

Opportunities and advantages for an accreditation body offering the scope of “validation and verification” according to the ISO/IEC 17029 and ISO 14065 standards and CORSIA subscope

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Presentation Overview

- Overview of the training:
 - Validation and verification
 - Introduction to CORSIA requirements
- Requirements for accrediting validation/verification bodies
- Key documents of CORSIA and requirements for monitoring, reporting and verifying emissions from international flights
- CORSIA offsetting requirements; emissions units and their cancellation
- How CORSIA MRV data are verified; advice to NABs

Validation/Verification Overview and Context

Risks and opportunities

Price of carbon

The role of assurance



Validation/Verification Overview

- Validation/verification is the newest scope of accreditation defined by a CASCO standard
- The principles and requirements are defined in ISO/IEC 17029
 - ISO 14065 provides sector-specific information for environmental information generally and GHG statements in particular
- The process steps for GHG validation and verification are defined in ISO 14064-3
 - ISO 14017 defines validation/verification steps for water statements

The Context for Validation and Verification

- The quantification of emissions de CO₂, as well as the quantification of reductions of greenhouse gas (GHG) emissions and removal enhancements play many important roles
 - Informs emitters of GHGs and their regulators
 - Establishes a reference point for GHG emission reductions by States according to their Nationally Determined Contributions (NDCs)
 - Facilitates a voluntary or regulatory market for the exchange of GHG emissions reductions and removal enhancements
- For decision making and markets to function well, GHG information should be validated and verified

Overview of Validation and Verification

- Validation and verification have many definitions
 - In everyday language
 - In quality management
 - In the context of greenhouse gas statements
- We use these terms solely with the specific meanings they have in the auditing of statements of environmental information

Definition of Verification

Process for evaluating an environmental information statement based on historical data and information to determine whether the statement is materially correct and conforms to criteria

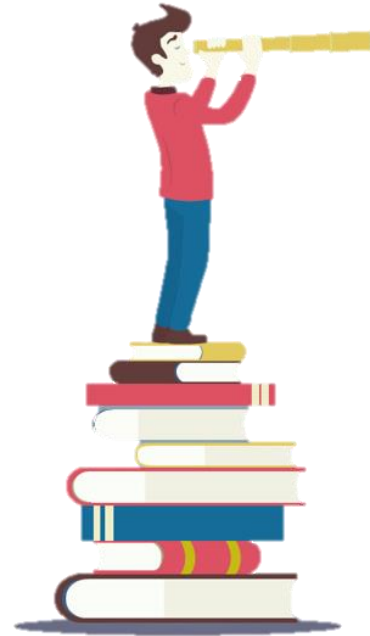
ISO 14065, 3.3.15



Definition of Validation

Process for evaluating the reasonableness of the assumptions, limitations and methods that support an environmental information statement about the outcome of future activities

ISO 14065, 3.3.16



The Scope of Validation and Verification Programs on Statements May Be Broad

- Statements relative to emissions of greenhouse gases
- Reports on sustainable development or the environment
- Statements relative to:
 - Construction technologies
 - Software engineering
 - Energy management
 - Financial management
 - And many others

Applications of Validation and Verification in the Scope of Greenhouse Gases

→ Statements relative to

- Greenhouse gas inventories according to ISO 14064-1
- Emission reduction and removal enhancement projects according to ISO 14064-2
- Carbon footprints of product according to ISO 14067

Validation/Verification in ISO/IEC 17011

Definitions of Scope

Obligations of ABs, Competence



Validation/Verification in ISO/IEC 17011

- According to **7.8.3 g**, the scope of accreditation for validation and verification shall, at a minimum, include:
 - The identification of the accredited activity (validation or verification, or both)
 - The standards or regulatory requirements according to which the validation or verification (or both) will be performed
 - The validation or verification program, if applicable
 - The industrial sector, if applicable

Identification of the Activity

- The two activities require different skills
 - A verifier gathers audit evidence to support the accuracy of historical information
 - A validator expresses an opinion on the soundness of the basis for forecast or projected information that project activities will generate upon implementation
- A validation/verification body (VVB) must describe the activities that it plans to perform to the accreditation body (AB)

Standards or Regulatory Requirements

- All ABs that provide accreditation according to ISO 14065 should at a minimum accredit VVBs for the verification of GHG inventories according to ISO 14064-1
- In most cases VVBs will also seek accreditation to perform verification for projects according to ISO 14064-2
- Accreditation may also be offered for the validation of projects and the verification of carbon footprints of product

Validation/Verification Programs: Inventories

- GHG programs are either voluntary or regulatory
- An organization may use ISO 14064-1 (or equivalent) to voluntarily establish an inventory of its GHG emissions
- An environmental authority may mandate that GHG emitters in its jurisdiction report their GHG emissions according to a regulatory program

Validation/Verification Programs: Projects

- A project to reduce emissions or enhance removals may be based on a voluntary program, like the *Verified Carbon Standard*, or regulatory
- The Clean Development Mechanism (CDM) of the United Nations is managed by the UN itself, including the accreditation of Designated Operational Entities (DOEs)
- The United Nations Framework Convention on Climate Change is developing a program to replace the CDM with a new mechanism

Industrial Sectors, If Applicable

- The AB may distinguish industrial sectors within its accreditation scoping policies
 - Sectors are differentiated in order to better evaluate the competence of verifiers and validators
- The composition of these sectors can be influenced by the needs of applicable program operators
- Which sectors would be the most important in Kenya?

Important Economic Sectors in Kenya

- Oil and gas
- Transportation
- Manufacturing

Obligations of ABs Implementing ISO 14065

- Documentation of policies et requirements relative to its accreditation program
- Publication of guidelines, forms, and normative documents written by competent persons in accordance with the needs of interested parties, including program operators
- Access to and deployment of competent personnel
- Training of AB personnel

Verification of GHG Inventories and Projects

Understanding Inventories and Projects
ISO 14064-3 as the Verification Standard
Key Elements of Verification



Further Information about GHG Inventories

- A greenhouse gas inventory established in accordance with ISO 14064-1 is based upon:
 - The identification of greenhouse gas sources, sinks and reservoirs
 - The quantification of emissions of each applicable greenhouse gas (GHG)
 - The normalization of each GHG in CO₂-equivalents using the global warming potentials (GWP) established by the Intergovernmental Panel on Climate Change (IPCC)
 - The preparation of an inventory that consolidates these data

Scope of an ISO 14064-1 Inventory

→ GHG inventories present a comprehensive list of GHG emissions prepared for intended users of the information

→ Example: Chevron/Texaco*

* 2003 Chevron/Texaco Corporate Social Responsibility Update, p 13

i Greenhouse Gas Emissions*

Millions of metric tons CO₂ equivalents



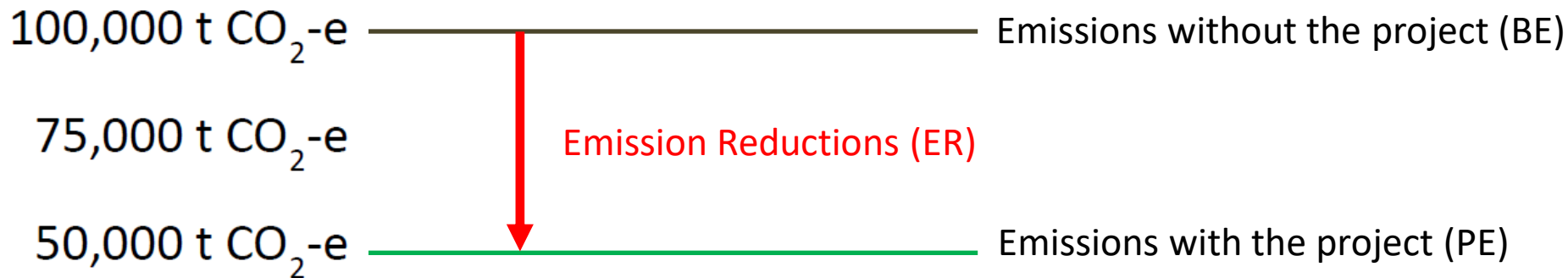
By sector:	2002	2003
Upstream	36.5	37.0
Downstream	24.3	23.7
Other	2.6	3.2
Total	63.4	63.9

By type:	2002	2003 [†]
Direct	62.8	62.6
Indirect	1.5	2.1
Grid Credits	(0.9)	(0.9)
Total	63.4	63.9

Greenhouse Gas Projects

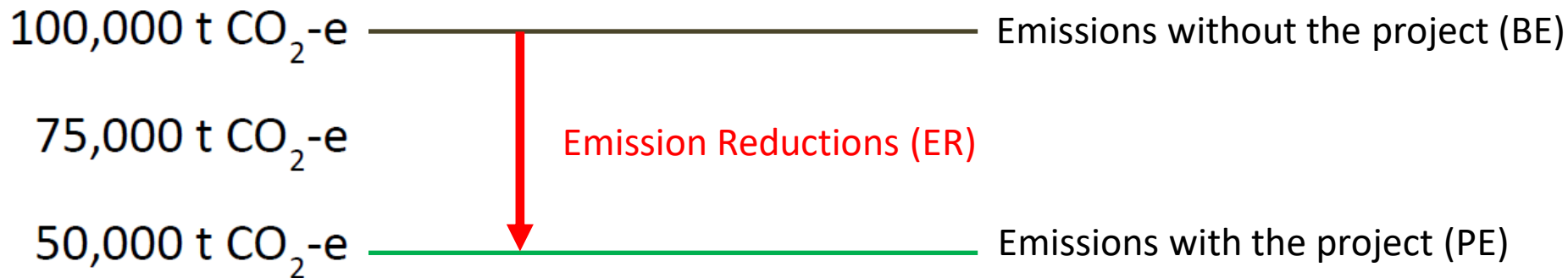
- **GHG project:** “activity or activities that alter the conditions of a GHG baseline and which cause GHG emission reductions or GHG removal enhancements”—ISO 14064-3, 3.4.1
- **GHG baseline:** “quantitative reference(s) of GHG emissions and/or GHG removals that would have occurred in the absence of a GHG project and provides the baseline scenario for comparison with project GHG emissions and/or removals”—ISO 14064-3, 3.4.6

Baseline for Emission Reduction Projects



Work the equation $ER = BE - PE$, find the value of ER

Baseline for Emission Reduction Projects



The answer to the equation $ER = BE - PE$: $ER = 50,000 \text{ tCO}_2\text{-e}$

Baseline for GHG Removal Enhancements



Work the equation $ER = AC - BC \times 44/12$: Find the value of ER

Baseline for GHG Removal Enhancements



The answer to the equation $ER = AC - BC \times 44/12$: $ER = 73,333 \text{ t CO}_2\text{-e}$

Measurement, Reporting, Verification (MRV)

- MRV—key activities in GHG management
- Mitigation projects can create financial instruments (carbon credits) and are therefore susceptible to:
 - over-estimation
 - fraud
 - scams of all kinds

Emission Reduction Projects

- Capture and destruction of methane (e.g. landfills, coal mines)
- Renewable energy
- Livestock manure management
- Destruction of ozone depleting substances

Removal Enhancement Projects

- Reduced emissions from degradation and deforestation (REDD)
- Carbon capture and storage
- Direct air capture
- Use of biochar as a soil amendment

Carbon Footprints of Product

- Type of life cycle assessment limited to a single impact category: climate
- The footprint is calculated on the basis of a functional unit, which is the quantified GHG performance of the studied product system
- Example: Energy used in a system of transport—trains have lower carbon footprints than aircraft for moving passengers 1 km

The Concept of Assurance

- Assurance is the confidence that a person—an “intended user”—can have in a GHG statement
 - Regarding quantitative data, the work of a verifier is very similar to that of a financial auditor
- Accreditation bodies should recognize that the provision of assurance does not correspond to classical conformity assessment that can be evaluated using a check list
- In your opinion, what generates confidence?

Ingredients of Confidence in an Opinion

- Belief in the validation/verification body's impartiality
- Belief that the validation/verification personnel are competent
- Confidence in the exercise of oversight by the accreditation body
- General acceptance of the adherence to the rule of law by related parties and government and business institutions in general
- General perception that corruption, bribery, and self-dealing is both prohibited and absent or very rare

The Importance of ISO 14064-3

- ISO 14064-3 adapted for greenhouse gas accounting the concepts and practices employed in financial audits
- Greenhouse gas opinions resemble very much in form and content the opinions of financial accounting auditors
- ISO 14064-3 recognizes *reasonable assurance* and *limited assurance* just like financial accounting standards do
- ISO 14064-3 allows verifiers to modify opinions according to the same principles that financial auditors use

The Role of Principles in Verification

- The evidence-gathering activities of the body shall take into account “the principles of the standards or GHG program that apply to the GHG statement”
- Accreditation body technical assessors should ensure that verifiers apply relevant principles when occasions arise to do so

Verification Criteria

- Verifiers and validators should evaluate the suitability of criteria (5.1.5)
- Accreditation body technical assessors should expect that verifiers and validators have prepared a brief justification that explains how the suitability of criteria has been assessed

Example of a GHG Inventory

- Annex F of ISO 14064-3 provides an example of a GHG inventory
 - The disclosure format provides for separate accounting of direct and indirect emissions, and many other details

GHG Statement Example

Recommended format for consolidated statement of GHG emissions (values shown for illustration only)

EMISSIONS	Notes	20xx CO ₂ e								Quantitative uncertainty	Qualitative uncertainty
		TOTAL (Tonnes a.a.)	Carbon dioxide (CO ₂)	Methane (CH ₄)	Nitrous oxide (N ₂ O)	Hydrofluoro- carbons (weighted average) (HFCs)	Perfluoro- carbons (weighted average) (PFCs)	Sulfur hexafluoride (SF ₆)	Nitrogen trifluoride (NF ₃)		
		GWP	1	30	265	5 000	4 600	23 500	16 100		
Direct GHG emissions in tonnes CO₂e		83 205	83 050	149	6	0	0	0	0		
1.1 Direct emissions from stationary combustion		2 050	2 050	0	0	0	0	0	0	7%	
1.2 Direct emissions from mobile combustion		81 005	81 000	5	0	0	0	0	0	7%	
Direct process emissions and removals arise from industrial processes		0	0	0	0	0	0	0	0		
1.4 Direct fugitive emissions arise from the release of greenhouse gases in anthropogenic systems		0	0	0	0	0	0	0	0		
Direct emissions and removals from Land Use, Land Use Change and Forestry		0	0	0	0	0	0	0	0		
Direct emissions in tonnes of CO₂ from biomass		718	718								
Indirect Emissions in tonnes CO₂e	5/NS[1]	4 157 450									
2 Indirect GHG emissions from imported energy		70 000									
2.1 Energy-indirect emissions from imported electricity		60 000								15%	
2.2 Energy-indirect emissions from imported energy		10 000								10%	
3 Indirect GHG emissions from transportation		614 950									
3.1 Emissions from Upstream transport and distribution for goods		153 200									C
3.2 Emissions from Downstream transport and distribution for goods		320 000									B
3.3 Emissions from Employee commuting includes emissions		12 200									C
3.4 Emissions from Client and visitor transport	NS										
3.5 Emissions from Business travels		129 550									B
4 Indirect GHG emissions from goods used by organization		3 327 500									
4.1 Emissions from Purchased goods		3 202 500									D
4.2 Emissions from Capital goods		125 000									D
5 Indirect GHG emissions from services used by organization		45 000									
5.1 Emissions from the disposal of solid and liquid waste		45 000									D
5.2 Emissions from the use of assets	NS										
5.3 Emissions from the use of services that are not described in the above subcategories (consulting, cleaning, maintenance, mail delivery, bank, etc.)	NS										
6 Indirect GHG emissions associated with the use of products from the organization		100 000									
6.1 Emissions from the use stage of the product		100 000									B
6.2 Emissions from downstream leased assets	NS										
6.3 Emissions from end of life stage of the product	NS										
7 Indirect GHG emissions from other sources	NS										
REMOVALS											
Direct removals in tonnes CO₂e		100	100	0	0	0	0	0	0		C
STORAGE											
Total storage as of year end in tonnes CO₂e		10	10	0	0	0	0	0	0		C
CARBON FINANCIAL INSTRUMENTS											
Renewable Electricity purchased in kWh		270 000	kWh								
Offsets from GHG Scheme AA in tonnes CO ₂ e		95 000	CO ₂ e								
Credits from GHG Scheme BB in tonnes CO ₂ e		125 000	CO ₂ e								
Other related information											
Performance tracking (emissions and removals by metric, e.g. tonnes CO ₂ e per annual revenue)										See attached document	
Base year GHG emissions, removals, and stocks; and adjustments to base year										See attached document	
Disclosure of most significant sources, sinks, and reservoirs										See attached document	
Statements of emissions (CO ₂ e) per unit of relevant units										See attached document	
Statement of emission reduction initiatives										See attached document	
Significance criteria										See attached document	
Uncertainty assessment										See attached document	

Key Principles

→ 4.2.1 Evidence-based approach to decision making

The process deploys a method for reaching reliable and reproducible validation/verification conclusions and is based on sufficient and appropriate objective evidence. The validation/verification statement is based on evidence collected through an objective validation/verification of the claim.

→ 4.2.3 Fair presentation

Validation/verification activities, findings, conclusions and statements, including significant obstacles encountered during the process, as well as unresolved, diverging views between the validation/verification body and the client are truthfully and accurately reflected.

4.3.2 Competence

Personnel have the necessary knowledge, skills, experience, training, supporting infrastructure and capacity to effectively perform validation/verification activities.

Sufficiency of Evidence

- In case of insufficiency of information to support a statement, the verifier/validator
 - shall not proceed with the validation/verification, and
 - shall disclaim the issuance of an opinion
- It is difficult to assess the sufficiency of evidence, because judgments of this nature are necessarily subjective

Verification Opinions

- A verification opinion consists of two distinct aspects
 - The part of the opinion that provides assurance to intended users about quantitative information
 - The part of the opinion that confirms conformity of the statements with criteria
- Both aspects are important, but assurance on quantitative data cannot be assumed to result from the responsible party's conformity to requirements
 - Instead, assurance results from the application of specific verification procedures that establish the accuracy of GHG statements

Opinion Issued with Reasonable Assurance

→ The opinion is drafted utilizing a “positive” format:

In our opinion we conclude [with reasonable assurance*] that the statements

- present fairly, in all material respects, XYZ company’s greenhouse gas emissions reported for [year 202x], and;
- have been prepared in conformity with [cite International Standards or other criteria] for the quantification and reporting of greenhouse gas emissions”

* The use of these words in the opinion is optional

Opinion Issued with Limited Assurance

→ The opinion is drafted utilizing a “negative” format :

Based on the processes and procedures implemented, nothing comes to our attention which causes us to believe that the GHG statements

- are not materially correct and are not a faithful representation of XYZ Company’s greenhouse gas data and information;
- have not been prepared in conformity with [cite International Standards or other criteria] for the quantification and reporting of greenhouse gases”

Clarifications on Assurance and Opinions

- Only statements of historical information can result in the issuance of an opinion provided with reasonable assurance
- A validation opinion only applies to the *reasonable basis* for the forecast or projection and not to the forecast or provision itself
- With respect to a validation of forecast emissions/removals, the validation opinion shall be expressed in the limited assurance format

Intentional Misstatements

- The standard requires that a body communicate with “appropriate parties when it believes an intentional misstatement or nonconformity with laws and regulations exists, but does not define who “appropriate parties” may be (5.4.3)
- The working group could not agree on an approach that would fit all situations relating to intentional misstatement or legal noncompliance
- At the minimum the body’s client is an “appropriate party” but there may be others according to applicable legal requirements
- In your opinion, what might motivate a responsible party to make intentional misstatements?

Motivations for Intentional Misstatements

- Increase revenues from carbon credit issuance
- Boost an organization's reputation
- Achieve a competitive advantage in the marketplace
- Satisfy shareholders and potential investors

Types of Risk

- **Inherent Risk:** The susceptibility, before the consideration of any responsible party controls, that significant misstatements may exist within the GHG statements
- **Control Risk:** The risk that a material misstatement that may occur in the GHG statement will not be prevented, or detected and corrected, by the responsible party's internal controls
- **Detection Risk:** The risk that the procedures performed by the verifier will not detect a material misstatement

Professional Judgment

- Professional judgment is used when evaluating the connection between the magnitude of risks and the quantity of evidence needed to support audit conclusions
- One way to characterize risk is to use qualitative categories such as high, medium, or low
- The requirements of ISO 14064-3 presume that the validator or verifier will record his/her judgments in working papers

Intended Users of Opinions

→ Who are the intended users of validation/verification opinions?

List of Potential Intended Users

- The client or responsible party
- Regulatory bodies (environmental ministries, financial regulators, civil aviation authorities, etc.)
- Programs that issue carbon credits
- Purchasers and traders of carbon credits
- Oversight bodies (e.g. accreditation authorities)
- Issuers of errors and omissions insurance
- NGOs and civil society

Simple Example of Verification of Data

- The consumption rate of a natural gas oven is 1 kW/hour
- A verifier who decides to verify the GHG emissions from this source must:
 - Establish that the total amount of natural gas consumed in the period covered in the report is accurate by referring to data from a flowmeter or the specifications of the equipment used and operating records
 - Determine if the emission factors used by the responsible party are appropriate
 - Recalculate the emissions for each gas (CO₂, CH₄, N₂O) emitted during combustion
 - Apply GWPs for each gas and calculate the total in tons of CO₂-e

Workshop Activity: Calculate the Emissions

- The oven has operated 80 hours during the week
- Suppose that the emissions of CO₂ are 201 grams/kWh for natural gas (to be confirmed, of course)
- The global warming potential of CO₂ is 1
- How many grams of CO₂ are emitted by the oven during a week?
- How many tons does that make?

Workshop Activity: The Answer

- We multiply 80 hours by 201: 16080 g
- We multiply 16080 par 1: 16080 g
- We multiply 16080 g par 10^{-6} to obtain tons: 0,01608 tCO₂
- We recalculate the GHG values for the natural gas combustion by-products CH₄ and N₂O
 - Though the emissions factors are much lower than for CO₂, the GWPs are higher: 28 for CH₄, 265 for N₂O according to the IPCC Assessment Report 5
- The total of the three results obtained equals the CO₂-equivalent (CO₂-e) for all GHGs emitted during combustion

Some Observations on Validation

- Validation is a process for evaluating the reasonable basis for assumptions, limitations and methods that support a statement about the results of future activities
- Validation is primarily used to confirm the preparations that a project proponent has put in place for a project that generates carbon credits
- Since the publication of the 2nd edition of ISO 14064-3, one can also validate any other statement of the results of future activities, including those associated with an organization

How Validation Is Different from Verification

- Validation focuses on the results of future activities
 - If, in the context of a validation, a validator encounters historical data, these can be *verified*
 - It occurs often that a project baseline is based on historical operational data
- Procedures are designed to consider:
 - the characteristics of future activities,
 - the logic and plausibility of assumptions,
 - the projected GHG emissions linked to them
- The characteristics are detailed in clause 7.1.4 of ISO 14064-3

Requirements for Validation/ Verification Bodies

According to ISO/IEC 17029

Principles

General and Structural Requirements

**Conformity assessment — General
principles and requirements for
validation and verification bodies**

*Évaluation de la conformité — Principes généraux et exigences pour
les organismes de validation et de vérification*

Background of ISO-IEC 17029

- ISO 14065 was published in 2007 as a sectoral application of CASCO's conformity assessment standards
- At the time, no CASCO standard was suitable to serve as the "parent" of ISO 14065
- The development of 17029 was initiated to fill this gap in the CASCO series of standards
 - ISO 14065 served as the inspiration for this new CASCO document

The Relations Between the Two Standards

- The experts on the two working groups (TC207 et CASCO) did not always agree on certain points
- According to ISO rules, a standard can incorporate requirements of another standard by reference
- The definitions in ISO 14065 sometimes substitute for those in ISO/IEC 17029
- ISO 14065 replaced the annexes in ISO/IEC 17029 with its own series

4: Principles of 17029/1

- Principles for the validation/verification process
 - Evidence-based approach for decision making
 - Documentation
 - Fair presentation

4: Principles of 17029/2

- Principles for validation/verification bodies
 - Impartiality
 - Competence
 - Confidentiality
 - Openness
 - Responsibility
 - Responsiveness to complaints
 - Risk-based approach

4: Principles of ISO 14065

- 14065 accepts the principles of 17209 and adds two others
 - Principle de conservativeness
 - Professional scepticism

4: Principles Recognized by ISO 14066

- Principles found in ISO/DIS 14066
 - Integrity
 - Due professional care
 - Professional judgement

The Role of Principles

- Principles serve as the basis for applying requirements
- Validators and verifiers need to consider them when making decisions
- The confidence that can be placed in validation and verification opinions is all the more respected when bodies act with impartiality and demonstrate required competence
- But, principles are not requirements!
- What role should principles play in accreditation?

Role of Principles

- Principles establish an overarching framework for the activity, e.g. impartiality, integrity, fair presentation, documentation
- Principles act as guideposts when making decisions about information, e.g. methods used for estimations
- Principles help define benchmarks, e.g. competence (how much competence is enough?)

5: General Requirements

5.1 Legal entity

[14065] The body shall document the names of its owners, and, if different, the names of the persons who control it

5.2 The body shall be responsible for the activities it performs in Agreed-upon procedures (AUP) engagements and for the reports of factual findings that it issues as a result of the application of the procedures

5.3 Management of Impartiality/1

5.3.1 Validation/verification activities shall be undertaken impartially

5.3.2 The body shall be responsible for the impartiality of its validation/verification activities and shall not allow for commercial, financial or other pressures to compromise impartiality

5.3.3 The body shall monitor its activities and its relationships to identify threats to its impartiality; this monitoring shall include the relationships of its personnel

5.3 Management of Impartiality/2

5.3.4 If a threat to impartiality is identified, its effect shall be eliminated or minimized so that impartiality is not compromised

5.3.5 The body shall have top management commitment to impartiality

5.3.6 The body shall have a publicly available commitment that it understands the importance of impartiality in carrying out its validation/verification activities and manages conflicts of interest and ensures objectivity

5.3 Management of Impartiality/3

5.3.7 Review and decision shall be made by personnel different from those who carried out the validation/verification execution

5.3.8 When providing both validation and verification to the same client, the body shall consider the potential threat to impartiality (e.g. self-review and familiarity) and shall manage this risk accordingly

5.3.9 The body shall not offer or provide both consultancy and validation/verification for the same statement from the same client

5.3 Management of Impartiality/4

5.3.10 Where the body that provides consultancy and the validation/verification body poses an unacceptable threat to the impartiality of the validation/verification body, the validation/verification body shall not provide validation/verification activities to clients who have received consultancy relating to the same claim

5.3.11 The body's activities shall not be marketed or offered as linked with the activities of any organization that provides consultancy

5.3 Management of Impartiality/5

5.3.12 The body shall take action when it is made aware of (e.g. via a complaint) inappropriate links with or announcements by any consultancy organization stating or implying that validation/verification activities would be simpler, easier, faster or less expensive if the validation/verification body were used; a body shall not state or imply that validation/verification would be simpler, easier, faster or less expensive if a specified consultancy organization were used

5.3 Management of Impartiality/6

5.3.13 The body shall take action to respond to any threats to its impartiality arising from the actions of other persons, bodies or organizations; this includes the actions of those bodies to which validation/verification activities have been outsourced

[14065] 5.3 Independent Mechanism

5.3 The body shall ensure, through a mechanism independent of its operation, that impartiality is being achieved

5.4 Liability

5.4 The body shall be able to demonstrate that it has

- evaluated the risks arising from its validation/verification activities and
- that it has adequate arrangements (e.g. insurance or reserves) to cover liabilities arising from its activities in each validation/verification program and the geographic areas it operates

6: Structural Requirements/1

6.1 Organizational structure and top management

- 6.1.1 The body shall be organized and managed so as to enable it to maintain the capability to perform its validation/verification activities
- 6.1.2 Validation/verification activities shall be structured and managed so as to safeguard impartiality
- 6.1.3 The body shall document its organizational structure, duties, responsibilities and authorities of management and other personnel involved in the validation/verification activities and any committees;
 - if the body is a defined part of a legal entity, the structure shall include the line of authority and the relationship to other parts within the same legal entity

6: Structural Requirements/2

- 6.1.4** The body shall identify the top management (board, group of persons, or person) having overall authority and responsibility for each of the following:
- a) development of policies and establishment of processes relating to its operations
 - b) supervision of the implementation of the policies and processes
 - c) ensuring impartiality
 - d) supervision of its finances
 - e) development of validation/verification activities and requirements
 - f) performance of validation/verification activities

6: Structural Requirements/3

- g) decisions and issue of validation/verification opinions
- h) delegation of authority to committees or individuals, as required, to undertake defined activities on its behalf
- i) contractual arrangements
- j) personnel competence requirements
- k) responsiveness to complaints and appeals
- l) management system of the body
- m) provision of adequate resources for validation/verification activities

6.2 Operational Control/1

- 6.2.1** The body shall have a process for the effective control of validation/verification activities delivered by entities under its operational control, branch offices, partnerships, agents, franchisees, etc., irrespective of their legal status, relationship or geographical location
- 6.2.2** The body shall determine and establish the appropriate level and method of control of activities undertaken, including:
- processes, sectors of validation/verification activities
 - competence of personnel, lines of management control
 - reporting and remote access to operations, and records

6.2 Operational Control/2

6.2.3 The body shall consider the risk that these activities pose to the competence, consistency and impartiality of the validation/verification body

Requirements for Validation/ Verification Bodies

According to ISO/IEC 17029
Resource Requirements

**Conformity assessment — General
principles and requirements for
validation and verification bodies**

*Évaluation de la conformité — Principes généraux et exigences pour
les organismes de validation et de vérification*

7: Resource Requirements

7.1 General

The body shall have access to personnel, facilities, equipment, systems and support services that are necessary to perform its validation/verification activities

7.2 Personnel/1

7.2.1 The body shall have access to a sufficient number of competent persons to perform its validation/verification activities

- 7.2.2** The body shall require all personnel involved in validation/verification activities to enter into a legally enforceable agreement by which the personnel commit themselves to the following:
- a) to comply with the processes and instructions of the validation/verification body, including those relating to impartiality and confidentiality
 - b) to declare any prior and/or present association on their own part, or on the part of another person or organization with which they have a relationship (e.g. family member or their employer), with a client of the body

7.2 Personnel/2

c) to reveal any situation known to them that can present them or the validation/verification body with a perceived or actual conflict of interest

7.2.3 The body shall use this information as input into identifying threats to impartiality raised by the activities of such personnel, or by the persons or organizations related to them

7.2.4 All personnel of the body, either internal or external, that could influence the validation/verification activities, shall act impartially

— [14065] Validators and verifiers demonstrate compliance with ethical requirements by adhering to the principles included in clause 4

7.2 Personnel/3

- 7.2.5** Within a period specified by the body, personnel who have provided consultancy on the claim to be the object of validation/verification shall not perform validation/verification activities in relation to their previous involvement, for a period sufficiently long to ensure that threats to impartiality are minimized or eliminated
- [14065]: the period specified shall not be less than two years
- 7.2.6** Personnel, including any committee members, contractors, personnel of external bodies, or individuals acting on the body's behalf, shall keep confidential all information obtained or created during the performance of the body's validation/verification activities

7.2 Personnel/4

7.2.7 The body shall communicate to personnel their duties, responsibilities, and authorities

7.3 Management of Personnel Competence

7.3.1 The body shall have a process for managing competence of its personnel involved in the validation/verification activities

[Requirements from ISO 14065]:

7.3.2 In addition, the body shall establish, implement and maintain a process for:

- a) defining required competencies for each program and sector in which it operates
- b) ensuring that verifiers, validators, technical experts and reviewers have appropriate competencies

[14065]: Management of Competencies/1

- c) Ensuring that there is access to relevant internal or external expertise for advice on specific matters relating to the environmental information program, validation/verification activities, sectors or areas within the scope of their work

The additional requirements and competencies for personnel given in Annexes D, E and F shall be followed as applicable

7.3.3 Performance monitoring shall be periodic. Monitoring techniques may include:

- annual performance reviews, reviews of the reports, on the job monitoring, and interviews
- Monitoring techniques used shall be in proportion with the impact of the performance on the outcome of the validation/verification

[14065]: Management of Competencies/2

- 7.3.4** The body shall establish competent validation/verification teams and shall provide appropriate management and support services.
- If one individual fulfills all the requirements for a validation/verification team, then that person may be considered as a validation/verification team
- 7.3.5** The validation/verification team shall have the ability to apply detailed knowledge of the applicable program, including its:
- a) eligibility requirements
 - b) implementation in different jurisdictions, as applicable
 - c) validation or verification requirements and guidelines

[14065]: Management of Competencies/3

7.3.6 The validation/verification team shall have sufficient technical experience to evaluate:

- a) relevant activities and technologies
- b) quantification, monitoring and reporting, including relevant technical and sector issues

7.3.7 The validation/verification team shall have data and information auditing expertise to evaluate the environmental information statement, including the ability:

- a) to evaluate the information system to determine whether the responsible party has effectively identified, collected, analysed and reported on relevant environmental information, and has systematically taken corrective actions to address any misstatements and nonconformities

[14065]: Management of Competencies/4

- b) to design an evidence-gathering plan
- c) to analyze risks associated with the use of data and data systems
- d) to identify failures in data and data systems
- e) to evaluate the impact of the various streams of data on the materiality of the environmental information statement

7.3.8 The validation/verification team shall be able to communicate effectively in appropriate languages on matters relevant to the validation or verification

[14065]: Management of Competencies/5

7.3.9 The validation/verification team leader shall have:

- a) sufficient knowledge and expertise of the competencies detailed in 7.3.1 to 7.3.5 to manage the validation/verification team in order to meet the validation/verification objectives
- b) the demonstrated ability to perform a validation or verification
- c) the demonstrated ability to manage audit teams

[MDx:202x] 7.3.1] Management of Competencies

7.3.1 The body shall demonstrate how the competence of personnel has been evaluated. The persons conducting the evaluation of personnel shall be competent.

Note: The evaluator may be external or internal to the body

7.3.2 Management of Competencies

7.3.2 The processes shall require the body:

- a) to determine the criteria for the competence of personnel for each function in the validation/verification process, including at least:
 - the ability to apply generic validation/verification concepts (e.g. evidence-gathering, risk, misstatements, level of assurance, materiality)
 - knowledge about the type and typical content of the client's statement
 - knowledge of the program requirements

7.3.2 Management of Competencies

- b) to identify training needs and provide, as necessary, training on validation/verification processes, requirements, methodologies, activities and other relevant validation/verification program requirements
- c) to demonstrate that the personnel have the required competence for the duties and responsibilities they undertake
- d) to formally authorize personnel for functions in the validation/verification process
- e) to monitor the performance of personnel

7.3.3 Documented Information

7.3.3 The body shall have documented information demonstrating competence of its personnel involved in the validation/verification activities

- This includes relevant education, training, experience, performance monitoring, affiliations, and professional status

➤ What establishments in Kenya are able to provide the necessary training for future validators and verifiers?

Examples of Sources for Competence

- Educational institutions providing instruction in science, engineering, and accounting
- Work experience in companies with responsibilities relevant to the work of validators/verifiers (e.g. working with environmental policy, measurement devices, internal auditing)
- Specialized training establishments
 - Schools of aviation
 - KENAS (for general training programs)

7.4 Outsourcing/1

7.4 In the absence of applicable program prohibitions on outsourcing, the body may outsource validation/verification activities and shall:

- a) retain full responsibility for the validation/verification
- b) not outsource the engagement activities (9.3), the decision on the confirmation of the statement and the issuance of the opinion (9.7)
- c) have a legally enforceable agreement, including confidentiality and management of impartiality requirements, with each body that provides outsourced activities

7.4 Outsourcing/2

- d) Have ensured that the body that provides outsourced activities conforms with the requirements of this document, including competence, impartiality and confidentiality and to any applicable program requirements
- e) obtain consent from the client to use the organization that provides the outsourced activities

[14065] Outsourcing

7.4 For ISO/IEC 17029:2019, 7.4 b), note that “engagement activities” refers to the process by which an agreement between the client and the body is concluded

GHG Programs; Processes of V/V

ISO 14065 implies the application
of the ISO 14064 Part 3 Standard

Greenhouse gases —

Part 3: **Specification with guidance for the verification and validation of greenhouse gas statements**

Gaz à effet de serre —

Partie 3: Spécifications et lignes directrices pour la vérification et la validation des déclarations des gaz à effet de serre

8 Validation/Verification Programs/1

The body shall apply one or more validation/verification programs that are consistent with, and do not exclude, requirements of ISO/IEC 17029

Note 1: A validation/verification program is a set of rules, procedures and management for carrying out validation/verification activities in a specific sector containing the following elements:

- scope of validation/verification
- specific competence criteria for the validation/verification team and body

8 Validation/Verification Programs/2

- process for validation/verification
- evidence-gathering activities of validation/verification
- reporting of validation/verification

Note 2 Annex A specifies the elements that can be included in a validation/verification program

Example: The programs already qualified by ICAO for issuance of eligible emissions units under CORSIA

[MDx:202x] Validation/Verification Program/1

MD 8.1 The body shall establish a development process for each new environmental information validation or verification program in which it wishes to operate

This development process shall provide outputs related to the following:

- identification of key stakeholders, and their expectations and requirements
- review and understanding of the applicable scope of validation/verification, including applicable criteria

...

[MDx:202x] Validation/Verification Program/2

- review and understanding of the applicable criteria for validation/verification
- consideration of VVB strategic and business risks
- identification of the competence requirements for validation/verification team, validators or verifiers, independent reviewers and support personnel, as relevant to each validation or verification criteria
- confirmation that the proposed validation or verification arrangements are capable of meeting the requirements of the applicable program
- necessary tools for gathering evidence during the validation/verification

Implications of Clause 8 “Programs”

- Unless a body only works in one program, the requirements of clause 8 must be satisfied for each validation/verification program that the body operates in
- AB technical assessors should expect that the specific requirements of each program included in the scope of operation of the body are taken into account and the results documented
- In the absence of a program of validation/verification, the body may itself define the scope of a program and deploy it as a program operator

9 Validation/Verification Process Requirements

9.1 Pre-engagement

9.2 Engagement

9.3 Planning

9.4 Execution

9.5 Review

9.6 Decision and issuance of the validation/verification opinion

First Step: Application of a VVB Client

- This is a process whose goal is to collect the necessary information for a body to prepare a proposal to offer services
- The application resembles other applications used in conformity assessment, but meets certain requirements defined in the standard

9.2 Pre-Engagement (9.2.1)/1

9.2.1 The body shall require the client to submit information sufficient to carry out a pre-engagement review, including at least the following:

- a) client name and the proposed statement to be validated/verified
- b) locations where the client's activities are undertaken
- c) the validation/verification program and associated specified requirements for the validation/verification
- d) the objectives and scope of the validation/verification

9.2 Pre-Engagement (9.2.1)/2

- e) reports, data and any other relevant information
- f) where known at this stage and where applicable, the materiality and level of assurance
- g) any other information as required by the validation/verification program

9.2.2 Pre-Engagement (Information Review)/1

9.2.2 The body shall conduct a pre-engagement review of information received from the client to ensure that:

- a) an applicable program exists or a program is to be established
- b) the statement is understood (context, content and complexity)
- c) the objectives and scope of the validation/verification have been agreed with the client
- d) the specified requirements against which the claim will be validated/verified have been identified and are available
- e) where applicable, the materiality and level of assurance have been agreed

9.2.2 Pre-Engagement (Information Review)/2

- f) the process for validation/verification activities can be achieved (e.g. evidence-gathering activities, evaluation of gathered evidence)
- g) the validation/verification duration can be estimated
- h) the body has identified and has access to the resources and competences that are required to undertake the validation/verification
- i) the time frame for the planned validation/verification can be proposed

[14065] 9.2 Pre-Engagement

9.2 In addition to the requirements given in ISO/IEC 17029, 9.2.2, the validation/verification team shall ensure that the engagement type(s) has(ve) been identified

The engagement type(s) may include:

- verification
- validation
- agreed-upon procedures (AUP)
- a combination of these types

[MDx:202x] Pre-Engagement (9.2.1)

9.2.1 The body shall confirm the type of engagement with the client or responsible party

Types may be verification, validation, agreed-upon procedures (AUP), or mixed engagement

[MDx:202x] Pre-Engagement (9.2)/1

MD 9.2.2 The body should only use AUP within accredited validation and verification under the following conditions:

- the requirements of ISO/IEC 17029 are applied
- the agreed-upon procedures have been determined in advance and are agreed with the responsible party
- an independent review and approval of the issuance of the report should take place in line with the requirements of ISO/IEC 17029 (clauses 9.6 and 9.7)

[MDx:202x] Pre-Engagement (9.2)/2

- the body's report should clearly describe restrictions on the use and distribution of the report; the report may be to the organization and intended users only
- the report clearly describes the procedures performed and the factual findings resulting from those procedures

A program may specify the use of AUP rather than an assurance engagement

[MDx:202x] Pre-Engagement (9.2)/3

Note: ISO 14064-3 requires “sufficiency of evidence to support a GHG statement, and states that, in the absence of sufficient information, the body shall not proceed (5.4.2)

Sufficient information to support an environmental information statement may not exist when statements include information provided by third parties, such as suppliers

In these cases, a body and its client may agree on a mixed engagement type (5.1.2) which can include the use of AUP for statements about which the verifier lacks the ability to determine the existence of data trails (6.1.3.2) or to verify the data management systems and controls that generated the information (6.1.3.3)

Key Points in Mixed Engagements

- The introduction of mixed engagements raises many challenges:
 - VVBs must ensure that verifiers are competent to perform validations if the GHG statement includes forecast or projected emissions
 - Verifiers must clearly identify in the scope of the engagement when forecast or projected emissions are found in the GHG statement
 - AB technical assessors should be able to recognize when verifiers do not identify within the GHG statement the existence of forecast or projected information
 - Do any comparable “mixed engagement” situations exist in other types of conformity assessment programs?

Analogues to Mixed Engagements for GHG

- ISO 19011 addresses “combined” and “joint” audits in the management system context (yes, but not really the same issue)
- _ _ _ _ _ (no analogues identified)

9.2 Pre-Engagement (9.2.3)

9.2.3 Following the pre-engagement review of submitted information by the client the body shall either accept or decline to perform validation/verification

[MDx:202x] Pre-Engagement (9.2.3)

MD 9.2.3 The time allocation for the engagement shall be justified based on the review of the provided information and recorded by the body

9.3 Engagement (9.3.1)

9.3.1 The body shall have an agreement with each client for the provision of validation/verification activities in accordance with the relevant requirements of this document and the requirements specified in the applicable validation/verification program

- a) for second- and third-party validation/verification activities, a legally enforceable agreement (e.g. a contract)
- b) for first-party validation/verification activities, an internal agreement such as service level agreement, internal contract, statement of work, or other enforceable internal agreement

9.3 Engagement (9.3.2)

The body shall ensure its agreement requires that the client complies at least with the following:

- a) validation/verification requirements
- b) making all necessary arrangements for the conduct of the validation/verification, including provisions for examining documentation and access to all relevant processes, areas, records, and personnel
- c) where applicable, making provisions to accommodate observers
- d) complying with the rules of the body for reference to validation/verification or use of marks

[MDx:202x] Pre-Engagement (9.3.1)

MD 9.3.1 The body shall ensure that its agreement requires the client to cooperate in the case where facts or information discovered materially affects the validation or verification opinion

The legally enforceable agreement shall include a policy governing marketing and other references to the body that the body authorizes its clients to use with respect to any environmental information statement

Where there is a license to use a validation or verification mark, or specific text, there shall be no ambiguity in the proposed use of the environmental information statement that has been validated or verified

The policy shall ensure conformance to **Annexe B**, “Reference to validated/verified statements and use of marks”

- Why should ABs take an interest in how bodies monitor the use of their clients’ references to opinions and marks of conformity?

Potential Abuse of References and Use of Marks

- May confuse intended users about the validity of opinions
- May harm the reputation of both VVBs and their AB
- May suggest that a VVB has inadequate controls or that they are ineffective

9.3 Engagement (9.3.3)

9.3.3 The agreement shall confirm that the client engages the body to undertake validation/verification activities, including the specification of:

- a) the items listed in 9.2.2
- b) the specific requirements for the validation/verification activity, including any additional relevant requirements set by a program or standard

9.3 Engagement (9.3.4)

The body shall take responsibility for any inputs that it accepts to take into account as part of its validation/verification activities, including those that have been generated by the client or other external parties

Verification Planning

- This is the longest section of clause 6 of the standard; it occupies 7.5 of 10 pages
- The objective of planning is to determine in advance what audit evidence is necessary to reach a conclusion with assurance that the GHG data and information in the statement are true and fair

How to Establish the Accuracy of Statements?

- Perform a strategic analysis to understand the responsible party's activities and their complexity
- Evaluate the risks associated with the GHG statement in order to identify the risks of:
 - material misstatements in the GHG statement
 - nonconformities to the criteria
- Plan the verification
- Execute the verification
- Complete verification activities

The Essential Role of Planning

- Verification planning is based on the materiality of emissions
- For the efficient use of time, only the most significant (or uncertain) emissions are normally verified
- The percentage of emissions verified varies according to the extent and complexity of the organization or project, and the effectiveness of systems of control
- Rates of verification of data can vary between 2 and 100 percent
 - The rates applied are often inversely proportionate to the size of the organization

9.4 Planning (9.4.1)/1

9.4.1 Before undertaking activities of validation/verification, the body shall plan the following activities taking account of the requirements specified in the applicable validation/verification program:

- a) assign competent resources to undertake the activities
- b) determine the validation/verification activities based on understanding of the GHG statement
- c) assess the risk of a significant misstatement in the GHG statement
- d) confirm the timing and access arrangements with the client

9.4 Planning (9.4.1)/2

- e) determine evidence-gathering activities needed to complete the validation/verification in accordance with the specified requirements and consistent with the results of b) and c)
- f) prepare an evidence-gathering plan, taking into account c) and any measures that the client has in place to control sources of potential errors, omissions and misrepresentations
- g) prepare a validation/verification plan considering the evidence-gathering plan as an input

[14064-3] Elements of Planning

For verification:

- 6.1.1 Strategic analysis
- 6.1.2 Risk assessment
- 6.1.3 Evidence gathering activities
- 6.1.4 Site visits
- 6.1.5 Verification plan
- 6.1.6 Evidence-gathering plan
- 6.1.7 Approval of verification and evidence-gathering plans

9.4 Planning (9.4.2)

9.4.2 The body shall develop a validation/verification plan that describes activities and schedules, and that includes the following:

- a) objectives and scope of validation/verification
- b) identification of the validation/verification team members and their roles and responsibilities in the team (e.g. team leader, observer))
- c) time frame and duration of validation/verification activities
- d) specified requirements

9.4 Planning (9.4.3)

9.4.3 The body shall inform the client of the names and roles of the team members with sufficient notice for any objection to the appointment of a team member to be made

- In your opinion, what would be valid reasons for objecting to the appointment of a team member?

Objections to Team Members

- “He worked for a competitor of ours”
- “We don’t think he understands our industry well enough”
- “He has a reputation of being aggressive and not open reasonable discussions about divergent views”
- “She doesn’t speak our language or understand our culture”

9.4 Planning (9.4.4)

9.4.4 The body shall communicate to the client the validation/verification plan

[14065] Planning 9.4.2

9.4.2 In addition to the planning activities required in ISO/IEC 17029, 9.4.1, the validation/verification team shall:

- a) perform a strategic analysis to understand the nature and complexity related to the environmental information statement and to determine the extent of validation/verification activities based on the engagement type
- b) assess the risk of nonconformity to the criteria

[14065] Planning 9.4.3

9.4.3 In addition to the planning activities required by ISO/IEC 17029, 9.4.2, the validation/verification plan shall include the level of assurance and materiality

[14065] Planning 9.4.4

9.4.4 The validation/verification plan and evidence-gathering plan shall be approved by the team leader

[14065] Planning 9.4.5

9.4.5 Amendments to the validation/verification plan and evidence-gathering plan shall be approved by the team leader in the following circumstances:

- a) change in scope or timing of validation/verification activities;
- b) change in evidence-gathering procedures;
- c) change in locations and sources of information for evidence-gathering;
- d) when the validation/verification process identifies new risks or concerns that could lead to material misstatements or nonconformities

[MDx:202x] Planning

MD 9.4.2.1 The body shall document the results of the strategic analysis



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Requirements Related to The Processes of V/V

Execution of the Validation/
Verification Follows Its Planning

Greenhouse gases —

**Part 3:
Specification with guidance for
the verification and validation of
greenhouse gas statements**

Gaz à effet de serre —

Partie 3: Spécifications et lignes directrices pour la vérification et la validation des déclarations des gaz à effet de serre

9.5 Execution of the Validation/Verification

9.5.1 The body shall perform the validation/verification execution activities in accordance with the established validation/verification plan

9.5.2 The validation/verification plan shall be revised as necessary during the validation execution activities

9.5.3 Any revisions to the validation/verification plan shall be internally documented, including the reasons, and communicated to the client

9.5.4 Execution of the Validation/Verification

9.5.4 The body shall undertake the following activities:

- a) collection of sufficient objective evidence on original data/information, ensuring its traceability through the data/information management process, any further analysis and calculation
- b) identification of misstatements and consideration of their materiality
- c) assessment of conformity with specified requirements, taking into account the validation/verification program

Site Visit (ISO 14064-3)

- The working group debated for a long time the necessity or not of visits to the site of the responsible party
- Many experts wanted to require visits in the conditions described by clause 6.1.4.2 a) – h) without exception
- The viewpoint of experts who thought that site visits were not always necessary for certain sectors (aviation, maritime transport, pipelines) won out
- According to the standard, any exception to the site visit requirement must be justified



Activities to Perform on a Site Visit

- Activities are planned in advance according to the results of the risk assessment
- The planning process shall detail:
 - the information to be verified
 - how the information will be verified
 - the thresholds of materiality



9.5.5 Execution of the Validation/Verification

9.5.5 The body shall prepare the following:

- a) a conclusion on the outcome of the activities in 9.5.4
- b) a draft validation/verification opinion
- c) a report, if applicable

NOTE: The report can be a separate document or can be included in a document containing the draft validation/verification opinion

NOTE [14065]: Guidance for sufficient and objective evidence is provided in ISO 14066, Annex A

[MDx:202x] Evaluation of Materiality

MD 9.5.4.1 In the case of statements with quantitative information, the body shall perform a materiality assessment on the statement to identify potentially material inputs

NOTE: For GHG, inputs include sources, sinks and reservoirs

➤ What are examples of sources, sinks, and reservoirs?

Examples of Sources, Sinks and Reservoirs

- Combustion of fuels (source)
- Chemical process (source)
- Fugitive emission (source)
- Manure management (source)
- Sanitary landfills (source)
- Forests (sink)
- Biochar as soil amendment (sink)
- Natural gas storage facility (reservoir)

[MDx:202x] Evaluation of Materiality

MD 9.5.4.2 Where sufficient objective evidence on original data/information, its traceability through data trails, and management through information systems and controls is not available, the body shall:

- a) exclude the data/information from the verification scope, or
- b) use agreed-upon procedures to test statements and report on findings (see ISO 14064-3, Annex C)

[MDx:202x] Uncertainty in Statements

MD 9.5.4.3 When assessing whether misstatements are qualitatively material, the VVB shall consider uncertainty in the statement

The VVB shall document the results of the evidence-gathering plan including whether additional evidence-gathering activities are required

The VVB shall document unresolved misstatements identifying whether misstatements, individual or as a whole, are material

[MDx:202x] Professionnal Scepticism

MD 9.5.4.3 The body shall be conducted with an attitude of professional scepticism, which assumes that the presented information and data may be wrong until proven differently

- In your opinion, what are the challenges a validator or verifier faces in maintaining an attitude of professional scepticism?

Maintaining Professional Scepticism—Issues

- The imbalance of knowledge between the validator/verifier and the responsible party
- The fact that the validator/verifier is being paid, even if indirectly, by the responsible party (“Self-interest”)
- The desire to establish a good working relationship with the responsible party and avoid conflict
- Familiarity with the responsible party that grows over time
- “Self-review” when re-examining a part of the statement that the validator/verifier has previously accepted

9.6 Review

9.6.1 The body shall undertake review activities

9.6.2 The review shall be carried out by persons who have not been involved in the validation/verification activities

[14065] 9.6.2 The review shall be carried out by persons:

- who have not been involved in the planning, and
- are not part of the validation/verification team

9.6.3 Review

9.6.3 The review shall confirm:

- a) that all validation/verification activities have been completed in accordance with the agreement and the program
- b) sufficiency and appropriateness of evidence to support the decision
- c) whether significant findings have been identified, resolved, and documented

[14065] “Significant Findings”

9.6.3 “Significant findings” are misstatements and nonconformities identified by the validation/verification team that could affect the opinion

9.6.4 Review

9.6.4 The reviewer shall communicate with the validation/verification team when the need for clarification arises

- the validation/verification team shall address concerns raised by the reviewer

9.6.5 Review

9.6.5 The review shall have available all records of the validation/verification activities as specified in 9.11

[14065] Supplementary Confirmations/1

9.6.4 In addition to the requirements of ISO/IEC 17029, 9.6.3, the review shall confirm:

- a) the competencies of validation/verification team members for the activities they conducted
- b) whether the validation/verification planning has been designed appropriately, including whether the objective, scope and materiality are addressed by:
 - 1) the strategic analysis and risk assessment
 - 2) the validation/verification plan
 - 3) the evidence-gathering plan

[14065] Supplementary Confirmations/2

- c) significant decisions made by the validation/verification team during the validation/verification
 - d) whether the opinion is appropriately drafted
 - e) whether the environmental information statement is fairly stated and conforms to criteria
- In your opinion, how much time should be necessary to achieve such a review?

Duration of Review Activities

- Industry practice in North America suggests that for GHG statements that are associated with relatively small enterprises, six hours is adequate
- Complex project or product verifications may require from 1-3 person days
- VVBs should itemize this activity as a cost item borne by the client to discourage taking shortcuts to improve profitability

[14065] Timing of the Review

9.6.5 The review may be started at any time during the process before the opinion is issued to allow significant issues identified by the reviewer to be resolved, provided that:

- the independence of the reviewer is maintained, and
- the activities planned and undertaken by the reviewer(s), including the results, are documented

9.6.6 The review shall be completed before the final opinion, or the report of factual findings for the AUP, is issued

9.7 Decision and Delivery of the Opinion

9.7.1 Decision

9.7.1.1 Upon completion of the validation/verification review, the body shall make the decision to confirm or not the statement

9.7.1.2 The decision shall be made by persons who have not been involved in the validation/verification execution

9.7.1.3 Based on this decision, a validation/verification opinion is issued or not according to program requirements

9.7.1.4 When the body is not issuing a validation/verification opinion, the body shall inform the client

[14065] Decision

9.7.1.2 It is noted that the reference to the word “claim” means “environmental information statement” in this document

- an environmental information statement can be confirmed when the body concludes that the statement is materially correct and conforms with specified criteria

[14065] Confirmation of AUP

9.7.1.3 The body shall decide whether to confirm an environmental information statement that it has tested using AUP in a mixed engagement

- the decision shall be based upon the body's report of factual findings (see (Annex C))

Use of Agreed-Upon Procedures

- AUP are used when the intended user does not require a verification opinion or when insufficiency of appropriate evidence does not allow for the verification of historical data
- It is often the case that AUP are applied to information and data furnished by third parties in the responsible party's supply chain

[14065] Who Can Make the Decision?

9.7.1.4 Regarding ISO/IEC 17029, 9.7.1.2, note that the person assigned to make the decision may be the reviewer

- the decision shall be made by persons who have not been involved in the validation/verification planning

9.7.1.5 Note that the reference to the word “statement” [in ISO/IEC 17029] means “verification opinion” or “validation opinion in this document

- In the case of AUP, the decision is issued through a report of factual findings
- Bodies may choose not to issue an opinion when the engagement is terminated prior to completion

[14065] Types of Opinions

9.7.1.6 If an opinion is issued, the body shall select one type of opinion, such as:

- a) unmodified
- b) modified
- c) adverse

[14065] Disclaiming the Issuance of an Opinion

9.7.1.7 The body may disclaim the issuance of an opinion when it is unable to obtain sufficient and appropriate evidence to come to a conclusion

- In this case the body shall ensure that it has been unable to obtain sufficient appropriate evidence and can conclude that the possible effects on the environmental information statement of undetected material misstatement(s) are material and pervasive (see Tables A.1 and A.2)

[14065] Opinion Issued After a Verification

9.7.1.8 At the conclusion of an engagement to verify statements of historical information, the verification body shall issue an opinion, unless it has declaimed the issuance of an opinion or the engagement type is AUP

- An opinion providing assurance to intended users shall be based upon the verification of sufficient and appropriate historical evidence

[14065] Opinion Issued After a Validation

9.7.1.9 At the conclusion of an engagement to validate statements about the outcome of future events, the verification body shall issue an opinion, unless it has disclaimed the issuance of an opinion

- A validation opinion of the reasonableness of the assumptions, limitations and methods shall be based upon the evaluation of sufficient and appropriate information

[MDx:202x] Meaning of “Confirmation”

MD 9.7.1.3.1 When a body “confirms” an environmental information statement that it has tested using agreed-upon procedures in a mixed engagement, it shall ensure that the wording of its report of factual findings does not state or imply provision of assurance to intended users

9.7.2 Issuance of the Opinion/1

9.7.2 When the body issues a validation/verification opinion, the opinion shall:

- a) state the client's name
- b) identify whether it is a validation opinion or a verification opinion
- c) refer to the statement, including the date or period which the statement covers
- d) include the type of of the body in relation to the opinion in question (i.e. first-party, second-party or third-party)

9.7.2 Issuance of the Opinion/2

- e) include the name and address of the body (if symbols, e.g. accreditation symbol, are included, they shall not be misleading or ambiguous)
- f) describe the objectives and scope of the validation/verification
- g) describe whether the data and information supporting the statement were hypothetical, projected and/or historical in nature
- h) include a reference to the validation/verification program and associated specified requirements

9.7.2 Issuance of the Opinion/3

- i) include the decision made about the statement, including the fulfillment of any program related requirements (e.g. materiality or level of assurance)
- j) indicate the date and the unique identification of the opinion
- k) include any findings, that have not been addressed prior to the issuance of the validation/verification opinion, if required by the program

[14065] Combining Information in an Opinion

9.7.2 If the environmental information statement includes a mixture of hypothetical, projected and/or historical information, the validation/verification opinion may be included in the same document

[14065] Contents of the Opinion/1

9.7.2 The opinion shall contain:

- identification of the environmental information-related activity (e.g. organization, project or product)
- identification of the responsible party
- a statement that the environmental information statement is the responsibility of the responsible party

[14065] Contents of the Opinion/2

- identification of the criteria agreed by the responsible party and the body for the development of the environmental information statement
- identification of the criteria used by the body to validate or verify the environmental information statement
- where the environmental information statement includes future prediction, an explanation that the actual result can differ from the estimate because the assumptions upon which the estimate is based can change

[14065] Additional Details About the Opinion (9.7.2)

The opinion may contain statements that limit the liability of the body

A modified opinion shall contain a description of the reason for the modification

- If the reason for the modification is quantitative, the body's opinion shall indicate the value of the material misstatement and its effect on the environmental information statement

An adverse opinion shall contain a description of the reason for the adverse opinion

When disclaiming the issuance of an opinion, the body shall provide an explanation

9.8 Facts Discovered

9.8.1 If new facts or information that could materially affect the validation/verification statement are discovered after the issuance date, the body shall:

- a) communicate the matter as soon as practicable to the client and, if required, the program owner
- b) take appropriate action, including the following:
 - 1) discuss the matter with the client
 - 2) consider if the validation/verification opinion requires revision or withdrawal

9.8.2 In Case of Revision of the Opinion

9.8.2 If the validation/verification opinion requires revision, the body shall implement processes to issue a new opinion including specification of the reasons for the revision

- These can include repeating relevant steps of the validation/verification process

9.8.3 The body may also communicate to other interested parties the fact that reliance of the original opinion can now be compromised given the new facts or information

[14065] Facts That Can Have an Effect

In addition to the requirements given in ISO/IEC 17029:2019, 9.3.2, the client shall communicate any facts to the body that can affect the validity of an issued opinion

- In your opinion, what would be the primary motivation for a body to include such a requirement in its validation/verification agreement?

GHG Statements: Responsibility for Them

- Standard practice in drafting opinions is to state that the responsible party is responsible for drafting the statement(s)
- VVBs impose a contractual requirement on their clients to disclose any subsequent facts that may become known because it is often the case that the VVB will not discover them independently
- This practice helps shield the VVB from liability if intended users of the opinion relied upon it and suffered harm as a result of the disclosure of new, material facts

ISO/IEC 17029's Management System Requirements

Appeals and Complaints
Information, Confidentiality, Records
Management System Elements

**Conformity assessment — General
principles and requirements for
validation and verification bodies**

*Évaluation de la conformité — Principes généraux et exigences pour
les organismes de validation et de vérification*

9.9 Handling of Appeals/1

9.9.1 The body shall have a documented process to receive, evaluate and make decisions on appeals

9.9.2 The process for handling appeals shall include at least the following:

- a) a description of the process for receiving, investigating, substantiating the appeal, and deciding what actions are to be taken in response
- b) tracking and recording the appeal, including actions to resolve it
- c) ensuring appropriate action is taken

9.9 Handling of Appeals/2

9.9.3 The body receiving the appeal shall be responsible for gathering all necessary information to determine whether the appeal is substantiated

9.9.4 The body shall acknowledge receipt of the appeal, and provide the appellant with the outcome, and, if applicable, progress reports

9.9.5 A description of the process for handling appeals shall be available to any interested party

9.9 Handling of Appeals/3

9.9.6 The body shall be responsible for all decisions during the process for handling appeals

9.9.7 Investigation and decision on appeals shall not result in any discriminatory action

9.9.8 Investigation and decision on appeals shall be made by, or reviewed and approved by, individuals not involved in the decision which is the subject of the appeal in question

9.10 Handling of Complaints/1

9.10.1 The body shall have a documented process to receive, evaluate and resolve complaints

9.10.2 The process for handling complaints shall include at least the following:

- a) a description of the process for receiving, substantiating, investigating the complaint, and deciding what actions are to be taken in response
- b) tracking and recording the complaint, including the actions taken to resolve it
- c) ensuring appropriate action is taken

9.10 Handling of Complaints/2

9.10.3 The body receiving the complaint shall be responsible for gathering all necessary information to determine whether the complaint is substantiated

9.10.4 Whenever possible, the body shall acknowledge receipt of the complaint, and provide the complainant with the outcome and, if applicable, progress reports

9.10.5 A description of the process for handling complaints shall be available to any interested party

9.10 Handling of Complaints/3

9.10.6 Upon receipt of a complaint, the body shall confirm whether the complaint relates to its validation/verification activities and, if so, shall resolve the complaint

9.10.7 Investigation and resolution of complaints shall not result in any discriminatory actions

9.10 Handling of Complaints/4

9.10.8 The resolution of complaints shall be made by, or reviewed and approved by, individuals not involved in the complaint in question

- Where resources do not permit this, any alternative approach shall not compromise impartiality

➤ Does the handling of appeals and complaints differ for activities relating to environmental information validation/verification compared to other types of conformity assessment programs?

Handling of Appeals and Complaints

- No. ISO/IEC 17029 uses CASCO's most recently revised standard "boilerplate" language that is common to all its standards

9.11 Records/1

9.11.1 The body shall maintain and manage records of its validation/verification activities, including:

- a) information submitted during pre-engagement and scopes of validation/verification
- b) justification for how validation/verification duration is determined
- c) any revisions to the validation/verification planning activities

9.11.1 Records/2

- d) demonstration that the validation/verification activities have been carried out in accordance with the requirements of this document and the validation/verification program including findings and information on material and non-material misstatements
- e) evaluation, selection and monitoring of performance of bodies providing outsourced activities
- f) evidence to support conclusions and the decisions
- g) validation/verification opinions
- h) complaints and appeals, and any subsequent correction or corrective action

9.11 Security and Confidentiality; Retention

9.11.2 The body shall maintain validation/verification records securely and confidentially, including during their transport, transmission, or transfer

9.11.3 The body shall retain validation/verification records in accordance with the program, contractual, and other management system requirements

10.1 Publicly Available Information

10.1.1 The body shall ensure the following information is made publicly available:

- a) information about the validation/verification process
- b) commitment to impartiality
- c) list of validation/verification activities the body provides, including references to applicable programs
- d) complaints and appeals process

[14065] Use of the Opinion in Its Entirety

10.1 Publicly available information shall include any requirements regarding the use of the body's opinion in its entirety (see Annex B)

10.2 Other Information to be Available

10.2.1 The body shall maintain and upon request provide clear, traceable, and accurate information about its activities and the sectors in which it operates

10.2.2 Unless otherwise specified in the program, the body shall provide, upon request, the status of a given validation/verification opinion

[14065] “Status” of the Opinion

10.2.2 Note that the status of the validation/verification opinion can be confirmation of the identity of the body that issued the opinion, its date of issuance and, if applicable, the revision date

- How does this requirement differ from that of a certification (of management systems, of persons, of products)?

Registries of Certified Systems or Products

- Unlike validation/verification opinions, the object of certified systems and products is to make certification public
- There is no requirement, ***unless it is established by a program,*** for validation/verification opinions to be disclosed

Disclosing Information About Opinions

- Common practice in many conformity assessment schemes (e.g. 17020, 17021, 17024, 17025, 17065) is to disclose the results of conformity assessment activities to the public
- By contrast, in many cases the existence of an environmental information opinion may remain confidential between a VVB and client, unless the client chooses to disclose it
 - The “intended users” of an opinion may be specified in the opinion, and a VVB may disclaim any liability to any other party for the content of the opinion

[14065] Description of the VV Process

10.2.3 The validation/verification team shall provide a detailed description of the validation/verification process

NOTE: The description of the validation/verification process includes how the body considers previous validation/verification results, where appropriate and if available

10.3 Reference to Validation/Verification

10.3.1 The body shall have rules governing any reference to validation/verification or use of its marks that it authorizes its clients to use

- These rules shall ensure, among other things, traceability back to the body and to the validation/verification opinion issued

10.3.2 This reference or marks shall be used only in relation to the statement which has been validated/verified and shall not be misleading with regards to product certification

[14065] Required Agreement Text/1

10.3.2 The body shall ensure its agreement requires that the client:

- shall not use the environmental information statement, opinion, report, marks, logos or labels in a manner that could mislead intended users or impair the reputation of the body

Marks, logos and labels may include symbols of the body or those associated with a program

The body shall establish rules applying to references to data and information in an environmental information statement that were validated or verified

[14065] Required Agreement Text/2

10.3.3 The body's agreement shall require the client to ensure that any opinions or reports of factual findings made public by the client are communicated in their entirety

10.4 Confidentiality/1

10.4.1 The body shall be responsible, through legally enforceable agreements, for the management of all information obtained or created during the performance of validation/verification activities

10.4.2 The body shall inform the client, in advance, of the information it intends to place in the public domain

10.4 Confidentiality/2

10.4.3 Except for information that the client makes publicly available, or when agreed between the body and the client, all other information is considered proprietary information and shall be regarded as confidential

10.4.4 When the body is required by law or authorized by contractual arrangements to release confidential information, the client or individual concerned shall, unless prohibited by law, be notified of the information released

10.4 Confidentiality/3

10.4.5 Information about the client obtained from sources other than the client (e.g. complainant, regulatory authority) shall be confidential between the client and the body

The provider (source) of this information shall be confidential to the body and shall not be shared with the client, unless agreed by the source

11.1 Management System: General

11.1.1 The body shall establish, document, implement and maintain a management system to support and demonstrate the consistent achievement of the requirements of this document

11 Management System

11.1.2 The management system of the body shall include at least the following:

- policies and responsibilities
- management review
- internal audits
- corrective actions
- actions to address risks and opportunities
- documented information

11.2 Management Review

11.2.1 The body's management shall review its management system at planned intervals, in order to ensure its continuing suitability, adequacy and effectiveness, including the stated policies and objectives related to the fulfillment of this document

11.2 Management Review: Inputs/1

11.2.2 The inputs to management review shall be recorded and shall include information related to the following:

- a) changes in internal and external issues that are relevant to the validation/verification body
- b) fulfilment of objectives
- c) suitability of policies and procedures
- d) status of actions from previous management reviews
- e) outcome of recent internal audits
- f) corrective actions

11.2 Management Review: Inputs/2

- g) assessments by external bodies
- h) changes in the volume and type of the work or in the range of the body's activities
- i) client and personnel feedback
- j) complaints and appeals
- k) effectiveness of any implemented improvements
- l) adequacy of resources
- m) results of risk analysis
- n) other relevant factors, such as monitoring activities and training

11.2.3 Management Review: Outputs

11.2.3 The outputs from the management review shall record all decisions and actions related to at least:

- a) the effectiveness of the management system and its processes
- b) improvement of the body's activities related to the fulfilment of the requirements of this document
- c) provision of required resources
- d) any need for change

11.3 Internal Audits/1

11.3.1 The body shall conduct internal audits at planned intervals to provide information on whether the management system:

- a) conforms to:
 - the body's own requirements for its management system, including the validation/verification activities
 - the requirements of this document
- b) is effectively implemented and maintained

11.3 Internal Audits/2

11.3.2 The body shall:

- a) plan, establish, implement and maintain an audit program including the frequency, methods, responsibilities, planning requirements and reporting,
 - which shall take into consideration the importance of the validation/verification body's activities concerned, changes affecting the body and the results of previous audits
- b) define the audit criteria and scope for each audit
- c) ensure that the results of the audits are reported to relevant personnel

11.3 Internal Audits/3

- d) implement appropriate correction and corrective actions without undue delay
- e) retain records as evidence of the implementation of the audit program and the audit results

11.3.3 The body shall ensure that its internal auditors do not audit their own work

[14065] The internal audit shall be conducted at least once a year, not exceeding 15 months between audits

11.4 Corrective Action/1

11.4 The body shall establish processes for the identification and management of nonconformities in its activities

- The body shall also, where necessary, take actions to eliminate the causes of nonconformities in order to prevent recurrence
- Corrective actions shall be appropriate to the impact of the problems encountered
- The processes shall define requirements for:
 - a) identifying nonconformities (e.g. from valid complaints and internal audits)

11.4 Corrective Action/2

- b) determining the causes of nonconformity
- c) correcting nonconformities
- d) evaluating the need for actions to ensure that nonconformities do not recur
- e) determining and implementing in a timely manner, the actions needed
- f) recording the results of actions taken
- g) reviewing the effectiveness of corrective actions

11.5 Actions to Address Risks and Opportunities

11.5.1 The body shall consider the risks and opportunities associated with the validation/verification activities in order to:

- a) give assurance that the management system achieves its intended results
- b) enhance opportunities to achieve the program and objectives of the body
- c) prevent, or reduce, undesired impacts and potential failures in the body's activities
- d) achieve improvement

11.5.2 Planning Actions

11.5.2 The body shall plan:

- a) actions to address these risks and opportunities
- b) how to integrate and implement these actions into its management system
- c) how to evaluate the effectiveness of these actions

NOTE: Although this document specifies that the body plans actions to address risks, there is no requirement for formal methods for risk management or a documented risk management process. Bodies can decide whether or not to develop a more extensive risk management methodology than is required by this document (e.g. through the application of other guidance or standards).

11.5.3 Actions Proportional to Impact

11.5.3 Actions taken to address risks and opportunities shall be proportional to the potential impact on the validation/verification opinion

NOTE 1: Options to address risks can include identifying and avoiding threats, taking risk in order to pursue an opportunity, eliminating the risk source, changing the likelihood or consequences, sharing the risk, or retaining risk by informed decision.

NOTE 2: Opportunities can lead to expanding the scope of the body's activities, addressing new clients, using new technology and other possibilities to address client needs.

11.6 Documented Information

11.6.1 The body shall control documented information required by the management system and by this document to ensure that it is:

- a) available and suitable for use, where and when it is needed, and
- b) adequately protected (e.g. from loss of confidentiality, improper use, or loss of integrity)

11.6.2 Control of Documented Information

11.6.2 For the control of documented information, the body shall address the following activities, as applicable:

- a) distribution, access, retrieval and use
- b) storage and preservation, including preservation of legibility
- c) control of changes (e.g. version control)
- d) retention and distribution

11.6.3 Documents of External Origin

11.6.3 Documented information of external origin determined by the body to be necessary for the planning and operation of its management system shall be identified as appropriate and controlled

11.6.4 Documented information retained as evidence of conformity shall be protected from unintended alterations

NOTE 1 Access can imply a decision regarding the permission to view the documented information only, or the permission and authority to view and change the documented information

NOTE 2 Documented information refers to processes, procedures, records, data, statements and other information required by this document

Introduction to CORSIA

Presented by Africa Abajas-Bermejillo

Introduction to ICAO Carbon Offsetting and Reduction Scheme for International Aviation

**CORSIA- sub scope for NAB and
candidate VB: reference documents,
key elements of the MRV**



**State
Authority**



Reports data



ICAO

Checks
Report

Fulfil
offsetting
obligations

Monitoring
throughout
the year

**Accreditation
Body**



Accredits

Verifier



Submission
of the
Verified
Report



Operator

Elaboration
of
Emissions
Report

Verification
of data

Verifies data

2.4 Verification of CO₂ emissions

2.4.1 Annual verification of an aeroplane operator's Emissions Report

2.4.1.1 The aeroplane operator shall engage a verification body for the verification of its annual Emissions Report.

Note.— The verification body is one of the verification bodies included in the list of verification bodies accredited in States, included within the ICAO document entitled “CORSIA Central Registry (CCR): Information and Data for Transparency” that is available on the ICAO CORSIA website.

2.4.1.3 A verification body shall conduct the verification according to ISO 14064-3:2006¹, and the relevant requirements in Appendix 6 Section 3.

2.4.1.4 Following the verification of the Emissions Report by the verification body, the aeroplane operator and the verification body shall both independently submit, upon authorization by the aeroplane operator, a copy of the Emissions Report and associated Verification Report to the State to which the aeroplane operator is attributed, in accordance with the timeline as defined in Appendix 1.

2.4.2 Verification body and national accreditation body

2.4.2.1 A verification body shall be accredited to ISO 14065:2013² and the relevant requirements in Appendix 6 Section 2 by a national accreditation body, in order to be eligible to verify the Emissions Report of the aeroplane operator.

Note.— An aeroplane operator may engage a verification body accredited in another State, subject to rules and regulations affecting the provision of verification services in the State to which the aeroplane operator is attributed.

2.4.2.2 A national accreditation body shall be working in accordance with ISO/IEC 17011³.

4.4 Verification of Emissions Unit Cancellation Report

4.4.1 Verification of an aeroplane operator's Emissions Unit Cancellation Report

4.4.1.1 The aeroplane operator shall engage a verification body for the verification of its Emissions Unit Cancellation Report.

Note.— The aeroplane operator may choose to use the same verification body engaged for the verification of its Emissions Report, although it is not obligated to do so.

4.4.1.2 A verification body shall conduct the verification according to ISO 14064-3:2006¹, and the relevant requirements in Appendix 6, Section 3.

4.4.1.3 If required by the verification body, the aeroplane operator shall provide access to relevant information on the cancellation of emissions units.

4.4.1.4 Following the verification of the Emissions Unit Cancellation Report by the verification body, the aeroplane operator and the verification body shall both independently submit, upon authorization by the aeroplane operator, a copy of the Emissions Unit Cancellation Report and associated Verification Report to the State to which the aeroplane operator is attributed in accordance with the timeline in Appendix 1.

4.4.2 Verification body and national accreditation body

4.4.2.1 A verification body shall be accredited to ISO 14065:2013² and the relevant requirements in Appendix 6, Section 2 by a national accreditation body, in order to be eligible to verify the Emissions Unit Cancellation Report of an aeroplane operator.

Note.— An aeroplane operator may engage a verification body accredited in another State, subject to rules and regulations affecting the provision of verification services in the State to which the aeroplane operator is attributed.

4.4.2.2 A national accreditation body shall be working in accordance with ISO/IEC 17011:2004³.

2.5 Validation or verification team knowledge (ISO 14065:2013 section 6.3.2)

2.5.1 The verification team as a whole, and the independent reviewer, shall demonstrate knowledge of:

- a) the requirements as outlined in this Volume, the Assembly Resolution A39-3, the Environmental Technical Manual (Doc 9501), Volume IV – Procedures for demonstrating compliance with the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), and any public ICAO explanatory material;
- b) the verification requirements as outlined in this Volume, and Environmental Technical Manual (Doc 9501), Volume IV – Procedures for demonstrating compliance with the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), including materiality threshold, verification criteria, verification scope and objectives and the Verification Report preparation and submission requirements;
- c) the eligibility criteria for technical exemptions, scope of applicability, State pair phase-in rules, and State pair coverage as outlined in this Volume and the Assembly Resolution A39-3;
- d) the monitoring requirements as outlined in this Volume; and
- e) the national requirements in addition to the provisions set out in this Volume.

2.5.2 When conducting the verification of an Emissions Unit Cancellation Report, only 2.5.1 (a), (b) and (e) shall be applicable.

2.6 Validation or verification team technical expertise (ISO 14065:2013 section 6.3.3)

2.6.1 The verification team as a whole, and the independent reviewer, shall demonstrate knowledge in the following technical competencies:

- a) general technical processes in the field of civil aviation;
- b) aviation fuels and their characteristics, including CORSIA eligible fuel;
- c) fuel related processes including flight planning and fuel calculation;
- d) relevant aviation sector trends or situations that may impact the CO₂ emissions estimate;
- e) CO₂ emissions quantification methodologies as outlined in this Volume, including assessment of Emissions Monitoring Plans;
- f) fuel use monitoring and measurement devices, and related procedures for monitoring of fuel use related to greenhouse gas emissions, including procedures and practices for operation, maintenance and calibration of such measurement devices;
- g) greenhouse gas information and data management systems and controls, including quality management systems and quality assurance / quality control techniques;
- h) aviation related IT systems such as flight planning software or operational management systems;
- i) knowledge of approved CORSIA Sustainability Certification Schemes relevant for CORSIA eligible fuels under this Volume, including certification scopes; and
- j) basic knowledge of greenhouse gas markets and emissions units programme registries.

2.6.2 Evidence of the above competencies shall include proof of relevant professional experience, complemented by appropriate training and education credentials.

2.6.3 When conducting the verification of an Emissions Report, 2.6.1 (a) to (i) shall be applicable.

2.6.4 When conducting the verification of an Emissions Unit Cancellation Report, only 2.6.1 (g) and (j) shall be applicable.

Understanding CORSIA's Nature



- Carbon Dioxide Emissions
- Fuel burnt * Emission Factor 3.16

Understanding CORSIA's Nature



Offsetting

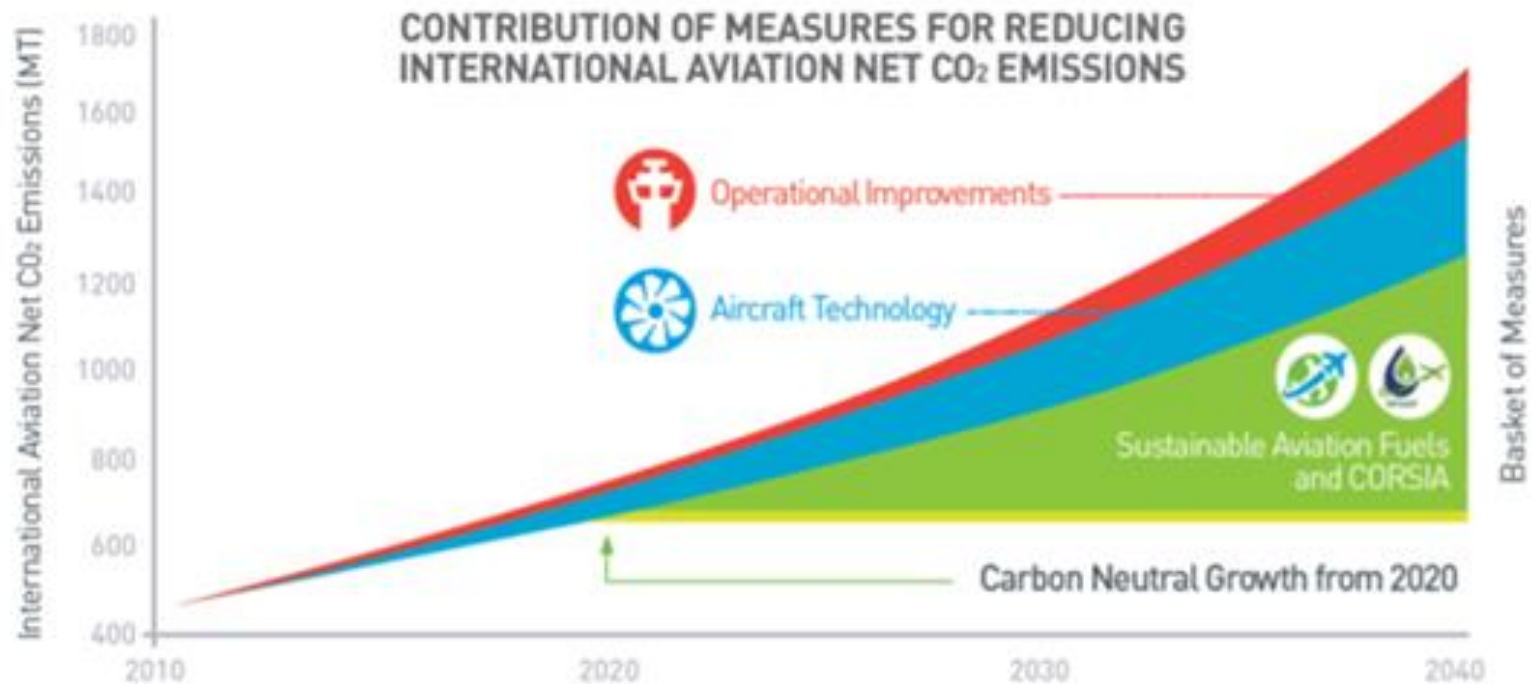
- CORSIA is an offsetting scheme. Different to emissions trading systems like EU ETS
- Compensates emissions from one sector through emissions reductions elsewhere. 1 offset = 1 tonne of CO₂ (tCO₂)

Understanding CORSIA's Nature

RS

Reduction Scheme

- CORSIA designed as a global MBM to help reducing emissions as gap filler to achieve ICAO's goal of carbon neutral growth from (CNG 2020). Complementary to aircraft technology, operational improvements sustainable aviation fuels.



Understanding CORSIA's Nature

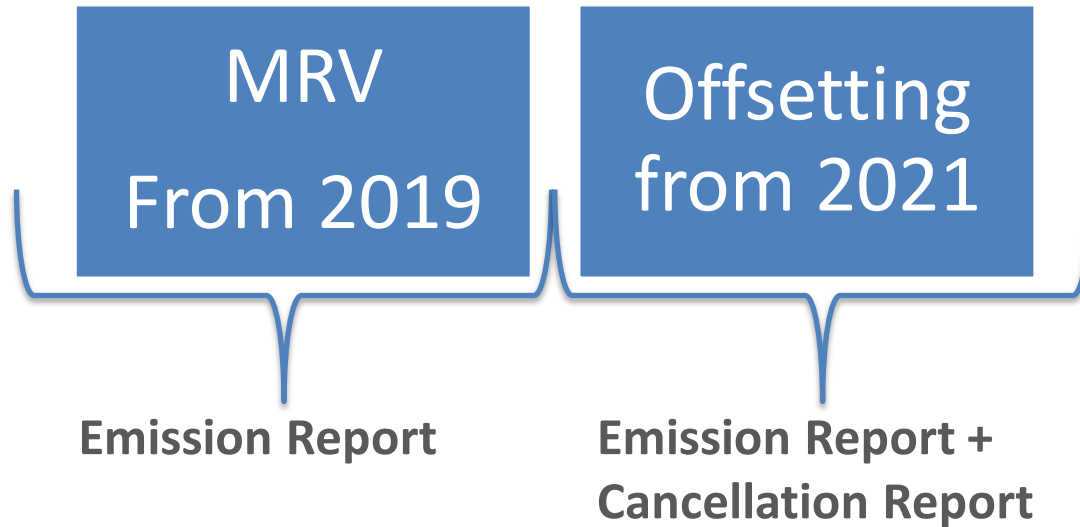
IA

International Aviation

- It addresses emissions from international flights
- International flight? Aircraft departing from a State and landing in another one

CORSIA Main Obligations

- CORSIA sets up two kind of key obligations for AOs, with different timetables but extremely related and dependent between each other. **Verification is key to ensure compliance of both.**



KEY ROLES

State Authorities	Aeroplane Operators	National Accreditation B. & Verification B.
<ul style="list-style-type: none">• Establish national regulatory framework• Submit list of attributed Aeroplane Operators & accredited Verification Bodies to ICAO• Approve the Aeroplane Operator Emissions Monitoring Plan• Perform Order of Magnitude Check of Aeroplane Operators Emissions Report & Emission Cancellation Report• Submit CO2 emissions data to ICAO	<ul style="list-style-type: none">• Prepare and submit the Emission Monitoring Plan• Monitor and reports emission data according to the Emission Monitoring Plan• Perform an internal pre-verification of the Emissions Report• Comply with offsetting requirements through submission of Emission Cancellation Report	<ul style="list-style-type: none">• National Accreditation Bodies provides accreditation to Verification Bodies• Verification Bodies verify Emissions Reports and Emissions Cancellation Reports

Applicability of MRV requirements to AOs

→ MRV requirements apply to AO that:

Produces annual CO₂ emissions >10 000 t CO₂ from international flights on or after 1/1/2019 (aprox 4 mil. Litres fuel)

Technical exemptions

- Excluding aeroplane(s) with a maximum certificated take-off mass (MTOM) $\leq 5,700\text{kg}$
- Excluding humanitarian, medical and firefighting flights.

Note* Only Civil operations: Scheduled flights, Non-scheduled flights, Cargo, Business aviation, General aviation are included. Heads of State flights, Military, Customs and police not covered because ICAO only deals with Civil aviation

An AO from Spain, that has >10 000 tn CO₂ from international flights, performs flights connecting several countries, some from Spain to Kenya and from Kenya to Spain. Would this AO have to report emissions?

1. Yes
2. No

An AO from Spain, that has >10 000 t CO₂ from international flights, performs flights connecting several countries, some from Spain to Kenya and from Kenya to Spain. Would this AO have to report emissions?

1. Yes
2. No

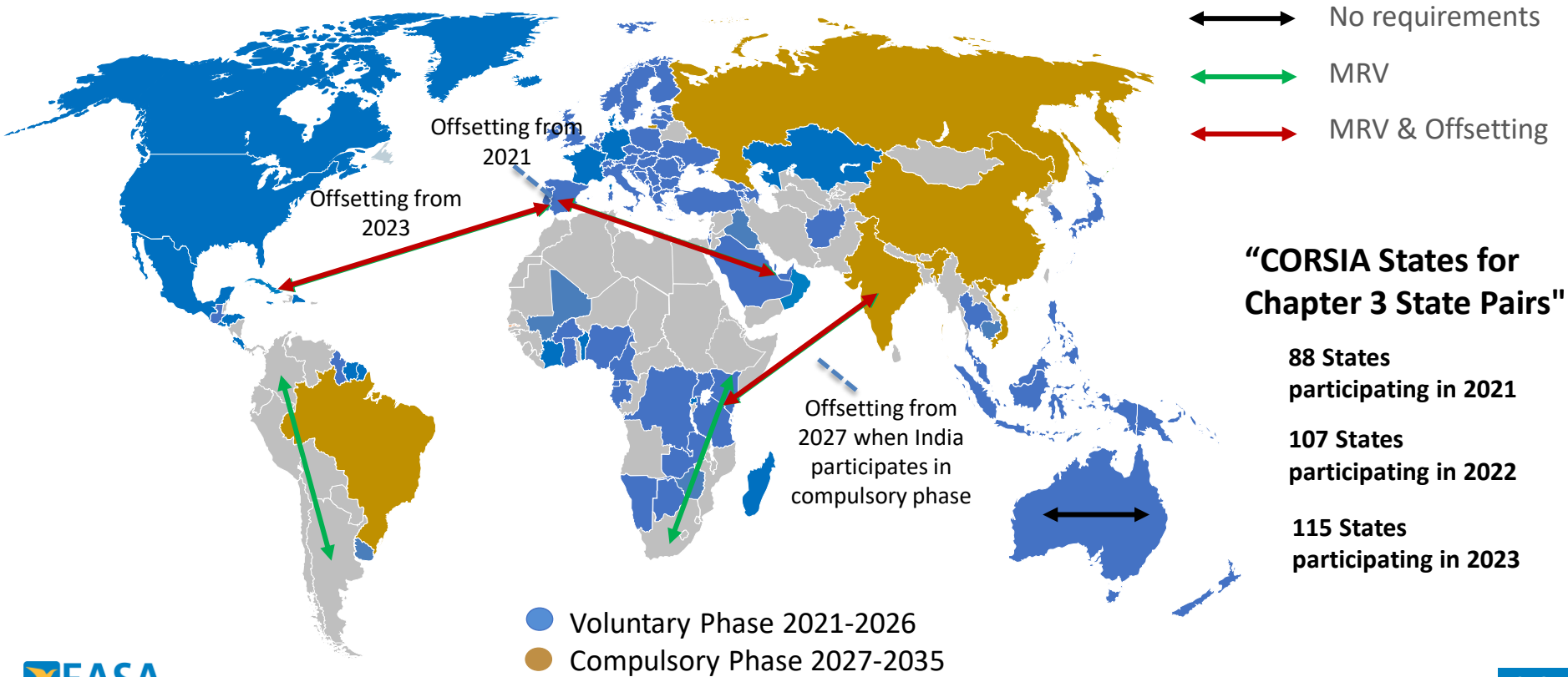
Would this AO have flights with offsetting requirements?

1. Yes
2. No
3. It depends

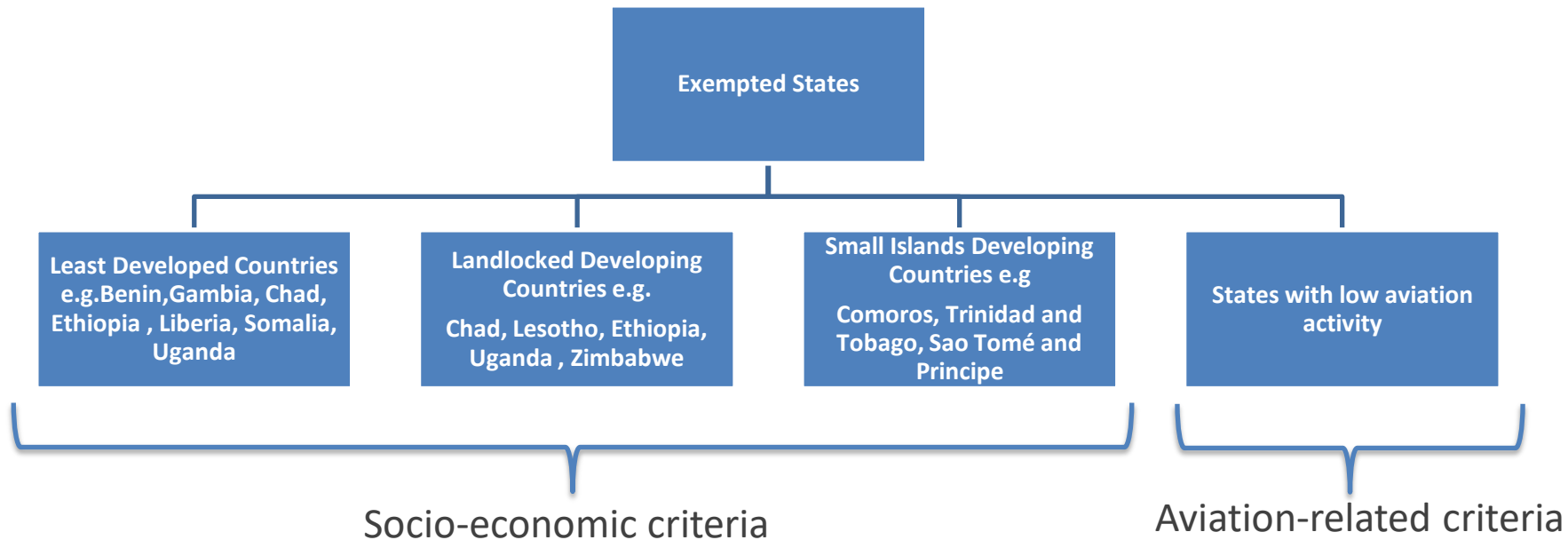
Would this AO have flights with offsetting requirements?

1. Yes
2. No
3. It depends

Applicability of Offsetting Requirements



Exempted States



States with low activity: (2018 RTK) below 0.5% individually, or beyond 90% in cumulative terms (KENYA CASE: 0,19% individual RTK, cumulative 96,81%)

An AO from Kenya (exempted State) that has >10 000 t CO₂ from international flights, performs all flights from and to Kenya. Would this AO have to report emissions?

1. Yes
2. No

An AO from Kenya (exempted State) that has >10 000 t CO₂ from international flights, performs all flights from and to Kenya. Would this AO have to report emissions?

1. Yes
2. No

Would this AO have flights with offsetting requirements?

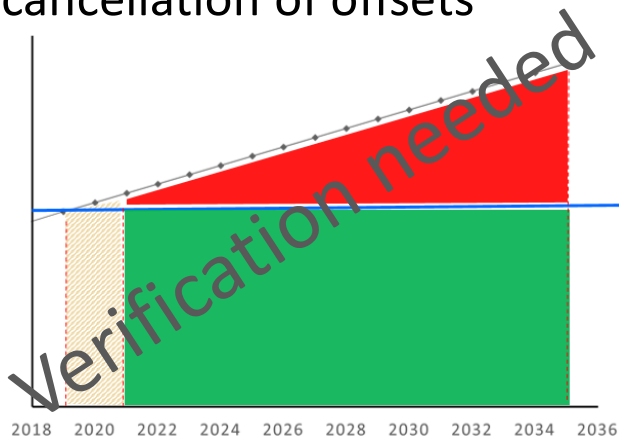
1. Yes
2. No

Would this AO have flights with offsetting requirements?

1. Yes
2. No

National Accreditation Bodies and Verification Bodies

- Verification is an essential part of CORSIA, as it ensures the accuracy of the information related to:
 - The amount of CO₂ emissions from international flights;
 - The amount of CO₂ emissions from flights with offsetting requirements
 - The purchase and cancellation of offsets

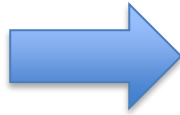


CORSIA SARPs

ICAO Standards and Recommended Practices (SARPs)



Annex 16 - Environmental Protection, Volume IV: CORSIA



SARPs lay down the responsibilities, requirements and timelines for AOs, State Authorities, NABs and VBs. SARPs establish additional verification requirements to those in the ISO standards, in order to customize them to CORSIA

e.g: Maximum number of annual verifications:

Verification bodies are required to demonstrate impartiality and remain free from conflict of interest. CORSIA requires that the leader of the verification team not undertake more than six annual verifications under any greenhouse gas emissions programme for the same aeroplane operator. After six years, the leader of the verification team will take a three consecutive year break from providing CORSIA verification services to the aeroplane operator.

CORSIA SARPs

Part I. DEFINITIONS, ABBREVIATIONS AND UNITS

Part II. CARBON OFFSETTING AND REDUCTION SCHEME FOR INTERNATIONAL AVIATION

CHAPTER 1. Administration

CHAPTER 2. Monitoring, Reporting and Verification

CHAPTER 3. CO₂ Offsetting Requirements and Emissions Reductions from Eligible Fuels

CHAPTER 4. Emission Units

APPENDICES

APPENDIX 1. Administrative Processes

APPENDIX 2. Fuel Use Monitoring Methods

APPENDIX 3. CERT

APPENDIX 4. Emissions Monitoring Plans

APPENDIX 5. Reporting

APPENDIX 6. Verification

ATTACHMENTS

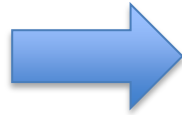
Attachment A. Attribution Processes

Attachment B. Applicability of MRV Requirements to International Operations

Attachment C. Processes for Fuel Use Monitoring

Environmental Technical Manual

ICAO Guidance



The ETM provides general guidelines on the interpretation of SARPs Annex 16, Volume IV

**Environmental Technical
Manual (ETM), Volume
IV (Doc 9501): CORSIA**

Environmental Technical Manual

Chapter 1. INTRODUCTION

Chapter 2. General Guidelines

Chapter 3. Guidelines on monitoring, reporting and verification

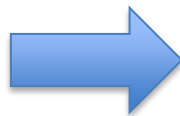
Chapter 4. Guidelines on calculation of offsetting requirements

Chapter 5. Administrative partnerships under CORSIA

Appendix 1. Standardized Emissions Monitoring Plan and reporting templates

Implementation Elements

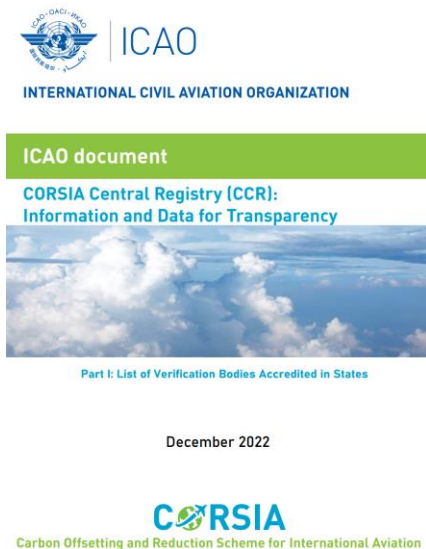
- **CORSIA States for Chapter 3 State Pairs**
- **ICAO Estimation and Reporting Tool (CERT)**
- **CORSIA Eligible Fuels**
 - CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes
 - CORSIA Approved Sustainability Certification Schemes
 - CORSIA Sustainability Criteria for CORSIA Eligible Fuels
 - CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels
 - CORSIA Methodology for Calculating Actual Life Cycle Emissions Values
- **CORSIA Eligible Emission Units**
 - CORSIA Emissions Unit Eligibility Criteria
 - CORSIA Eligible Emissions Units
- **CORSIA Central Registry**
 - CORSIA Central Registry: Information and Data for the Implementation of CORSIA:
 - CORSIA Aeroplane Operator to State Attributions
 - CORSIA 2020 Emissions
 - CORSIA Annual Sector's Growth Factor (SGF)
 - CORSIA Central Registry (CCR): Information and Data for Transparency
 - Part I: List of verification bodies accredited in States
 - Part II: Total CO2 Emissions for 2019 Aggregated for all Aeroplane Operators on each State Pair
 - Part III: Total Annual CO2 Emissions and Information for Aeroplane Operators



Additional ICAO Documents are referenced in SARPs to implement CORSIA. Become available at different points in time


Verification Bodies in CORSIA

- Information on 54 verification bodies from 31 States, as of December 2022



ICAO CORSIA Website

<https://www.icao.int/environmental-protection/CORSIA/Pages/default.aspx>

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ICAO / Environmental Protection / CORSIA

[ENV Homepage](#) [CORSIA Homepage](#) [CORSIA IMPLEMENTATION](#) [ACT CORSIA](#)

Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)

CORSIA News (click here to consult the complete list)

October 2022

Solomon Islands notified its decision to voluntarily participate in the CORSIA (making total 118 States)

○○●○○○○○○○○

What is CORSIA?

CORSIA is the first global market-based measure for any sector and represents a cooperative approach that moves away from a "patchwork" of national or regional regulatory initiatives. It offers a harmonized way to reduce emissions from international aviation, minimizing market distortion, while respecting the special circumstances and respective capabilities of ICAO Member States.

CORSIA complements the other elements of the basket of measures by offsetting the amount of CO₂ emissions that cannot be reduced through the use of technological improvements, operational improvements, and sustainable aviation fuels with emissions units from the carbon market.

Who Participates in CORSIA?

CORSIA is implemented in three phases: a pilot phase (2021-2023), a first phase (2024-2026), and a second phase (2027-2035). For the first two phases (2021-2026), participation is voluntary. From 2027 onwards, participation will be determined based on 2019 RTK data.

As of 1 January 2022, 107 had announced their intention to participate in CORSIA (click here for a list of 2022 volunteer States, as approved by the ICAO Council). 8 more States (Cambodia, Cuba, Federated States of Micronesia, Iraq, Maldives, Saint Vincent and the Grenadines, Timor-Leste, and Zimbabwe), announced their intention to participate in CORSIA from 1 January 2023, bringing the total number of participating States to 115 (click here for the latest list of 2023 volunteer States, as approved by the ICAO Council).

COVID-19 impacts and 2022 CORSIA periodic review

CORSIA» IMPLEMENTATION

- Assembly Resolution A41-22
 - (EN) (FR) (SP) (RU) (AR) (ZH)
- Reservation to Resolution A41-22
- SARPs - Annex 16 Volume IV
- Environmental Technical Manual - Volume IV
 - » Templates
- ICAO CORSIA Implementation Elements
 - » CORSIA States for Chapter 3 State Pairs
 - » ICAO CORSIA CO₂ Estimation and Reporting Tool (CERT)
 - » CORSIA Eligible Fuels
 - » CORSIA Eligible Emissions Units
 - » CORSIA Central Registry (CCR)

Additional Material for CORSIA Implementation


Status of CORSIA Implementation

CORSIA

CORSIA Newsletter

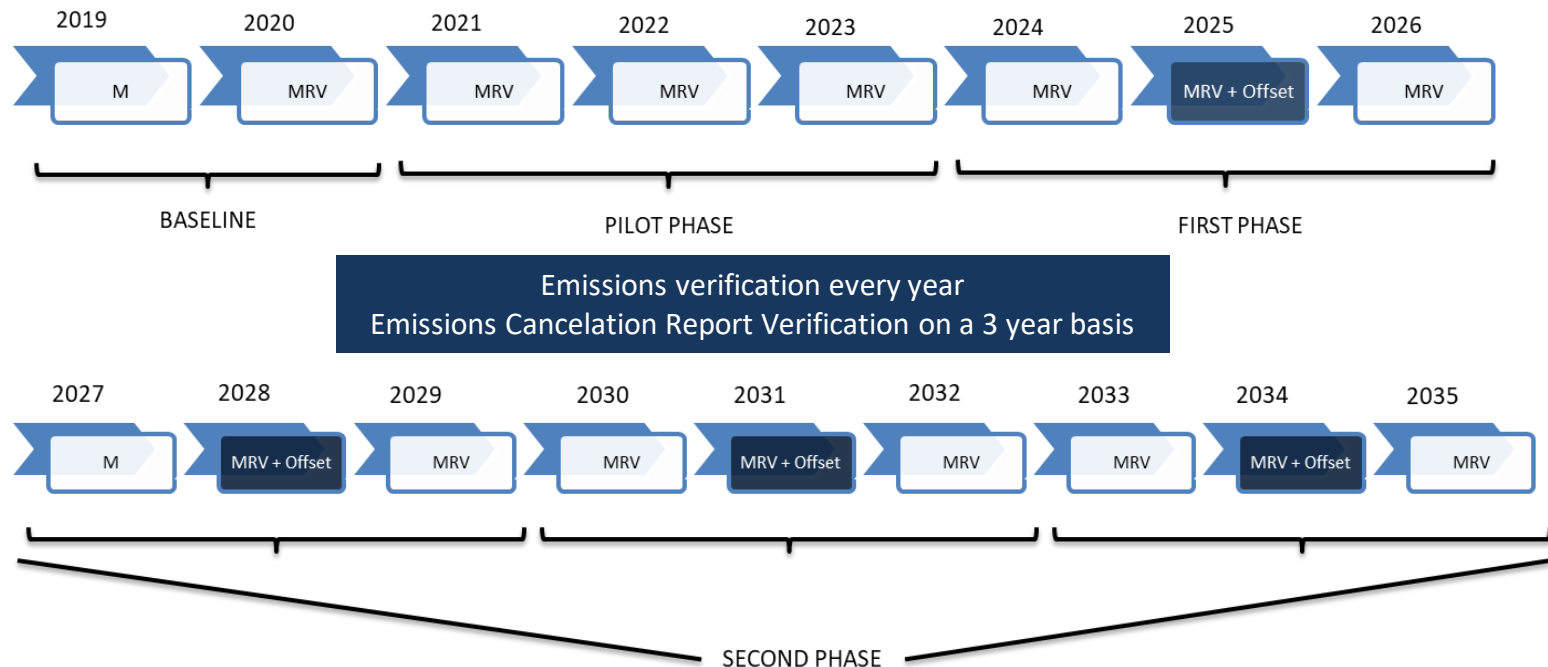
ACT» CORSIA

- CORSIA Buddy Partnerships
- Examples of Good Practice
- Frequently Asked Questions
- Brochure and Leaflets
- Videos
- Seminars
- Online Tutorials
- Background Information



Administration

- Monitoring, Reporting and verification (MRV) on an annual basis
- Offsetting requirements on a three years basis



Are all Aeroplane Operators registered in a State required to undertake MRV?

1. Yes
2. No

Are all Aeroplane Operators registered in a State required to undertake MRV?

1. Yes
2. No

Select the correct answer

1. Countries can decide whether or not to implement Annex 16, Volume IV and they can do it in phases
2. It is up to Aeroplane Operators whether to implement MRV starting in 2021 since the first phase is voluntary
3. All States have to participate in CORSIA from 2027 unless exempted

Select the correct answer

1. Countries can decide whether or not to implement Annex 16, Volume IV and they can do it in phases
2. It is up to Aeroplane Operators whether to implement MRV starting in 2021 since the first phase is voluntary
3. All States have to participate in CORSIA from 2027 unless exempted

CO2 emissions from domestic flights have to be monitored, verified and reported but are not subject to offsetting requirements

1. True
2. False

CO2 emissions from domestic flights have to be monitored, verified and reported but are not subject to offsetting requirements

1. True
2. False

Select the correct answer:

1. Any AO with MRV requirements will have offsetting requirements
2. The MRV requirements are independent from the offsetting requirements. There might be AOs with MRV requirements, but without offsetting requirements if not flying routes between participating States
3. The MRV requirements are independent from the offsetting requirements. There might be AOs with MRV requirements, but without offsetting requirements because they are from an exempted State

Select the correct answer:

1. Any AO with MRV requirements will have offsetting requirements
2. The MRV requirements are independent from the offsetting requirements. There might be AOs with MRV requirements, but without offsetting requirements if not flying routes between participating States
3. The MRV requirements are independent from the offsetting requirements. There might be AOs with MRV requirements, but without offsetting requirements because they are from an exempted State

The NAB is the competent body in charge of submitting to ICAO the list of the verification bodies

1. True
2. False

Q17: The NAB is the competent body in charge of submitting to ICAO the list of the verification bodies

1. True
2. False

Introduction to ICAO Carbon Offsetting and Reduction Scheme for International Aviation

**EMP, ER, VR: from monitoring to
verification.**



Monitoring of CO2 Emissions

- **Who monitors?:** The aeroplane operator
- **When?:** Every year. Starting in 2019
- **How?:** According to a CORSIA Fuel Monitoring Method or CORSIA Estimation Tool
- **Tool:** Emissions Monitoring Plan
- **Where to look:**
 - Annex 16 Volume IV Chapter 2 2.1-2.2. Appendix 2,3 and 4. Attachment B-2, Attachment B-3, Attachment C
 - ETM Doc 9501 Chapter 3.1 and Appendix 1.1

Reporting of CO2 Emissions

- **Who reports?:** The aeroplane operator and the State
- **When?:** Every year. Starting in 2020 (for 2019 data)
- **Tools:**
 - Aeroplane Operator Emissions Report
 - State Emission Report
- **Guidance:**
 - Annex 16 Volume IV Chapter 2 2.3-2.2. Appendix 5.
 - ETM Doc 9501 Chapter 3.2 and Appendix 1.2

Verification of CO2 Emissions

- **Who verifies?:** The aeroplane operator (recommended) , a Verification Body and the State
- **When?:** Every year. Starting in 2020 (for 2019 data)
- **Tools:**
 - Emissions Report and Verification Report (contains the verification statement and required supporting information)
 - Emission Cancellation Report and Verification Report
- **Guidance:**
 - Annex 16 Volume IV Chapter 2 2.4. Appendix 6.
 - ETM Doc 9501 Chapter 3.3
 - ISO 14064-3-2019, ISO 14065:2020, ISO 17029:2019

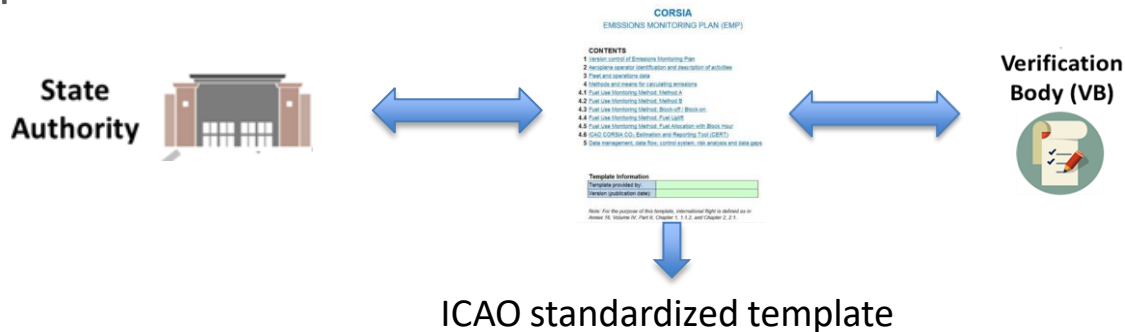
Emission Monitoring Plan and Emission Monitoring Methods

CORSIA Monitoring Plan

What is a Monitoring Plan?

Tool by which the AO identifies the means and methods for CO₂ emissions monitoring and record of fuel use.

Serves as the manual to determine and explain the AO's monitoring activities. It acts as the “guide” for the State and Verification Body against which the AO's Emission Report is to be checked.



Relevance of the EMP for NABS & VBs

- VBs need to understand the EMP (Emissions Monitoring Plan) since it is always the starting point of the verification
- VBs need to know if the AO is eligible to use simplified reporting procedures (CERT)
- VB needs to check if the EMP meets the requirements of Annex 16, Volume IV & national legislation and whether procedures described on it have been implemented by the AO (e.g. data flow and control activities)
- VBs need to understand the exact data points required for fuel calculation to be able to check that the methodologies are correctly applied
- VBs need to understand where there is risk of data gaps occurring in the process



CORSLA	
EMISSIONS MONITORING PLAN (EMP)	
CONTENTS	
1	Version control of Emissions Monitoring Plan
2	Aircraft operator identification and description of activities
3	Fuel and operations data
4	Methods and means for calculating emissions
4.1	Fuel Use Monitoring Method: Method A
4.2	Fuel Use Monitoring Method: Method B
4.3	Fuel Use Monitoring Method: Block-off / Block-on
4.4	Fuel Use Monitoring Method: Fuel Usage
4.5	Fuel Use Monitoring Method: Fuel Allocation with Block Hour
4.6	ICAO CORSIA CO ₂ Estimation and Reporting Tool (CERT)
5	Data management, data flow, control system, risk analysis and data gaps
Template information	
Template provided by:	
Version (publication date):	
<small>Note: For the purpose of this template, international flight is defined as in Annex 16, Volume IV, Part I, Chapter 1, 1.1.2, and Chapter 2, 2.1</small>	

Relevance of the EMP for NABS & VBs

- The EMP will be the key element for the VB to elaborate the Risk Analysis. In particular, it will allow to understand:
- Complexity of the EMP (number of aeroplane types, different monitoring methods, use of simplified MRV)
 - Maturity of the internal control activities
 - Data flow activities
 - Assessment whether CORSIA data and information is part of a certified management system
 - Whether there are internal audits/audit reports & pre-verification reports
 - Responsibilities in the company
 - Use of CORSIA eligible fuels

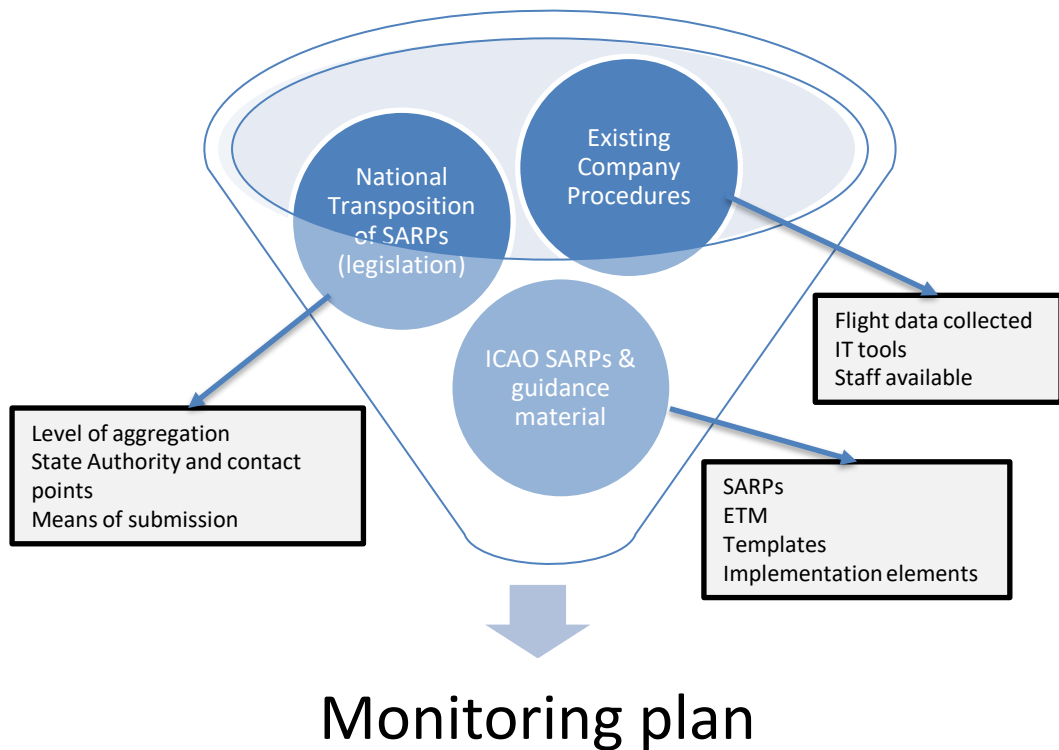


CORSIA EMISSIONS MONITORING PLAN (EMP)	
CONTENTS	
1 Version control of Emissions Monitoring Plan	
2 Aeroplane operator identification and description of activities	
3 Flight and operations data	
4 Methods and means for calculating emissions	
4.1 Fuel Use Monitoring Method: Method A	
4.2 Fuel Use Monitoring Method: Method B	
4.3 Fuel Use Monitoring Method: Block-off / Block-on	
4.4 Fuel Use Monitoring Method: Fuel Uplift	
4.5 Fuel Use Monitoring Method: Fuel Allocation with Block Hour	
4.6 CAO CORSIA CO₂ Estimation and Reporting Tool (CERT)	
5 Data management, data flow, control system, risk analysis and data gaps	
Template information	
Template provided by:	
Version (publication date):	
<small>Note: For the purpose of this template, international flight is defined as in Annex 16, Volume IV, Part I, Chapter 1, 1.1.2, and Chapter 2, 2.1.</small>	

The Emissions Monitoring Plan (EMP)

CORSIA	
EMISSIONS MONITORING PLAN (EMP)	
CONTENTS	
1	Version control of Emissions Monitoring Plan
2	Aeroplane operator identification and description of activities
3	Fleet and operations data
4	Methods and means for calculating emissions
4.1	Fuel Use Monitoring Method: Method A
4.2	Fuel Use Monitoring Method: Method B
4.3	Fuel Use Monitoring Method: Block-off / Block-on
4.4	Fuel Use Monitoring Method: Fuel Uplift
4.5	Fuel Use Monitoring Method: Fuel Allocation with Block Hour
4.6	ICAO CORSIA CO₂ Estimation and Reporting Tool (CERT)
5	Data management, data flow, control system, risk analysis and data gaps
Template Information	
Template provided by:	
Version (publication date):	
<i>Note: For the purpose of this template, international flight is defined as in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2, and Chapter 2, 2.1.</i>	

Content of the CORSIA EMP

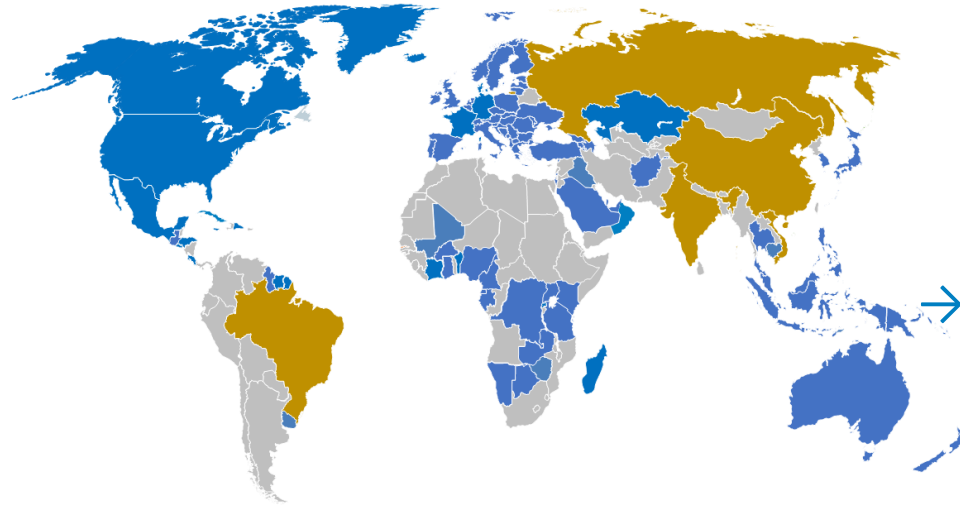


Contents

1. Monitoring Plan Versions
2. AO Identification and description of Activities
3. Fleet and operations data
4. Monitoring method & Calculation
5. Data management

Ensuring Completeness of Flights with Offsetting Obligations

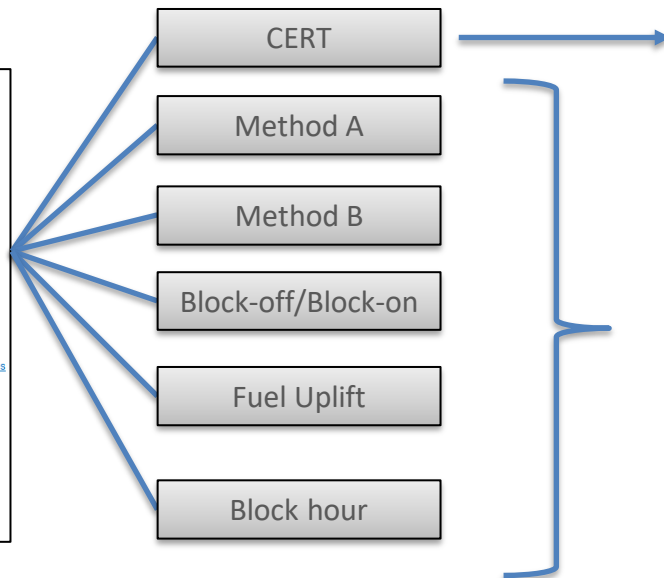
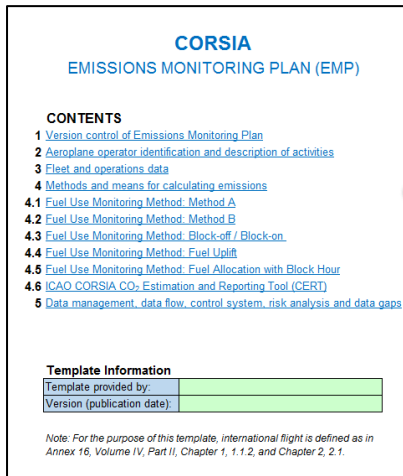
The VB to ensure flights with offsetting obligations are correctly identified



→ AO to describe how it assures that all flights are monitored and how the international flights and flights with offsetting requirements are identified

→ AO should have a system in place to assure that the database with participating States is updated → States may opt in or out by 30 June

Monitoring Methods



Only eligible for certain AOs

$$\text{CO}_2 \text{ Emissions} = \text{MF} * \text{FCF}$$

Where:

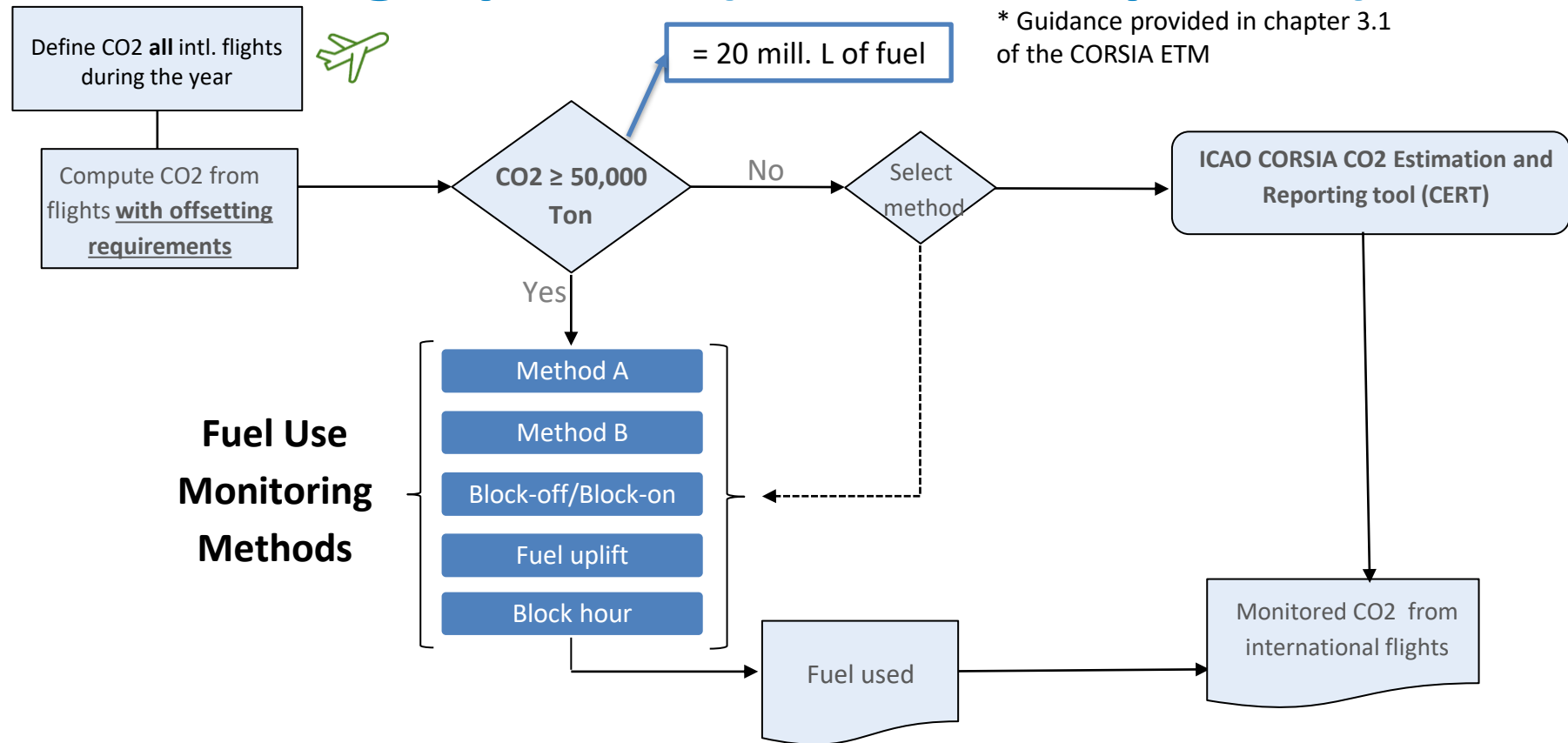
MF = Mass of fuel used

FCF = Fuel Conversion Factor

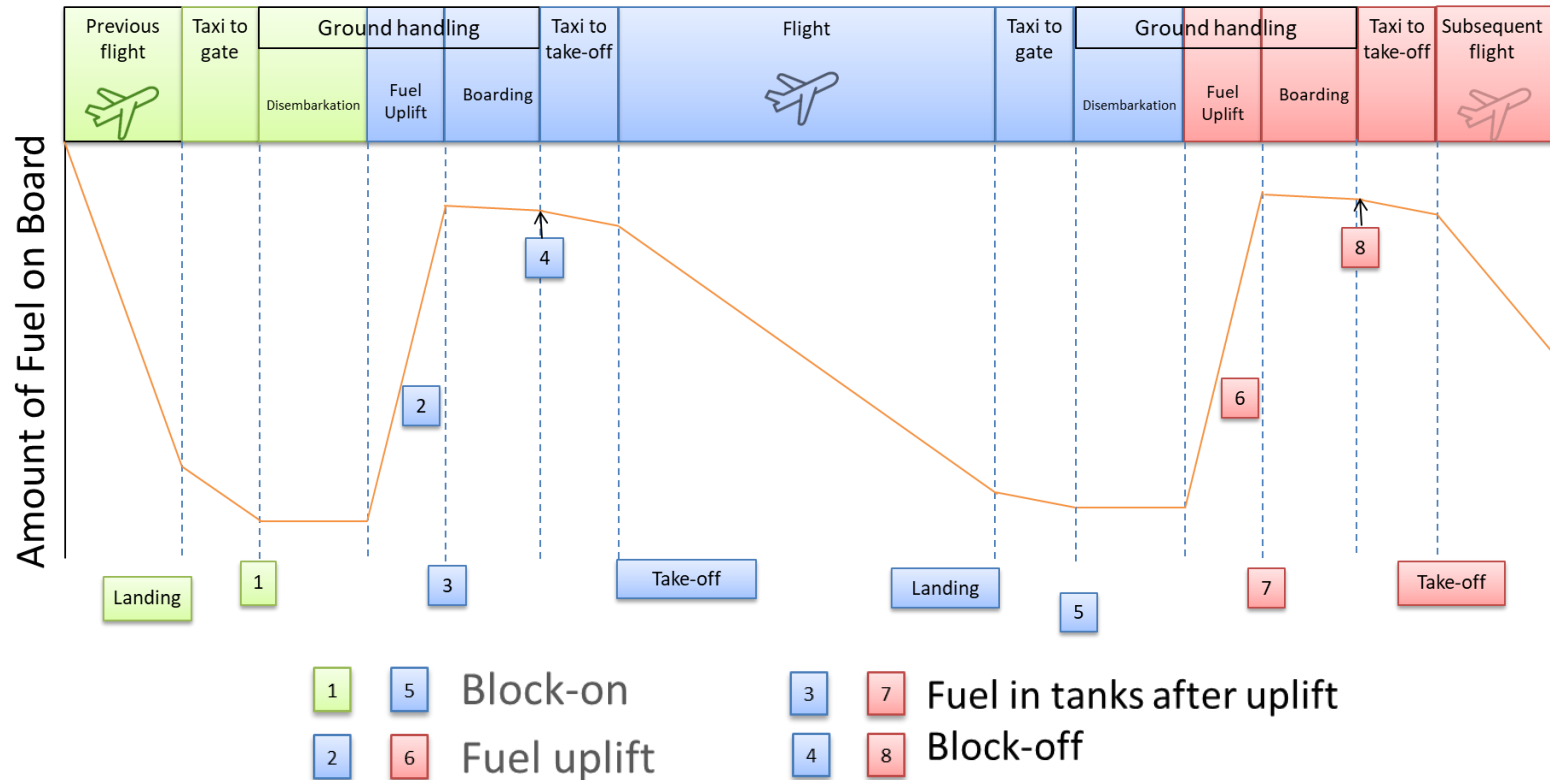
Constant fuel conversion Factor for

- Jet A & A1 → 3.16
- Jet B & Av. Gas → 3.10

Monitoring Options (2021-2035 period)



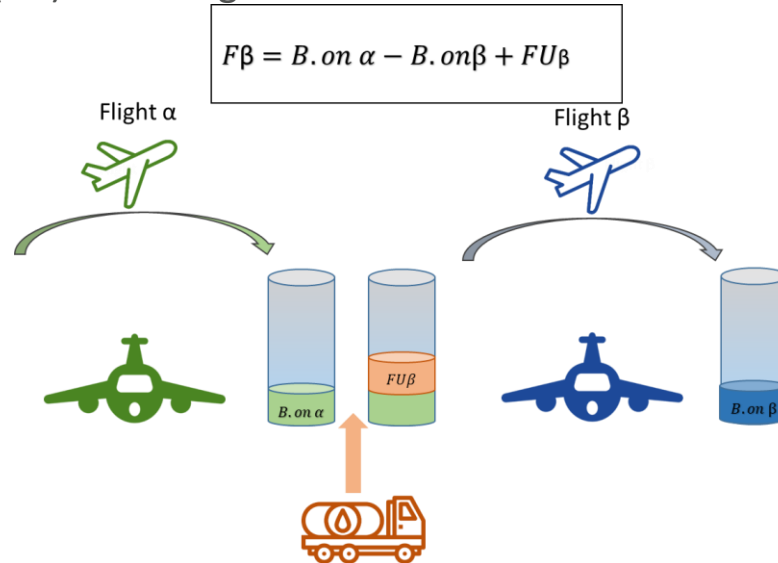
Understanding Fuel Curve and data points



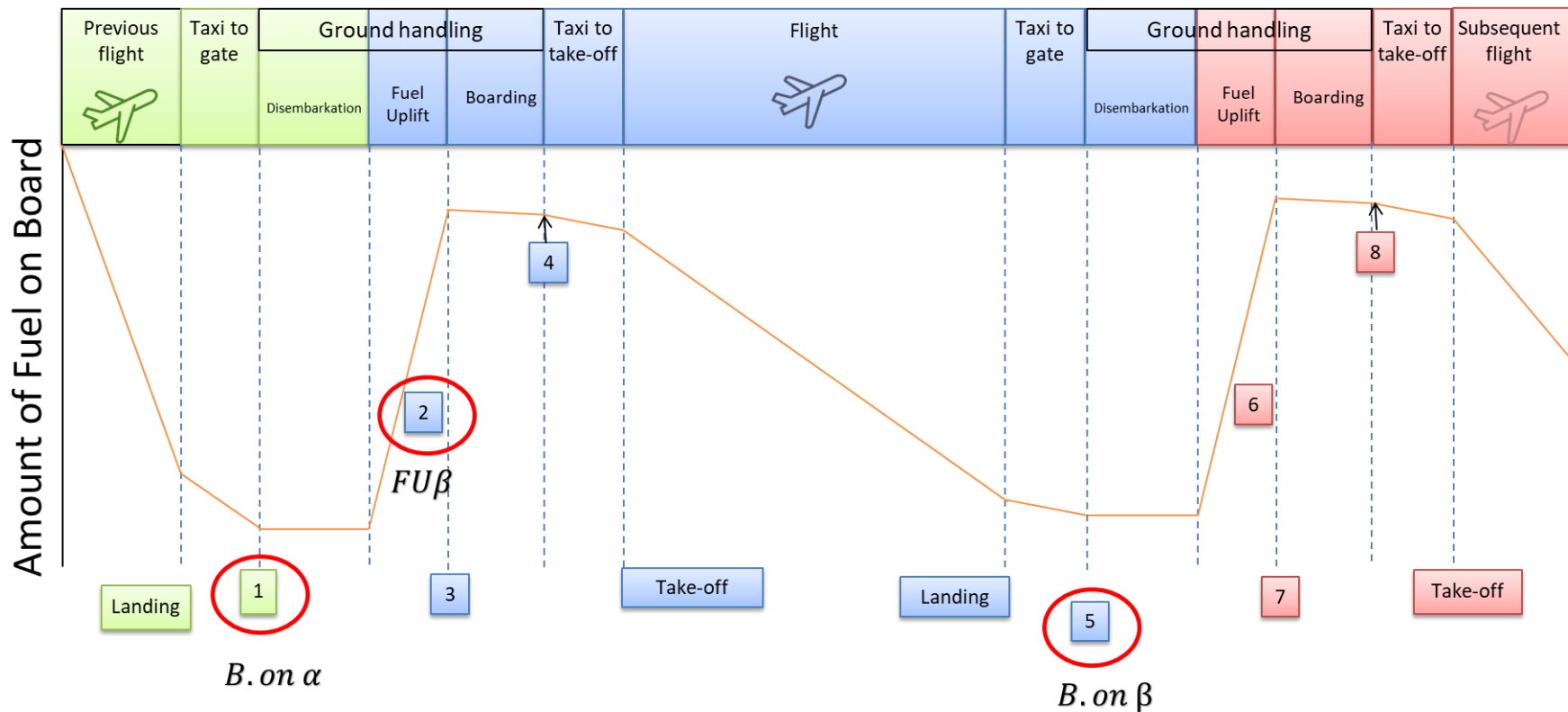
Method B (as an example of the Methods)

→ Relates the flight for which the calculation is carried out to the previous flight . Data needed:

- Amount in the tanks at block-on (B.on) for the flight in question
- Amount in the tanks at block-on (B.on) for the previous flight
- Fuel Uplift (FU) of the flight under consideration



Method B



Fuel Use Monitoring Method: Method B

ETM Table 3-4

Table 3-4. Illustration of calculations of fuel use based on Method B

<i>Flight details</i>		<i>Fuel in Tanks and Uplift (in tonnes)</i>			<i>Fuel use</i>
<i>Consecutive number</i>	<i>Date of flight</i>	<i>On-block previous flight</i>	<i>On-block current flight</i>	<i>Uplift quantity</i>	<i>Method B</i>
N		R_{N-1}	R_N	U_N	$F_N = R_{N-1} - R_N + U_N$
1	28-Jan-16	5.5	8.5	89.3	86.3
2	29-Jan-16	8.5	5.8	43.3	46.0
3	29-Jan-16	5.8	9.7	26.9	23.0
4	30-Jan-16	9.7	4.0	–	5.7
5	30-Jan-16	4.0	4.5	71.7	71.2
...	31-Jan-16	4.5	–	–	–

What is CORSIA CERT?

© ICAO 2022



CORSIA | CO₂ Estimation & Reporting Tool (CERT)

Version 2022

CO₂ Emissions Estimation & Data Gap Filling

Back Home Next

Step:

- Collect flight information (aircraft type, aerodromes of origin and destination) for all flights during the relevant time period.
- Enter the information for all flights by double clicking on the green cells below. Data should be entered using decimals separated by ".".
 Note: For a given aerodrome pair flown by a particular aircraft type, all flights can be entered as a single entry by entering total number of flights during the relevant time period.
 Note: Data can also be copied and pasted across input cells as needed.
 Note: Data can also be imported from a csv file, structured to match the contents under the INPUT section below, by clicking on →
- After entering input, compute CO₂ emissions. Click on →
- After computing CO₂ emissions, continue to fill the necessary information for the Emissions Report. Click on →

Import Input File (.csv)
Estimate CO₂ Emissions
Populate ER with CO₂ Information

INPUT										OUTPUT					
Date (Opt.)	Flight ID (Opt.)	ICAO Aircraft Type Designator	Origin Aerodrome	Destination Aerodrome	Total Number of Flights	Total Block Time for all flights (in min.)	Total Fuel Use for all flights (in tonnes)	Type of Fuel	Data Gap Ref. (Opt.)	Date Gap	Aerodrome Pair Great Circle Distance (in km)	Fuel (in tonnes)	CO ₂ Emissions (in tonnes of CO ₂)	Flight(s) subject to Scope of Applicability of CORSIA	Warnings
		Search Aircraft Custom AC	Search Aerodrome Code Custom AP												

→ Tool developed by ICAO, using CO₂ Estimation Models (CEMs)

→ It is continuously improved as ICAO gets more data and CEMs are improved

→ 5 versions released (2018, 2019, 2020, 2021 and 2022)

Functionalities of the CERT



Estimation of CO2 for determination of simplified compliance procedures eligibility



Report generation functionality



Monitoring (estimating CO2)



List of States pairs subject to offsetting requirement



Main page | Background information

Step:

1

Choose below the purpose of the use of the ICAO CORSIA CERT 2022 (click on the appropriate checkbox):

- Assessment of (1) whether the operator is within the applicability scope of the Annex 16, Volume IV, Part II, Chapter 2 requirements towards the submission of the Emissions Monitoring Plan and (2) the operator's eligibility to use the ICAO CORSIA CERT as a monitoring method in 2022. Click on -> ☐

- Estimation of 2022 Emissions and/or Generation of an Emissions Report. Click on -> ☐

Next

Background information on the ICAO CORSIA CERT

The ICAO CORSIA CO₂ Estimation and Reporting Tool (CERT) can be used by an aeroplane operator to support the monitoring and reporting of their CO₂ emissions, in accordance with the requirements from ICAO Annex 16, Volume IV, Part II, Chapter 2, 2.2, 2.5.1 and Appendix 3.

The ICAO CORSIA CERT supports aeroplane operators in fulfilling their monitoring and reporting requirements by populating the standardized Emissions Monitoring Plan and Emissions Report templates provided in Appendix 1 of the Environmental Technical Manual (Doc 9501), Volume IV. This support includes:

- (i) assessing whether or not they are within the applicability scope of the Chapter 2 MRV requirements;
- (ii) assessing their eligibility to use Fuel Use Monitoring Methods in support of their Emissions Monitoring Plan (Annex 16, Volume IV, Part II, Chapter 2, 2.2; and
- (iii) filling any CO₂ emissions data gaps (Annex 16, Volume IV, Part II, Chapter 2, 2.5.1).

The 2022 version of the ICAO CORSIA CERT is valid for the assessment of (1) whether the operator is within the applicability scope of the Annex 16, Volume IV, Part II, Chapter 2 requirements towards the submission of the Emissions Monitoring Plan and (2) the operator's eligibility to use the ICAO CORSIA CERT as a monitoring method in 2023. For operators within the scope of applicability of the Annex 16, Volume IV, Part II, Chapter 2, the ICAO CORSIA CERT 2022 can be used to support the development of an Emissions Report.

The Aeroplane Operator can always use CERT to report annual CO2 emissions to the State Authority

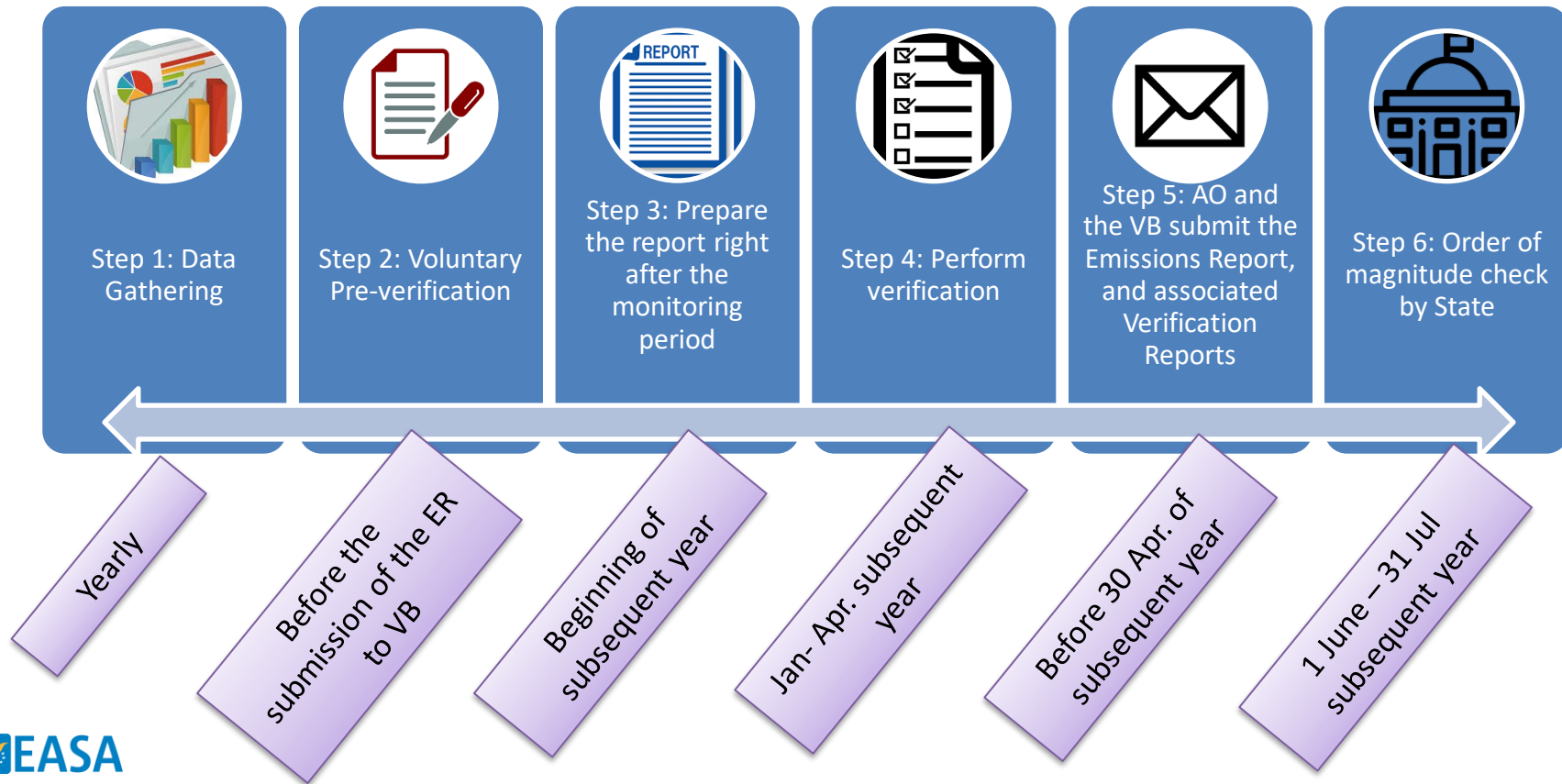
1. True
2. False
3. Only if from exempted State

The Aeroplane Operator can always use CERT to report annual CO2 emissions to the State Authority

1. True
2. False
3. Only if from exempted State

Emission Report

Process to Prepare an Annual Report by an AO



Purpose of the Emission Report

CORSIA EMISSIONS REPORT (ER)

CONTENTS

- 1 [Aeroplane operator identification and description of activities](#)
- 2 [Underlying basic information of the Emissions Report](#)
- 3 [Aeroplane fleet and fuel types](#)
- 4 [Fuel density](#)
5. [Reporting](#)
- 5.1 [Reporting - State pairs](#)
- 5.2 [Reporting - Aerodrome pairs](#)
- 6 [Data gaps](#)

Template Information

Template provided by:	
Version (publication date):	

Note: For the purpose of this template, international flight is defined as in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2, and Chapter 2, 2.1.

- To document the monitoring activity of the AO as well as the VB info
- To serve as a way of communication between the AO and the State
- To serve the State as basis for calculation of AO's offsetting requirements from 2021 onwards

Emissions Reporting

From 2019
emissions

From 2021
emissions

a) Summary of reported international flights and emissions

Total CO ₂ emissions from international flights (in tonnes):	
Total CO ₂ emissions from flights subject to offsetting requirements (in tonnes):	
Total number of international flights during reporting period:	
Total number of international flights subject to offsetting requirements:	
Total emissions reductions claimed from the use of CORSIA eligible fuels (in tonnes):	

Emission Report

CORSIA EMISSIONS REPORT (ER)

CONTENTS

- 1 [Aeroplane operator identification and description of activities](#)
- 2 [Underlying basic information of the Emissions Report](#)
- 3 [Aeroplane fleet and fuel types](#)
- 4 [Fuel density](#)
- 5. [Reporting](#)
- 5.1 [Reporting - State pairs](#)
- 5.2 [Reporting - Aerodrome pairs](#)
- 6 [Data gaps](#)

Template Information

Template provided by:	
Version (publication date):	

Note: For the purpose of this template, international flight is defined as in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2, and Chapter 2, 2.1.

Reporting CORSIA Eligible Fuels

→ **CORSIA eligible fuel:** A CORSIA sustainable aviation fuel or a CORSIA lower carbon aviation fuel, which an AO may use to reduce its offsetting requirements.



Requirements:

- Fuel needs to come from fuel producers that are certified by an approved Sustainability Certification Scheme included in the ICAO document entitled “CORSIA Approved Sustainability Certification Schemes”*
- That such certification scheme meets the requirements included in the ICAO document entitled “CORSIA Eligibility Framework and Requirements for Sustainability Certification Schemes”

CORSIA Eligible Fuels

- The AO to indicate in the ER if it uses CORSIA Eligible fuels to attach an additional CORSIA Eligible Fuels Supplementary Information
- In this template the AO should include
 - Emissions reductions claimed
 - Fuel type, mass and Life Cycle Emissions value (LSf)
 - Evidence of compliance with Sustainability Criteria

CORSIA
**CORSIA ELIGIBLE FUELS
SUPPLEMENTARY INFORMATION***
(* supplementary information to the Emissions Report from aeroplane operator to State)
CONTENTS
[Template information](#)
[Aeroplane operator identification and reporting information](#)
[CORSIA eligible fuel claim form](#)
[Summary of CORSIA eligible fuels information](#)

Template Information

Template provided by:	
Version (publication date):	

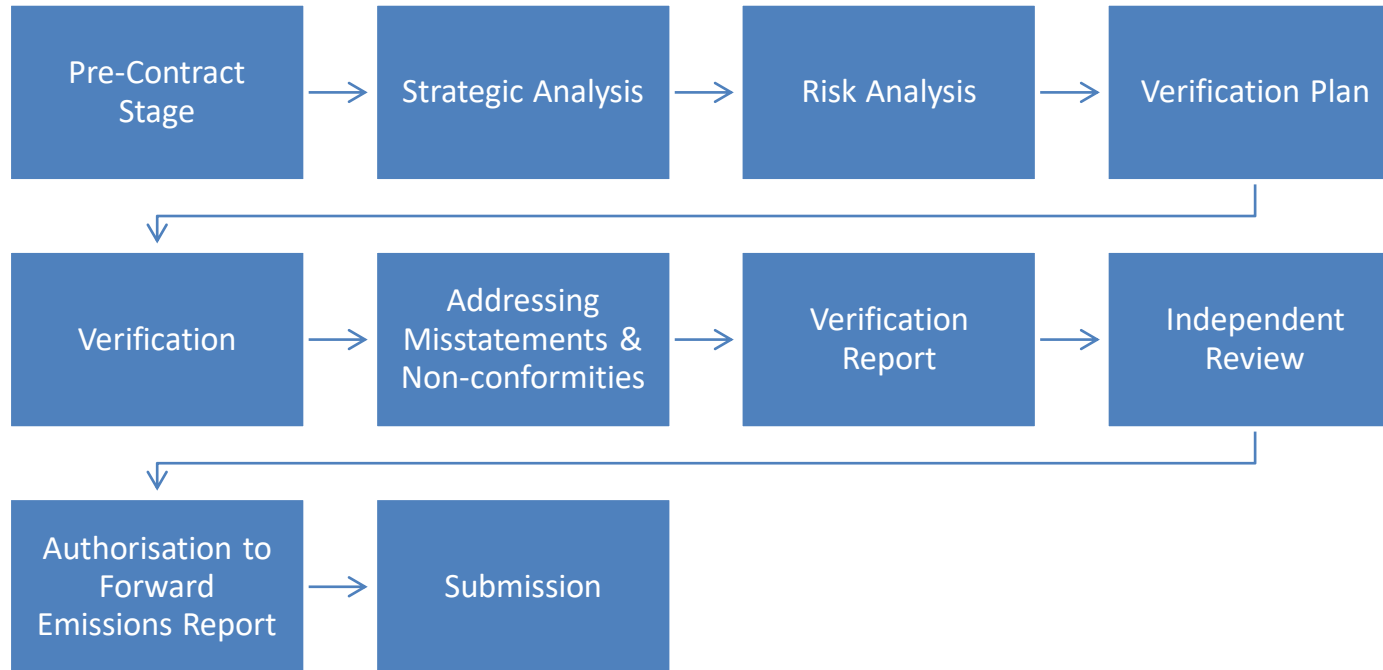
Verification Report

Verification of CO2 Emissions

Understanding the process:

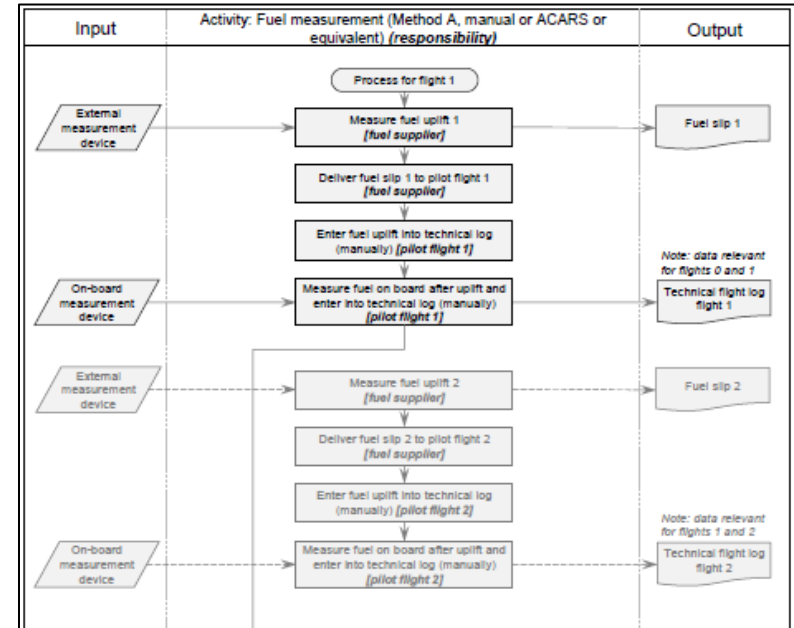
1	The AO is recommended to conduct a pre-verification of its data before submitting it to the VB. It does not replace the requirement for third-party verification.
2	The AO engages a VB from the list of accredited bodies , within the ICAO document “CORSIA Central Registry (CCR): Information and Data for Transparency
3	The VB verifies the AO Emission Report to demonstrate that it is free from material misstatements and material non-conformities
4	<p>The VB drafts a Verification Report after undertaking the verification, containing a Verification Statement</p> <div><div>Verified as satisfactory</div><div>Verified as not satisfactory</div></div> <p>(or satisfactory with comments if non-material misstatements and / or non-material non-conformities)</p>
5	VB forwards a copy of the Verification Report with the Emission Report to the State

Steps of the Verification Process by the Verification Body



Understanding the Data Flow of an AO

- VB must verify along the data flows of the EMP
- Starting point of the verification activity is always the (external/internal) primary **data source** such as the fuel supplier invoices, fuel uplift statements, flight or technical logs, invoices from air navigation service providers, or ACARS messages
- See whether staff of the AO demonstrates a sufficient level of knowledge of the specific data flow activities.



Verification Report

CORSIA	
Verification Report	
CONTENTS	
Scope of Verification Report	
Identification	
Time allocation and scope of the verification	
General information	
Process and analysis	
Conclusions	
Concluding verification statement	
Template Information	
Template provided by:	
Version (publication date):	

There is no need to verify emissions of an AO if they are using CERT as Monitoring Method:

1. True
2. False

There is no need to verify emissions of an AO if they are using CERT as Monitoring Method:

1. True
2. False

The VB must verify the EMP:

1. True
2. False

The VB must verify the EMP:

1. True
2. False

Introduction to ICAO Carbon Offsetting and Reduction Scheme for International Aviation

Understanding CORSIA Offsetting requirements and calculation



Understanding CORSIA's Nature



Offsetting

- CORSIA is an offsetting scheme. Different to emissions trading systems like EU ETS
- Compensates emissions from one sector through emissions reductions elsewhere. 1 offset = 1 tonne of CO₂ (tCO₂)

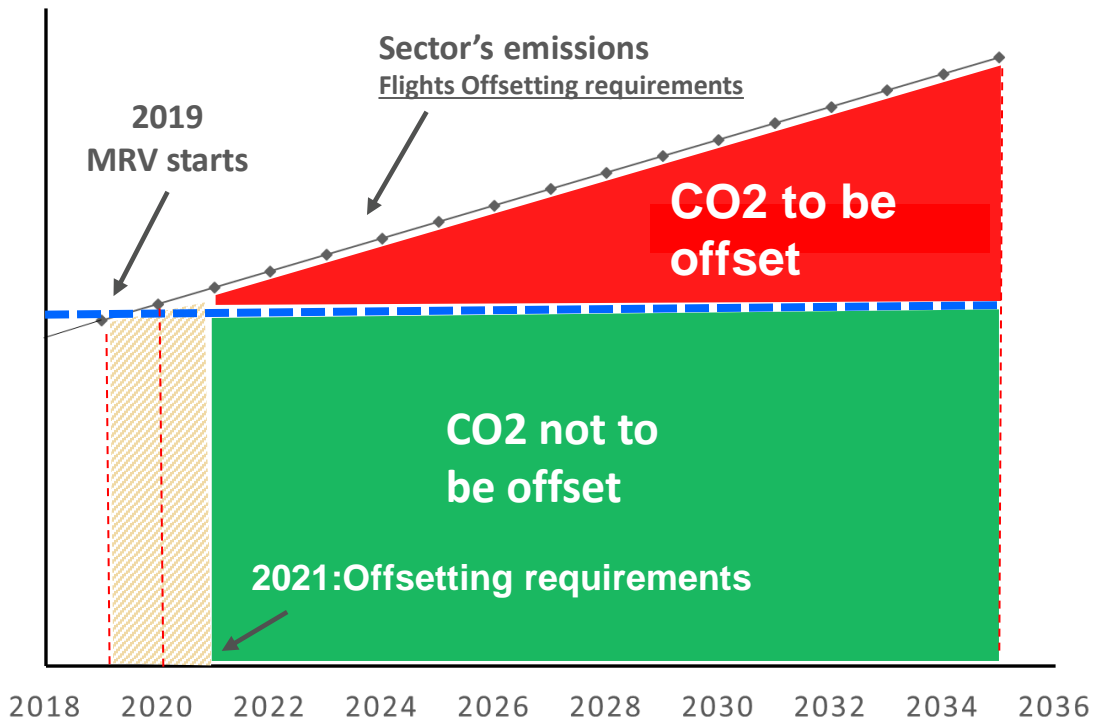
An aeroplane operator will have to demonstrate that it has purchased and cancelled offsets, equivalent to its CORSIA offsetting requirement:

1. Annually, with first deadline on 30 April 2022, with regard to emissions 2021
2. On a 3-year period basis, starting in 2022, with regard to emissions from 2019, 2020 and 2021 emissions
3. On a 3-year period basis, starting in 2025, with regard to 2021, 2022 and 2023 emissions

An aeroplane operator will have to demonstrate that it has purchased and cancelled offsets, equivalent to its CORSIA offsetting requirement:

1. Annually, with first deadline on 30 April 2022, with regard to emissions 2021
2. On a 3-year period basis, starting in 2022, with regard to emissions from 2019, 2020 and 2021 emissions
3. On a 3-year period basis, starting in 2025, with regard to 2021, 2022 and 2023 emissions

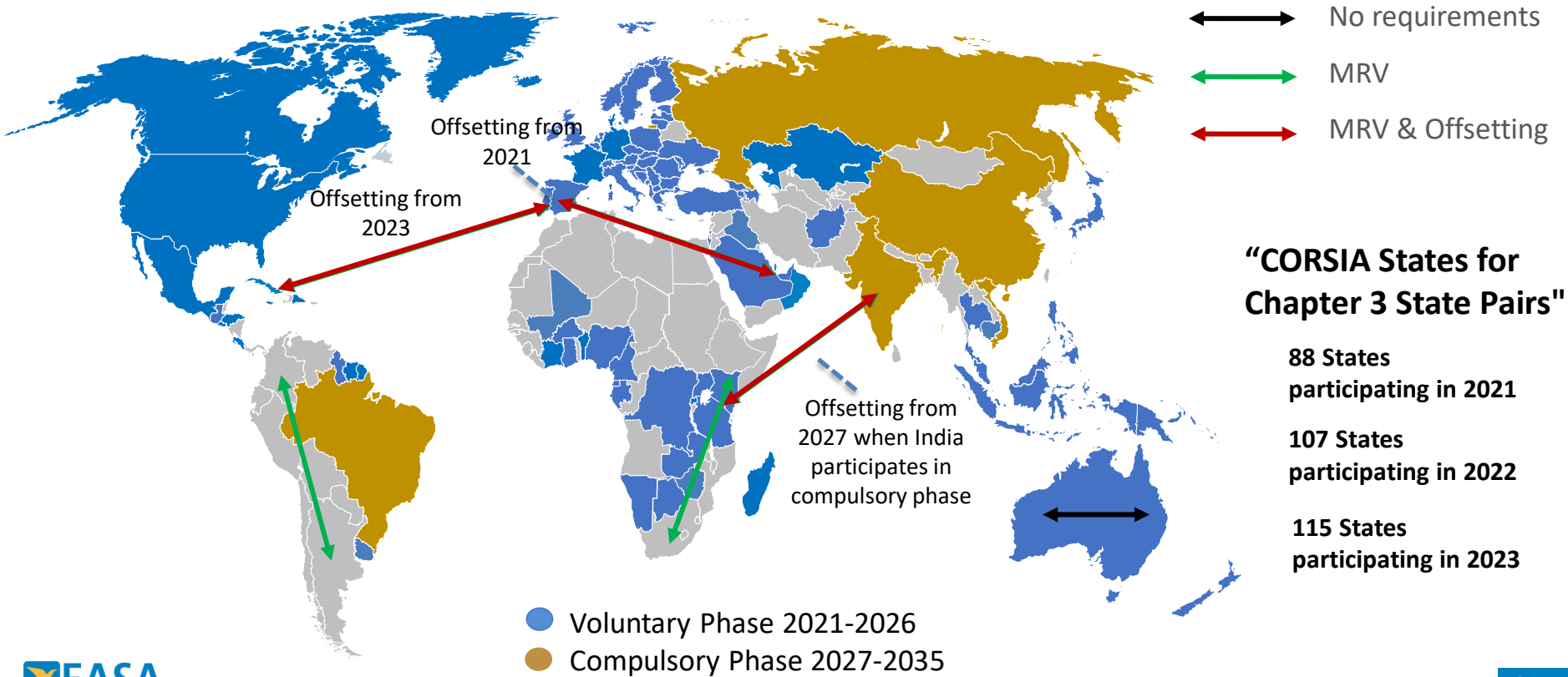
Carbon Offsetting Requirements. Understanding the overall context



Baseline:
Average emissions
2019-2020
Flights offsetting
requirements

Illustrative purposes

Applicability of Offsetting Requirements



Emissions Reporting

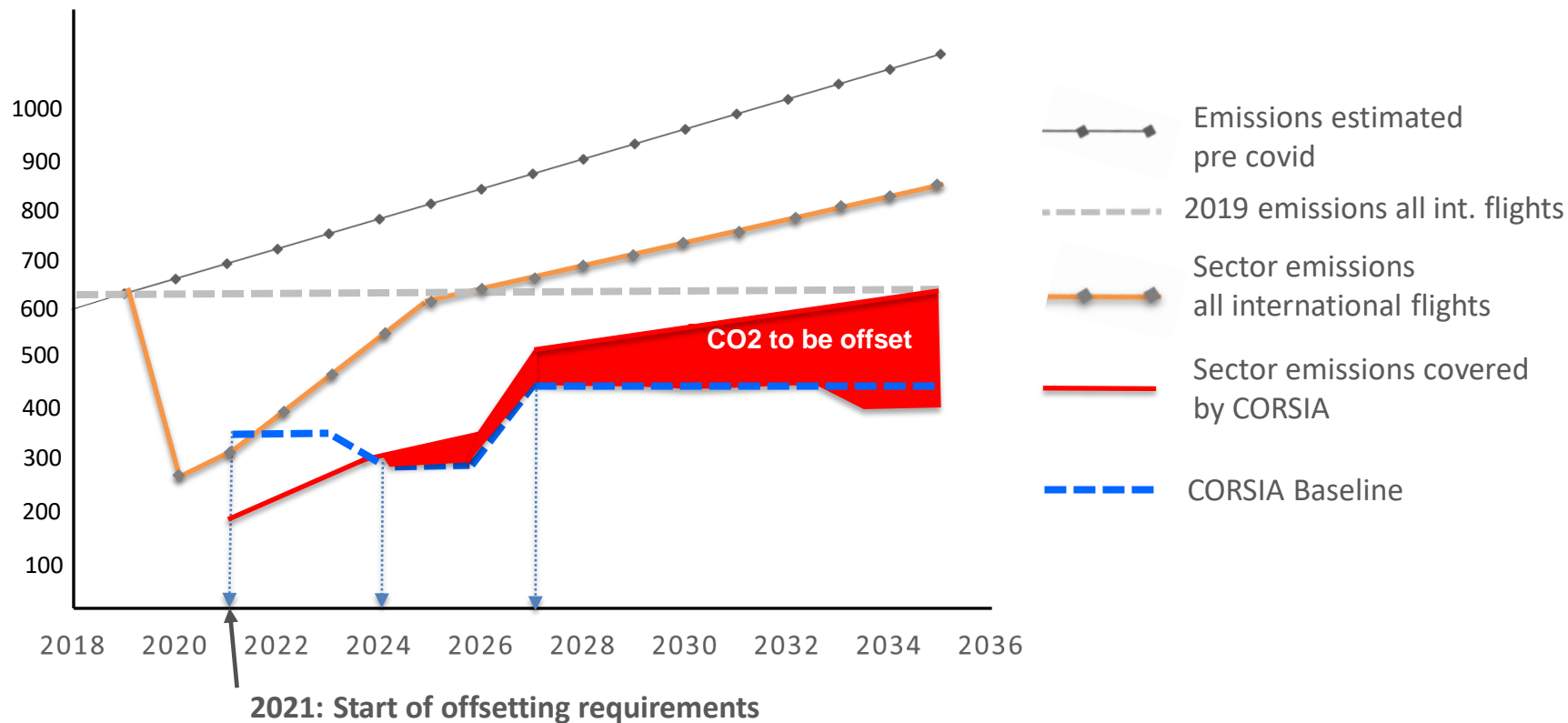
From 2019
emissions

From 2021
emissions

a) Summary of reported international flights and emissions

Total CO ₂ emissions from international flights (in tonnes):	
Total CO ₂ emissions from flights subject to offsetting requirements (in tonnes):	
Total number of international flights during reporting period:	
Total number of international flights subject to offsetting requirements:	
Total emissions reductions claimed from the use of CORSIA eligible fuels (in tonnes):	

Revised Baseline



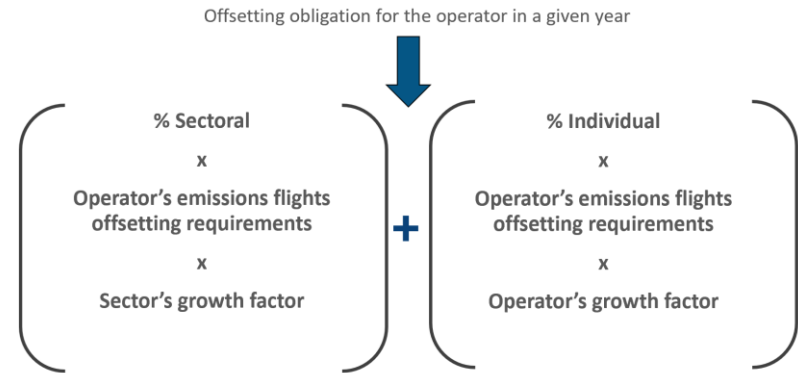
Offsetting Formula

- The total amount of emissions to be offset is distributed among individual AOs according to a formula and a dynamic calculation and based on the sectoral growth factor and the individual CO2 emissions of the AO.

$$OR_y = \%S_y * (OE_y * SGF_y) + \%O_y * (OE_y * OGF_y)$$

where:

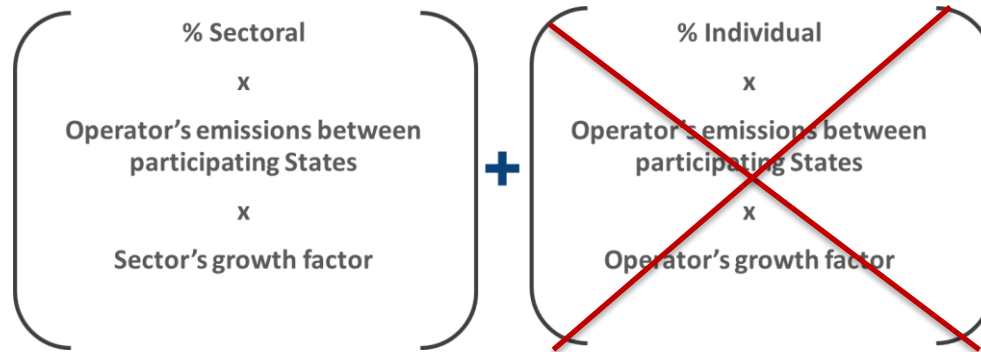
OR_y = Aeroplane operator's offsetting requirements in the given year y ;
 OE_y = Aeroplane operator's CO₂ emissions covered by 3.1 in the given year y ;
 $\%S_y$ = Per cent Sectoral in the given year y ;
 $\%O_y$ = Per cent Individual in the given year y where $\%O_y = (100\% - \%S_y)$;
 SGF_y = Sector's Growth Factor; and
 OGF_y = Aeroplane operator's Growth Factor.



Understanding the offsetting “formula”

- 2021-2032: 100% sectoral 0% individual
- 2033-2035: 85% sectoral 15% individual

This means that from 2021 to 2032 there is only one part of the formula to use:

$$\left(\begin{array}{c} \% \text{ Sectoral} \\ \times \\ \text{Operator's emissions between} \\ \text{participating States} \\ \times \\ \text{Sector's growth factor} \end{array} \right) + \left(\begin{array}{c} \% \text{ Individual} \\ \times \\ \text{Operator's emissions between} \\ \text{participating States} \\ \times \\ \text{Operator's growth factor} \end{array} \right)$$


Understanding the offsetting “formula”

Sector’s Growth Factor / Operator’s Growth Factor

Sector’s growth factor



$$\frac{\text{Sector's emissions flights offsetting requirements} - \text{CORSIA Baseline}}{\text{Sector's emissions flights offsetting requirements}}$$

AO’s growth factor



$$\frac{\text{Operator's emissions flights offsetting requirements} - \text{Operator's Baseline}}{\text{Operator's emissions flights offsetting requirements}}$$

The baseline will be re-calculated when the routes included in CORSIA change. This can happen, for example, when new States volunteer to participate or States decide to withdraw their voluntary participation. The recalculation of the baseline will be done by ICAO at the start of each year

CORSIA Baseline 2021-2023: Emissions from flights with offsetting requirements in 2019

CORSIA Baseline 2024-2035: 85% Emissions in 2019 from flights with offsetting requirements

Aeroplane Operators will receive free offsets from its authority, equivalent to its baseline

1. True
2. False

Aeroplane Operators will receive free offsets from its authority, equivalent to its baseline

1. True
2. False

Example Offsetting requirements calculation for 2021 emissions

- ✓ **CORSIA Baseline (2019):** 341,380,188 tn CO₂
- ✓ **Sector's CO₂ emissions in 2021:** 167,142,002 tn CO₂
- ✓ **2021:** 100% sectoral 0% individual
- ✓ **Aeroplane Operator** emissions in 2021: 19,313 tn CO₂
- ✓ **Sector's growth factor** =
$$\frac{167,142,002 - 341,380,188}{167,142,002} = 0.0$$



Given that the total CO₂ emissions for all State pairs subject to offsetting requirements in 2021 were lower than the corresponding amount in 2019, each State is to use the 0.0 value for the purposes of calculating the 2021 CO₂ offsetting requirements for each aeroplane operator attributed to it.

Calculation for Aeroplane Operator = 19,313 x 0,0 = 0 offsets

Example Offsetting requirements calculation for 2033 emissions

- ✓ CORSIA Baseline (85% of 2019): 430 MT CO₂
- ✓ Sector's CO₂ emissions in 2033: 550 MT CO₂
- ✓ 2033: 85% sectoral, 15% individual
- ✓ Aeroplane Operator emissions in 2033: 140,000 tn CO₂
- ✓ Aeroplane Operator emissions in 2019: 90,000 tn CO₂
- ✓ Sector Growth Factor: $\frac{550-430}{550} = 0.2181$
- ✓ Operator Growth Factor: $\frac{140,000 - 76,500}{140,000} = 0.4535$

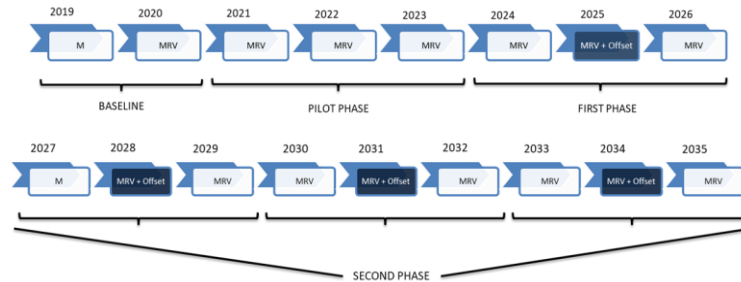
Illustrative purposes

85% of AO 2019 emissions

Calculation for Aeroplane operator = $(0.85 \times 140,000 \times 0.2181) + (0.15 \times 140,000 \times 0.4535) = 25954 + 9524 = 35,478$ offsets for 2033 emissions

Offsetting Requirements & Cancellation:

- Aeroplane operators will meet their offsetting requirements by **purchasing and cancelling CORSIA eligible emissions units**.
- Aeroplane operators will provide evidence to the State of the offsets it has purchased and cancelled every three years starting in 2025 by submitting to the State a **Verified Emission Units Cancellation Report (EUCR)**



If an Aeroplane operator's emissions with offsetting requirements do not increase compared to its baseline:

1. It will not have offsetting requirements
2. It will have offsetting requirements as long as the sector's emissions covered by CORSIA increase above the CORSIA baseline emissions

If an Aeroplane operator's emissions do not increase compared to its baseline:

- a) It will not have offsetting requirements
- b) It will have offsetting requirements as long as the sector's emissions covered by CORSIA increase above the CORSIA baseline emissions

A cargo airline has reported in 2022 100,000 tn CO₂ as 2021 emissions from routes with offsetting requirements. The airline has increased emissions by 25% in comparison to 2019 level. The offsetting requirement for this airline for 2021 emissions will be:

1. 100,000 tn CO₂, because the airline is increasing its emissions and therefore has to offset all its emissions with offsetting requirements
2. 100,000 tn CO₂ multiplied by the Sector Growth Factor
3. 25,000 tn CO₂ because the airline has to offset its growth in comparison to its 2019 emissions, even if the Sector Growth factor is negative for 2021

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Introduction to ICAO Carbon Offsetting and Reduction Scheme for International Aviation

Understanding CORSIA Eligible Emissions Units and their cancellation



Offsetting & Cancellation: Roles & Resp.

NAB



- ✓ Set up the scheme & extend accreditation to include EUCR
- ✓ Engage with VB to extend accreditations

AO



- ✓ Cancel such CORSIA Eligible Emissions Units within a registry designated by a CORSIA Eligible Emissions Unit Programme
- ✓ Request each Programme registry to make visible on the registry's public website, information on AO's cancelled CORSIA Eligible Emissions Units
- ✓ Submit a Verified EUCR for approval and a copy of the associated Verification Report to State

VB



- ✓ Conduct the verification
- ✓ Submit a Verified EUCR for approval and a copy of the associated Verification Report to State (upon authorisation of AO)

State



- ✓ Perform an OMC of the EUCR of each AO
- ✓ Gather all AO's information & report to ICAO using the Emissions Unit Cancellation Report

CORSIA Eligible Emission Units

- ICAO Document CORSIA Eligible Emission Units
- CORSIA Implementation element referenced in CORSIA SARPs
- Current document contains eligible Emission Units Programmes for the Pilot phase only (2021-2023)
- 2022 assessment cycle:
 - 7 additional Programmes and one to be reassessed for Pilot phase.
 - 7 current eligible programmes to be re-assessed to be eligible for First Phase (2024-2026)

Result: Forest Carbon Partnership Facility Program accepted to supply CORSIA eligible emissions units for the pilot phase (2021-2023).

TAB will continue the work of re-assessing the already-eligible programmes on their eligibility in the CORSIA first phase (2024-2026)



November 2022



CORSIA Eligible Emission Programmes

1. American Carbon Registry
2. Architecture for REDD+ Transactions
3. China GHG Voluntary Emission Reduction Program
4. Clean Development Mechanism
5. Climate Action Reserve
6. Global Carbon Council
7. The Gold Standard
8. Verified Carbon Standard
9. Forest Carbon Partnership Facility Program



Gold Standard
for the Global Goals



CORSIA Eligible Emission Units

- Projects generating units must have started their first crediting period from 1 January 2016
- Reductions must occur no later than 31 December 2020, inclusive *

Vintage and timeframe conditions for Pilot Phase offsetting requirements

***Note:** American Carbon Registry and Architecture for REDD+ Transactions allows for emission reductions through 31 December 2023

Emission Units Programme Registries

- Registries are electronic databases to record and track emissions units. Offset credits are assigned an identification number that can be tracked from when the unit is issued through to its transfer or use (cancellation or retirement) via the registry system.
- Registries are essential to assure credibility and transparency within the market and avoid double counting, as they record the ownership of each credit.
- CORSIA SARPs: the AO shall:
 - a) cancel CORSIA Eligible Emissions Units **within a registry** designated by a CORSIA Eligible Emissions Unit Programme
 - b) request registry to make visible on the public website information on each AO's cancelled units for a given compliance period.

Registries

- When a buyer retires/cancels a credit to offset against their emissions, the registry retires the serial number of the credit so it cannot be resold later on.
- ICAO requirement: “ must be able to identify CORSIA eligible emissions units, and to enable the public identification of cancelled units that are used toward CORSIA offsetting requirements; and any further requirements decided by the ICAO Council”
- Functionality is not available yet in some registries and is subject to ICAO approval.
- In some registries you need an account to see the projects, in others projects are accessible to anyone to view








































ALL PROJECTS

Project Status

Country

Project Type




































CORSIA

GS ID	PROJECT DETAILS	STATUS	SDGS	PROJECT TYPE	ACTIONS
GS11933	TMS Tankers Ltd. Shipping Retrofit Project 1 by TMS TANKERS LTD.	 Planned	  	Energy Efficiency Transport Sector	VIEW
GS11892	Foundation Wind Energy-II (Private) Limited 50 MW Wind Farm Project by Foundation Wind Energy-II (Private) Limited	 Planned	  	Wind	VIEW
GS11891	Foundation Wind Energy-I Limited 50 MW Wind Farm Project by FOUNDATION WIND ENERGY-I LIMITED	 Planned	  	Wind	VIEW
GS11685	Safe Water Supply - Choluteca VPA 001(R) by Offset Financial Holdings LLC	 Planned	  	Energy Efficiency Domestic	VIEW
GS11684	Safe Water Development of the Americas by Offset Financial Holdings LLC	 Planned		Energy Efficiency Domestic	VIEW
GS11972	Togo household water purifier project by Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd.	 Planned	   	Energy Efficiency Domestic	VIEW
GS11636	NREA Zaafarana 50 MW Solar PV Park by First Climate (Switzerland) AG	 Planned	  	Other	VIEW
GS12015	Safe Water in Uganda by NET ZERO DANIŞMANLIK ANONİM ŞİRKETİ	 Planned	     	Energy Efficiency Domestic	VIEW
GS11864	GS7591 VPA 48 Safe Water Supply in the Central African Republic by CO2balance UK Ltd	 Planned	   	Energy Efficiency Domestic	VIEW

ALL PROJECTS

Project Status Country Project Type **CORSIA**

Search...

GS ID	PROJECT DETAILS	STATUS	SDGS	PROJECT TYPE	COUNTRY	ACTIONS
GS11256	Changdao Geothermal Central Heating System by Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd.		Certified   	Geothermal	China	VIEW
GS11239	Shangrao Swine Farm Animal Manure Management System GHG Mitigation Project by Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd.		Certified   	Biogas Electricity	China	VIEW
GS11238	Ji'an Swine Farm Animal Manure Management System GHG Mitigation Project by Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd.		Certified   	Biogas Electricity	China	VIEW
GS11222	Ganzhou Swine Farm Animal Manure Management System GHG Mitigation Project by Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd.		Certified   	Biogas Electricity	China	VIEW
GS11207	Multi-Layer Household Water Filtration System in Kenya by Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd.		Certified    	Energy Efficiency Domestic	Kenya	VIEW
GS11167	Taishan Geothermal Central Heating System by Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd.		Certified   	Geothermal	China	VIEW
GS10790	GS10789 VPA1: Efficient and Clean Cooking for households in Somalia by Burn Manufacturing Co.		Certified     	Energy Efficiency Domestic	Somalia	VIEW
GS10782	Household biogas plants in rural parts of Central India by Value Network Venture Advisory Services Pte. Ltd.		Certified   	Biogas Electricity	India	VIEW

All Projects Registered Pipeline Open Comment Period VCUs Buffer

PROJECT SEARCH

ID

PROPOSITOR

NAME

PROJECT TYPE

METHODOLOGY

STATUS

COUNTRY/AREA

Kazakhstan
Kenya
South Korea
Lao
Laos

REGION

CREDITING PERIOD

Search

Clear Search

ID	Name	Proponent	Project Type	AFOLU Activities	Methodology	Status	Countr...
3884	Installation of high efficiency cookstoves in Sub Saharan Africa by BURN	Multiple Proponents	Energy demand		VMR0006	Under validation	Kenya
3767	MicroEnergy Credits – Microfinance for Solar Lamps in Kenya	MicroEnergy Credits Corp	Energy industries (renewable/non-renewable sources)		AMS-IIIAR	Under validation	Kenya
3669	Western Kenya Soil Carbon Project	Soil-Carbon Certification Services	Agriculture Forestry and Other Land Use	ALM	VM0017	Under validation	Kenya
3660	Papariko - Restoration of Degraded Mangrove Areas in Kenya	Vlinder Austria GmbH	Agriculture Forestry and Other Land Use	ARR	AR-AM0014	Under validation	Kenya
3340	Boomitra Grassland Restoration in East Africa Through Soil Enrichment	Boomitra Inc	Agriculture Forestry and Other Land Use	ALM	VM0042	Under development	Kenya

1

1 - 36 of 36 items

All Projects Registered Pipeline Open Comment Period VCUs Buffer

PROJECT SEARCH

ID

NAME

▶ PROJECT TYPE

▶ COUNTRY/AREA

▼ ADDITIONAL CERTIFICATION

Silver
Other Certifications
CORSIA
Crown Standard
FSC

ISSUANCE STATUS

-Select-

SERIAL NUMBER BLOCK START

SERIAL NUMBER BLOCK END

Search Clear Search

Issuance Date ▼	Sustainable Development Goals ▼	Vintage Start ▼	Vintage End ▼	ID ▼	Name ▼	Count... ▼	Project Type ▼	Method
23/02/2022		26/01/2020	31/12/2020	2982	BioLite Improved Cook stoves Programme	Kenya	Energy demand	AMS-II.C
23/02/2022		26/01/2020	31/12/2020	2982	BioLite Improved Cook stoves Programme	Kenya	Energy demand	AMS-II.C
23/02/2022		26/01/2020	31/12/2020	2982	BioLite Improved Cook stoves Programme	Kenya	Energy demand	AMS-II.C
23/02/2022		26/01/2020	31/12/2020	2982	BioLite Improved Cook stoves Programme	Kenya	Energy demand	AMS-II.C

BIOLITE IMPROVED COOKSTOVES PROGRAMME



Project ID: 2982

Type & Standard: VCS

CORSIA: Yes

Project duration: 2018 - 2025

Annual reduction: 11.005

Country: Kenya,

Type of project: Energy Demand

PROJECT DESCRIPTION

The Programme of Activities “BioLite Improved Cook Stoves Programme” involves the substitution of traditional and inefficient cook stoves with efficient biomass cook stove (wood, charcoal) in rural and/or urban household in India, Kenya and Uganda in biomass deficient regions.

The current practice of utilization of biomass in traditional cook stoves with efficiency of 10% leads to inefficient combustion resulting in emissions such CO, particulate matter etc) into the atmosphere. The proposed programme activity involves the replacement of inefficient traditional cook stoves with improved stoves which have the efficiency of greater than 25%. This results in reduction in usage of fuel (biomass) for cooking purpose which contributes to environmental sustainability and community development.



MULTI-LAYER HOUSEHOLD WATER FILTRATION SYSTEM IN KENYA



PROJECT DESCRIPTION

The project distributes water purifiers to residents and families across Kenya. The water purifiers of the project offer an affordable, long-term and zero emission solution for households that generally consume unsafe drinking water. It not only dramatically increases access to safe drinking water but also reduces consumption for woody fuels previously required to treat drinking water, which will decrease environmental degradation and greenhouse gas emissions.

Project ID: 11207

Type & Standard: GS

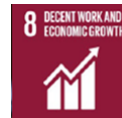
CORSIA: Yes

Project duration: 2020 - 2025

Annual reduction: 471,924

Country: Kenya,

Type of project: Energy Efficiency - Domestic



HOUSEHOLD AND COMMERCIAL BIOGAS PLANTS IN KENYA



Project ID: 7587

Type & Standard: GS

CORSIA: Yes

Project duration: 2018 - 2023

Annual reduction: 204, 831

Country: Kenya,

Type of project: Biogas -Heat

PROJECT DESCRIPTION

The project has installed different scaled biogas plants for households and commercial purposes in Kenya's rural areas. These biogas plants allow households, slaughterhouses and small-medium sized farms transform their organic waste into renewable biogas to accommodate their energy demand and will drive regional sustainable development.



Emission Units Cancellation Report

→ Reference Documentation:

- Annex 16 Volume 4, Chapter 4 Emission Units. 4.4. Verification of Emission Units Cancellation Report, Appendix 5. (Content) and Appendix 6.3 (Verification of EUCR)
- ETM Chapter 3.3 Verification. Section 3.3.6 and 3.3.7
- Appendix 1 of ETM will include standardized template in the future revision of the ETM

→ The first deadline submission EURC: 30 April 2025. However:

- Cancellation: By 31 January 2025 or 60 days after the State informs AOs of their total final offsetting requirements for the 2021-2023 period
- Communication in respective Eligible Emissions Units Program registry (or registries) public website(s): By 7 February 2025

→ No template yet

Content of EU CR



→ AO General information



→ Compliance period years reported

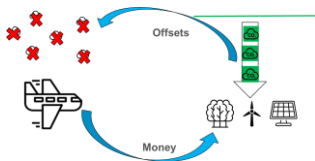


→ AO's total final offsetting requirements (as informed by the State)



→ Total quantity of emissions units cancelled

→ Consolidated identifying information for cancelled emissions units, including details of each batch (quantity, serial no., date, programmes, unit type, host country, methodology, identifier, registry name, identifier of cancelling account)



Content of EUCR

Table A5-7. Emissions Unit Cancellation Report from aeroplane operator to State

<i>Field #</i>	<i>Data Field</i>	<i>Details</i>
Field 1	Aeroplane operator information	1.a Name of aeroplane operator 1.b Detailed contact information of aeroplane operator 1.c Name of a point of contact 1.d Unique identifier by which an aeroplane operator is attributed to a State, in accordance with Part II, Chapter 1, 1.2.4 1.e State
Field 2	Compliance period years reported	2. Year(s) in the reported compliance period for which offsetting requirements are reconciled in this report
Field 3	Aeroplane operator's total final offsetting requirements	3. Aeroplane operator's total final offsetting requirements (in tonnes), as informed by the State

Content of EU CR

<i>Field #</i>	<i>Data Field</i>	<i>Details</i>
Field 4	Total quantity of emissions units cancelled	4. Total quantity of emissions units cancelled to reconcile the total final offsetting requirements in Field 3
Field 5	Consolidated identifying information for cancelled emissions units	<p>For each batch of cancelled emissions units (<i>batch</i> defined as a contiguous quantity of serialized emissions units), identify the following:</p> <p>5.a Quantity of emissions units cancelled;</p> <p>5.b Start of serial numbers;</p> <p>5.c End of serial numbers;</p> <p>5.d Date of cancellation;</p> <p>5.e Eligible emissions unit programme;</p> <p>5.f Unit type;</p> <p>5.g Host country;</p> <p>5.h Methodology¹;</p> <p>5.i Demonstration of unit date eligibility;</p> <p>5.j Programme-designated registry name;</p> <p>5.k Unique identifier for registry account to which the batch was cancelled;</p> <p>5.l Aeroplane operator in whose name the unit was cancelled; and</p> <p>5.m The unique identifier for the registry account from which the cancellation was initiated.</p>

CORSIA: Technical Challenges for CABs & VBs

MRV and FUMMs

Carbon Offsetting

Cancellation of CORSIA EEU's



Offsetting Requirements

- Aeroplane operators purchase offsets (carbon credits) to meet their offsetting requirements
- Eligible units are sold on registries that have been vetted by ICAO's Technical Advisory Board and approved by the ICAO Council
- Accredited VVBs must verify Eligible Unit Cancellation Reports
- ICAO's CORSIA EEU document¹ lists programs that can supply Eligible Emissions Units



ICAO

INTERNATIONAL CIVIL AVIATION ORGANIZATION

ICAO document

CORSIA Eligible Emissions Units



Verification of Eligible Emissions Units

- The SARP defines objectives when verifying an Emissions Unit Cancellation Report
- a. The Airplane Operator (AO) has accurately reported cancellations of Eligible Emissions Units
 - b. The stated number of emissions units is sufficient for meeting the AO's total final offsetting requirements, after accounting for the use of CORSIA eligible fuels, and the AO can demonstrate sole “right of use” to the units
 - c. the EEU's have been cancelled by the AO and have not been used by the AO to offset any other emissions

How Are VVBs To Achieve the Objectives?

- Begin with strategic analysis to understand the AO's:
 - process for identifying the required number of emissions units to comply with an offsetting requirement
 - processes to ensure eligibility of emissions units
 - internal documented procedures to communicate with CORSIA Eligible Emissions Unit program registries who publish EEU cancellation information
 - procedures for ensuring that the AO has sole ownership of emission units
 - procedures for ensuring that cancelled units are used only once by the AO
- Understand who does what through process and organization chart reviews

Appropriate Verification Techniques/1

- Inquiry: review of documents prepared by the AO, including:
 - procedures
 - internal audit reports
 - AO annual report
 - AO website (and other locations) for marketing information where the AO may make environmental claims (such as in-flight magazines)

Appropriate Verification Techniques/2

- Apply procedures to test whether the organizational structure is sufficiently robust to identify where each relevant data item can be found

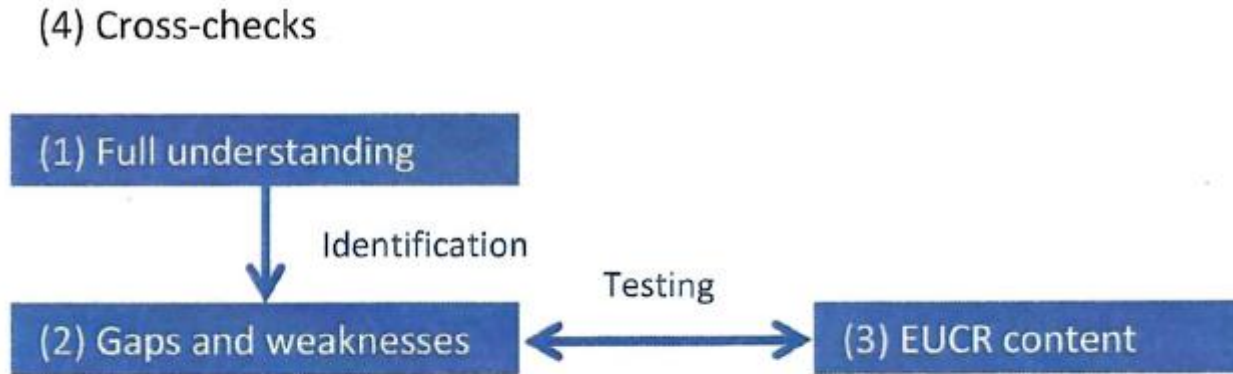


Figure 3-10. Overview of the generic verification process of the EUCR

Verifying Against Objective “a”

- a) Cancellations are made in the name of the AO
 - 1. For each batch, review and confirm that the entity name contained in Field 5.I of of Table A5-7 (Appendix 5 of the SARP) is the same as the name of the AO provided in Field 1.a
 - 2. On an emissions unit program registry public website, for each corresponding batch contained in an EUCR, cross-check and confirm whether a reported batch of serial numbers are cancelled in the name of the AO

Verifying Against Objective “a”

- b) All reported cancelled units are CORSIA Eligible Emissions Units
 - 1. For each batch, review and confirm entries in Field 5.e “Eligible Emissions Unit Program” and 5.l “Demonstration of unit data eligibility” are within the parameters of unit data eligibility
 - 2. Review and cross-check, for each batch, entries made in Field 5.e and 5.i of the EUCR and the corresponding batch of cancelled units on the relevant emissions unit program registry public website

Verifying Against Objective “a”

- c) Reported emissions units have been cancelled in a CORSIA Eligible Emissions Unit program registry
 - 1. For each batch of the same emissions unit program, review and confirm that the “Program-designated registry name” in Field 5.j matches that found on the website or program documentation of the CORSIA EEU program identified in Field 5

Verifying Against Objective “a”

- d) Cancellation status of the units is as per the requirements of SARP
 - 1. Review program documentation for each respective emissions unit program registry used by an AO to identify which option offered by a registry is consistent with “cancellation” and not just transfer to another registry
 - 2. Once the relevant cancellation status per program registry has been identified, the verifier should review and confirm that reported cancelled units have been cancelled in accordance with the relevant option

Verifying Against Objective “b”

- a) Sufficient quantity of CORSIA EEU's have been cancelled
 - 1. Review and confirm that the total quantity of CORSIA EEU's cancelled across all batches contained in Field 5 equals the total quantity of cancelled emissions units in Field 4
 - 2. Review and confirm that the AO's total final offsetting requirement equals the total quantity of emissions units cancelled in Field 4

Verifying Against Objective “b”

b) Demonstration of sole right of use to cancelled emissions units

1. For cancelled units reported in an EUCR, review contractual evidence and confirm the AO’s sole right to cancel the unit to meet its requirements under CORSIA, without encumbrance or restriction of any kind in either the instrument itself or any of its underlying attributes

Verifying Against Objective “c”

a) Risk determination

1. During the risk analysis step, the verifier should develop an initial determination of whether a risk of “dual use” exists under both another regulatory program and under a non-regulatory/voluntary program
2. During the verification, the verifier should revisit the risk determination and identify whether any changes have occurred since the original determination, and update the determination accordingly
3. If no risk exists under both categories, then no further verification activities are required; the verifier should justify a “no-risk” determination
4. If a risk exists under either/both categories, the verifier should conduct additional activities

Verifying Against Objective “c”

→ Additional activities where risks remain:

1. Regulatory program review
2. Non-regulatory program review

→ The purpose of the additional review is to ensure that the AO has not made any other claims to reduce emissions, such as a “carbon neutrality” claim, or used the same EEUs in another carbon pricing program

Fuel Use Monitoring Methods

- Verification objectives include:
 - The correct application of the FUMMs
 - Available data make the chosen FUMM appropriate
 - Continued eligibility to use CERT, if applicable
- The verifier may use different FUMMs as cross-checks

Review of Fuel Use Monitoring Methods

- CORSIA allows aeroplane operators (AOs) to select from among five FUMMs:
 - Method A
 - Method B
 - Block-off / Block-on
 - Uplift
 - Fuel allocation with block hour
- The same method must be used for all aircraft of the same type

Method A: Description

- Requires data from the flight under consideration (N) and from the subsequent flight (N+1) (Flight 2 = “N”)

Method A

Flight	Uplift	Fuel After Uplift	Block-off	Block-on	Block hour
1	25.8	33.1	33.1	4.1	2.5
2	44.5	48.5	48.5	19.3	2.6
3	17.6	36.8	36.7	2.8	3.1

Method A: Calculation

→ Fuel use is calculated according to the following formula:

→
$$F_N = T_N - T_{N+1} + U_{N+1}$$

→ Where T = Fuel in **T**ank after Uplift and U = **U**plifted fuel

→ Calculate the fuel use based on the data provided in the previous slide

Method A: Fuel Use

→		T_N	48.5
→	minus	T_{N+1}	36.8
→	plus	U_{N+1}	17.6
→	equals	F_N	29.3

Method B: Description

→ Requires data from the flight under consideration (N) and from the prior flight (N-1) (Flight 2 = “N”)

Method B

Flight	Uplift	Fuel After Uplift	Block-off	Block-on	Block hour
1	25.8	33.1	33.1	4.1	2.5
2	44.5	48.5	48.5	19.3	2.6
3	17.6	36.8	36.7	2.8	3.1

Method B: Calculation

→ Fuel use is calculated according to the following formula:

→
$$F_N = R_{N-1} - R_N + U_N$$

→ Where **R** = Fuel **R**emaining in Tank at block-on and **U** = **U**plifted fuel

→ Calculate the fuel use based on the data provided in the previous slide

Method B: Fuel Use

→		R_{N-1}	4.1
→	minus	R_N	19.3
→	plus	U_N	44.5
→	equals	F_N	29.3

Block-off/Block-on: Description

- Measures difference in fuel at time of block-off of the flight under consideration (N) and at block-on of the same flight

Block-off/Block-on					
Flight	Uplift	Fuel After Uplift	Block-off	Block-on	Block hour
1	25.8	33.1	33.1	4.1	2.5
2	44.5	48.5	48.5	19.3	2.6
3	17.6	36.8	36.7	2.8	3.1

Block-off/Block-on: Calculation

→ Fuel use is calculated according to the following formula:

→
$$F_N = T_N - R_N$$

→ Where **T** = Fuel in **T**ank after Uplift and **R** = Fuel **R**emaining in Tank at block-on

→ Calculate the fuel use based on the data provided in the previous slide

Block-off/Block-on: Fuel Use

→		T_N	48.5
→	minus	R_N	19.3
→	equals	F_N	29.2

Fuel Uplift: Description

→ Measures of fuel uplifted to the flight under consideration (N)

Uplift

Flight	Uplift	Fuel After Uplift	Block-off	Block-on	Block hour
1	25.8	33.1	33.1	4.1	2.5
2	44.5	48.5	48.5	19.3	2.6
3	17.6	36.8	36.7	2.8	3.1

Fuel Uplift: Calculation

→ Fuel use is calculated according to the following formula:

→
$$F_N = U_N$$

→ Where U = **U**plifted fuel

→ Calculate the fuel use based on the data provided in the previous slide

Fuel Uplift: Fuel Use

→ U_N 44.5

→ equals F_N 44.5

→ What to do if a flight has no fuel uplift:

- The amount of fuel uplifted for the subsequent flight under consideration will be determined by distributing the fuel to both flights in proportion to the block time of both flights
- The same method can be used for more than one flight that does not include an uplift

Fuel Allocation with Block Hour: Description

- Requires data not only from the flight under consideration (N) but also data from other flights of the same aeroplane type
- It requires the calculation of the “Average Fuel Burn Ratio” of the aircraft type using the method

$$\text{AFBR} = \frac{\sum_N U}{\sum BH}$$

(The amount of fuel uplifted for the aircraft type)
(Total block hours flown by the aircraft type)

Fuel Allocation with Block Hour: Description

→ Data from the entire calendar year's worth of flights should be included in the AFBR; this table is simplified for illustration

Fuel Allocation with Block Hour

Flight	Uplift	Fuel After Uplift	Block-off	Block-on	Block hour
1	25.8	33.1	33.1	4.1	2.5
2	44.5	48.5	48.5	19.3	2.6
3	17.6	36.8	36.7	2.8	3.1

Fuel Allocation with Block Hour: Calculation

→ First calculate the AFBR according to the following formula:

$$AFBR = \frac{\sum_N U}{\sum BH}$$

→ Then calculate the fuel used for each flight based on the following equation:

$$F_N = AFBR * BH_N$$

Fuel Allocation with Block Hour: Fuel Use

→ AFBR Calculation:

$$\begin{array}{r} \rightarrow 25.8 + 44.5 + 17.6 = 87.9 \\ \hline 2.5 + 2.6 + 3.1 = 8.2 \end{array} \quad 10.72$$

→ Fuel use calculation (by flights):

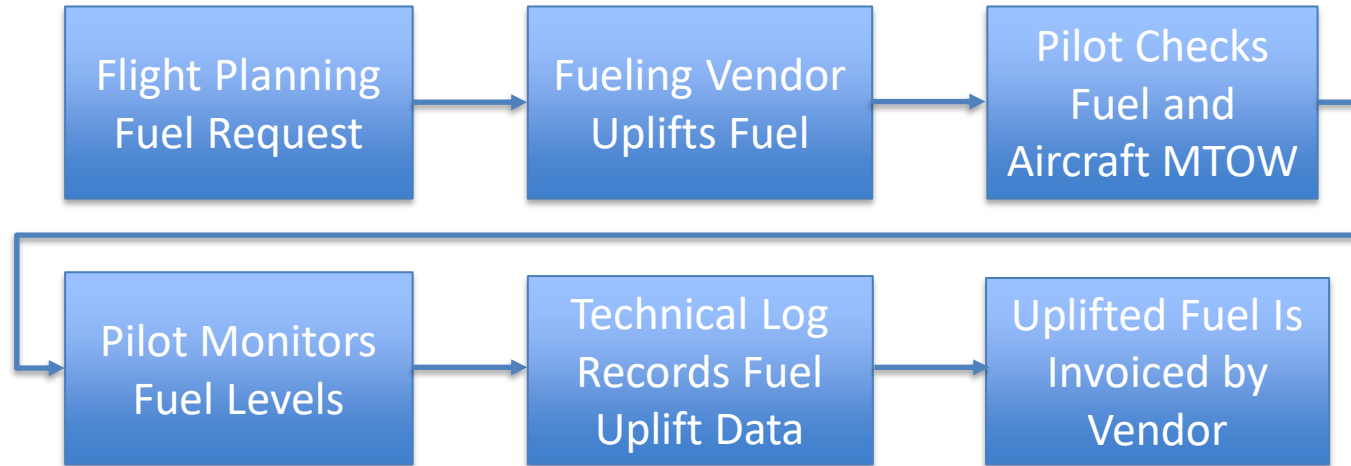
$$\rightarrow 1 = 2.5 \times 10.72 = 26.8$$

$$\rightarrow 2 = 2.6 \times 10.72 = 27.9$$

$$\rightarrow 3 = 3.1 \times 10.72 = 33.2$$

Flow of Fuel Uplift Data

→ (Simplified Process)



Implications for AB Technical Assessors

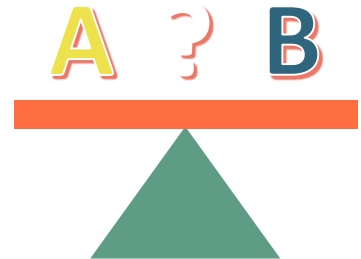
- AB Technical Assessors need to be sufficiently competent in CORSIA requirements and the general operation of carbon credit registries to provide adequate oversight of VVB personnel

Verifying Data Using Analytical Procedures

Checking Data from the AO

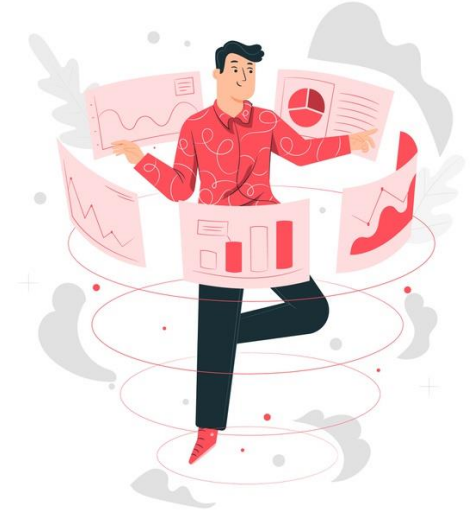
High-Level Analytical Procedures in 14064-3

- High-level analytical procedures are similar to crosschecks described in 1st edition of ISO 14064-3 (2006)
- The idea is to compare elements in the GHG statement with expected results from industry benchmarks or prior reported data
- The design of “analytical procedures” is a requirement in ISO 14064-3:2019 (6.1.3); their use as a risk assessment tool in 6.1.2.4 is optional



Use of Analytical Procedures

- According to the ETM, 3.3.5.4:
 - “It is absolutely essential that the VB have a sufficient understanding and also practical experience in applying analytical procedures to large dataset”
 - “Verifiers should develop a set of standard cross checks already implemented in spreadsheet software”



Recommended Data Checks

- Calculation of average fuel burns
- Maximum tank capacity and uplift per flight
- Average fuel burn according to airplane age
- Calculation of average densities by geographies
- Expected fuel burn for data gaps in comparison to estimated emissions
- Tracking of airplane registrations
- Use of data from air navigation service providers
- Checks to ensure the correct set of State pairs for offsetting compliance



Checks of Primary Data

- Verifiers should check for abnormal or incorrect primary data, such as:
 - Unreasonably low average fuel burns
 - Technically infeasible fuel uplifts
 - Questionably long aircraft down times



VVB Software Tools for Data Checking

- The next several slides provide an example of an Excel spreadsheet developed to perform “analytical procedures” on large AO data sets provided to the VVB as a spreadsheet
- The VVB will develop analytical procedures and import the AO data into them
- The VVB then performs recommended data checks
- The following slide shows flight data and a check on whether all flights are to international destinations
 - Note that in this illustration IATA airport codes were used

Date	Flight (FPL Item 7)	Airplane Type (ICAO)	Origin (IATA)	Origin Country	Destination (IATA)	Destination Country	Internat'l Flight ? (yes/no)
Tuesday, January 1, 2019	ACM285	B738	SEA	USA	YXY	Canada	Yes
Wednesday, January 2, 2019	ACM286	B738	YXY	Canada	SEA	USA	Yes
Wednesday, January 2, 2019	ACM157	B738	SEA	USA	MEX	Mexico	Yes
Thursday, January 3, 2019	ACM2157	B738	MEX	Mexico	MTY	Mexico	No
Thursday, January 3, 2019	ACM2158	B738	MTY	Mexico	MEX	Mexico	No
Friday, January 4, 2019	ACM158	B738	MEX	Mexico	SEA	USA	Yes
Friday, January 4, 2019	ACM159	B738	SEA	USA	MEX	Mexico	Yes

How the Destination Check Works

- The VVB has created a separate tab populated with airport codes
- The spreadsheet formulae use the “**VLOOKUP**” function to populate the origin and destination “**Country**” columns

Origin Country	Destination	Destination Country
=IFERROR((VLOOKUP(C5,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")	KMN	=IFERROR((VLOOKUP(E5,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")
=IFERROR((VLOOKUP(C6,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")	PRC	=IFERROR((VLOOKUP(E6,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")
=IFERROR((VLOOKUP(C7,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")	KMN	=IFERROR((VLOOKUP(E7,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")
=IFERROR((VLOOKUP(C8,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")	KMN	=IFERROR((VLOOKUP(E8,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")
=IFERROR((VLOOKUP(C9,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")	MSK	=IFERROR((VLOOKUP(E9,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")
=IFERROR((VLOOKUP(C10,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")	BQZ	=IFERROR((VLOOKUP(E10,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")
=IFERROR((VLOOKUP(C11,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")	KMN	=IFERROR((VLOOKUP(E11,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")
=IFERROR((VLOOKUP(C12,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")	KMN	=IFERROR((VLOOKUP(E12,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")
=IFERROR((VLOOKUP(C13,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")	DVL	=IFERROR((VLOOKUP(E13,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")
=IFERROR((VLOOKUP(C14,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")	KMN	=IFERROR((VLOOKUP(E14,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")
=IFERROR((VLOOKUP(C15,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")	AZK	=IFERROR((VLOOKUP(E15,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")
=IFERROR((VLOOKUP(C16,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")	KMN	=IFERROR((VLOOKUP(E16,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")
=IFERROR((VLOOKUP(C17,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")	PRC	=IFERROR((VLOOKUP(E17,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")
=IFERROR((VLOOKUP(C18,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")	SAX	=IFERROR((VLOOKUP(E18,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")
=IFERROR((VLOOKUP(C19,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")	KMN	=IFERROR((VLOOKUP(E19,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")
=IFERROR((VLOOKUP(C20,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")	AZK	=IFERROR((VLOOKUP(E20,'Airport Codes'!\$A\$4:\$D\$2038,4,FALSE)), "")

Airport Pair Check

Date	(All)
------	-------

Origin	Origin Country	Destination	Destination Country	Count of Destination
AZK		KMN	Congo (ROC)	2
BQZ		KMN	Congo (ROC)	1
BRC	Argentina	KMN	Congo (ROC)	1
DVL	USA	KMN	Congo (ROC)	1
KMN	Congo (ROC)	AZK		2
KMN	Congo (ROC)	BQZ		1
KMN	Congo (ROC)	DVL	USA	1
KMN	Congo (ROC)	LDF		1
KMN	Congo (ROC)	MSK		2
KMN	Congo (ROC)	PRC		2
KMN	Congo (ROC)	SAX		1
LDF		KMN	Congo (ROC)	1
MSK		KMN	Congo (ROC)	2
PRC		KMN	Congo (ROC)	2
SAX		KMN	Congo (ROC)	1
(blank)	(blank)	(blank)	(blank)	
Grand Total				21

Airport Codes

IATA code	ICAO Code	City
JAA		Jalalabad
KBL		Kabul - Khwaja Rawash Airport
URZ		Uruzgan
TIA		Tirana - Rinas
AAE		Annaba
ALG		Algiers, Houari Boumediene Airport
CZL		Constantine
GJL		Jijel
ORN		Oran (Ouahran)
PPG		Pago Pago
ALV		Andorra La Vella - Heliport
BUG		Benguela
CAB		Cabinda

Comparing Countries

- The formulae in this column return a “yes” or a “no” to the international flight question, and color code the “no” response in red for easier identification

Internat'l Flight ? (yes/no)
Yes
Yes
Yes
No
No
Yes
Yes

Fuel Uplift Data Imported from the AO

- In the following slide, fuel uplift data from the AO are imported
- The fuel density column shows the default 0.8 kg/L value; many AOs will supply actual calculated fuel densities from fueling invoices

- The fuel tank capacity numbers are imported by the VVB from a Lookup table

Aircraft Type	Tank Units	Fuel Cap.	In KG
A319	Liters	24,210	19,368
A320	Liters	15,590	12,472
B736	US Gallons	6,875	20,818
B737	US Gallons	6,875	20,818
B738	US Gallons	6,875	20,818
B763	US Gallons	23,980	72,611

Before fuelling (kg)	Uplifted Volume (L)	Fuel Density (Kg/L)	Uplifted (kg)	Block-off (kg)	Block-on (kg)	Block hour (hours)	Fuel Tank Capacity (kg)
2030	3419	0.8	2735	4765	1940	1.2	12,472
1940	6350	0.8	5080	7020	4418	1	12,472
4418	0	0.8	0	4418	1705	1.1	12,472
2168	6400	0.8	5120	6825	4298	1.1	12,472
4298	0	0.8	0	4298	1748	1.1	12,472
1748	11760	0.8	9408	11956	3350	4.9	19,368
3350	10717	0.8	8573	11923	1875	4.9	19,368
1875	3400	0.8	2720	4595	1995	1	19,368
1995	8475	0.8	6780	9680	2440	3.5	19,368
2440	10224	0.8	8179	10619	2700	3.5	19,368
2700	3400	0.8	2720	5420	2949	1.1	19,368
2250	6686	0.8	5348	7598	2325	2.2	20,818
2325	8760	0.8	7008	9333	4333	2.2	20,818
4333	14863	0.8	11890	16223	3960	4.9	20,818

Fuel Checks Related to Flight Data

- The first column calculates fuel burn per hour
 - The formula is $(M7 - N7) / 1000 / O7$ where:
 - **M** = Block-off fuel in kg
 - **N** = Block-on fuel in kg
 - “1000” converts kg to tons
 - “**O7**” = the block hours from flight operations data

Fuel burn (t)/hour (N-M/1000)	Outside Normalized Average (+/- 10%)	Deviation from Average (N:n...)/n	Block Off Fuel > Tank Capacity (N > FTC)	Block off > In Tank (BF + U > Block Off)	Fuel Consumption (Not < 2.5t nor > 250t)	Fuel Density (< 0.775 - 0.84 > kg/L)
2.4	No	98.48%	False	False	In range	In range
2.6	No	108.85%	False	False	In range	In range
2.5	No	103.18%	False	False	In range	In range
2.3	No	96.10%	False	TRUE	In range	In range
2.3	No	96.98%	False	False	In range	In range
1.8	Yes	73.47%	False	False	In range	In range
2.1	Yes	85.79%	False	False	In range	In range
2.6	No	108.77%	False	False	In range	In range
2.1	Yes	86.54%	False	False	In range	In range
2.3	No	94.65%	False	False	In range	In range
2.2	No	93.97%	False	False	Out of Range	In range
2.4	Yes	100.27%	False	False	In range	In range
2.3	Yes	95.08%	False	False	In range	In range
2.5	Yes	104.70%	False	False	In range	In range

Plausibility Checks on Fuel Data/2

- Fuel burn per hour is calculated
- The VVB calculates a “filtered average” with minimum and maximum values for all the data in the column
- Fuel burn that is $\pm 10\%$ of normal is considered plausible; fuel burn rates that exceed 10% variation should be investigated
- The age of the aircraft should be taken into account as older aircraft were less fuel efficient than newer models

Filtered Average - Column O

Average	2.4
Min	1.8
Max	4.3

Fuel burn (t)/hour (N- M/1000)
2.4
2.6
2.5
2.3
2.3
1.8
2.1
2.6
2.1
2.3
2.2

Fuel burn (t)/hour (N- M/1000)	Outside Normalized Average (+/- 10%)	Deviation from Average (N:n...)/n	Block Off Fuel > Tank Capacity (N > FTC)	Block off > In Tank (BF + U > Block Off)	Fuel Con- sumption (Not < 2.5t nor > 250t)	Fuel Density (< 0.775 - 0.84 > kg/L)
2.4	No	98.48%	False	False	In range	In range
2.6	No	108.85%	False	False	In range	In range
2.5	No	103.18%	False	False	In range	In range
2.3	No	96.10%	False	TRUE	In range	In range
2.3	No	96.98%	False	False	In range	In range
1.8	Yes	73.47%	False	False	In range	In range
2.1	Yes	85.79%	False	False	In range	In range
2.6	No	108.77%	False	False	In range	In range
2.1	Yes	86.54%	False	False	In range	In range
2.3	No	94.65%	False	False	In range	In range
2.2	No	93.97%	False	False	Out of Range	In range
2.4	Yes	100.27%	False	False	In range	In range
2.3	Yes	95.08%	False	False	In range	In range
2.5	Yes	104.70%	False	False	In range	In range

Plausibility Checks on Fuel Data/2

- Block-off fuel should not exceed the capacity of the fuel tanks or the amount of fuel in tanks before uplift + the amount of fuel uplifted
- Per flight fuel consumption should not be $< 2.5 \text{ t}$ nor $> 250 \text{ t}$
- Fuel density should be within the range of 0.775 to 0.84 kg/L

Fuel burn (t)/hour (N-M/1000)	Outside Normalized Average (+/- 10%)	Deviation from Average (N:n...)/n	Block Off Fuel > Tank Capacity (N > FTC)	Block off > In Tank (BF + U > Block Off)	Fuel Consumption (Not < 2.5t nor > 250t)	Fuel Density (< 0.775 - 0.84 > kg/L)
2.4	No	98.48%	False	False	In range	In range
2.6	No	108.85%	False	False	In range	In range
2.5	No	103.18%	False	False	In range	In range
2.3	No	96.10%	False	TRUE	In range	In range
2.3	No	96.98%	False	False	In range	In range
1.8	Yes	73.47%	False	False	In range	In range
2.1	Yes	85.79%	False	False	In range	In range
2.6	No	108.77%	False	False	In range	In range
2.1	Yes	86.54%	False	False	In range	In range
2.3	No	94.65%	False	False	In range	In range
2.2	No	93.97%	False	False	Out of Range	In range
2.4	Yes	100.27%	False	False	In range	In range
2.3	Yes	95.08%	False	False	In range	In range
2.5	Yes	104.70%	False	False	In range	In range

Method A			Method B			Block-off/ Block-on			Fuel Uplift			Fuel Allocation with Block Hour	AFBR	Jet A CO ₂ Emissions Factor	Block-off/ Block-on tCO ₂
						2825									
2602			2602			2602			2419.05			2352	2352	3.16	8222
			2713			2250			2660.95						
						2527									
						2550									
						8606									
10048			10048			10048			10717			9950	2031	3.16	31752
						2600									
						7240									
						7919									
						3170									
						5273									
5000			5000			5000			8760			5569	2531	3.16	15800
						12263									

Fuel Use Monitoring Methods

- The VVB's analytical procedures should provide calculation methods for the five FUMMs
- The AO will only report using a single FUMM, so for any client the alternate columns do not need to be populated with data
- Alternate FUMMs can be used as a cross-check, however
- It can happen that the Average Fuel Burn Rate (per hour) equals the fuel used for that flight

Can you explain the most likely reason for this to occur?

AFBR = Block Hour Duration

→ The flight time was exactly one hour

Fleet and Operations Data

- Flight data verification should include:
 - Comparing the fleet in the ER with the applicable air operator certificate(s)
 - Identifying lease agreements and their impacts
 - Cross-checks with ATC invoices
 - Confirmation of the attribution method to ensure all international flights are accounted for
 - Confirmation that technical exemptions are properly applied
 - Evaluating the completeness and accuracy of the data set

Final Checks

- Checking that CORSIA requirements regarding fuel uplift have been correctly applied (see SARP Part 2, Chapter 2, 2.2.3, and the EMP) to calculate CO₂ emissions:
- $$\text{CO}_2 = \sum \mathbf{M_f} * \mathbf{FCF_f}, \text{ where}$$
 - $\mathbf{M_f}$ = Mass of fuel
 - $\mathbf{FCF_f}$ = Fuel conversion factor (3.16 for Jet-A/Jet-A1; 3.10 for AvGas or Jet B)
- Assessing the AO's handling of data gaps

Advice to Accreditation Body Assessors

The Learning Curve which is
GHG Validation/Verification

GHG Accreditation: Steep Learning Curve

- Establishing a program of validation et verification of environmental information is not a trivial matter
- Investments are required in:
 - the training of personnel
 - the development of policies, procedures, forms, etc.
 - maintaining relationships with programs recognizing the oversight of the accreditation body, such as Verra (Verified Carbon Standard) and others
- Challenges for VVBs are similar

Challenges for Accreditation Bodies

- Competent persons may be difficult to recruit and retain for the evaluation of the work of accredited validation/verification bodies
- It can be difficult to recover the costs associated with the maintenance of the accreditation program from clients using it
- The decision to launch the program should be taken with “eyes wide open” with respect to the commitments required to maintain it



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Your safety is our mission.

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End

Thank you for your attention

Working for quieter and cleaner aviation.

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