms frequently used in a similar way as uncertainty. However, these are not synonyms, but have their own defined meaning (see also illustration in Figure 8):

- **Accuracy**: This means closeness of agreement between a measured value and the true value of a quantity. If a measurement is accurate, the average of the measurement results is close to the "true" value (which may be e.g. the nominal value of a certified standard material[129]). If a measurement is not accurate, this can sometimes be due to a systematic error. Often this can be overcome by calibrating and adjustment of instruments.
- **Precision**: This describes the closeness of results of measurements of the same measured quantity under the same conditions, i.e. the same thing is measured several times. It is often quantified as the standard deviation of the values around the average. It reflects the fact that all measurements include a random error, which can be reduced, but not completely eliminated.
- **Uncertainty[130]**: This term characterizes the range within which the true value is expected to lie with a specified level of confidence. It is the overarching concept which combines precision and assumed accuracy. As shown in Figure 8, measurements can be accurate, but imprecise, or vice versa. The ideal situation is precise and accurate.

If a laboratory assesses and optimizes its methods, it usually has an interest in distinguishing accuracy and precision, as this leads the way to identification of errors and mistakes. It can show such diverse reasons for errors such as the

[129] Also a standard material, such as e.g. a copy of the kilogram prototype, disposes of an uncertainty due to the production process. Usually this uncertainty will be small compared to the uncertainties later down in its use.

[130] The MRR defines in Article 3(6): 'uncertainty' means a parameter, associated with the result of the determination of a quantity, that characterises the dispersion of the values that could reasonably be attributed to the particular quantity, including the effects of systematic as well as of random factors, expressed in per cent, and describes a confidence interval around the mean value comprising 95% of inferred values taking into account any asymmetry of the distribution of values.

need for maintenance or calibration of instruments, or for better training of staff. However, the final user of the measurement result (in the case of the ETS, this is the operator and the competent authority) simply wants to know how big the interval is (measured average ± uncertainty), within which the true value is probably found.

In the EU ETS, only one value is given for the emissions in the annual emissions report. Only one value is entered in the verified emissions table of the registry. The (aircraft) operator can't surrender "N ± x%" allowances, but only the precise value N. It is therefore clear that it is in everybody's interest to quantify and reduce the uncertainty "x" as far as possible. This is the reason why monitoring plans must be approved by the competent authority, and why (aircraft) operators have to demonstrate compliance with specific tiers, which are related to permissible uncertainties.

The uncertainty analysis which is to be added to the monitoring plan (only for installations) as supporting document (Article 12(1) of the MRR) is discussed in section 6.4. For more details, a separate guidance document on the assessment of uncertainty in the EU ETS is provided (Guidance document No. 4, see section 2.3).

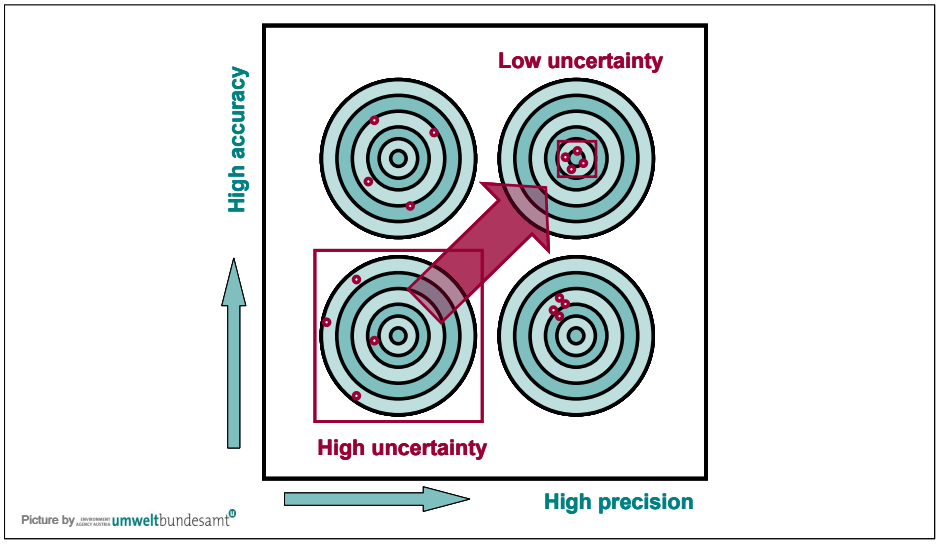

Figure 8: *Illustration of the concepts accuracy, precision and uncertainty. The bull's eye represents the assumed true value, the "shots" represent measurement results.*

Example: An aircraft operator is operating five aircraft and 500 flights each per year resulting in 2,500 total fuel uplifts in one year. Method A is used for the determination of the fuel consumed.

$$F_N = T_N - T_{N+1} + Up_{N+1}$$

where:

$F_{N,A}$..... Fuel consumed for the flight under consideration (=flight N) determined using method A [t]

T_N ..... Amount of fuel contained in aircraft tanks once fuel uplift for the flight under consideration (=flight N) is complete [t]

T_{N+1} ..... Amount of fuel contained in aircraft tanks once fuel uplift for the subsequent flight (=flight N+1) is complete [t]

Up_{N+1} ... Fuel uplift for the subsequent flight (=flight N+1) [t]

The total amount of fuel consumed over the year is then simply the sum of all F_N. Assuming that all flights are covered by the ETS, i.e. all flights start or end within the EU, only the fuel contained in the aircraft tank before the first flight and after the last flight are relevant. All other readings in between are mutually cancelled out:

$$\sum_{N=1}^{2500} F_N = \sum_{N=1}^{2500} (T_N - T_{N+1} + Up_{N+1}) = T_1 - T_{2500} + \sum_{N=1}^{2500} Up_{N+1}$$

The amount of fuel contained in the tank and all uplifts will usually be determined by volumetric flow meters. Therefore, each uplift has to be converted into mass amounts by multiplying with the density of the fuel:

$$T_{(tonnes)} = T_{(Volume)} \cdot \rho \qquad Up_{(tonnes)} = Up_{(Volume)} \cdot \rho$$

where:

ρ ..... (actual) density of the fuel

It is assumed that the uncertainty related to the determination of the density is ±3% and that the uncertainty related to the volume of the uplift is ±0.5%. The (relative) uncertainty u of the mass of each uplift can be determined as the uncorrelated (i.e. independent) uncertainty of a product[131]:

$$u_{Up,tonnes} = \sqrt{u_{Up,Volume}^2 + u_{density}^2} = \sqrt{0.5\%^2 + 3\%^2} = 3.04\%$$

The relative uncertainty related to the total amount of fuel consumed over the year can be calculated as an uncorrelated (independent) uncertainty of a sum[131]:

$$u_{fuel(year)} = \frac{\sqrt{(U_{T,1})^2 + (U_{T,2500})^2 + (U_{Up,1})^2 + .. + (U_{Up,2500})^2}}{|T_1 - T_{2500} + Up_1 + .. + Up_{2500}|}$$

where:

U ..... absolute uncertainty of the parameter in index

u ..... relative uncertainty of the parameter in index

It is assumed that the uncertainty related to the tank level reading is ±0.1m³ and that the amount contained in the tank after each uplift is approximately the same amount, e.g. 8m³. In this example the related uncertainty would be u_T = 1.25%. Therefore, the uncertainty related to the tank level reading is small compared to the uncertainty related to the fuel uplift uncertainty. This simplifies the determination of the relative uncertainty related to the total amount of fuel consumed over the year:

[131] For further information please see Annex III of Guidance Document 4 on Uncertainty.

$$u_{fuel(year)} = \frac{\sqrt{2 \cdot (U_{T,1})^2 + 2500 \cdot (U_{Up,1})^2}}{\left|2500 \cdot Up_1\right|} \approx \frac{\sqrt{2500 \cdot (U_{Up,1})^2}}{\left|2500 \cdot Up_1\right|} = \frac{1}{50} \cdot u_{Up,1}$$

$$u_{fuel(year)} = \frac{1}{50} \cdot u_{Up} = \frac{1}{50} \cdot 3.04\% = 0.06\%$$

It can be seen clearly that the more uplifts happen during the year, the lower is the overall uncertainty related to the total amount of fuel consumed. Under the assumption that each uplift is about the same amount having equal uncertainty, the overall (relative) uncertainty is calculated by dividing the (relative) uncertainty of a single uplift by the square root of the total number of uplifts in this year.

Furthermore you may note that the absolute values of the fuel uplifts, the density of the fuel or the size of an aircraft's fuel tank are of no relevance for the determination of the overall (relative) uncertainty under the given assumptions.

It also needs to be noted that the uncertainty related to the tank level readings may not be negligible if many flights of the same aircraft are carried out outside the EU ETS, i.e. neither starting nor landing within the EU.

9.4 Annex IV: Acronyms

EU ETS.....EU Emission Trading System

CH ETS.....Swiss Emission Trading System

UK ETS.....UK Emission Trading System

CORSIA.....Carbon Offsetting and Reduction Scheme for International Aviation

ICAO .....International Civil Aviation Organisation

MRV.....Monitoring, Reporting and Verification

MRR.....Monitoring and Reporting Regulation (M&R Regulation)

AVR .....Accreditation and Verification Regulation (A&V Regulation)

MP .....Monitoring Plan

CA .....Competent Authority

AER .....Annual Emissions Report

MS .....Member State(s); In this guidance always meaning “EEA state”, i.e. “EU Member State or EFTA State”

EEA.....European Economic Area (covers EU and EFTA countries)

EFTA.....European Free Trade Association (members: Norway, Iceland, Liechtenstein, Switzerland; The latter does not participate in the EU ETS)

CRCO .....Eurocontrol’s Central Route Charges Office

SET.....Small Emitter Tool (Eurocontrol)

EMIS .....Environmental Management Information Service (Eurocontrol)

9.5 Annex V: Legislative texts

EU ETS Directive: Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a system for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC, amended several times, e.g. by Directive 2009/29/EC in order to prepare the third EU ETS phase, and by Regulation (EU) 421/2014 regarding the scope for aviation activities, and simplifications for certain small emitters. Download of the consolidated version:
http://data.europa.eu/eli/dir/2003/87/2024-03-01

The “CORSIA Delegated Act”: Commission Delegated Regulation (EU) 2025/927 of 31 July 2025 supplementing Directive 2003/87/EC of the European Parliament and of the Council as regards measures adopted by the International Civil Aviation Organization for the monitoring, reporting and verification of aviation emissions for the purpose of implementing a global market-based measure and repealing Commission Delegated Regulation (EU) 2019/1603. Download under:
http://data.europa.eu/eli/reg_del/2025/927/oj

The "CORSIA Offsetting Regulation": Commission Implementing Regulation (EU) 2024/1879 of 9 July 2024 laying down rules for the application of Directive 2003/87/EC of the European Parliament and of the Council as regards the calculation of offsetting requirements for the purpose of CORSIA. Download under: http://data.europa.eu/eli/reg_impl/2024/1879/oj

The "FEETS Delegated Act": Commission Delegated Regulation (EU) 2025/723 of 6 February 2025 supplementing Directive 2003/87/EC of the European Parliament and of the Council by laying down detailed rules for the yearly calculation of price differences between eligible aviation fuels and fossil kerosene and for the EU ETS allocation of allowances for the use of eligible aviation fuels. Download under: http://data.europa.eu/eli/reg_del/2025/723/oj

M&R Regulation: Commission Implementing Regulation (EU) No. 2066/2018 of 19 December 2018 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council and amending Commission Regulation (EU) No. 601/2012. Download under: http://data.europa.eu/eli/reg_impl/2018/2066/2025-05-27

A&V Regulation: Commission Implementing Regulation (EU) 2018/2067 on the verification of data and on the accreditation of verifiers pursuant to Directive 2003/87/EC of the European Parliament and of the Council Download under: http://data.europa.eu/eli/reg_impl/2018/2067/2025-06-22

RED II: Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast). Download under: http://data.europa.eu/eli/dir/2018/2001/oj

Swiss Linking agreement: Agreement between the European Union and the Swiss Confederation on the linking of their greenhouse gas emissions trading systems Download under: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02017A1207%2801%29-20201105

EEA agreement: Inclusion of the EU ETS for Aviation in the EEA agreement: Decision of the EEA Joint Committee No 6/2011 of 1 April 2011 amending Annex XX (Environment) to the EEA Agreement: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:093:0035:0037:EN:PDF

Scope guidance: Commission Decision 2009/450/EC of 8 June 2009 on the detailed interpretation of the aviation activities listed in Annex I to Directive 2003/87/EC of the European Parliament and of the Council: http://data.europa.eu/eli/dec/2009/450/oj

Commission's list of aircraft operators: For the latest Regulation see: https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets/monitoring-reporting-and-verification-eu-ets-emissions_en