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Bhutan Civil Aviation Authority

Aviation Environment Circular
AEC-2026-01

File Ref: *BCAA/DECC/CBIT/2025-26/1233*

Greenhouse Gas (GHG) Reporting for Civil Aviation (IPCC Code: 1.A.3.a)

Issue 01, Revision 00, dated 06 April 2026

1. General

The Circular is issued by the Head of Authority of Bhutan Civil Aviation Authority (BCAA) in line with the section 52 of Civil Aviation Act of Bhutan 2016 to communicate requirements, procedures, and guidance on matters not fully addressed in existing published regulation.

Circulars issued may be permanent or interim in nature, and are intended to ensure continued compliance, standardisation, and the effective implementation aviation environment requirements.

This document shall be designated as the Aviation Environment Circular (AEC), and adherence to its provisions shall be mandatory for all applicable stakeholders.

2. Purpose

This Circular establishes comprehensive technical guidance and regulatory requirements for applicable civil aviation stakeholders (refer to Paragraph 3) regarding the collection, monitoring, and reporting of greenhouse gas (GHG) activity data and the associated GHG emissions arising from civil aviation activities.

The Circular is intended to ensure the consistent, accurate, and timely submission of GHG activity data and associated emissions necessary for the estimation and compilation of GHG emissions for national greenhouse gas inventories and for fulfilling reporting obligations under the United Nations Framework Convention on Climate Change (UNFCCC). The estimation of GHG emissions shall be undertaken in accordance with the methodologies prescribed in the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines, as amended.

Furthermore, this Circular supports the implementation of the Memorandum of Understanding signed between the Department of Environment and Climate Change (DECC) and BCAA, facilitating effective coordination and streamlined institutional arrangements relating to GHG emissions and activity data originating from civil aviation stakeholders.

The scope of this Circular covers GHG emissions falling under the IPCC source categories 1.A.3.a Civil Aviation.

3. Applicability

This Circular applies to the following aviation stakeholders:

- All the aircraft operators (helicopters and aeroplanes) conducting commercial (scheduled and unscheduled) and non-commercial flights particularly those whose activities contribute to national GHG inventories.
- All aviation fuel suppliers.
- Airport ground handling agents managing the chartered flights in Bhutan.

4. Cancellation

This is the first Circular issued on the subject.

5. Related Regulations and References

Civil Aviation Act 2016.
Bhutan Air Navigation Regulations 2021.
National Environment Protection Act of Bhutan 2007.
United Nations Framework Convention on Climate Change (UNFCCC) reporting guidelines.
Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories (2006 and 2019 Refinement Version).

6. Glossary and Acronyms

Activity data: Data on the magnitude of a human activity resulting in emissions or removals taking place during a given period of time (e.g., fuel consumption, flight hours).

Air operator certificate (AOC): A certificate authorizing an operator to carry out specified commercial air transport operations.

Operator: The person, organization or enterprise engaged in or offering to engage in an aircraft operation.

Aviation Fuel Supplier (AFS): Any entity engaged in the supply, distribution, or sale of aviation turbine fuels (ATF).

BCAA: Bhutan Civil Aviation Authority.

DECC: Department of Environment and Climate Change.

Emission Factor (EF): A coefficient that quantifies the emissions or removals of a gas per unit activity. Emission factors are often based on a sample of measurement data, averaged to develop a representative rate of emission for a given activity level under a given set of operating conditions.

Emissions: The release of greenhouse gases and/or their precursors into the atmosphere over a specified area and period of time. (UNFCCC Article 1.4)

Fuel uplift. Measurement of fuel provided by the fuel supplier, as documented in the fuel delivery notes or invoices for each flight (in litre).

Greenhouse Gases (GHG): Gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of radiation emitted by the Earth's surface, by the atmosphere itself, and by clouds. This property causes the greenhouse effect. Water vapour (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH^4) and ozone (O_3) are the primary GHGs in the Earth's atmosphere. Humanmade GHGs include sulphur hexafluoride (SF_6), hydrofluorocarbons (HFCs), chlorofluorocarbons (CFCs) and perfluorocarbons (PFCs); several of these are also O_3-depleting (and are regulated under the Montreal Protocol). *Source: Glossary of the Working Group I contribution to the Sixth Assessment Report (page 2233)*

IPCC: Intergovernmental Panel on Climate Change.

LTO Cycles: landing/take-off cycles

MRV: Monitoring, Reporting and Verification.

Quality Assurance: Quality Assurance (QA) activities include a planned system of review procedures conducted by personnel not directly involved in the inventory compilation/development process to verify that data quality objectives were met, ensure that the inventory represents the best possible estimate of emissions and sinks given the current state of scientific knowledge and data available, and support the effectiveness of the quality control (QC) programme.

Quality Control: Quality Control (QC) is a system of routine technical activities, to measure and control the quality of the inventory as it is being developed. The QC system is designed to:

i. Provide routine and consistent checks to ensure data integrity, correctness, and completeness;
ii. Identify and address errors and omissions;
iii. Document and archive inventory material and record all QC activities.

QC activities include general methods such as accuracy checks on data acquisition and calculations and the use of approved standardised procedures for emission calculations, measurements, estimating uncertainties, archiving information and reporting. More detailed QC activities include technical reviews of source categories, activity and emission factor data, and methods.

Reporting period. A period which commences on 1 January and finishes on 31 December in a given year for which an aircraft operator, Aviation Fuel Suppliers, Ground Handling Agents or State reports required information. The flight departure time (UTC) determines which reporting period a flight belongs to.

UNFCCC: United Nations Framework Convention on Climate Change.

7. The GHG Activity Data and Emission Submission Requirements

7.1 Institutional arrangements, data scope and boundaries

Stakeholders shall establish clearly defined organizational and operational boundaries, including the development and implementation of procedures in accordance with this Circular and applicable guidance materials. Stakeholders shall also implement appropriate systems to ensure the effective collection, monitoring, verification, and reporting of greenhouse gas (GHG) activity data and associated emissions. The table below outlines the roles and responsibilities of all applicable civil aviation stakeholders.

Stakeholders	Responsibilities
Bhutan Civil Aviation Authority	Responsible for coordinating, collecting, verifying, and reporting civil aviation GHG emissions and activity data to the DECC in accordance with the Memorandum of Understanding.
Aircraft Operators (AOC Holders)	Shall maintain and submit fuel consumption data segregated between domestic and international flights, along with the number of Landing and Take-Off (LTO) cycles, where applicable, in accordance with the definitions for International Aviation (International Bunkers) and Domestic Aviation provided under the 2006 Guidelines issued by the Intergovernmental Panel on Climate Change, as amended. Fuel consumption data for international flights shall exclude fuel uplifted at airports located outside Bhutan. Operators shall also calculate their organizational GHG emissions in accordance with this Circular and the approved GHG Reporting Manual.
Aviation Fuel Suppliers	Shall maintain records of aviation turbine fuel sales and submit the required data to BCAA in accordance with this Circular and the approved GHG Reporting Manual, ensuring that data is segregated by individual aircraft operators. The organization shall also calculate its organizational GHG emissions in accordance with this Circular and the approved GHG Reporting Manual.
Ground Handling Agents	Shall maintain and submit records of aviation turbine fuel uplifted by chartered aircraft, segregated between domestic and international flights, in accordance with the definitions for International Aviation (International Bunkers) and Domestic Aviation under the 2006 IPCC Guidelines, as amended. The organization shall also calculate its organizational GHG emissions in accordance with this Circular and the approved GHG Reporting Manual.

7.2 Reporting Period and Frequency

7.2.1. *Annual reporting:* All applicable stakeholders, as specified in Paragraph 3, shall submit the GHG activity data, including the corresponding emissions, in accordance with the approved format and the organization's approved procedures, on an annual basis for the preceding calendar year **(1 January to 31 December)**.

7.2.2. *Submission Deadline:* The annual GHG activity data and associated emissions report shall be submitted to the BCAA no later than **31 July** of the subsequent year.

7.2.3. *Reporting Upon Request:* Notwithstanding the annual submission requirement, stakeholders shall provide GHG activity data and associated emissions information upon request by the BCAA.

7.3 Reporting Format and Submission Templates

7.3.1 *Electronic Submission:* GHG activity data and the corresponding emissions, following verification and formal endorsement by the Accountable Manager or Chief Executive Officer (CEO) of the respective stakeholder, shall be submitted electronically to the BCAA via email and uploaded to the designated Google Drive folder maintained by the BCAA.

7.3.2 *Standardized Templates:* Stakeholders shall use the official GHG Activity Data Reporting Template published on the BCAA website for the preparation and submission of the required data.

7.4 Responsibilities of the stakeholders

All stakeholders shall bear ultimate responsibility for the accuracy, completeness, and timely submission of the required GHG activity data and associated emissions. To ensure effective compliance with this Circular, each applicable stakeholder shall:

a) *Establishment of GHG Reporting Manual (GHG Monitoring Plan):*
Develop, implement, and maintain a documented GHG Reporting Manual for the collection, aggregation, management, calculation, and reporting of all required GHG activity data and emissions. Such procedures shall be aligned with the methodologies prescribed in Circular, the 2006 IPCC Guidelines (as amended), and any other applicable regulatory requirements. The GHG Reporting Manual shall be submitted to and approved by the BCAA and shall conform to the format specified in Appendix I of this Circular.

b) *Data Integrity and Record Keeping:*
Establish and maintain robust systems and internal controls to ensure the accuracy, integrity, traceability, and reliability of all collected data, including appropriate record-keeping practices, data validation processes, and archival systems.

c) *Resource Allocation:*
Allocate adequate human, technical, and financial resources to support the effective implementation of GHG data collection, monitoring, calculation, and reporting requirements, including timely submission to the BCAA.

d) *Training and Competency:*
Ensure that personnel involved in the collection, processing, calculation, and reporting of GHG activity data are appropriately trained, competent, and fully aware of their respective responsibilities.

e) *Appointment of Focal Point:*
Each applicable stakeholder shall designate a primary and alternate Focal Point, duly approved by the organization's management. The names and contact details of the designated Focal Points shall be submitted to the BCAA for approval and shall be updated promptly in the event of any changes.

The designated Focal Point shall serve as the official liaison between the stakeholder and the BCAA for all matters relating to GHG activity data and emissions reporting including any matters pertaining to the aviation environment. The responsibilities of the Focal Point shall include, but not be limited to:

- ✓ Ensuring the accurate and timely submission of all required GHG data and reports to the BCAA;
- ✓ Coordinating internally within the organization to facilitate data collection and compliance;
- ✓ Responding to queries, requests for clarification, or data validation requirements issued by the BCAA or other competent authorities; and
- ✓ Monitoring and ensuring compliance with updates or amendments to this Circular and related regulatory provisions.

8. Methodologies For Data Collection And Monitoring

Stakeholders shall collect and monitor GHG activity data using verifiable and traceable primary data sources consistent with this Circular and the 2006 IPCC Guidelines (as amended).

8.1 Fuel Consumption Data:

Fuel consumption data shall be derived from primary source documentation, including but not limited to:

- ✓ Fuel uplift invoices or delivery receipts;
- ✓ Fuel reconciliation records;
- ✓ Aircraft technical logbooks;
- ✓ Recorded fuel density values at the time of uplift or delivery.

8.2 Flight and Operational Data (Where Applicable):

Where required for emissions calculation or segregation between domestic and international operations, flight data shall be obtained from:

- ✓ Operational flight plans;
- ✓ Aircraft technical logbooks;
- ✓ Records of departure and arrival aerodromes;
- ✓ Flight hours and block hours.

9. Quality Assurance And Quality Control (QA/QC)

All the applicable stakeholders shall establish and implement comprehensive Quality Assurance and Quality Control (QA/QC) procedures to ensure the completeness, consistency, accuracy, transparency, and reliability of GHG activity data and associated emissions.

The QA/QC framework shall include, but not be limited to, the following:

a) *Data Collection Procedures:*
Documented procedures governing data collection, recording, entry, storage, retention, and archival systems to ensure traceability and data integrity.

b) *Internal Review and Verification:*
Systematic internal review of collected data by the designated Focal Point or responsible personnel. All GHG activity data and emissions reports submitted to the BCAA shall be verified and formally endorsed by the Accountable Manager or Chief Executive Officer (CEO).

c) *Cross-Checks and Data Validation:*
Implementation of appropriate reconciliation and validation mechanisms to identify anomalies, inconsistencies, outliers, or missing data (e.g., fuel uplift data against flight hours for aircraft operators; total fuel supplied versus total fuel received for aviation fuel suppliers).

d) *Error Identification and Correction:*
Clearly defined procedures for the identification, documentation, correction, and tracking of data errors. All corrections shall be transparent, justified, and auditable.

e) *Record Keeping and Retention:*
Stakeholders shall maintain comprehensive and traceable records of all raw data, calculations, methodologies, assumptions, and supporting documentation used in the preparation of GHG activity data and emissions reports for a minimum period of ten (10) years, or as otherwise specified by the BCAA.

10. Compliance And Enforcement

10.1 Regulatory Oversight

The BCAA shall conduct oversight activities to verify compliance with the requirements of this Circular. Such oversight may include, but is not limited to:

- ✓ Review of submitted GHG activity data and emissions reports;
- ✓ Examination of supporting documentation and source records;
- ✓ Verification of monitoring methodologies and QA/QC procedures;
- ✓ On-site inspections and audits, where deemed necessary; and
- ✓ Requests for clarification, corrective actions, or resubmission of data.

Stakeholders shall provide full cooperation and make available all relevant records, systems, and personnel necessary to facilitate regulatory oversight activities.

10.2 Non-Compliance:

Failure to comply with the GHG data submission requirements, including obligations relating to accuracy, completeness, and timeliness, may result in regulatory action, which may include:

- ✓ Issuance of formal notices of non-compliance or warnings;
- ✓ Imposition of administrative sanctions or penalties, as determined by the Head of the Authority, commensurate with the nature and severity of the non-compliance; and
- ✓ Suspension, limitation, or revocation of operating licences, certificates, approvals, authorizations, or other aviation documents, in cases of serious or repeated non-compliance.

10.3 Corrective Actions:

Stakeholders identified as non-compliant shall implement appropriate corrective actions within a timeframe specified by the BCAA and shall provide evidence of effective implementation for review and acceptance by the Authority.

11. Guidance And Support

11.1 BCAA Website:

The Aviation Environment Circular (AEC), prescribed reporting templates, and any related guidance materials shall be made available on the official website of the BCAA.

11.2 Workshops and Training:

The BCAA may conduct workshops, briefings, or training sessions, as deemed necessary, to facilitate stakeholders' understanding and effective implementation of the requirements of this Circular.

11.3 Contact Information:

For any queries or requests for clarification concerning this Circular, stakeholders may contact the Airworthiness Section, BCAA.

12. Effective Date

This Circular shall come into effect from 06 April 2026.

BHUTAN CIVIL AVIATION AUTHORITY
PARO
BHUTAN

Head of Authority

Bhutan Civil Aviation Authority

DIRECTOR GENERAL
Bhutan Civil Aviation Authority
Paro Bhutan

Appendix I: Standard Structure for GHG Reporting Manual

The GHG Reporting Manual shall be developed by each applicable stakeholder in accordance with this Circular and submitted to the BCAA for approval. The Manual shall, at a minimum, be structured as follows:

i. Document Control Requirements:

- ✓ Header (on each page)
- ✓ Organization Logo
- ✓ Title of the Manual
- ✓ Chapter / Section Title
- ✓ Page Number
- ✓ Footer (on each page)
- ✓ Issue Number
- ✓ Revision Number
- ✓ Date of Issue / Revision
- ✓ Title of Document

ii. Format of the Manual

- PART 0 – GENERAL
  - Cover Page
    - Name of Organization
    - Document Title
    - Issue and Revision Number
    - Effective Date
  - Foreword
    - Statement of commitment to compliance with the Aviation Environment Circular (AEC).
    - Signed by the Chief Executive Officer (CEO) or Accountable Manager (AM).
  - Distribution List
    - The Manual shall be distributed, at a minimum, to:
      - ❖ Chief Executive Officer (CEO)/Accountable Manager (AM)
      - ❖ Heads of Department
      - ❖ Company Library / Document Control
      - ❖ Bhutan Civil Aviation Authority (BCAA)
  - Record of Revisions / Amendments
    - Revision Number
    - Date of Revision
    - Description of Amendment
    - Amendment entered by
  - List of Effective Pages (LEP)
    - Page Number
    - Revision Status
    - Effective Date

Prepared by: _____

Reviewed by: _____

Approved by: _____

- Table of Contents
  - Comprehensive listing of sections, subsections, and appendices with page numbers.

➢ PART 1 – GHG MONITORING AND REPORTING FRAMEWORK

- Description of Organization and Activities
  - Overview of operations
  - Scope of activities relevant to GHG emissions
  - Organizational structure related to GHG data management
- GHG Focal Point Nomination
  - Appointment of Primary and Alternate GHG Focal Points
  - Roles and Responsibilities
  - Procedure for notification of changes to the BCAA
- GHG Data Collection and Monitoring Procedures
  - Data sources and methodologies
  - Fuel consumption data procedures
  - Flight and operational data procedures (where applicable)
  - Monitoring systems and controls
  - Use of prescribed GHG Reporting Template
- Reporting Period and Frequency
  - Annual reporting cycle
  - Internal submission timelines
  - Verification and endorsement procedures prior to submission to BCAA
- Quality Assurance and Quality Control (QA/QC) Procedures
  - Internal review mechanisms
  - Data validation and cross-check procedures
  - Error identification and correction process
- Record Retention
  - Data storage systems
  - Archival procedures
  - Retention period in accordance with this Circular